GOOD PRACTICE GUIDELINES

Scaffolding in New Zealand

HSWA

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New Zealand Government

WORKSAFE NEW ZEALAND | MAHI HAUMARU AOTEAROA

These guidelines offer advice on the safe design, use, and maintenance of scaffolding.

ACKNOWLEDGEMENTS

WorkSafe New Zealand would like to acknowledge and thank the stakeholders who have contributed to the development of this guidance.

These guidelines are based on the Best Practice Guidelines for Scaffolding in New Zealand 2009 published by Scaffolding, Access, and Rigging New Zealand Inc (SARNZ).

SCAFFOLDING IN NEW ZEALAND KEY POINTS:

Duty holders have responsibilities under the Health and Safety at Work Act 2015.

Duties under the Health and Safety in Employment Regulations 1995 still apply.

Ensure scaffolding is fit for purpose and meets the needs of all users.

PPE should be used at all times.

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INTRODUCTION

IN THIS SECTION:

These guidelines offer advice for keeping workers safe when erecting, dismantling and working on scaffolding. They also provide guidance on how to meet the requirements of the Health and Safety at Work Act 2015, and the Health and Safety in Employment Regulations 1995.

1.1 SCOPE

These guidelines are for persons conducting a business or undertaking (PCBUs), workers, upstream PCBUs (see Section 2, Roles and responsibilities), and other people involved in scaffolding work.

All work involving scaffolding must comply with the requirements of the Health and Safety at Work Act 2015 (HSWA) and all relevant regulations, including the Health and Safety in Employment Regulations 1995 (HSE Regulations) and the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016 (GRWM Regulations). For more information on the specific regulations relating to scaffolding work, see Appendix A: Scaffolding regulations.

Scaffolding is defined in the HSE Regulations (see Appendix A). It includes any equipment or item used in connection with the construction, erection, dismantling or use of scaffolding.

The guidelines also include structures that may not be strictly classed as scaffolding under the legal description, but which are constructed using standard scaffold components (eg temporary grandstand and roof edge protection).

1.2 HOW TO USE THESE GUIDELINES

These guidelines represent the current state of knowledge (the best available at the time of publication) on the safe design, use and maintenance of scaffolding in New Zealand. They also explain also explains the relevant legal requirements of HSWA and the HSE Regulations.

Some requirements and recommendations in the guidelines are based on a benchmark set by New Zealand and/or International Standards. In particular, duty holders should use the joint Australian and New Zealand Standard 1576 series as the benchmark for designing, manufacturing, and working safely with scaffolding.

To purchase Standards, go to the Standards New Zealand website: www.standards.co.nz or email: enquiries@standards.co.nz

Some industries have guidelines that deal with specific problems faced in their working environments, such as the electricity sector or plant and machinery hire. When deciding how to do a job safely, make sure to check any industry-specific guidance.

A list of standards and guidelines relating to scaffolding, scaffold components, and other industry guidance that could be relevant to a scaffolding site can be found in Appendix C: Further information.

Good practice guidelines give advice – they are not legally binding. However, if a duty holder deviates from good practice they should have well thought out reasons for this and be able to provide appropriate evidence.

Good practice guidelines may sometimes be cited by WorkSafe as an expected standard of practice if poor practice is being alleged. They have formerly also been called best practice guidelines.

1.3 KEY TERMS

SCAFFOLDER/CERTIFIED SCAFFOLDER

For the purposes of these guidelines, a scaffolder or certified scaffolder is someone who holds a current certificate of competence appropriate to the type of scaffold that is being erected, used, maintained, repaired, or dismantled.

COMPETENT PERSON

'Competent' means someone has the appropriate knowledge and skills to carry out a particular task. This may be acquired through training, qualification, experience, or a combination of these. NZQA registered unit standards may assist in fulfilling the qualification requirement.

SCAFFOLDING CERTIFICATION TYPES

The HSE Regulations define three different types of scaffolding: Basic, Advanced and Suspended. See Section 4: Training and certification for more information on certificates of competence.

USE OF 'MUST' AND 'SHOULD'

TERM	DEFINITION
Must	Legal requirement that has to be complied with
Should	Recommended practice or approach, not mandatory to comply with the Act or these guidelines

Table 1: Requirements in this guidance

1.5 KEY

Sections of HSWA and regulations can be found in shaded boxes.

02/

ROLES AND RESPONSIBILITIES

IN THIS SECTION:

HSWA defines the roles and responsibilities of different duty holders. These include PCBUs, officers, workers and other persons at workplaces.

For more information see WorkSafe's special guide *Introduction to the Health and Safety at Work Act 2015*, available at: www.worksafe.govt.nz

2.1 PERSON CONDUCTING A BUSINESS OR UNDERTAKING (PCBU)

While a PCBU may be an individual or an organisation, in most cases the PCBU will be an organisation, for example a business entity such as a company.

All PCBUs must ensure, so far as is reasonably practicable, the health and safety of workers and that other people are not put at risk from the work of the business or undertaking. This is the **primary duty of care**.

The primary duty of care includes, so far as is reasonably practicable:

- providing and maintaining:
  - a work environment without risks to health and safety
  - safe plant and structures
  - safe systems of work
- ensuring safe use, handling and storage of plant, structures and substances
- providing adequate and accessible welfare facilities for workers
- providing information, training, instruction or supervision necessary to protect all persons from risks to their health and safety from work
- monitoring workers' health and conditions at the workplace to prevent injury or illness.

PCBUs cannot contract out of their duties, but where duties are shared, must consult, co-operate and co-ordinate activities with other PCBUs to meet their shared duties.

A PCBU that manages or controls a workplace must ensure, so far as is reasonably practicable, the workplace, the means of entering or exiting the workplace, and anything arising from the workplace are without health and safety risks to any person. For example, before leaving the site for the night, secure it against unauthorised access.

PCBUs WITH OVERLAPPING DUTIES

More than one PCBU can have a duty in relation to the same matter. Where this happens the PCBUs have overlapping duties. This might happen in a:

- shared workplace (eg a building site), where more than one PCBU and its workers control and influence the work on site
- contracting chain, where contractors and sub-contractors provide services to a principal contractor and client.

PCBUs that share no contractual relationship may still share overlapping duties, such as when they work on the same site.

PCBUs must discharge their overlapping duties to the extent they have the *ability to influence and control the matter*, and must, so far as is reasonably practicable, consult, co-operate and co-ordinate with each other. For example:

- two individual sub-contractors collaborate on a scaffold design so it enables both sets of their workers to work safely.

> a utility company agrees to co-operate with the PCBU in identifying powerlines and other electrical services before the scaffolding work starts.

UPSTREAM PCBUs

There are further duties for PCBUs (called upstream PCBUs) who:

> design plant, substances or structures
> manufacture plant, substances or structures
> import plant, substances or structures
> supply plant, substances or structures
> install, construct or commission plant or structures.

Upstream PCBUs influence and sometimes eliminate health and safety risks through, for example, designing or manufacturing products that are safe for the end user. Upstream PCBUs must consider potential health and safety risks of their products that could reasonably be expected to be used at a workplace.

Upstream PCBUs have duties under HSWA around testing, analysis, and information provision. For example, an upstream PCBU must provide information on how to use the structure, substance, or plant in a way that is safe and healthy to each person they provide it to. The downstream PCBU may engage with that upstream PCBU to make sure the downstream PCBU's needs are understood.

WORKER ENGAGEMENT, PARTICIPATION AND REPRESENTATION

PCBUs can ensure a safe workplace more effectively when everyone involved in the work:

> communicates with each other to identify hazards and risks
> talks about any health and safety concerns
> works together to find solutions.

PCBUs have two related duties under HSWA:

> to engage with workers on health and safety matters that affect or are likely to affect them, so far as is reasonably practicable
> to have practices that give workers reasonable opportunities to participate effectively in the ongoing improvement of workplace health and safety.

Both duties involve two-way communication in a 'conversation' about health and safety. Everyone involved in health and safety must be able to contribute and have their opinion considered when decisions are made.

PCBUs are expected to have deliberate, planned ways to engage and support participation. Each PCBU can determine the best way to meet its duties, depending on workers' views and needs, the size of the organisation and the nature of its risks.

More information on worker engagement, participation, and representation can be found in WorkSafe's good practice guidelines ***Worker Engagement, Participation and Representation***.

2.2 WORKERS

A worker is an individual who carries out work in any capacity for a PCBU and includes employees, contractors, sub-contractors, apprentices and trainees, and volunteer workers.

Workers' responsibilities include:

> taking reasonable care of their own health and safety
> taking reasonable care what they do (or fail to do) does not cause harm to any other person
> co-operating with any reasonable health and safety policy or procedure of the PCBU
> complying, so far as reasonably able, with any reasonable instruction given by the PCBU, so the PCBU can comply with the law

> in relation to PPE:
  - using or wearing PPE in accordance with any information, training or reasonable instruction given by the PCBU
  - not intentionally misusing or damaging the PPE
  - telling the PCBU when they become aware the PPE is damaged or defective, or when it needs to be cleaned or decontaminated.

2.3 OFFICERS

An officer is a person with a specific role in an organisation (such as a company director) or a person with the ability to exercise significant influence over the management of the business or undertaking. Organisations can have more than one officer. Officers could include, for example, the chief executive or director of a scaffolding company.

Officers have a duty to exercise due diligence to ensure the PCBU complies with their duties under HSWA. Each officer has a duty – it is not a joint duty. As part of this duty, officers must ensure the PCBU has appropriate resources and processes to meet their health and safety duties, and verify that those resources and processes are used.

2.4 OTHER PEOPLE AT THE WORKPLACE

Other people at a workplace must take reasonable care of their own health and safety and ensure that they do not adversely affect others' health and safety.

Other people at a workplace potentially at risk from work activities include volunteers, customers, passers-by, visitors, other PCBUs, or workers of another PCBU.

2.5 OTHER REGULATIONS

The HSE regulations around scaffolding and working at height (see Appendix A) are still current requirements under current legislation (HSWA). Those regulations define key terms, when scaffolding should be used and that it is fit for purpose, and the certification regime by which a scaffolder must meet a certain level of competence. Section 4 provides guidance around training and certification.

The GRWM regulations set out a number of duties around general workplace issues, including:

> facilities

> first aid

> personal protective equipment (PPE)

> emergency plans

> hazardous substances.

There are also regulations particularly relevant to anyone working on or around scaffolding. PCBUs must manage risks associated with working under raised objects, and risks associated with falling objects.

GRWM regulations 24 and 25 specify PCBU duties to manage risks associated with falling objects and working under raised objects.

Some duties have continued under the HSE regulations (eg notification of hazardous work) while other duties are new to HSWA (eg notifiable incidents). See Appendix B.

03/

MANAGING RISKS

IN THIS SECTION:

Risk management involves thinking more broadly about risk, not just spotting work-related hazards. Think about the root cause of any potential harmful event, the likelihood it will occur, the consequences if it does, and the steps to take to eliminate or minimise the risk.

PCBUs must manage all health and safety risks with scaffolding work. Remember to consult, co-operate and co-ordinate with other PCBUs and to engage with workers.

To manage risks:

- identify hazards that could reasonably foreseeably create a risk to health and safety
- eliminate the risk so far as is reasonably practicable
  - if it is not reasonably practicable to eliminate the risk – minimise the risk so far as is reasonably practicable
- maintain the implemented controls so they remain effective
- review, and if necessary revise controls to maintain, so far as is reasonably practicable, a work environment that doesn't have risks to health and safety.

Figure 1: Risk management as a continual process

3.1 IDENTIFY HAZARDS

The first step in the risk management process is to identify hazards which could injure or harm anyone. A good hazard identification process is the key to risk management.

Identify hazards and identify the controls before the work commences. It may not be possible to control them all before work starts – so identify the controls before work starts, and implement them when required.

For example, consider these hazards:

- an edge where a person could fall
- a falling object
- a live power line
- hazardous material.

Consider all relevant matters including:

- nature of the scaffolding work
- the range of possible methods of carrying out the work.

Monitor known hazards and identify any new hazards that arise to make sure controls are working.

HAZARD IDENTIFICATION METHODS

Identify hazards by:

- physical inspections:
  - inspect the worksite and assess where someone could get injured by scaffolding activities
  - consider hazards that may be created by other site users, or if the scaffolding activities could create hazards for others (eg traffic management)

- safe work method: identify the hazards involved in each task. Some workplaces use job safety analysis (JSA) or task analysis (TA) to do this
- engaging with workers
- process analysis: identify hazards at each stage of the work plan
- guidance and standards consideration
- hazard and operability analysis (HAZOP)
- accident investigation analysis – identify hazards and causes of harm from investigations involving similar types of work.

3.2 ASSESS RISKS

PCBUs must assess and manage risks that could result from work. Risks to health and safety arise from people being exposed to potential hazards (sources of harm). Carry out a risk assessment when:

- it is uncertain whether a hazard may cause injury or illness
- a work activity involves different hazards, and the workers involved don't know how those hazards interact to produce new or greater risks
- workplace changes may impact on the effectiveness of controls
- new or different risks are associated with a change in work systems or work location.

PCBUs must eliminate risks so far as is reasonably practicable. If a risk can't be eliminated, it must be minimised so far as is reasonably practicable.

To decide what is 'reasonably practicable', PCBUs must weigh up all relevant matters. Those matters include, but are not limited to:

- how likely the hazard or risk is to happen
- what degree of harm the hazard or the risk might cause
- how much the PCBU knows, or ought reasonably to know, about the hazard or risk and how to eliminate it
- what ways are available to eliminate or minimise the risk
- what ways are suitable to eliminate or minimise the risk.

It is only after assessing the extent of the risk and the available ways of eliminating or minimising the risk that consideration may be given to the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

There are times when certain work risks must be dealt with in a specified way. For example, there are specific requirements in regulations about dealing with the risks arising from carrying out remote or isolated work or work dealing with hazardous substances or asbestos.

A risk assessment will help to:

- identify which workers or others are at risk
- determine what sources and processes are causing that risk
- determine the severity of the risk
- identify if and what kind of controls should be implemented
- check the effectiveness of existing controls.

3.3 CONTROL RISKS

Some controls are more effective than others. Controls can be ranked from the highest level of protection and reliability to the lowest. This ranking is known as the hierarchy of controls.

Eliminating a risk is the most effective control. PCBUs must always eliminate a risk if this is reasonably practicable.

If this is not reasonably practicable, PCBUs must minimise the risk so far as is reasonably practicable by one or a combination of the following:

> Substitution: For example, using elevating work platforms (EWPs) when erecting scaffolding over a void instead of working from the unfinished scaffold and using fall arrest equipment.

> Isolation: Isolate means preventing contact or exposure to the risk. For example, using barriers to keep pedestrians away from the work.

> Engineering controls: For example, advance guardrail systems to provide edge protection while the scaffolder installs the guardrails.

> If risk remains, it must be minimised by implementing administrative controls, so far as is reasonably practicable, for example by installing warning signs near the scaffolding.

> Minimise any remaining risk with suitable PPE. **Remember that PPE is required under the GRWM regulations and that some PPE such as harness, hard hat and safety footwear must be used at all times during the erection, alteration and dismantling of scaffolding.**

> Administrative controls, including PPE, rely on human behaviour and supervision. Used on their own, they tend to be the least effective in minimising risks.

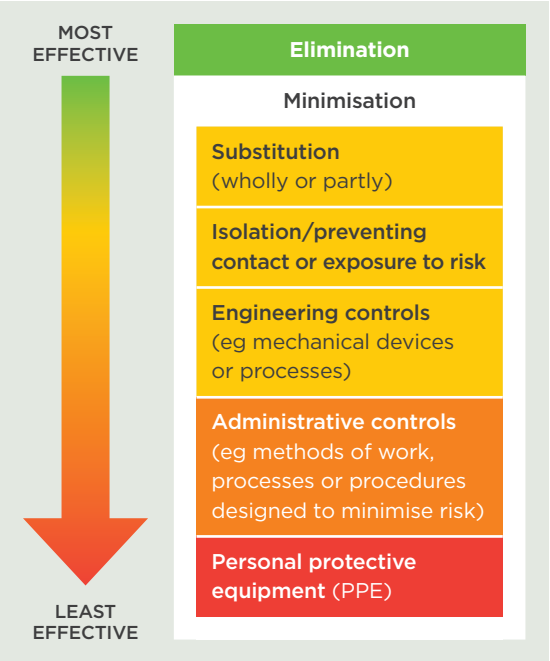


Figure 2: Hierarchy of controls

Appendix E demonstrates some risks that may be found on a scaffolding site, and possible controls.

RISK RATING TABLE				
Likelihood of injury or harm to health	**Consequences of injury or harm to health**			
	Insignificant *no injuries*	**Moderate** *first aid and/ or medical treatment*	**Major** *extensive injuries*	**Catastrophic** *fatalities*
Very likely	**High**	**Extreme**	**Extreme**	**Extreme**
Likely	**Moderate**	**High**	**Extreme**	**Extreme**
Moderate	**Low**	**High**	**Extreme**	**Extreme**
Unlikely	**Low**	**Moderate**	**High**	**Extreme**
Highly unlikely (rare)	**Low**	**Moderate**	**High**	**High**

Table 2: An example of a risk rating table

3.4 REVIEW CONTROLS

Regularly review controls on site to make sure they are still effective.

Review, and if necessary revise controls:

- when the control is not effective in controlling the risk (eg if there has been an incident or near miss)
- before a change at the workplace that is likely to give rise to a new or different health and safety risk that the control may not effectively control
- if a new hazard or risk is identified
- if the results of consultation with workers or other PCBUs indicate that a review is necessary, or
- if a health and safety representative or committee recommends a review.

Common review methods include workplace inspection, consultation, testing and analysing records and data. When reviewing controls, review the safe work method statement or task analysis and revise it if necessary.

If problems are found, go back through the risk management steps, review the information and make further decisions about controls.

04/

TRAINING AND CERTIFICATION

IN THIS SECTION:

Everyone involved in the scaffolding process must have the knowledge, training and skills to perform the work safely, regardless of the height of the scaffold, and must have certification under the HSE regulations where appropriate.

Training helps people share knowledge and develop skills, and is an important part of managing risks as it ensures control measures are properly used and maintained.

PCBUs have a primary duty of care under HSWA to ensure, so far as is reasonably practicable, all persons (workers and others) are provided with any information, training, instruction or supervision needed to protect from health and safety risks arising from their work.

4.1 COMPETENCY REQUIREMENTS BASED ON HEIGHT OF SCAFFOLD

HEIGHT OF SCAFFOLD *Measured from the highest component*	PERSON PERMITTED TO ERECT THE SCAFFOLD
Up to 5 m	**Competent person**: someone who has the knowledge and skills to carry out a particular task. Skills and knowledge may be acquired through training, qualification, or experience, or a combination of these. NZQA registered unit standards may assist in fulfilling the qualification requirement.
5 m and above	**Holder of appropriate class of certificate of competence**

Table 3: Competency requirements based on height of scaffold

Design (or verification of the design) of some types of scaffolding should be undertaken or verified by a chartered professional engineer (CPEng). See Section 7.3 for more information.

UNIT STANDARDS

Some unit standards may assist in demonstrating competence to erect scaffolds less than 5 m high.

UNIT STANDARD	TITLE
9184	Erect and dismantle non-notifiable prefabricated frame scaffolding up to five metres in height
13016	Demonstrate knowledge of the erection and dismantling of scaffolding up to five metres in height
13053	Erect and dismantle scaffolding up to five metres in height

Table 4: NZQA registered unit standards

4.2 CERTIFICATES OF COMPETENCE

Anyone who carries out scaffolding work including erection, alteration, repair or dismantling of a scaffold of which any part is 5 m or more above the ground, must hold the appropriate class of certificate of competence (COC) for that type of scaffold (see Section 4).

When determining whether a certificate of competence is required, the 5 m measurement is taken from ground to the highest component.

For notification purposes (see Appendix B), the 5 m measurement is taken from the highest platform that a person could fall from. For example a scaffold with a working platform 3 m above a slab next to a 5 m void would be a notifiable scaffold. This is in line with the HSE Regulations.

The HSE Regulations split different types of scaffolding into Basic, Advanced and Suspended.

COCs are issued by SARNZ (Scaffolding, Access and Rigging Association of New Zealand) under the delegated authority of WorkSafe and are valid for four years.

4.3 CERTIFICATES OF COMPETENCE

HOW TO OBTAIN A CERTIFICATE OF COMPETENCE

Applicants must have thorough knowledge of and experience with the type or types of scaffolding they are seeking a certificate in, as set out in Regulation 35 (see Appendix A). They must also be of good character and reputation, and physically and mentally able.

Knowledge and experience can be obtained by:

> training to a NZ Certificate Level. International qualifications may contribute to gaining the NZ Certificate via a recognition of prior learning process, recent relevant industry experience

> renewing a current certificate of competence that meets the requirements of the HSE Regulations, regulations 31 and 35.

To renew a certificate of competence, the holder must apply to SARNZ detailing recent work experience and up to date knowledge of good practice. Contact SARNZ or see their website for more information: www.sarnz.org.nz/qual

4.4 RESPONSIBILITIES WHEN WORKING WITH TRAINEES

A trainee (worker) who does not yet hold a certificate of competence but is training to do so can be involved in scaffolding work as long as they are under the direct supervision (see below) of someone who holds a certificate of competence of the relevant type.

WHAT IS DIRECT SUPERVISION?

Direct supervision means within reach, or within visual contact. The supervising scaffolder is responsible for monitoring the work and ensuring compliance with regulations and recommended practice. They must be in a position to take immediate charge in an emergency.

The appropriate ratio of scaffolders to trainee scaffolders depends on the level of experience and competence of each trainee, the complexity of the scaffolding work being undertaken, and the risks associated with any mistakes that may be made by trainees.

See WorkSafe's fact sheet *Providing Information, Training, Instruction or Supervision for Workers* for aspects to consider when deciding what information, training, instruction and/or supervision to provide.

4.5 EXPECTED COMPETENCIES OF EVERYONE INVOLVED IN THE SCAFFOLDING PROCESS

WorkSafe considers the following competencies essential to all people in charge of erecting, altering or dismantling scaffolding. This applies to **all** scaffolding, regardless of height or whether a certificate of competence is required.

- Knowledge of the basic rules of physics and mathematics as they apply to scaffolding. For example, an ability to make simple calculations of dead load and live load is often needed (see Section 7).
- Ability to read and understand suppliers' information, general site plans, design drawings and specifications for scaffolds.
- Thorough knowledge of the scaffolding equipment being used.
- Thorough knowledge of the assembly methods and design requirements associated with scaffolding equipment.
- Ability to identify the common hazards of scaffolding work and take effective precautions to control the risks resulting from the hazards.
- Competency to visually inspect scaffolding equipment for faults.
- The physical skills needed for scaffolding construction.
- Competency in manual lifting techniques.
- Ability to work safely and confidently at heights.
- Ability to use scaffolding tools and equipment correctly.
- Ability to erect and dismantle scaffolding in the correct sequence.
- Knowledge of the prevention of falling objects.

05/

SITE MANAGEMENT

IN THIS SECTION:

Scaffolding work usually occurs within a larger context and can be impacted by other activities and PCBUs on the site. Plan for and manage these activities in consultation with other PCBUs and workers.

Site management includes everything from ensuring there are the right facilities, PPE, and equipment to do the work, to site-specific issues like traffic management or containment of hazardous substances. All risks associated with the work, including any connected work such as construction, must also be controlled so they do not cause harm to anyone.

5.1 SAFE SYSTEM OF WORK

Implement a safe system of work before work starts. This ensures the work happens in the right location with the right plant and equipment on site and with the right workers with relevant competencies.

Make sure to engage with workers carrying out the work and their representatives when developing the safe system of work. If you are working with other PCBUs, co-operate, co-ordinate and consult with them so far as is reasonably practicable.

A safe system of work should include:

> engaging workers
> assigning responsibilities
> a safe work method statement
> consulting a competent person regarding any temporary works design
> identifying any health and safety hazards and risks
> carrying out a risk assessment
> describing how you will control any identified risks
> describing how controls will be implemented, monitored and reviewed
> communication systems
> accident investigation and reporting methods
> emergency procedures.

5.2 SITE ASSESSMENT BEFORE WORK BEGINS

To undertake a site assessment, consider the following:

> What is the purpose of the scaffold, and who will be using it?
> What is the nature of the ground, surface or structure on which the scaffold is to be erected? Does it need to be verified for load-bearing capacity?
> How will the scaffold be stabilised from overturning? If it will be tied to a structure, how will this be done?
> Will the scaffold be subject to environmental loads such as funnelling wind, vehicle impact, or snow?
> How will workers and vehicles access the site and the area for storage of material and equipment?
> Does the scaffolding create risk for workers on or around it?
> Are there electrical conductors or cables in the vicinity of the scaffold? Could the scaffold or workers come into contact with them at any stage of the scaffolding process? That could include delivering scaffolding equipment to the site, erection, associated scaffolding use and work activity, and eventual dismantling/removal from site.

- Is there sufficient space to erect the scaffold and store scaffold materials?
- Is the scaffold to be erected on a public roadway or footpath, and what are the local authority requirements?
- How will the site be protected from unauthorised access?
- Is pedestrian access through the site required? How will this be managed?
- Is a specific traffic management plan required?
- Are there any other potential hazards specific to the site?
- Does the work need to be notified to WorkSafe? (See Appendix B for information on notifications.) Should anyone else be notified?

5.3 UTILITIES AND OTHER SERVICES

Services include gas, water, stormwater, sewerage, telecommunications and electricity supply, or fuel and refrigerant in pipes or lines. The PCBU must identify and manage hazards and risks associated with underground and overhead services in the planning and design stages. In the first instance, contact the service owner for advice before developing your safe work method.

MINIMUM APPROACH DISTANCES (MADs) NEAR POWER LINES OR ELECTRICAL CONDUCTORS

Power lines and electrical conductors can cause harm to anyone handling, erecting or dismantling scaffolding, or handling equipment when working on or in the vicinity of a scaffold. MADs (see Table 5) must be adhered to. They apply to the person and to anything held by them (eg scaffold poles, or anything they handle while on the scaffold).

Do not erect scaffold or handle anything closer than:

- 4 m from overhead power lines or electrical conductors, unless you have written consent from the local electricity network company or power line owner
- 6 m for 220 kV and above, under any circumstances.

Work closer than 4 m from any power lines under 110 kV must first be approved via consent from the owner of the line. (**Note**: that could be the property owner.) This consent will specify minimum permissible distances. The consent will also help identify and manage the associated electrical risks. In some cases, the power line owner may be able to assist by installing sleeves over live parts, de-energising the line, re-routing the line, or providing shields.

CIRCUIT VOLTAGE	DISTANCE LIMITS (m)
Below 1 kV	0.5
11 kV	1.5
22 kV	2.0
33 kV	2.5
66 kV	3.0
110 kV	4.0
220 kV and above	6.0

Reproduced from *New Zealand Electrical Code of Practice for Electrical Safe Distances 2001 (ECP 34)* see: www.energysafety.govt.nz

Table 5: Minimum approach distance limits for persons from exposed live parts (where consent has been obtained)

5.4 ARRIVAL OF MATERIALS ON SITE

- Examine all equipment on arrival at the site.
- Stack scaffold components in an appropriate and secure location on site, particularly when work is above or near to a public thoroughfare.

- Do not use defective or damaged items. Remove any found from the site as soon as possible.
- Confirm that foundations and ground conditions are adequate for the load of the scaffold (see Section 8).
- Examine the building or structure. If there are concerns about tie positions etc, obtain advice before continuing.

EQUIPMENT INSPECTION

Used scaffolding equipment should be inspected before use to identify items that are unsuitable or that fail to comply with relevant standards or supplier's or manufacturer's guidelines.

Bent or damaged scaffold tube must not be straightened for re-use. Bent sections must be cut out or discarded.

Unauthorised repairs or alterations of equipment may lead to catastrophic failure.

GRADING	EXAMPLES	RESULTING ACTION
Checked and approved	> Scaffolding components confirmed as safe and suitable for use	May be used for normal operations.
Repaired	> Bolts replaced on couplers > Wedges replaced on modular scaffolding	May be used for normal operations.
Reduced length or cut down	> Shortened tubes > Cut-down planks	May be used in appropriate situations.
Downgraded	> Scaffold plank downgraded to a soleboard	May be used in appropriate situations.
Scrapped (taken out of service)	> Bent tubes > Rotten planks > Tubes with excessive rust or reduced wall thickness	May not be used or reintroduced back into service.

Table 6: Grading for inspected scaffolding equipment

5.5 SECURING THE WORK AREA

Site security should consider all risks to workers and others. Establish the work activity's boundary before securing the work area. Each work activity may be smaller than the whole workplace, so as each work activity moves its boundary moves with it. As the work boundary moves, so far as is reasonably practicable eliminate (or minimise, where elimination is not possible) risk to workers and others outside the work activity.

Other people near the work have a responsibility to take reasonable care that their actions (or lack of actions) do not put themselves or others at risk. They must also comply with any reasonable instruction given by the PCBU, as far as they are reasonably able to.

When organising site security and site access, consider:

- warning or hazard signs
- supervising authorised visitors

- the risk of unauthorised access occurring (consider schools, parks, shops or other public places, or amenities and events nearby)
- pedestrians and other members of public
- other workers and mobile plant on site
- vehicle traffic control within and near the site
- delivery points, including vehicle access and egress
- immobilising/locking vehicles
- safe and secure storage of materials (eg stacked equipment)
- control of energy sources (eg temporary mains service boxes)
- suitably designed and constructed physical barriers (eg safety fences, lockable gates, or covers).

5.6 MANAGING TRAFFIC

Work near roads must always be approved by the local authority or road owner. If required, police and local authorities must be informed of any narrowing of roadways caused by the placement of barriers or other restraints. Particular attention must be paid to permits issued for oversized or over-width loads that may be travelling in the area.

Manage traffic, including all road users, while the work takes place with a temporary traffic management plan (TMP). All work on a road or work that affects the normal operating condition of a road must have an approved TMP.

On busy roads or motorways, scaffolding should be erected behind approved barriers, or alternatively in a position where there is no possibility of impact.

Scaffolding near roadways must have suitable lighting to illuminate all potential hazards (but avoid distracting motorists).

Suitable warning signs should be posted well in advance of the scaffolding area to warn oncoming motorists of the hazards in the area and also of any speed restrictions that may apply.

All personnel must be aware of the hazards involved in working over roadways and care must be taken when handling equipment near these areas. High visibility garments must meet New Zealand Transport Agency (NZTA) requirements.

Where practicable, work should be carried out during low traffic flow times (ie between 9.00 am and 4.00 pm, or alternatively from 9.00 pm to 7.00 am if adequate lighting can be maintained).

If pedestrians have to be diverted into traffic flows, the traffic management plan must be drawn up by a site traffic management supervisor. All steps must be taken to protect them along the entire alternative route. Also bear in mind that an alternative route may be used by people with prams, or by people in wheelchairs or with walking aids. It may require the erection of:

- temporary hoardings
- warning lights, or external lighting if the diversion is at night
- warning signs
- barricades
- ramps over obstacle areas etc.

For more information refer to NZTA's *Code of Practice for Temporary Traffic Management* available on NZTA's website: www.nzta.govt.nz

5.7 MOBILE PLANT AND MACHINERY

Mobile plant, machinery and vehicles can cause serious injury or death. This can happen where people and plant are sharing the same site or route or where there is uncontrolled entry to and from the site. Members of the public can be particularly at risk.

Isolate plant and machinery from people working on the site and from pedestrians. Where possible, plan the work so vehicles and pedestrians are not in the same area at the same time.

Ensure vehicles and plant are maintained and log books and maintenance records are up to date. Check the steering, brakes, hydraulics and mirrors. Tyres should be in good condition at the right pressure. Reversing alarms must be working and active.

Secure loads and plant. Care must be taken when vehicles and plant are being used on slopes. Vehicles should only be operated by people trained to do so. Keep vehicles and pedestrians apart or separated by barriers.

5.8 CONFINED SPACES

The hazard identification and risk assessment can identify whether part of the work site is a confined space. A confined space is an enclosed or partially enclosed space, not intended or designed primarily for human occupancy, where there is a risk of one or more of the following:

- an oxygen concentration outside the safe oxygen range
- a concentration of airborne contaminant that may cause impairment, loss of consciousness or asphyxiation
- a concentration of flammable airborne contaminant that may cause injury from fire or explosion
- engulfment in a stored free flowing solid or a rising level of liquid that may cause suffocation or drowning.

If the scaffolding is partly or completely within a space that meets those defined criteria refer to *AS 2865 Confined spaces* to find out the appropriate work methods, risk management, and emergency planning.

If the scaffolding is partly or completely within a confined space, make sure:

- workers are trained in confined space entry and enough workers are available to carry out a rescue in the event of an emergency
- an entry permit system is established
- a permit is completed and approved by the PCBU in charge of the confined space
- pre-entry tasks are established and understood by all
- the atmosphere is tested before entry and continuously monitored during entry, if necessary
- ventilation is installed and adequate where deemed necessary
- an emergency plan is established and tested
- suitable standby person/s are present, trained and aware of their specific tasks in the event of an emergency
- communication is established with the standby person/s
- all equipment is suitable and operational, within current inspection dates, and used by workers trained in the use of the equipment.

The natural reaction in an emergency is to immediately try to rescue a person in difficulty. In a confined space, this often leads to the serious injury or death of the would-be rescuer/s. A suitably trained and competent standby person should be present to communicate and oversee the work being conducted. They will co-ordinate the response to any emergency. Emergency response planning should follow the requirements of *AS 2865*.

For more information about confined spaces, see WorkSafe's fact sheet *Confined Spaces: Planning Entry and Working Safely in a Confined Space*, available at: www.worksafe.govt.nz

5.9 HAZARDOUS SUBSTANCES

Scaffolds are often used to provide access for work involving substances such as asbestos and lead. Scaffolding work can also take place on sites where other work involves or produces substances like silica dust.

Exposure to these substances can cause harm. Exposure may occur:

> while the scaffold is being erected
> during alteration or inspection of the scaffold while in use
> during removal of encapsulation and dismantling of scaffold.

Contamination can continue after the scaffold is dismantled if equipment is not thoroughly decontaminated.

The PCBU must have a plan to manage the risk of exposure to substances that could cause harm. Chemical contamination needs to be controlled in accordance with the safety data sheet for the substance.

Asbestos-contaminated sites need to be managed in very specific ways under the Health and Safety at Work (Asbestos) Regulations 2016. Guidance on managing the risk of asbestos can be found in WorkSafe's approved code of practice Management and Removal of Asbestos.

5.10 EMERGENCY PLANNING

The PCBU must have an emergency plan for the workplace covering any likely type of emergency. It needs to be maintained, regularly tested, and improved to remain effective.

Emergency plans should be developed with workers. Workers should be trained in the emergency plan. The plan should be available and accessible to the people who need it. To ensure a co-ordinated response to an emergency, the emergency plan should be incorporated into any broader construction project emergency plan, and be communicated to all workers.

The PCBU must make sure the emergency plan deals with unexpected incidents such as falls from height, and how to rescue workers. Planning must determine all the potential emergency conditions. A suitable response must be developed for each credible emergency.

It should include:

> competent personnel available to carry out a rescue
> first aid and medical provisions and who is trained to administer first aid
> where the nearest emergency centre is
> location of alarms, fire extinguishers and escape routes.

If working with fall arrest equipment or on a suspended scaffold, also include:

> the rescue method when someone falls from height (eg use of a crane or elevating work platform) for different situations
> the equipment necessary for a rescue
> information on suspension trauma
> first aid training.

GRWM Regulation 14 requires that the PCBU prepare, maintain, and implement an emergency plan.

5.11 PPE

As well as the regulations for providing, using, and maintaining PPE, there are standards that the PPE should meet, and expectations about when and where to use it. Remember that elimination is the preferred risk control, and PPE is a minimisation control.

PPE	USE
Hard hats	> wear at all times > appropriate for both working at heights and use in construction > include a chin strap > wear correctly, (check to see if approved to be worn with other headwear)
Safety footwear appropriate to the task	> wear at all times
Hi-Viz	> wear at all times
Harnesses	> wear at all times (except for minor scaffolds). Section 6.2 provides advice on harness use.
Hearing protection	> wear when needed > clearly labelled with its rating
Eye Protection	> wear when needed
Gloves	> wear when needed > to protect the hands and to prevent scaffolding components slipping
Respiratory protection	> wear when there is a risk of exposure to airborne contaminants.
Life jackets/personal flotation device	> wear when needed, see Section 6.6

Table 7: PPE standards and uses

5.12 COMMUNICATION

A safe system of work must include effective communication. This could be verbal if workers are within hearing distance. Where that is not possible, or where a worker is alone, communication could involve RT contact with the rest of the crew, or established phone calls to a contact person at set intervals. The system should allow workers to regularly communicate that they are safe.

5.13 FITNESS FOR WORK

A number of things can impact on a worker's competence. Sleep deprivation, poor diet, relationship problems, money problems, alcohol and drug abuse, health problems and the uncertainty about the continuity of work are examples of issues that can affect people's ability to work safely.

Work should be well planned and scheduled to allow enough time for work flow changes (eg machinery breakdowns, adverse weather) and completion so as not to put undue pressure on workers. If workers are exposed to extreme temperatures or physical demands, jobs can be rotated to minimise the effects.

There should be a fatigue policy covering hours of work, roster patterns, and days of work/time off between shifts. PCBUs should also have a policy in place to constructively prevent alcohol and other drug-related issues.

5.14 OTHER PLANNING CONSIDERATIONS

Planning considerations should include discussions on:

- permits/consents/notifications
- service mark-outs and locations
- site-specific documentation which could include:
  - health and safety policy
  - summary worksite safety plan
  - worksite emergency procedures
  - worksite safety induction card
  - visitor and worksite induction register
  - accident/incident register, including near misses
  - injury/ill-health/incident reporting
  - hazard identification
  - site-specific risk assessment
  - safe or standard operating procedures
- quality plan
- overhead services and underground service plans
- construction plans
- nature or condition of the ground
- weather conditions (eg time of year, expected conditions etc.)
- interaction with other PCBUs
- site access and security
- traffic management and public safety
- type of plant and equipment to be used
- provision of adequate facilities for workers.

06/

FALL PROTECTION SYSTEMS FOR SCAFFOLDERS

IN THIS SECTION:

Fall prevention systems prevent a fall from occurring. They are preferred to fall arrest systems, which stop a fall at a certain point, but don't necessarily prevent harm. These fall protection systems require a high level of user competency and supervision.

Fall arrest harnesses with appropriate attachment equipment and anchorage for the task should be worn if there is any risk of a fall, or if required for rescue readiness.

Workers should be hooked on in all situations where there is a risk of a fall.

Fall protection systems must be appropriate for the intended task. Scaffolders must be trained in how to use them safely. All equipment must be inspected regularly.

If a person falls, the arresting force on the harness must be less than 6 kN (610 kg).

Lanyards must be appropriate to the use, and to the size of the person.

Anchor points must be suitable and able to take the force of someone falling.

There must be an emergency plan and procedures in place detailing how to rescue someone who falls from height.

Workers using fall arrest systems must not work alone.

6.1 COMMON RISKS

Fall arrest systems have limitations and dangers. It is essential for a worker who has fallen to be rescued as quickly as possible. Rescue procedures must be detailed in an emergency plan before any scaffolding work takes place.

RISKS ASSOCIATED WITH USING FALL ARREST EQUIPMENT

> Lanyards that are too long can result in the worker swinging down or back or striking the ground (pendulum effect).

> The worker can be too heavy or too light for the shock absorber.

> A fall arrest system can fail if inappropriate anchor points (not strong or high enough or too close to an edge) are used.

> A worker who has fallen and is suspended in a harness can develop a condition in which blood pooling in the legs can lead to loss of consciousness and death

> People rescuing a worker who has fallen face risks to their own safety.

> A worker disconnects from the anchor points because their movement is restricted, exposing them to the risk of a fall.

> A worker is not correctly connected to the attachment and the connection fails under the load.

> A slack horizontal line suddenly pulled by a worker who has overbalanced may pull others off balance.

6.2 TYPES OF FALL PROTECTION SYSTEMS

Personal fall protection systems allow a worker to be protected while a task is undertaken while working at height. They must be appropriate for the intended task.

Fall restraint prevents the worker from getting too close to somewhere they could fall from.

Work positioning systems enable a worker to be stable while working hands free.

Fall arrest systems catch a worker if they fall. They can be used with horizontal lifeline and life rail systems, which allow horizontal movement while being hooked on.

These systems require a high level of competency and supervision. Workers must be trained in the use of fall arrest systems and safety harnesses. Ongoing competency should be assessed and demonstrated.

FALL RESTRAINT

A total restraint system prevents a person from coming close to an unprotected edge so they are not able to fall. If the system can be adjusted so a person can reach a position where they can fall, the system is known as a restraint technique and must be rated as a fall arrest system.

WORK POSITIONING SYSTEMS

A work positioning system is a system that enables a person to work supported in a harness in tension in such a way that a fall is prevented. Work positioning systems should be designed and set up to allow a person to work safely and in reasonable comfort.

FALL ARREST SYSTEMS

Fall arrest systems are designed to catch and hold a person if they fall. They consist of a harness connected to an anchorage point. They do not prevent the fall from occurring.

The arresting force on the person must be less than 6 kN (610 kg). The lanyard assembly must include an appropriate shock-absorbing device.

The lanyard must be attached to the harness at the top dorsal (back) attachment or to the front chest attachment on the harness. The anchor point should be within easy reach but as high as practicable. When working in fall arrest the worker must maintain 100% hook at all times.

COLLECTIVE FALL ARREST SYSTEMS

Collective fall arrest systems include industrial safety nets and soft landing systems. They protect more than one person at a time from falling.

INDUSTRIAL SAFETY NETS

Industrial safety nets are sometimes used where it is not practicable to provide scaffolds or temporary guardrailing. They are attached to perimeter cords.

Each net will be labelled with the maximum fall distance the net has been designed for (usually 1–6 m) and minimum clearance distance below the net.

Securing a safety net to a building, structure or scaffold may require design by a CPEng, as the impact loads applied to a safety net require the supporting structure or scaffold to support these loads.

6.3 USING FALL ARREST SYSTEMS

HARNESSES

It is essential that the correct safety harness is chosen. When correctly fitted, a harness should fit comfortably and firmly, but with enough room to slide a hand between the webbing and the body.

LANYARDS

Lanyards connect the harness to an anchor point, a horizontal life line, a rail, or some other form of anchorage. Double or twin-tailed lanyards have an additional safety factor that allows the user to be connected to an anchor point by one or other of the tails at all times. An appropriate lanyard and anchorage must be used to suit the task and situation.

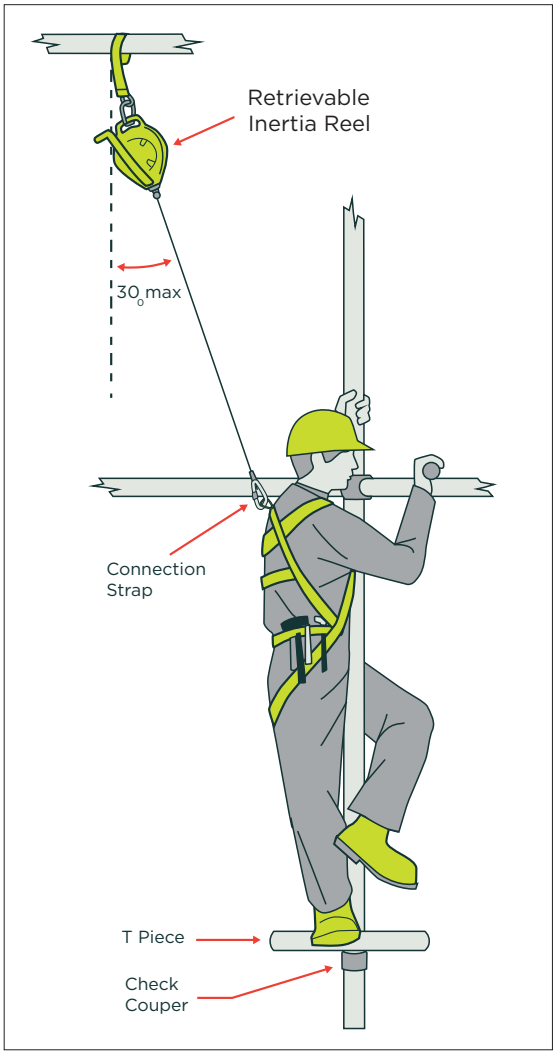


Figure 3: A worker attached to an inertia reel to limit fall distance

FALL ARREST DEVICES

TYPE 1 FALL ARREST DEVICES (INERTIA LOCK ROPE GRAB)

A type 1 fall arrest device has a unit that slides up and down an anchor line and locks onto the line if a person falls. Note that the angle of use must be in line with manufacturer's instructions, as failure can result from horizontal use.

Type 1 devices are generally set up each time they are needed but in some situations, permanent lines made of stainless steel or a non-corrosive material may be attached to building elements such as chimneys, towers or vertical ladders.

The lanyard used with a harness and type 1 fall arrest device should not be longer than 2 m. If it is used with a vertical line the lanyard and fall arrest device should be maximum 300 mm long.

The anchor point on the line should be above head height and be set up with as little slack as possible.

TYPES 2 AND 3 FALL ARREST DEVICES (INERTIA REELS)

Types 2 and 3 fall arrest devices (inertia reels) are both spring loaded, retractable reels that are fixed to an anchor point. A steel cable or webbing material pulls out and retracts automatically as the person moves away from and back towards the reel. The type 3 device can also be used to pull a person up.

Types 2 and 3 fall arrest devices are not used with lanyards and must be attached directly to the fall arrest attachment of the harness.

SELECTING A FALL ARREST DEVICE

When choosing a fall arrest device, consider:

> whether work is at different heights with workers moving up and down frequently
> the nature of a fall if it occurs
> the adequacy of anchorages (particularly with type 1 devices)
> whether the fall is sloping
> whether the fall is over an edge, as this can lead to failure of the lanyard
> whether the anchor point above the user is offset by more than 30 degrees from the vertical (for type 2 and 3 devices).

6.4 ANCHOR POINTS

Anchor points must have a minimum ultimate strength of 15 kN (1500 kg).

Where possible, safety harnesses should be attached to anchor points on the scaffold above shoulder height and behind the scaffolder.

Note: If this is not possible, the attachment may be below shoulder height.

The lanyard should be as short as possible to minimise the distance of a potential fall.

WHEN TO HOOK ONTO AN ANCHOR POINT

Where there is a risk of a fall, scaffolders should hook onto the first available anchor point when they are:

> working on a platform without a guardrail
> climbing up and down the scaffold structure
> working on unplanked scaffolding
> hemping
> working over a void
> working on a hanging scaffold
> working on a cantilever scaffold.

Suitable anchor points for hooking onto include:

> Putlogs supported by the ledgers of the lift above and fixed at both ends by single couplers.
> Ledgers and transoms supported with load bearing couplers (right-angle couplers).
> Guardrails supported with load bearing couplers (right-angle couplers).
> Standards can be used as anchor points if there are no joins in the section of tube or if the manufacturer states the component can withstand the load imposed by a fall.
> Tube and coupler scaffolding can provide safe anchor points for a scaffolder wearing a full body harness and attached to a lanyard with an energy absorber.
> For proprietary scaffolding, refer to the manufacturer's specifications.

Do not hook on to:

> scaffold that is not anchored or rakered
> standards, unless used with a suitable anchor device designed for the purpose
> ledgers or guardrails supported by single couplers or putlog clips
> ledgers or guardrails within a bay where there is a joint
> transoms below foot level
> transoms when underslung below ledgers
> puncheons
> putlog transoms or bridle tubes
> reveal or prop tie assemblies
> braces or other diagonal tubes.

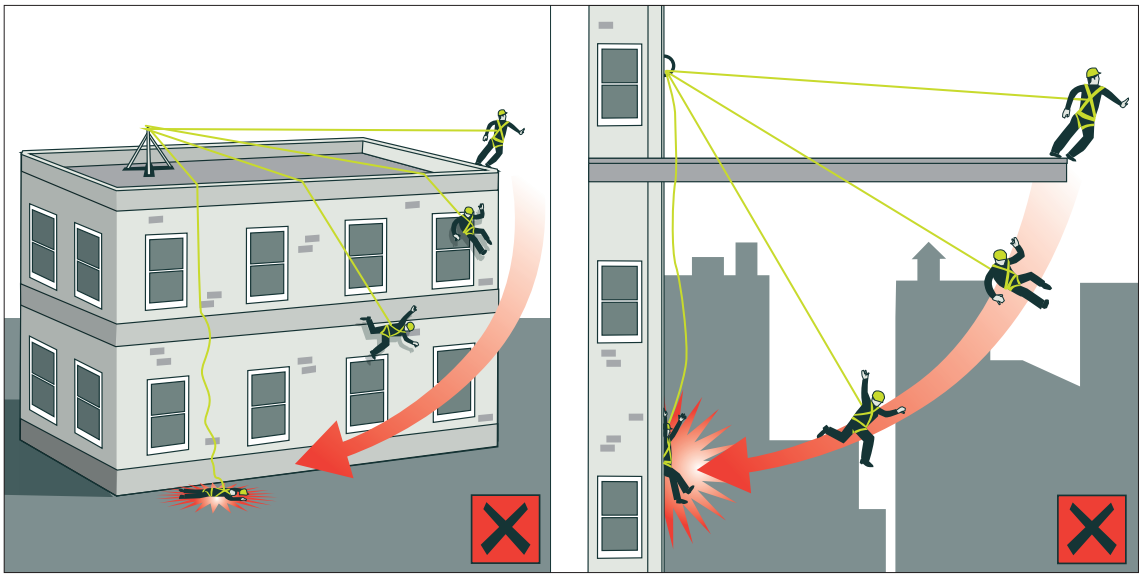


Figure 4: Pendulum effect caused by anchor point rope too long (left) and anchor point swing back (right)

HOW TO PREVENT THE PENDULUM EFFECT

> Select an anchorage point at a right angle to the position of the line at the perimeter edge. If a right angle to the work position is not possible to achieve, the anchor point should be no more than 30 degrees to the work position. A mobile anchorage may be used.
> Use a secondary anchor point and/or an anchor line.
> Use a perimeter guardrail to prevent the possibility of a fall.
> Use a work positioning system, or some other means of access such as an elevating work platform.

6.5 INSPECTION AND MAINTENANCE OF FALL ARREST EQUIPMENT

Most fall arrest/restraint equipment has a service life of about 10 years from the date of manufacture. However, harsh work environments may mean that equipment lasts less than 10 years.

Daily inspections should be done by a competent user or operator of the equipment.

Bags or containers will help protect equipment being transported. All equipment should be stored when not in use to protect equipment from exposure to:

> sunlight/UV light
> heat
> moisture
> chemicals
> sharp edges and abrasives
> heavy objects.

INSPECTIONS

All inspections should be carried out by a suitably qualified person.

All inspections should be documented (except for operator inspections before and after use). The inspection frequency table below is a guide only – if equipment is used in harsh conditions it should be inspected more often.

INSPECTION FREQUENCY	ITEMS INSPECTED
Before and after use	PPE including harnesses, lanyards, connectors and fall arrest devices
Six-monthly (or more often according to manufacturer's or supplier's recommendation)*	Harnesses, lanyards, and associated PPE Fall arrest devices Ropes and slings
12 monthly (or more often according to manufacturer's or supplier's recommendation)*	Anchorages Fall arrest devices – types 2 and 3 Horizontal and vertical lifelines
On entry or re-entry into service*	All personal and common use equipment
After a fall arrest and before further use*	All equipment that has been stressed as a result of the fall

Table 8: Suggested inspection frequency

6.6 WORKING NEAR OR OVER WATER

When working over or near water, assess the hazards and risks to decide what control measures should be in place and what PPE should be worn and what control measures should be in place. Personal protective equipment includes life jackets and harness systems.

Have a rescue plan in place and take into account the extra risks working near water can create (eg drowning).

When operating a swing platform above water, persons in the platform may replace the safety harness and lanyard with an approved life jacket, provided a job-specific hazard assessment has been undertaken taking into account the working environment and the hazards presented in that workplace (eg structures, changing water levels, currents and wind).

6.7 RESCUING A PERSON FROM A FALL

The rescue method should reflect the complexity of the task and how accessible the fallen worker is. While a fall arrest system may hold the worker suspended, this can still lead to serious harm or death, so rescue should start immediately, so far as is reasonably practicable. If a worker is unconscious when rescued, lie them down in the recovery position until emergency services arrive.

* These inspections should be completed by a height safety equipment inspector.

In some instances it may be possible to access and assist the fallen worker from the lift below. The worker can then be brought into the lift or set in a comfortable sitting position on a guardrail or ledger.

From a hanging scaffold, cantilever, bridge span or other void situation where access to the injured worker may be difficult, the right planning, equipment, and competency of the rescuer is essential. It is advised that in a void situation that the scaffolders exposed to the fall hazard use a type 3 or similar fall arrest device to ensure the rescue does not put anyone else at risk of injury.

> There should be sufficient number of workers on site that have been suitably trained in rescue procedures and the use of specialist rescue equipment.
> Workers must be familiar with and regularly practice specific techniques for rescuing personnel working with fall arrest equipment.
> Rescue equipment must be available at all times, and maintained and inspected regularly to ensure that it is in good order and ready to be used whenever it may be required.
> A pre-rigged retrieval system is a good way of ensuring prompt rescue.

07/

SCAFFOLDING DESIGN

IN THIS SECTION:

Scaffolding designers must ensure, so far as is reasonably practicable, that the scaffolding is designed to be without risks to health and safety

7.1 INFORMATION FOR IMPORTERS AND SUPPLIERS

All scaffolding systems and equipment should be designed and proven (via analysis or testing) to meet or exceed industry standards. This also applies if a scaffolding system or component is subsequently varied or different systems are combined. See Appendix C for a full list of industry standards relating to scaffolding and scaffolding components.

Supplier and system type should be identified on all scaffolding systems and components (except for base plates, sole plates, and plain tube that is not part of a manufactured component). Markings must be permanent and legible.

Section 41 of HSWA specifies PCBU importers' duties.

Section 42 of HSWA specifies suppliers' duties.

7.2 CONSIDERATIONS FOR SCAFFOLDING DESIGNERS

Anyone involved in the design of scaffolding systems (whether they are scaffolders, engineers, or designers of components) should consider:

- the intended use of the scaffolding system
- the expected environment it will be erected and used in
- supporting surfaces/structures, including ground conditions
- how it will be used and by whom
- the planned service life
- testing, maintenance and repair requirements
- other products and components that will interact with or are related to the scaffolding
- technical specifications recommended in industry standards (eg AS/NZS 1576.1 Scaffolding – General requirements).

Scaffolds can provide access for multiple PCBUs on a site. For example, users of a single scaffold may include builders, roofers, and bricklayers, all with different needs.

To be fit for multiple purposes, a scaffold may require at least one adjustment during its use. This should be considered in the design process.

Section 39 of HSWA specifies duties of a PCBU (a designer) who conducts a business or undertaking that designs a structure that is to be used, or could reasonably be expected to be used, as or at a workplace.

7.3 ENGINEER DESIGN

A CPEng holds a statutory quality mark that indicates a professional engineer's current competence to practice in New Zealand, and to deal with complex engineering problems and activities requiring the application of specialist engineering knowledge and work from first principles.

CPEngs are listed publicly on the CPEng register at: www.ipenz.org.nz/ipenz

The following types of scaffolding should be designed by, or have the design verified by, a CPEng:

- where the design is not covered by the manufacturer's specifications or instructions
- when substituting components from different scaffold systems that have not been tested, theoretically and/or physically, as safe to combine
- where additional components are included in a proprietary system and cannot be installed in accordance with these guidelines (see Section 11)
- if the load-bearing capacity of the ground or other supporting structures has not been verified (eg propping and falsework)
- if environmental loadings have not been verified (see Section 7.6.2/loading code)
- strengthening design of scaffolding with mechanical lifting appliances with imposed load exceeding 250 kg
- tube and coupler scaffolding higher than 33 m
- scaffolds using a safety net
- event stage platforms being designed and erected to support people and materials (these may require building consent – see Section 11)
- design loads of special duty scaffolds (see Section 7.10) if there is not enough information in the manufacturer's specifications or instructions to determine or calculate loads.
- mast-climbers
- support structures for a swinging stage
- horizontal lifeline and life rail systems
- scaffolding erected directly from a supporting structure, roof, veranda or balcony (design of point loads, tie spacings etc).

INFORMATION TO PROVIDE TO THE ENGINEER

- Plan view showing dimensions and scaffold bay layout.
- Cross sections of the scaffold in relation to the work face showing transverse bracing and plank levels.
- Elevation showing longitudinal bracing and position of ties.
- Section of the proposed ties and what the ties are connected to.
- Detailed list of scaffold components and weights.
- Screening information such as weight and porosity, to determine wind loads on the scaffold.
- Intended use of the scaffold.
- Duty loading of the scaffold.
- Soil samples (on request) to determine the load-bearing capacity of the ground the scaffold is to be erected on.

7.4 SCAFFOLD LOADS

Scaffolding should be designed for the worst combination of dead loads (self weight) and live loads (temporary loads) that can reasonably be expected during the period that the scaffold is required to be in service. The foundations and any supporting structure of a scaffold must be able to carry and distribute the weight of these loads.

DEAD LOAD (SELF WEIGHT)

The dead load includes all components and equipment which are part of the scaffold. This includes structural components, platforms, edge protection, scaffold sheeting, hoists and suspension cables.

LIVE LOAD (TEMPORARY LOAD)

The live load is the combination of:

- duty live loads (classified as light, medium, heavy, special) including people and stacked materials
- environmental loads including:

- wind loads on guardrails, toeboards, stacked materials, screens, sheeting, platform ropes, guy wires and other attachments
- snow loads
- rain and ice loads in regions where they may affect the scaffold and claddings
- earthquake loads.

> impact loads (short, sudden loadings such as materials being put on or taken off a platform, or mechanical hoist operations).

Scaffolds should not be used to support formwork and plant such as hoist towers and concrete pumping equipment unless the scaffold is specifically designed to do this.

MATERIAL	APPROXIMATE WEIGHT
Bricks	4 kg per brick
Cement	40 kg per bag
Concrete block 400 x 200 x 200 mm hollow	19 kg per block
Concrete block 400 x 200 x 150 mm hollow	16 kg per block
Concrete block 400 x 200 x 100 mm hollow	13 kg per block
Concrete block 400 x 200 x 100 mm solid	16 kg per block
Concrete ready mixed wet	2550 kg per cubic metre
Concrete in wheelbarrow	140 kg
Drums empty	200 litre 13 kg
Marble	2700 kg per cubic metre
Paint five litres	10 kg
Persons single	100 kg
Persons plus wheelbarrow with concrete	220 kg
Plaster fibrous	1.6 kg per square metre
Plaster bag	38 kg
Plywood 17 mm	10 kg per square metre
Sand	2000 kg per cubic metre
Shale	2600 kg per cubic metre
Steel rods 6.5 mm diameter	25 kg per 100 m
Steel rods 10 mm diameter	67 kg per 100 m
Steel rods 12 mm diameter	89 kg per 100 m
Steel rods 16 mm diameter	158 kg per 100 m
Steel rods 20 mm diameter	247 kg per 100 m
Steel rods 25 mm diameter	358 kg per 100 m

MATERIAL	APPROXIMATE WEIGHT
Tiles terra cotta	3.5 kg per tile
Tiles concrete	3.75 kg per tile
Timber hardwoods	1100 kg per cubic metre
Timber softwoods	640 kg per cubic metre
Water (excluding container)	1 kg per litre
Right angle coupler	1 kg
Single coupler	0.6 kg
Joiner	0.8 kg
Swivel coupler	1.2 kg
3 m laminated timber plank	18 kg
48.3 mm galvanised scaffold tube 1 m	4.4 kg per metre

Table 9: Typical weights of people and materials

DUTY LIVE LOAD CLASSIFICATIONS

When calculating loads, note that the intent is that they will be uniformly distributed loads (UDLs).

Light-duty: A load of (up to 2.2 kN) 225 kg per bay, including a single concentrated load of (1 kN) 100 kg.

> The maximum number of working platforms useable concurrently in any one bay of a tube and coupler scaffold is:
  - Scaffold height up to 13.5 m high – four lifts or working platforms per bay.
  - Scaffold height up to 33.0 m high – two lifts or working platforms per bay.

Medium-duty: A load of (up to 4.4 kN) 450 kg per bay, including a single concentrated load of (1.5 kN) 150 kg.

> The maximum number of working platforms useable concurrently in any one bay of a tube and coupler scaffold is:
  - Scaffold height up to 13.5 m high – 2 lifts or working platforms per bay.
  - Scaffold height up to 33.0 m high – 1 lifts or working platforms per bay.

Heavy-duty: A load of (up to 6.6 kN) 675 kg per bay, including a single concentrated load of (2 kN) 200 kg.

> The maximum number of working platforms useable concurrently in any one bay of a tube and coupler scaffold is:
  - Scaffold height up to 13.5 m high – 2 lifts or working platforms per bay.
  - Scaffold height up to 33.0 m high – 1 lifts or working platforms per bay.

Special-duty: The heaviest intended load but not less than 1 kPa (or 102 kg/m^2).

Where loads exceed heavy duty, the scaffold must be classed as special duty and designed to support the heaviest intended load, but not less than 1 kPa over the entire working platform.

The maximum duty loads are calculated as uniformly distributed loads (UDL) of the full bay, while the concentrated or point load should be assumed to be in the most adverse position in the bay.

Proprietary Scaffolds: The number of lifts that can be loaded in a bay of a proprietary scaffold system of light, medium or heavy duty should be specified in the manufacturers' instructions. Different systems will have different load capacities which may allow more or less lifts to be loaded within a bay.

7.5 SCAFFOLDS FOR PUBLIC ACCESS

Scaffolds for public access can include:

> pedestrian walkways

> footbridges

> stairs.

When designing scaffolds for public access, consider the most traffic expected to use it, and whether it needs fire access. These kinds of scaffolds need resource and building consent and should be designed by an engineer.

7.6 CALCULATING LOAD COMBINATIONS

Load combinations for strength limit states can be calculated as follows:

(**1.5 x dead load**) + (**1.5 x live loads**, including environmental and impact loads)

Note: When re-using scaffold materials, the sum of the dead and live loads should be increased by 15 percent.

LIVE LOADS ON STANDARDS

Live loads on standards vary for different bays and platforms. The following examples demonstrate how to calculate loads for a particular bay on a platform.

To calculate the live load on a standard, assume that each standard in the bay supports one third of the duty live load on each platform in each adjoining bay. This allows for off-centre loading of platforms and concentrated loads placed closer to a standard.

Example calculation for design load for a standard

For a medium duty scaffold, the live load is 4.4 kN (450 kg per bay). The live load on each standard between two bays based on the worst possible loading in adjacent bays is:

4.4 kN (450 kg) x 2/3 = 2.9 kN (300 kg)

Assume the dead load of the scaffold supported by the standard is 3.5 kN (350 kg).

The design load for this standard is:

2.9 kN (300 kg) + 3.5 kN (350 kg) = 6.4 kN (650 kg) with one loaded lift within the bay.

ENVIRONMENTAL LOAD DESIGN MAY REQUIRE ENGINEER INPUT

Environmental loadings are complex to calculate. There are also times when design loads may be unverified. Scaffolders should understand the basic principles and seek professional advice from a CPEng.

Where environmental loads (such as adverse weather conditions) mean that work should not proceed, the load calculation for that situation may be restricted to the dead loads, live loads (from material stacked on the scaffold) and environmental loads. When work starts again the loading will change.

7.7 PERMISSIBLE LOADS ON SCAFFOLD TUBE

CLEAR SPAN (mm)	TUBE AS A BEAM				TUBE AS A STRUT	
	Simply supported beam		Cantilevered beam			
	Point Load (kg)	UDL (kg)	Point Load (kg)	UDL (kg)	Strut length (mm)	Concentric Load (kg)
225	917	1835	229	459		
300	687	1373	172	343	300	3870
450	456	914	114	228		
600	343	684	86	171	600	3740
675	304	610				
900	230	456			900	3522
1125	181	363				
1200	170	341			1200	3190
1350	159	301				
1500	134	270			1500	2770
1575	128	254				
1800	110	221			1800	2275
2050	98	196				
2100	94	187			2100	1809
2250	88	173				
2400	82	162			2400	1442
2700	72	143			2700	1164
3000	64	127				

Table 10: Maximum permitted loads on galvanised steel tube (48.3 mm outside diameter and 3.2 mm wall thickness)

Notes:

1. Cantilevered spans (beam) exceeding 600 mm are not recommended.
2. UDL = Uniformly Distributed Load.
3. Allowance has been made for 15% reduction for reuse and the self-weight of the tube and limits the deflection of beams to 1/150 of the span.

ALUMINIUM SCAFFOLD TUBE

CLEAR SPAN (mm)	TUBE AS A BEAM				TUBE AS A STRUT	
	Simply supported beam		Cantilevered beam			
	Point Load (kg)	UDL (kg)	Point Load (kg)	UDL (kg)	Strut length (mm)	Concentric Load (kg)
225	1633	3266	354	816	225	6750
300	1224	2449	199	531	300	6527
450	816	1632	88	236	450	6082
600	612	1224			600	5637
675	544	1007			675	5414
900	354	566			900	4746
1125	226	361			1125	3595
1200	198	317			1200	3159
1350	156	250			1350	2496
1500	126	202			1500	2020
1575	114	183			1575	1834
1800	87	139			1800	1404
2050	68	109			2050	1109
2100	63	101			2100	1032
2250	55	88			2250	899
2400	48	76			2400	790
2700	37	59			2700	624
3000	29	47			3000	505

Table 11: Maximum permitted loads on aluminium tube (48.3 mm outside diameter and 4.45 mm wall thickness)

Notes:

1. Cantilevered spans (beam) exceeding 450 mm are not recommended.
2. UDL = Uniformly Distributed Load.
3. Allowance has been made for 15% reduction for reuse and the self-weight of the tube and limits the deflection of beams to 1/150 of the span.

7.8 LOADS ON INCLINED LOAD-BEARING MEMBERS

Scaffolding tubes used as a strut (ie as a spur or a raker) under compression must be supported by a brace. The maximum distance between node points is 3 m.

PERMITTED LOADS ON SPECIAL DUTY SCAFFOLD

Live loads for special duty structures must be designed by a CPEng, unless there is enough information and structural values to calculate loads.

CALCULATING THE SCAFFOLD AREA

Multiply the horizontal length of a scaffold by the average height of the scaffold to give the scaffold area in square metres:

length (m) x average height* (m) = Area (m^2)

Example calculation for the area of scaffold (Figure 6)

A scaffold is 10 m high to the top working platform at one end and 5 m high to the top working platform at the other end. The scaffold is 24 m long

length: 24 m

average height: 10 m + 5 m = 15 m / 2 = 7.5 m

area of scaffold: 24 m x 7.5 m = 180 m^2

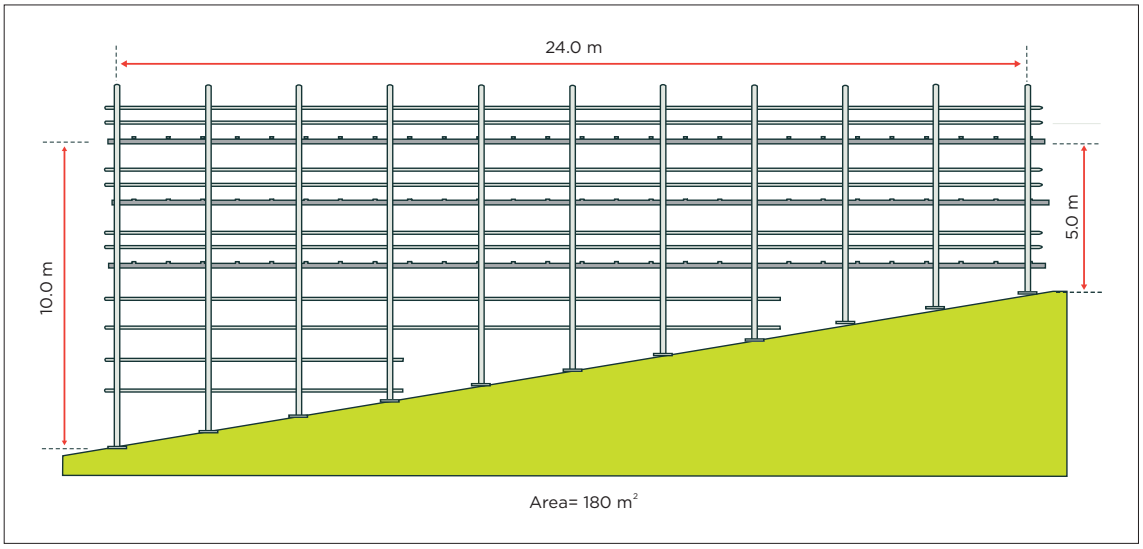


Figure 5: Example calculation for the area of a scaffold

* Measured from the top working platform, when calculating the area of scaffold sheeting, the height will be measured to the top of the highest component.

7.9 STABILITY

The scaffold structure must be designed and constructed to remain stable against overturning, and it must be able to provide support for all loads imposed on it for the full period that the scaffold is in place.

If stability is in doubt, the scaffold must be assessed by a competent person.

MINIMUM TIP FACTOR RATIO

MINIMUM FREE-STANDING SCAFFOLD HEIGHT (TO TOP WORKING PLATFORM)	TIP FACTOR RATIO (BASE-TO-HEIGHT RATIO)
Up to and including 2 m	1:2
More than 2 m	1:3

Table 12: Base-to-height tip factor ratio for free-standing scaffolding

7.10 SCAFFOLDING OVER VERANDAS, GANTRIES OR ROOFS

Scaffolding over verandas, gantries or roofs can be hazardous. If the scaffolder cannot verify the load capacity of the supporting structure or that the load path transfers directly through the structure to back props and to the ground, the scaffold must be designed (or have the design verified) by a CPEng.

METHODS OF ERECTING THE SCAFFOLD

> Erect the scaffold directly through the supporting structure (eg standards pass through the supporting structure).

> Backprop the supporting structure, directly below each standard. This transfers the scaffold weight through the supporting structure, to the backpropping directly below each standard. A visual inspection of the inside of the supporting structure will be required and a CPEng may need to verify the design.

> Backprop the supporting structure, when the standards and backpropping are not directly in line. This may require using a beam system on top of the backpropping under the supporting structure, and a similar beam system on top of the supporting structure, below the standards. This method is used to transfer the load of the standard along the beam system when the backpropping has to be offset. A CPEng may need to verify the design.

> Erect the scaffold directly on the supporting structure. A CPEng must verify that the supporting structure can support the imposed loads of the scaffold.

> Erect a heavy-duty gantry over the structure, and scaffold from the gantry. A CPEng may need to verify the design.

> Cantilever out a window or opening above the structure, to support the scaffold. A CPEng may need to verify the design.

- Hang a scaffold from the parapet to form a hanging scaffold. A CPEng may need to verify the design.
- Suspend a scaffold (swinging stage or boatswain's chair).

7.11 SPECIAL DUTY SCAFFOLD

A special duty scaffold doesn't comply with the general requirements of a light, medium or heavy-duty working platform with respect to loadings and/or dimensions.

EXAMPLES OF SPECIAL DUTY SCAFFOLDS

- Bay widths and lengths that do not meet the minimum or maximum width requirements.
- Lift heights that do not meet the minimum or maximum height requirements.
- Where one or both guardrails are excluded.
- Where toeboards are excluded.
- Vertical ladder on non-proprietary scaffolds.
- Scaffolds with a gap greater than 300 mm to the workface without inside guardrails.
- Limited access scaffolds.
- Tube and coupler scaffolding over 33 m.
- Scaffolds erected from proprietary equipment that fall outside the manufacturer's specifications.
- Special duty bridging scaffolds.
- Special duty roof saddle scaffolds.

All special duty scaffolds should be erected, altered, repaired and dismantled by a holder of an appropriate certificate of competence, regardless of height. That person should also do the handover to the user/client.

Special duty scaffolds that are 5 m or more must be notified to WorkSafe and must only be worked on by holders of appropriate certification. They should be designed by a CPEng (see Section 7) unless there is enough information and structural values to calculate loads.

Consider notifying other kinds of special duty scaffolding to WorkSafe where a risk assessment has identified a greater risk of serious harm. Some examples of this kind of scaffolding are:

- concentrated weight scaffolds
- special duty loading platforms
- special duty cantilever scaffolds
- special duty hanging scaffolds
- special duty falsework (propping)
- stage platforms being designed and erected to support people and materials
- scaffolds erected directly from a supporting structure, roof, veranda or balcony.

08/

ERECTING THE SCAFFOLD

IN THIS SECTION:

During the scaffolding process, scaffolders will be faced with a number of risks to their health and safety.

The following sections cover general methods and principles for erecting scaffolding (many also apply to dismantling). These are particularly relevant to tube and coupler (also known as tube and clip) scaffolding systems, which are generally not covered by manufacturer's specifications and can be erected in many different configurations.

For proprietary scaffolding systems, always refer to the manufacturer's instructions and specifications. For information specific to particular types of scaffolding, see the relevant section of these guidelines.

While 'minimum' dimensions and measurements are stated, the most important thing to remember is that the equipment must be fit for purpose. Consider all factors rather than using equipment and components that meet the minimum requirements.

Common risks when erecting (and dismantling) include:

> People falling from the scaffold (eg due to inadequate edge protection, incomplete working platform, or component failure).
> Components or pieces of equipment falling and injuring someone below.
> Incorrect use of, or defective or badly maintained, tools or components cause personal injury.
> Scaffold collapsing (eg due to incorrect construction or design)
> Personal injury from manual handling of equipment (ie unloading and loading, carrying or transporting components).

Eliminating the risk of a fall is required over protecting someone from a fall.

If it is not reasonably practicable to eliminate the risk of a fall, it must be minimised so far as is reasonably practicable. The tunnelling method or advance guardrail systems are recommended to prevent the risk of falling when erecting scaffolding. (See Section 8.6)

Section 43 of HSWA specifies the duties of PCBUs who install, construct, or commission plant or a structure that is to be used, or could reasonably be expected to be used, as or at a workplace.

8.1 BEFORE YOU START

Work involving the erection and dismantling of scaffolding, where a person may fall 5 m or more, (measured from the highest platform that a person could fall from) must be notified to WorkSafe at least 24 hours before work begins (see Appendix B).

Some special duty scaffolds and scaffolds involving high risks should also be notified to WorkSafe (see Section 7). See http://forms.worksafe.govt.nz/hazardous-work-notification

> Isolate the work area using, for example, diversion barriers.
> Install signage/tags on the access points of incomplete scaffold stating 'INCOMPLETE SCAFFOLD' or 'UNSAFE SCAFFOLD' as soon as possible and where they are easy to see.

- If the scaffold is erected adjacent to or over public spaces or adjoining property specific controls like hoardings, catch fans or barricades with clear signs should be provided. Catch platforms should be designed to support a uniformly distributed load of not less than 5 kPa.
- The bottom lift should have a maximum height of 3 m, and all other lifts should be between 1.8 and 2.1 m high.
- The scaffold structure should be assembled with edge protection installed progressively (see tunnelling method steps in Section 8.6) so no one is exposed to a fall.
- The scaffold must be as close as practicable to and no more than 300 mm away from the working face. If this is not practicable, inside guard rails must be installed.
- Harness, safety helmet and appropriate safety footwear must be worn at all times while erecting, altering or dismantling scaffolding. The harness must be hooked on to a suitable anchor point when there is a risk of a fall that could cause harm. (See Section 6.) Tighten scaffold components and connections securely using the correct tools.
- Install all bracing, ties, guy ropes and buttresses as the scaffolding is being erected.
- Ensure scaffold bays are not overloaded with scaffolding to be installed.
- Install ladders and stairs at the same time as scaffold platforms and edge protection. Do not climb the outside of the scaffolding.
- Non-proprietary platforms must have a minimum bay width of 675 mm wide. All platforms must allow 450 mm of clear access past stacked material and obstructions such as roof eaves.
- Inspect every part of the scaffold when it is complete to ensure it is safe and fit for purpose. Checklists in Appendix F can be used.
- When the scaffold is safe and ready for use, attach ‘SAFE SCAFFOLD’ signs at access and egress points.

8.2 FOUNDATIONS AND SUPPORTING STRUCTURES

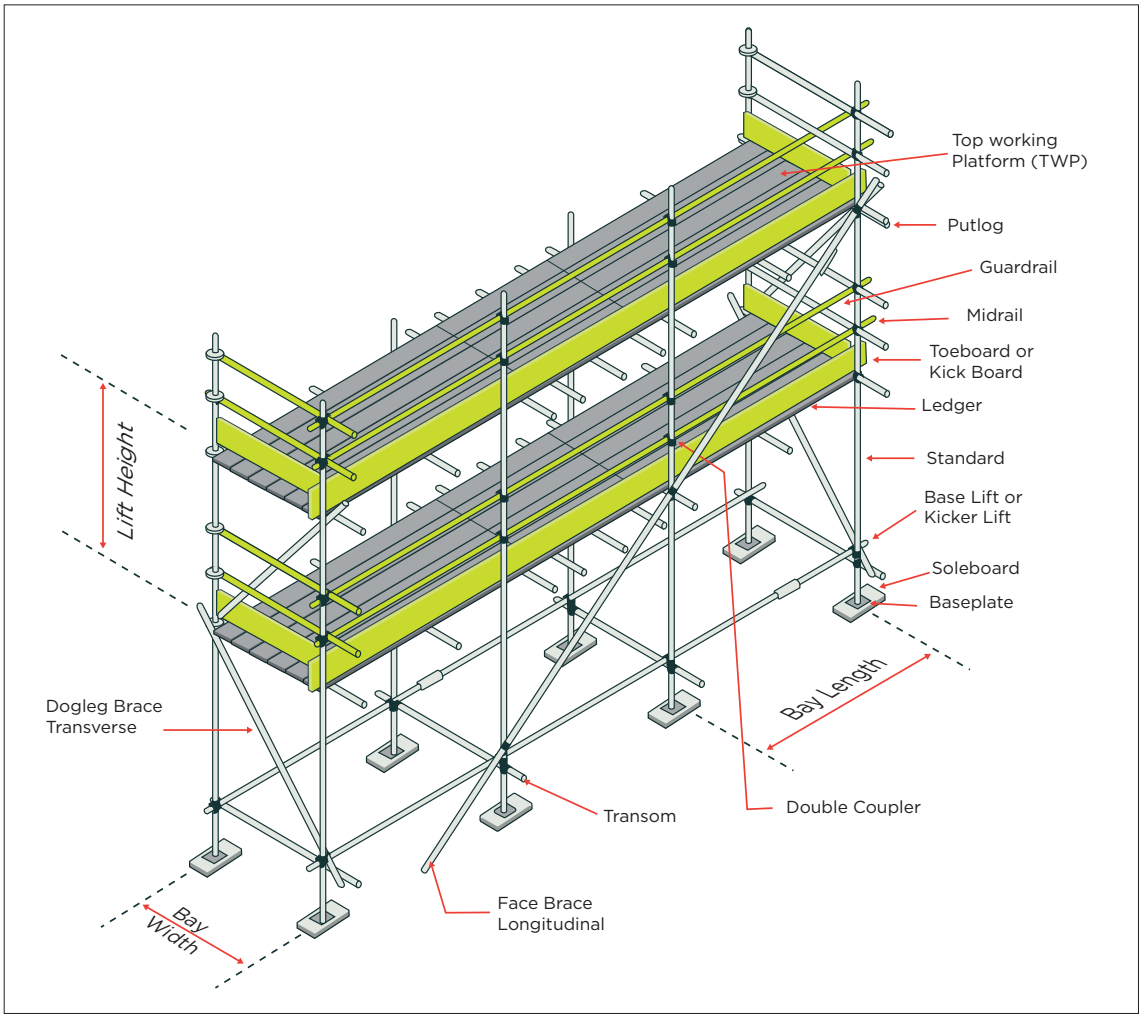


Figure 6: Common scaffold terms and components

Foundations must be able to carry all of the loads on the scaffold (dead and live loads; see Section 7). The foundations must be able to carry and distribute these loads at each standard, and over the whole area of the loaded scaffold (see Table 14). Determining this is the first step in basing out the scaffold.

Weather conditions, particularly wind and rain, and the load-bearing capacity of the ground/supporting structure are important considerations. In particular, think about areas that are:

> adjacent to trenches and on slopes, as the pressure exerted by the scaffold may cause the ground to subside

> prone to runoff or flooding, as flowing water or saturated ground may cause the ground to subside or be undermined

> sand or light material that has poor load bearing and may blow or wash away.

If the load-bearing capacity of the foundation or supporting structure is difficult to determine or verify, a CPEng must verify or undertake the design. The ground may need to be tested.

GROUND CONDITIONS	NOMINAL BEARING CAPACITY (kg/m²)
Soft clay – can be moulded by light finger pressure	2,000
Sand	5,000
Stiff clay – can be moulded by strong finger pressure	7,500
Hard clay – difficult to indent with thumb	10,000
Rock	50,000

Table 13: Load-bearing capacity of different ground conditions

SOME TYPES OF SUPPORTING SURFACES AND STRUCTURES

> Concrete floor slabs
> Tar seal or bitumen surfaces
> Compacted fill
> Uneven ground or rough terrain
> Sloping ground
> Soft soils or sand
> Verandas

SOLEBOARDS

Soleboards are used under baseplates or adjustable basejacks to distribute the load of the scaffold and to protect surfaces which may be adversely affected by point loadings (such as timber floors).

Soleboards may not be required on level solid surfaces (eg reinforced concrete floor slabs).

The softer the ground and/or the heavier the loads, the bigger the soleboard required.

Minimum contact area = vertical load / bearing capacity of supporting surface

Length of soleboard = minimum contact area / width of soleboard

Don't assume a soleboard which meets the minimum size requirements (500 mm x 200 mm x 38 mm thick) is large enough to support the load imposed by a standard.

DIMENSIONS	SUITABLE MATERIALS	UNSUITABLE MATERIALS
The thickness and size of the soleboard should suit the situation, and must be at least: > 38 mm thick > 200 mm wide x 500 mm long on soft surfaces such as asphalt and compacted gravel to give a minimum ground contact area of 0.11 m²	> Pinus radiata > Hardwoods > Laminated ply > Scaffold planks (light duty scaffold only)	> 100 x 50 mm stacked timber blocks > concrete blocks > bricks > pallets

Table 14: Minimum dimensions and materials for soleboards

Example calculation:

If the scaffold is to be erected on a stiff clay surface (load-bearing capacity 7,500 kg/m^2) and each standard has a design load of 860 kg:

Minimum contact area = 860 kg ÷ 7,500 kg/m^2 = 0.115 m^2

To calculate the length of a soleboard that is 225 mm wide:

Length of soleboard = 0.115 ÷ 0.225 = **0.511 m**

BASEPLATES

A baseplate distributes the load from a standard to the soleboard or supporting structure.

A baseplate must be used under every standard that does not have either a castor or an adjustable basejack. Baseplates should be a minimum 200 cm^2 with minimum length or width of 120 mm. Generally they are 150 x 150 mm. They should be at least 6 mm thick for steel, or 10 mm for aluminium, with a shank of at least 50 mm of at least 50 mm for centering under the standard.

BASEJACKS

Adjustable basejacks (also known as screwjacks or adjustable baseplates) allow the scaffold to be levelled. They have the same base area and thickness requirements as baseplates. The shank has a threaded section with a positioning nut that generally has small handles to assist in turning. The minimum shank length inside the standard is 150 mm. It is good practice to only use 50% of the adjustment available on a basejack

Basejacks are commonly used with proprietary scaffold systems. They can be used:

> in conjunction with a U-head plate to act as a U-head jack, or

> horizontally to place a scaffold tube in compression (eg when they are used with a tube in a window frame to form a reveal tie).

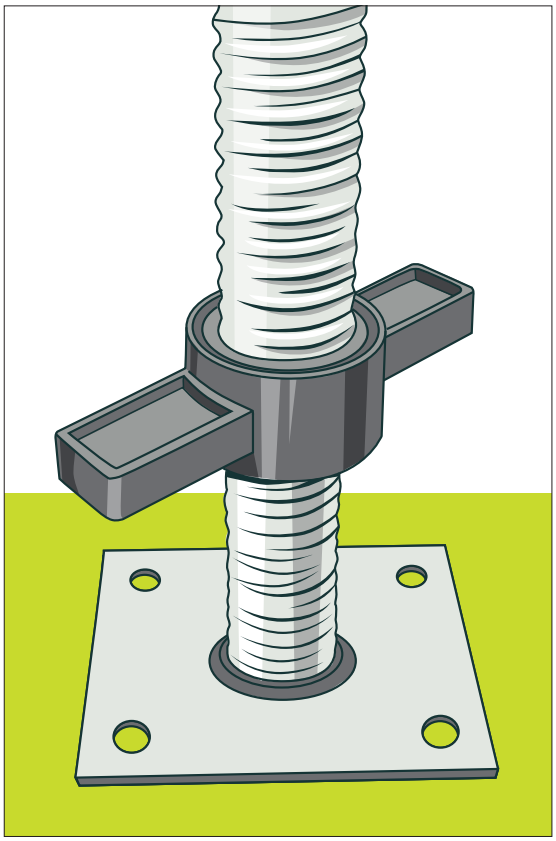


Figure 7: Basejack

Note: Baseplates and basejacks should be used in accordance with the manufacturer's instructions and should not be extended beyond the recommended distance.

8.3 BASING OUT

Note: For proprietary scaffold systems, refer to the manufacturer's specifications. Most proprietary scaffold systems require ledgers and transoms to be fitted at the base of the scaffold.

> Make sure the stability of the ground is known.

> Decide how the scaffold will be kept stable, upright and free from undue movement. This may influence the design of the scaffold base so must be done early in the process. Use suitable soleboards and baseplates.

- Level the ground and clear the area on which the scaffold is to be erected of any debris.
- Determine how the scaffold will follow the perimeter of the building or structure and plan and measure carefully. See Section 10.
- Ensure the placement of the first standard is the high point of any slope.
- Stagger standards (ie erect standards, so that only one standard in a pair finishes in any one vertical lift. Stagger all ledgers and guardrails).
- Ensure all standards and ledgers are plumb and level. If in doubt check with a spirit level. Maximum tolerance is + or - 5 degrees.
- Ensure all joins in standards and ledgers are in the correct position and made with the appropriate components.
- Do not use internal joint pins in ledgers as they are not rated for tension loads.
- Ensure all standards bear firmly against baseplates.
- Ensure all standards and ledgers are constructed with the appropriate span for the duty loadings of the scaffolding.
- Engage a CPEng to perform or check calculations and design of falsework and propping systems where necessary, and adhere to all dimensions and specifications.
- Ensure the working platform is as close as practicable to the working face, with a gap of less than 300 mm.

BASING OUT ON SLOPING GROUND

Use a sloping ledger installed as low as practicable and following the slope of the ground by connecting transoms with right-angle couplers to the standards and the sloping ledger (see Figure 5) or use a sloping ledger connected directly to the standards with swivel couplers.

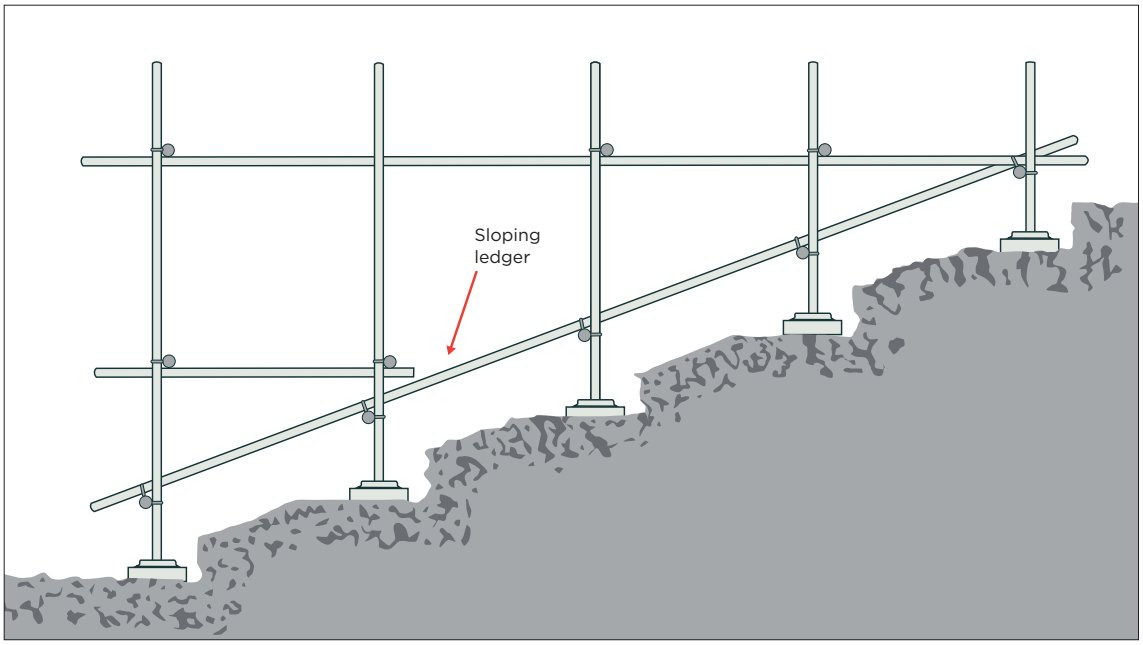


Figure 8: Basing out on a slope

BASING OUT OVER AN OBSTRUCTION OR TRENCH

Longer soleboards may be used when basing out over an obstruction or trench to distribute the load away from the edge of the trench.

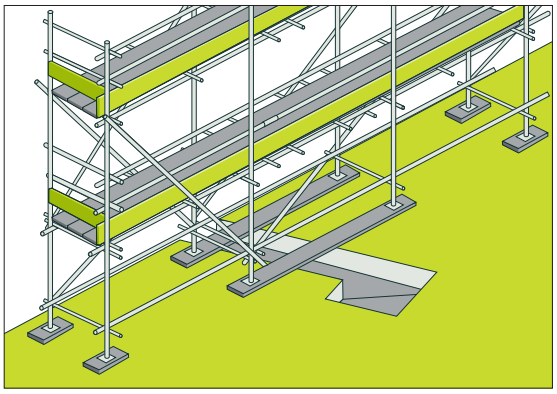


Figure 9: Basing out over a trench

8.4 BRACING

Scaffold structures must be adequately braced in every plane. This will generally require bracing in at least two directions depending on the design and configuration of the scaffold system. Bracing may include:

> longitudinal (or face) bracing
> traverse bracing
> plan bracing
> rakers.

For proprietary scaffolding systems, refer to the manufacturer's specifications.

For tube and coupler scaffolding see Section 10.

8.5 EDGE PROTECTION

This section is about edge protection on a scaffold to prevent people, material and tools falling from the working platform. For scaffolding used as roof edge protection, see Section 12.7.

Edge protection must be provided at the open sides and ends of all platforms and landings. Toeboards should be fitted to all platforms.

Full edge protection must be installed where the gap between the working platform and the working face exceeds 300 mm. For scaffold systems incorporating a ledger outside the platform and between the standards, the gap may be measured between the standard and the working face. If this isn't practicable, the scaffold is classified as special duty.

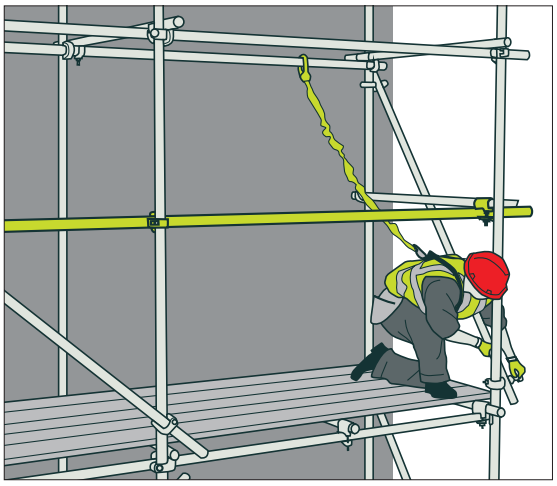
Guardrails must be between 900 and 1100 mm high with a midrail located halfway between the work platform and the top rail. See table 17 for more details. Guardrails must be capable of supporting at least a 71 kg (700N) downward force and a 46 kg (450N) horizontal force.

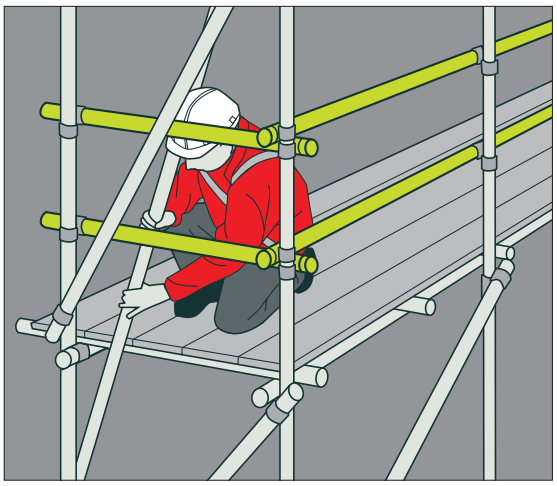
The advance guardrail or tunnelling methods are the recommended methods to safely install edge protection (see below).

8.6 GUARDRAIL INSTALLATION METHODS

THE TUNNELLING METHOD (PREFERRED METHOD FOR TUBE AND COUPLER)

The tunnelling method allows a guardrail to be progressively installed on a fully planked platform so that when the scaffolder enters the platform, edge protection is already in place. This creates a safe zone to protect scaffolders and other workers during erection and dismantling of the scaffold.





This method not only protects the scaffolder but provides a safe zone for the completion of the lift and for others to use during alteration or dismantling. The only piece of additional equipment is a single guardrail on non-working platforms.

While each type of scaffold has some specific requirements, the tunnelling method should be used in all situations when it is not practicable to eliminate the risk of a fall. For proprietary scaffolds refer to the manufacturer's instructions.

Figure 10: The tunnelling method

TUNNELLING METHOD STEPS	NOTES
1. Base out the scaffold and fully plank out the base lift (minimum 675 mm bay width) from below.	Staggered standards assist in installing the guardrail as this reduces the need to hemp all exterior standards.
2. Install access stairs or ladders.	Ladders or stairs should be erected in the same sequence as the platform to allow safe access to the next lift.
3. Connect lanyard to an appropriate anchor point and use the stairs or ladder to access the planked platform above.	The inside ledger is an appropriate anchor point for tube and coupler.
4. While hooked on, install the first section of guardrail and stop end to create a safe zone above.	Equipment is passed up from below.
5. Progressively install the single guardrail along the scaffold. > Install the next guardrail by staying within the safe zone and reaching down to connect the lanyard to the inside ledger at deck height in the next bay. > Receive the standard in the safe zone and walk out and hemp the standard while attached to the inside ledger. > This process can be repeated until the complete lift is a safe zone with a single guardrail on all exposed sides of the scaffold.	A scaffolder may only move along the scaffold for the maximum length of the longest ledger (typically the bay length or 6.5 m for tube and coupler scaffold). Once a single guardrail is installed the lift can be completed without hooking on the safety harness, unless there is a risk from a fall (eg from an unprotected platform, or if you need to raise the planks you are standing on).
6. Repeat the procedures for subsequent lifts.	Single guardrails should be left in place on all non-working platforms (dummy lifts) to provide a safe zone for altering and dismantling the scaffold.
7. The erection procedures above should be used in reverse when dismantling the scaffold.	Planks should be flipped up on their edge prior to removal to protect the eyes of the scaffolder from debris left on the scaffold. This can be done from the deck level itself if one plank only at a time is lifted up onto its edge then replaced to maintain the planked deck.

Table 15: Tunnelling method steps

ADVANCED GUARDRAIL INSTALLATION METHOD

Telescopic rails allow stanchions that are attached to the standards to be moved up to the next platform level while the scaffolder remains on the platform below. Platforms must be fully planked from below before scaffolders move up to that level to install the platform guardrails.

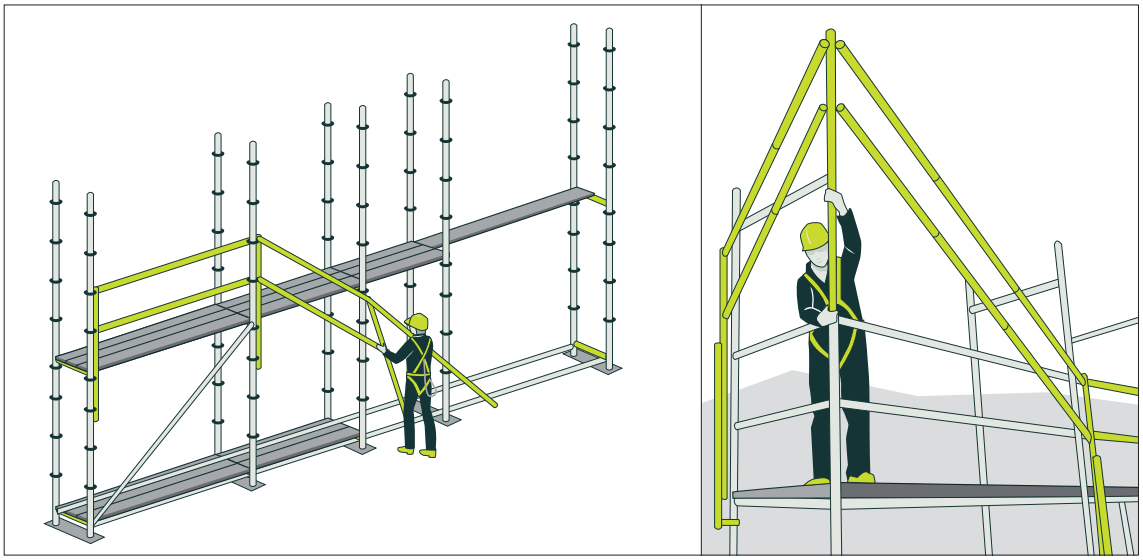


Figure 11: Advanced guardrail system

PROGRESSIVE GUARDRAIL INSTALLATION METHOD

A guardrail is installed from the level below before the work platform is installed (see Figure x). The scaffolder can then enter the platform with the edge protection already in place.

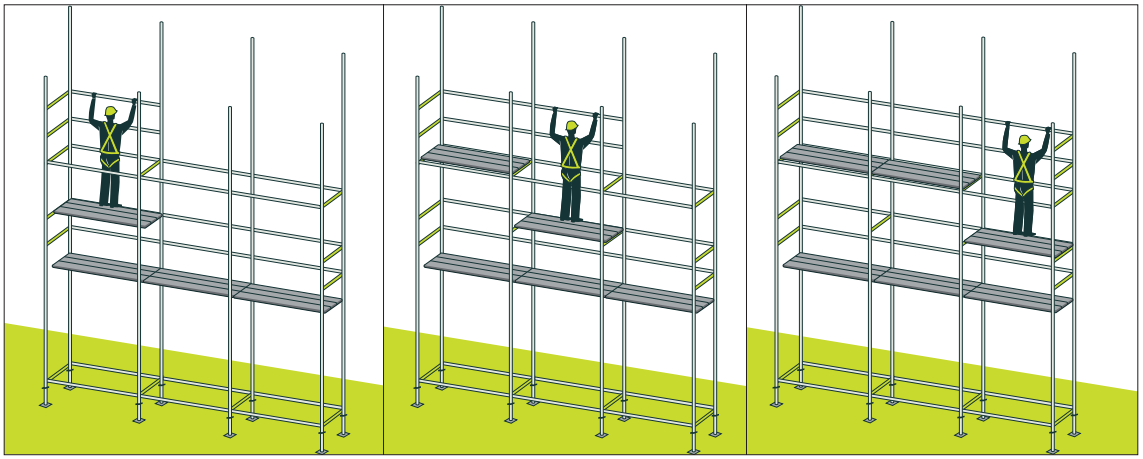


Figure 12: Progressive guardrail installation

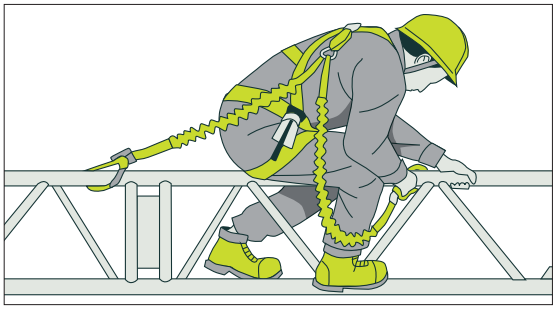


Figure 13: Double lanyard lead climbing (least preferred method)

8.7 PLATFORMS

All platforms, whether they are working or access platforms, must meet the requirements of the job. Platforms are rated as light, medium, heavy or special duty.

While non-proprietary platforms must have a bay width at least 675 mm wide, **all** platforms must allow 450 mm of clear access. This means that if the platform will be used to store materials as well as accommodate workers, it will need to be made wider to allow for clear access.

Platforms must be:

> as close as practicable to the working face with a maximum gap of 300 mm
> strong enough to support all loads placed on them including dead and live loads
> fitted with edge protection (ie with guardrails and toeboards)
> wide enough to allow 450 mm of clear access past any stacked material or obstruction
> free of trip hazards (ie planks must be secured and butted rather than lapped in most circumstances (see 7.8 Planks below)).

Gaps in the working platform should not exceed 50 mm. The minimum width of a scaffold plank, lap plate or prefabricated platform unit is 225 mm ± 5 mm. There are also narrower components such as infill planks.

8.8 ENSURING ADEQUATE AND SAFE ACCESS AND EGRESS

Access to working platforms must be adequate and safe for the working conditions and type of work to be carried out. Plan for the number of people using a scaffold and whether they need to carry materials or tools to the working platform.

> Where possible, install a stair access rather than a ladder access. Ramps and personnel hoists are alternative options.
> Access openings and stairways must not have sharp edges or points that could cause injury.
> Openings in edge protection at access points to stairways and ladders must be protected by gates, tortured path, or be sufficiently distant from the working platform so that a person cannot fall through the opening.
> Gates must open inwards onto the platform and be self-closing. Where gates are being used in place of guardrails, they must be designed and located so they perform the same function.
> Where a personnel hoist is used, an alternative, non-mechanical means of egress such as stairs or a ladder should also be provided.
> Platforms must allow 450 mm of clear access past ladder openings (see Section 8.7 above).

STAIRS

Stairs may come in a ‘stair unit’, which is attached to a scaffold by hooking over a tube or transom and placed in a separate bay against a working platform. See AS/NZS 1576.1 for full requirements.

> Handrails must be present and set 900 mm – 1100 mm above the stair tread and the landing. Flexible materials must not be used.

- There must be a gate in place or tortured path to prevent people walking from a working platform into the stair opening.
- If stairs are made up using components, they must be checked to ensure all steps are level, secure from movement and rotation, and can take the live loads imposed. Stair treads must be slip resistant and measure at least 500 mm wide x 175 mm deep x 150-225 mm high.
- If using a 1.5 m high stair, there must be a stepping platform from the working platform to the stair. A minimum landing of 400 mm (in the direction of travel) must be provided at the top and bottom of each flight of stairs.

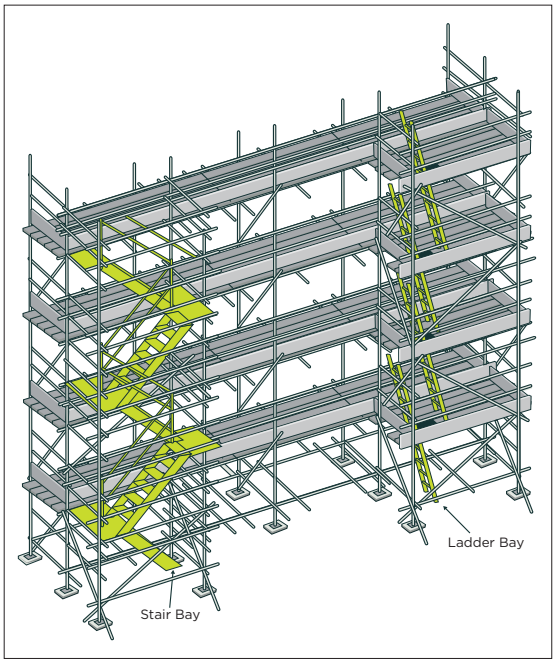


Figure 14: Ladder and stair access

LADDERS

Ladders are an appropriate option where access to the working platform is only used by a small number of people and where materials, tools and equipment can be delivered by material hoist, crane or rope and gin wheel.

All ladder access openings in a platform must be kept clear and be protected by either a hatch, gate or by barriers (see tortured path below). Workers should not be required to climb over or through guardrails to access the working platform from the ladder.

- Where practicable, ladders should be erected in an independent scaffold bay, so they do not interfere with the working platform.
- Ladders must be in good structural condition and not affect the stability of the scaffold.
- Where practicable, ladders must be pitched at a slope of not less than 1 in 4 and not more than 1 in 6.
- Ladders must be securely tied to prevent movement top and bottom.
- Ladders must extend at least 1 m above the exit point. A ladder can stop at the exit point if sufficient guardrails (stop ends) are in place that can be used to hold onto.
- The height of the lowest rung must be no more than 400 mm from the supporting surface.
- The maximum ladder height between working platforms or landings must not exceed 4.2 m.
- Ladders must be offset to prevent a single continuous ladder.
- External ladders may only be used to a height of 5.1 m or two lifts above the supporting structure.

INTERNAL LADDER ACCESS TO WORKING PLATFORM

Internal ladder access to a working platform must have either guardrails or a hatch to protect the opening or void in the working platform. Keep the hatch closed. Avoid vertical ladders if practicable.

If the outside of the hatch requires support (ie if there is no outside plank to support it) a coupler can be attached to the outside ledger. It is recommended that the hatch should be lapped a minimum of 32 mm onto the adjacent planks.

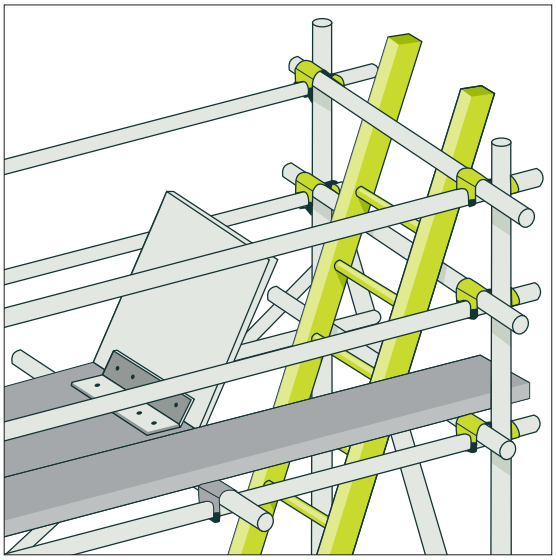


Figure 15: Internal ladder hatch

EXTERNAL LADDER ACCESS

An external ladder may be used to provide access to the first and second lifts. The ladder is generally secured to a putlog that is extended beyond the bay. There should be an inward-opening, self-closing gate in place at access points.

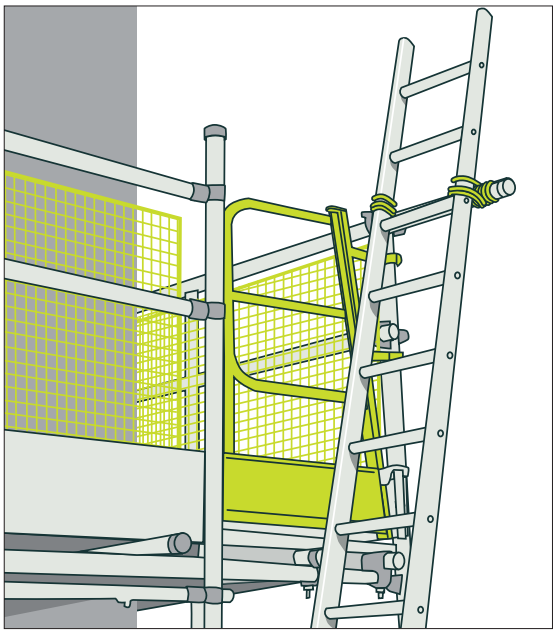


Figure 16: External ladder access with self-closing safety gate

PREVENTING FALLS THROUGH ACCESS OPENINGS VIA TORTURED PATH

All ladders above the second lift must be erected within the framework of the scaffold or in a dedicated ladder access bay. Creating a barrier that a person must walk around to access a ladder opening in such a bay is called a tortured path. It prevents a person stepping backwards from a platform into the ladder opening.

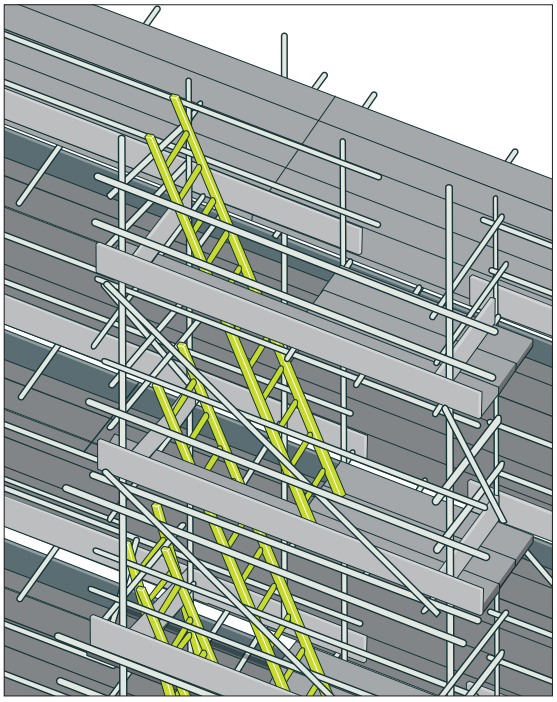


Figure 17: Ladder access bays with single lift ladders and tortured path

8.9 PLANKS

Planks (scaffolding decking components) can be modular or non-modular and can be made of timber, steel, aluminium, or plastic.

Planks must be of uniform thickness and width. (See requirements below.) They should be slip resistant, secured to prevent displacement in normal use, and positioned to avoid significant gaps and trip hazards. End overhang of planks must be 80 mm minimum to 220 mm maximum.

They should be butted, not lapped, (except at returns, curved faces or unusual profiles) to reduce trip hazards.

Planks can be secured with twine, steel wire, plastic strapping, scaffold components or spring-loaded hooks.

Timber planks should be supported by ledgers, transoms or putlogs with a maximum spacing of 1.4 m. Steel, aluminium and plastic planks must be supported according to the manufacturer's instructions.

Planks can fail due to deterioration or impact loads such as someone jumping from a roof above the working platform. Serious injuries due to plank failure in recent years could have been prevented with a span of 1.4 m or less.

GENERAL MAINTENANCE OF PLANKS

Visually inspect planks before each use. Look for:

> laminations separating (laminated planks)
> warping, twisting, breaks and splits
> end fixings missing or damaged
> deep burns
> oil stains
> projecting nails
> rot
> saw cuts and notches.

Fillet stack damp or wet planks to allow them to dry before being stored for future use. They should be stacked on at least three pieces of dunnage and separated with fillets to ensure air can circulate freely until planks are completely dry.

Store dry planks under cover when they are not in use. They can be block stacked but must be kept off the ground by at least three lengths of dunnage.

Damaged planks may be cut down to remove a damaged area. Cut ends may need to be fitted with screws or plates to prevent splitting.

Mechanical testing can be used as an additional measure to ensure planks have not deteriorated in a way that cannot be recognised with a visual inspection. Mechanical testing is often carried out as part of a quality management system which will include a means of identifying when the plank was last tested.

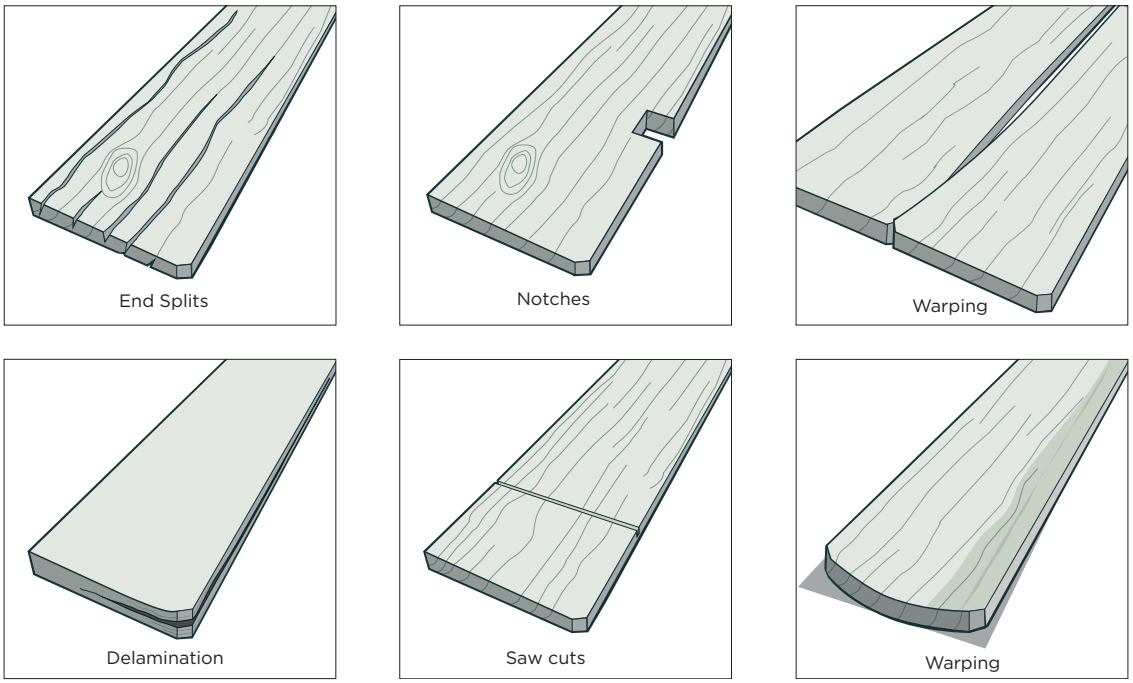


Figure 18: Plank defects

8.10 STABILISING THE SCAFFOLD

METHODS OF STABILISING THE SCAFFOLD STRUCTURE

> Use bolster bays (also known as buttress or raker bays), rakers or outriggers to increase the base dimension.
> Tie the scaffold to a supporting structure.
> Use cables to guy the structure to supports or anchors.
> Increase the dead load by securely attaching counterweights near the base.

RAKERS OR OUTRIGGERS

Rakers or outriggers are raking tubes attached to a scaffold to increase its base width, helping to stabilise it.

Key points to remember:

> Raking tubes must be braced to prevent bending and spreading.
> Do not attach the raking tube more than 300 mm from the standard.
> The distance between braces (node points) on a raker must not exceed 3 m.
> Where possible the horizontal brace should be above head height.

There are additional requirements for freestanding scaffold that will be covered in material that can catch the wind (see Section 13.8).

For tube and fitting scaffolding, attach the tube brace to the standards of the scaffold or to ledgers or guardrails that are connected with right angle couplers.

For proprietary scaffolding, refer to the manufacturer's instructions. Ledgers or guardrails with rakers attached must be locked into place by using a check clip above the joins or pins of the ledgers and guardrails if they are capable of being dislodged by upward pressure.

When screening is installed, additional braces are needed to strengthen the rakers from buckling (see Section 13.8).

RAKERS CONNECTING TO THE GROUND

Where the raking tube connects to the ground, use a soleboard and baseplate to distribute the point load of the tube.

If the ground is soft and a soleboard is not suitable, drive the raker into the ground to find a solid base. (Check for underground services such as electricity first.)

To prevent the raker from being forced further into the ground:

> Connect a horizontal tube perpendicular to the raker at ground level using a load bearing fitting, or

> Drive a tube into the ground and attach the raker to it as close to the ground as possible.

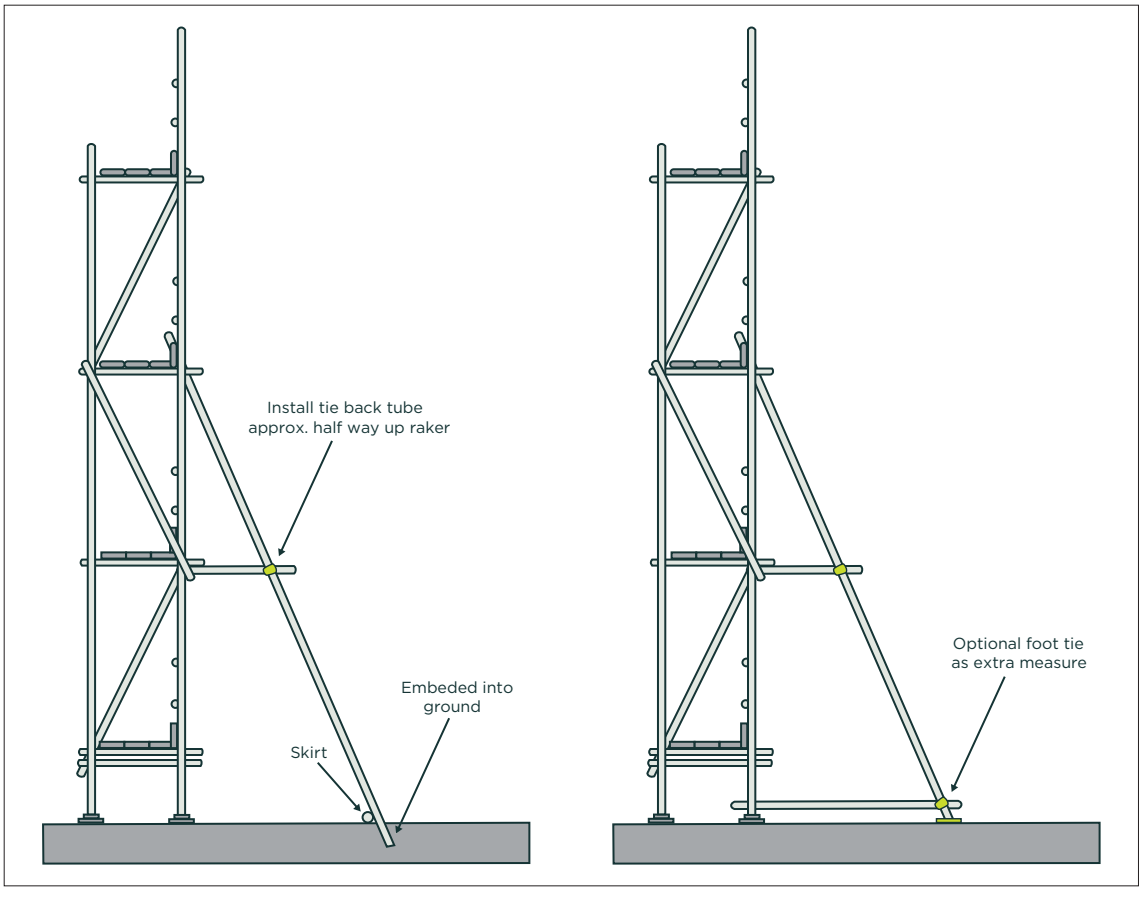


Figure 19: Raker embedded in the ground (left) and at ground level (right)

TIES

When the height of the scaffold is more than three times the width of the base, the scaffold must be tied to the supporting structure if not rakered or buttressed.

Ties are critical to the stability of the scaffold, preventing it from falling towards or away from the structure, and stabilising individual standards to prevent them from buckling. Ties should be connected to the scaffold with right angle couplers and be connected to both the inside and outside standards

For proprietary scaffolds, tie methods and spacings should be according to the manufacturer's instructions. For information on tube and couple scaffolding, see Section 10.

TYPES OF TIES

Rigid tie

A component that has a direct physical connection from the scaffold to the supporting structure and has strength in tension and compression. The preferred method in most circumstances is to bolt to a wall.

Commonly used anchors for rigid ties include dyna bolts, tru bolts, boa coils and chemset bolts. Always follow the manufacturer's specifications and design loads permitted on anchors.

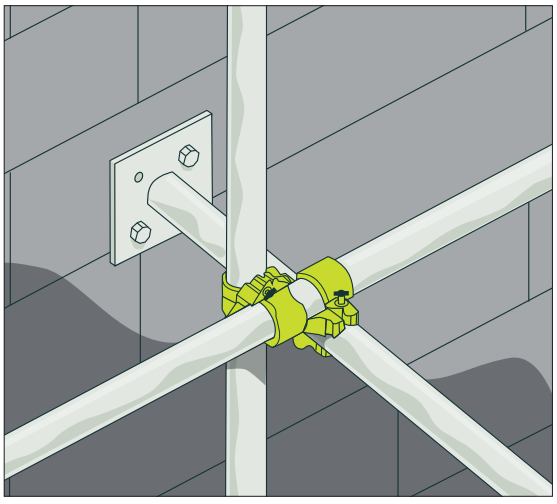


Figure 20: Rigid tie

Column or box tie

A tie assembly that is positively fixed around every side of a column or beam. This tie offers rigidity from inward and outward movement, due to the series of parallel tubes interlocking all elevations of the column or beam.

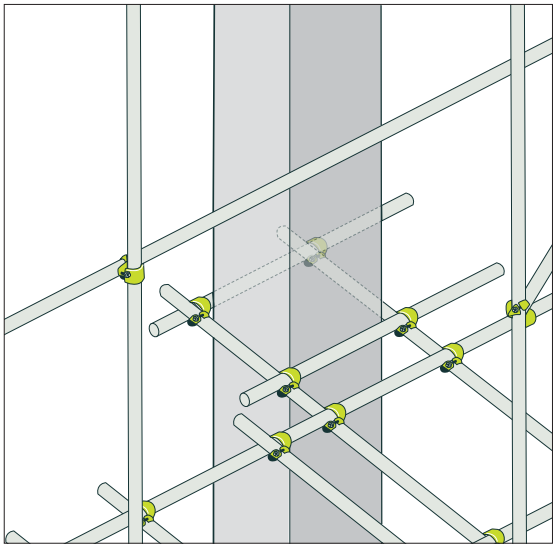


Figure 21: Column/box tie

Lip, parapet or opening ties

Ties that attach over, through or behind a structurally sound feature of the supporting structure. The integrity of the wall or parapet must be verified.

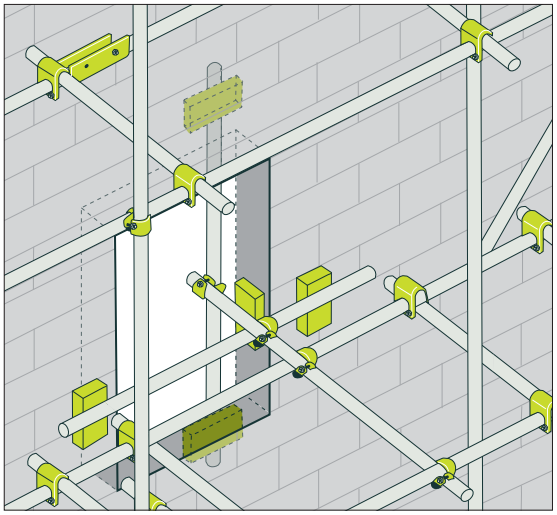


Figure 22: Lip/parapet/opening tie

Reveal ties

Reliant on pressure and friction, by way of expansion of a reveal pin, screw jack or adjustable prop, into the internal side surfaces of an opening, recess or cavity of the supporting structure.

They usually do not require permanent fixing anchors to the support structure to achieve rigidity, and can be removed without leaving any anchor bolts or abrasion to the exterior. Reveal ties should not make up more than 50% of total ties for a scaffold.

Regular inspections are required as reveal ties can loosen during service.

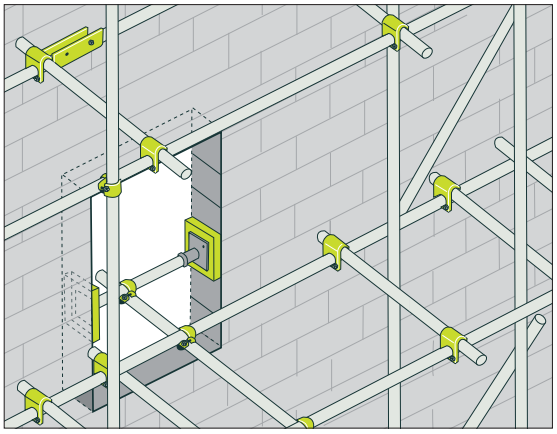


Figure 23: Reveal tie

Beam clamps

A pair of beam clamps can be used to secure tube, sling or chain to a universal beam (UB) rolled steel joist (RSJ) or tapered flange beam and then back to the scaffold.

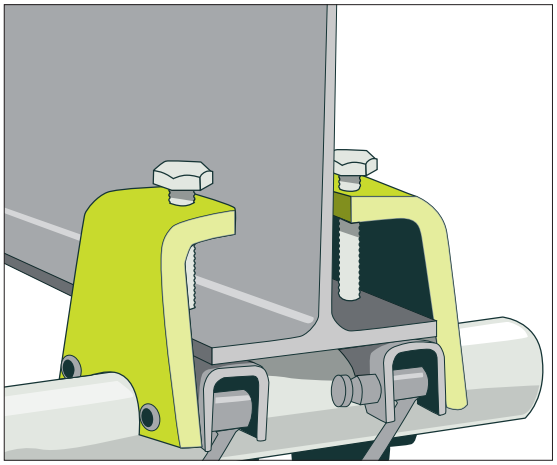


Figure 24: Girder or beam clamps

Wire tie

If possible, use rigid ties instead of wire ties, otherwise additional wire ties need to be used to achieve the 6.0 kN (610 kg) safe working load (SWL) capacity, as it's not possible to accurately determine the loading on the tie.

INCREASING TIE SPACINGS

Tie spacings can be increased to a maximum of three bays if required but additional strengthening of the scaffold may be needed. For example, plan bracing (see Section 8) a lift at the tie height would mean you could increase the horizontal distance between ties. The load on the remaining ties will be increased significantly and must be accounted for.

Spacing distances may differ due to:

> use of screen mesh or other material, which adds a wind loading

> other environmental loads

> lifting appliances attached to a scaffold

> through load transfer to the scaffold base, lower standards supporting high dead and/or live loads

> use of plan bracing

> use of raker bracing to the ground or other substantive support surface

> tie systems designed to support proprietary scaffolds.

In most instances these tie spacings are determined by design.

ADDITIONAL REQUIREMENTS FOR TIES

> They must not block access along the working platform and access way.
> They should be connected to both inner and outer scaffold standards to increase the rigidity of the scaffold unless otherwise specified.
> Ties between the scaffold and the structure should be non-pivoting and secured. They should not be able to be inadvertently loosened.
> Add more ties as the load on a scaffold increases (eg if the scaffold is sheeted or netted, or the platform is used to store materials).
> Inspect ties regularly to ensure that they have not been loosened or otherwise modified.
> Do not overload the scaffold.
> Additional ties may be required to stabilise scaffold in certain circumstances, such as in very high scaffolds, or in high wind.
> Drilled-in anchors (whether expanding or chemical types) that are subject to tensile loads should only be used where it is not practicable to secure or tie the scaffold in any other way. Where they are used, drilled-in anchors must have a safety factor of 3 and they must be assessed for suitability by a competent person.
> Where possible, use cast-in anchors or anchors that go through a wall rather than friction or chemical anchors.
> Ties using chemical or mechanical anchors should have 'pull tests' conducted on a selection of either three anchors or 5% of anchors, whichever is the greater number. The tests should cover a representation of situations including the type of anchor, the substrate material and the installer. Results should be recorded.

8.11 MECHANICAL LIFTING APPLIANCES ON A SCAFFOLD

> Hoists, winches and other lifting appliances may be mounted on scaffolding only if the scaffold structure is adequate in strength, or is specially strengthened and tied back, to take the imposed loads to a maximum of 250 kg.
> Strength of the scaffold must be calculated as at least twice the lifting capacity of the appliance.
> If the imposed load exceeds 250 kg, the scaffold must be designed by a CPEng.

8.12 GIN WHEELS

Gin wheels are attached to a scaffold or structure and used to lift materials. They are typically ring or hook type gin wheels (see Figure 20). The maximum load they are permitted to raise or lower is 50 kg. The scaffold must be stabilised by extra rakers or ties to carry the additional load.

Gin wheels must:

> be of solid construction and have a suitable wheel diameter
> have rope guides to prevent the rope slipping off
> be free turning
> be able to be secured according to manufacturer's specifications or accepted industry practice
> be attached to an appropriately designed and constructed support.

The rope used with a gin wheel should be a fibre rope with a minimum diameter of 16 mm and suitable for hand haulage. Where hooks

are used to attach to loads they must have a self-closing latch. Ropes are commonly end-spliced into the main rope to form a continuous rope, with two smaller diameter ropes spliced into the main rope for attaching equipment.

The gin wheel should be mounted on a purpose made bracket or a cantilever tube projecting outwards from the scaffold and attached to standards using right angle couplers. If attached to a tube extending more than 600 mm from the outer standard, it should be supported by a brace (see Figure 23). Proprietary gin wheels may not need a brace; install them according to the manufacturers' instructions.

Shackles used to secure gin wheels must be moused, and the gin wheel must be prevented from moving along the support.

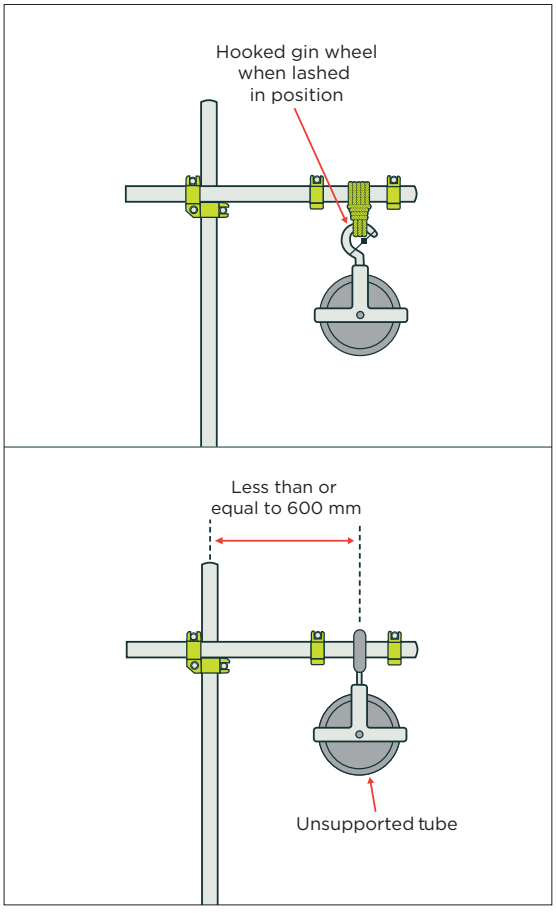


Figure 25: Gin wheel 600 mm or less from the standard

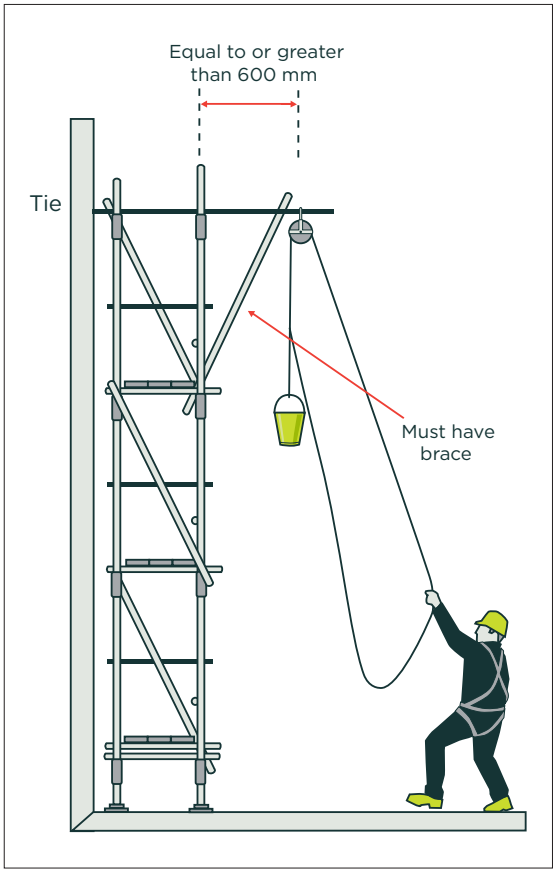
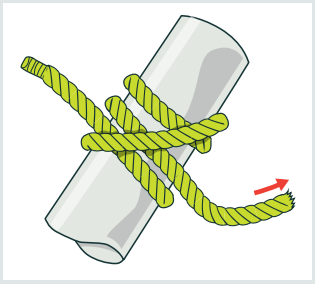


Figure 26: Gin wheel more than 600 mm from the standard

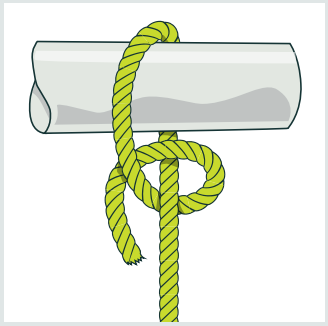
8.13 HAND LINES

Where a small amount of material is to be hoisted, a rope or hand line can be used. The minimum rope diameter is 12 mm.

8.14 BENDS AND HITCHES



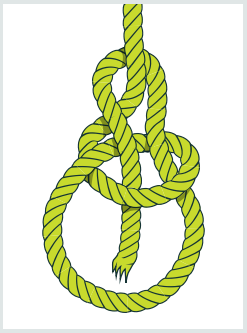
Rolling hitch



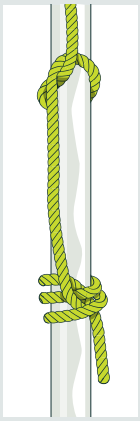
Half hitch

Figure-8

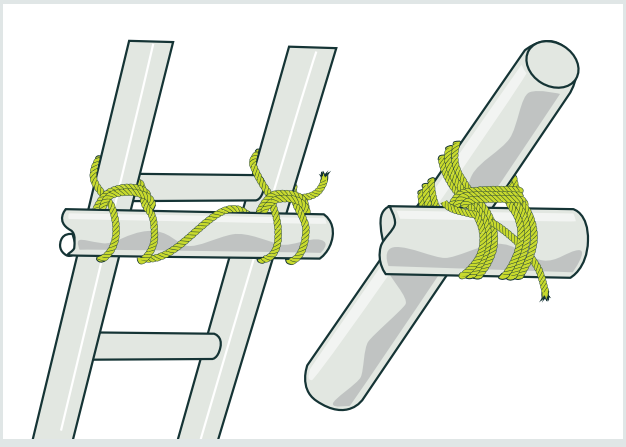
Timber or plank hitch: Recommended for raising and lowering planks or timber. The rope's tail can be wrapped around the noose up to five or six times if required, depending on the thickness of the rope and in conjunction with a half hitch if required.



Single bowline: A very simple method of creating a temporary eye at the end of a rope.



Rolling hitch in combination with a half hitch



Square lashing: Used to secure a ladder to a tube, for example.

Figure 27: Common scaffolding bends and hitches

8.15 GRIPS AND SHACKLES

WIRE ROPE (BULLDOG) GRIPS

Always fit the grips the same way around, with the bridge on the loaded or long part of the rope and the U-bolt on the short part of the rope

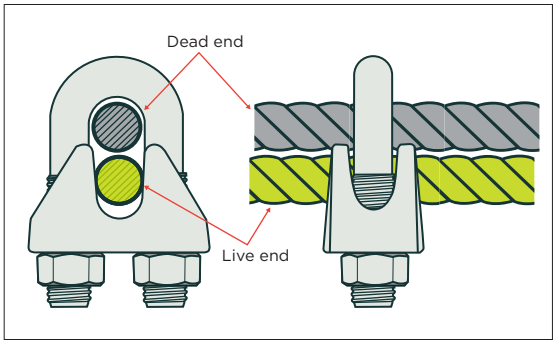


Figure 28: Wire rope (bulldog) grips, front and side view

Do not use wire rope (bulldog) grips on any load-hoisting rope. Wire rope grips are only suitable for forming an eye on stays or guys. Load-hoisting gives alternating load/tensions in the wire rope. Movement in the wire rope could allow movement in the grip and allow the wire rope to come loose and pull out of the grip. For more information on wire rope use, see the WorkSafe Approved Code of Practice for *Load-Lifting Rigging*.

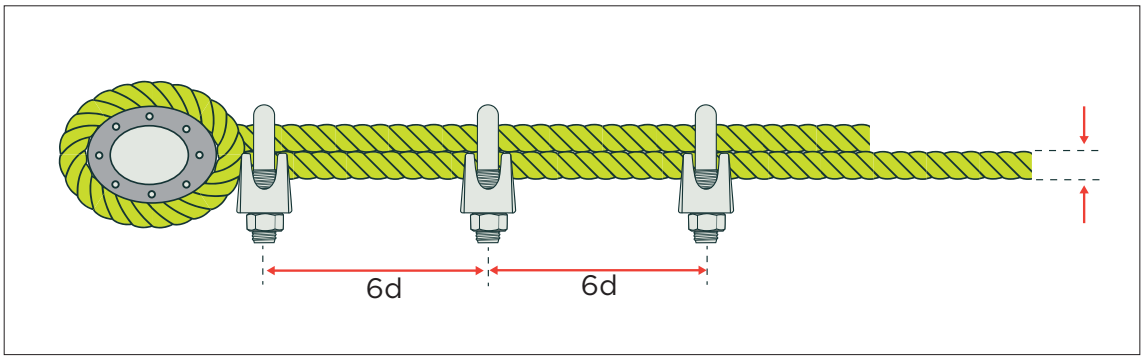


Figure 29: Correct method of using bulldog grips to form an eye

SHACKLES

Both D and Bow shackles used in scaffolding and suspended scaffolding should have their SWL clearly marked and when in use the pin should be securely screwed in and moused to the body of the shackle with steel tie wire or similar.

8.16 HANDOVER AND TAGGING

PRE-HANDOVER INSPECTION

All scaffolds must be checked by a competent person before handover.

Notifiable scaffolds must be inspected before they are handed over by someone with the appropriate certificate of competence.

Instructions for daily tests must be provided to the client for suspended scaffolding. Scaffolds must be regularly inspected to ensure they are still compliant and fit for purpose. See Section 9 for information on inspections.

HANDOVER CERTIFICATE

When the scaffolding has been inspected and deemed to be safe for use, the scaffolding PCBU should issue a handover certificate to advise the client that the scaffold:

> has been built according to the agreed specification, duty rating, and any limitations on the use of the scaffold
> has been left in a suitable condition for its intended use
> complies with the relevant statutory requirements.

The person issuing the handover certificate should check that the scaffold is safe to use and provide the necessary tags for displaying on the scaffold (see below.)

The end user must make sure they are aware of and understand the intended use as well as the limitations on the scaffold. For suspended scaffolds, this includes how to perform the daily pre-start check (the scaffolder should give them this information). If the client is not on site at the time of the handover, the handover certification may be sent electronically.

This certificate should be kept until the scaffold is further altered or dismantled.

TAGGING THE SCAFFOLD

All scaffolds, regardless of height, must have a tag clearly displaying important safety information at access points. (Minor scaffolds may be excluded from this requirement if appropriate for the situation. Minor scaffolds are lightweight, portable, single bay, with a working platform that cannot be higher than 2 m.)

Include on the tag:

> the status of the scaffold (ie SCAFFOLD UNSAFE or SCAFFOLD SAFE)
> the name and contact phone number of the certified scaffolder (or erector if under 5 m)
> the purpose (Intended use) of the scaffold
> the duty loadings of the scaffold
> the maximum number of platforms or bays that may be loaded
> any limitations on the use of the scaffold
> a record of each inspection (these should be done weekly or after a significant storm or earthquake) or alteration, including who inspected or altered the scaffold and when it was done.

Note: Information about inspections may be recorded on separate register or included on scaffolding tags.

SCAFFOLDING THAT DOES NOT MEET INSPECTION REQUIREMENTS

If scaffolding does not meet inspection requirements or is incomplete, prevent access to the scaffold and tag access points to advise others of the status of the scaffold (eg ‘Unsafe Scaffold’).

09/

SCAFFOLD USE AND MANAGEMENT

IN THIS SECTION:

Many risks associated with erecting a scaffold also apply to people using and working on it. Regular inspections of the scaffold are essential.

People using the completed scaffold should follow any special requirements outlined on the handover certificate or scaffold tag.

Common risks when working on the scaffold include:

> slips and trips on slippery surfaces, decking with trip hazards or obstructed working and access platforms
> falling through gaps in poorly constructed platforms or through unprotected openings
> using tools incorrectly, or defective or badly maintained tools
> carrying or transporting tools and materials
> hazardous substances such as asbestos and silica dust contaminating the scaffolding
> falling from the scaffold (eg due to inadequate edge protection or climbing the outside of the scaffold)
> failure of scaffold components
> scaffold collapses (eg due to overloading, unauthorised alterations, incorrect construction or design).

Standard requirements for work on a scaffold include:

> A safety helmet and appropriate safety footwear should be worn.
> Clear access of at least 450 mm should be maintained on all access and working platforms.
> The scaffold should be kept clear of rubbish and excess material. Harmful substances such as silica dust should be prevented from collecting on the scaffold.
> Inspections of the scaffold and associated equipment should be carried out regularly to ensure the scaffold is safe to use. Records of inspections should be kept.
> Tools and equipment should be in good working condition.
> Repairs and alterations should be carried out by a competent person. All scaffolds that have been repaired or altered should be inspected.
> Scaffolding that is no longer safe to use should be taken out of service immediately until repairs have been done. It should be tagged to warn people and access points should be closed off.

9.1 PRE-START CHECKS AND REGULAR INSPECTIONS

Pre-start checks before a scaffold is first used for the day should identify any risks. Pre-start checks on suspended scaffold must be done by a competent person and include a visual check and load test.

MINIMUM FREQUENCY OF SCAFFOLD INSPECTIONS

SCAFFOLD TYPE	INSPECTION FREQUENCY	INSPECTION DONE BY
All scaffolds, regardless of height, that are in use for a week or more	> Weekly while in use. > Monthly while set up but not in use. > After each structural alteration, repair, addition or change of anchorage. > After any storm or event that could adversely affect the safety of the scaffold.	Certified scaffolder or competent person, depending on the type of scaffolding.
Notifiable scaffolds	As above.	Certified scaffolder.
Suspended scaffolds (see Section 14)	As above and before first use.	Certified scaffolder.
	Daily as part of the pre-start check.	The competent user.

Table 16: Inspection frequency for different types of scaffolding

COMPONENT	CHECK
Supporting structure/ foundation	Is the ground or structure supporting the scaffold capable of supporting all the imposed loads?
General structure	Are all components of the structure present (ie none have been removed)?
Standards	Correctly aligned and properly supported at their bases.
Ledgers, transoms and putlogs	Is there any undue deflection?
Ties and braces	Are they in place and effective in stabilising the structure?
Couplers	Tightened properly.
Working platforms	Secured and free of trip hazards and gaps larger than 50 mm. Allow minimum 450 mm clear access past stacked material and obstructions.
Planks	Not damaged and properly supported.
Guardrails and toeboards	Secured and in place.
Stairs and ladders	In good condition, properly supported and secured. Are gates and hatches in place and operating correctly?

Table 17: Overview of inspection checklist (can also be used for pre-start checks. See Appendix E for examples of inspection forms)

INSPECTION RECORDS

Details of the inspection must be recorded and signed by the person who carried out the inspection. They can just be a checklist of main findings and comments.

The inspection record or register must be kept on site, and for convenience can be included on or combined with the scaffolding tag.

9.2 DAMAGED OR NON-COMPLIANT SCAFFOLD

If the scaffold cannot be repaired, it should have the stair or ladder access removed if possible, and/or tags attached to all access points (where the means of access cannot be removed) or on visible locations on the scaffold, stating the status of the scaffold. The scaffold should be dismantled and disposed of.

Scaffolding that does not satisfactorily meet inspection requirements, or has been damaged, must be taken out of service immediately and may not be used until repairs have been done. A scaffolding tag should be hung on the scaffold at access points to advise other people of the status of the scaffold. Physical means to prevent access should also be considered.

Repairs must only be done by someone qualified to do so. Bent tube must not be straightened for reuse – it must be cut out and/or discarded.

9.3 REPAIRS AND ALTERATIONS TO THE SCAFFOLD

Repairs and alterations must only be done by a competent person. Before carrying out repairs or alterations isolate the area and ensure scaffolding tags on all access points display the correct status of the scaffold.

When carrying out alterations or repairs ensure:

> the scaffold is stable
> the status of the scaffold is displayed clearly
> repairs comply with the manufacturer and/or supplier's information
> the scaffold is not used until repairs have been completed and the scaffold has been inspected by a competent person.

9.4 DISMANTLING THE SCAFFOLD

A risk assessment should be done before dismantling the scaffold. Risks when dismantling scaffolding may be different to risks when erecting scaffolding and should be considered separately. When dismantling scaffold:

> Set up exclusion zones with warning notices for other workers and public protection as required.
> If scaffold has been used for removal of asbestos or work with hazardous material, obtain a clearance certificate from the user before dismantling. Ensure the scaffold is free of loose material and debris.
> Inspect the scaffold for stability and plan for dismantling.
> Ensure all debris and rubbish has been removed from the scaffold before beginning to dismantle it.
> Dismantle by reversing the procedures required to erect the scaffold.
> Remove ties, braces, ledgers, transoms, planks and guardrails, followed by standards as joint positions are reached.
> If a building or structure is being demolished, dismantle the scaffold so that no more than 4 m of scaffold is left above the last vertical tie point at any time.
> If a scaffold is being partially dismantled, make sure that the remaining section is stable.
> Lower materials down. Do not drop or throw them.
> Do not overload lower lifts with dismantled components. (Some components may be temporarily placed on lower lifts but must not be allowed to build up).
> Install temporary raking tubes or ties to stabilise the scaffold if necessary.
> Remove all scaffolding materials. Do not leave components on roofs or projecting cornices, etc.

10/

TUBE AND COUPLER SCAFFOLDING

IN THIS SECTION:

Tube and coupler scaffolds are constructed of plain tubes connected by couplers to form a structure which supports working platforms made up of planks.

Tube and coupler scaffolds can be assembled in a wide range of configurations making them very versatile but requiring a high level of skill and knowledge to ensure the finished scaffold is safe and fit for the intended use.

Note: The maximum height of a tube and coupler scaffold constructed in accordance with these guidelines is 33 m measured from the supporting structure to the top of the working platform. Scaffolds above this height require engineer design.

10.1 COMPONENTS

TUBES

Tubes are the most basic scaffolding components. Table 19 sets out the dimensions and properties of scaffold tubes and references to relevant standards. For tube loadings see Section 7.

Steel and aluminium tube **must not** be used together (unless for non-structural components).

Scaffold tube should comply with the requirements of AS/NZS1576.1

DIMENSION AND PROPERTIES	STEEL TUBE TO AS/NZS 1576.3	GALVANISED STEEL TUBE	ALUMINIUM TUBE
Outside diameter (mm)	48.3 (±0.5 tolerance)	48.3 (±0.5 tolerance)	48.4 (±0.5 tolerance)
Thickness (seamless) (mm)	4 (±0.5 tolerance)	3.2 (±0.48 tolerance)	4.47 (±0.56 tolerance)
Thickness (welded) (mm)	4 (±0.8, g 0.4 tolerance)	3.2 (±0.3.2 tolerance)	
Mass per linear metre	4.37 kg/m	3.56 kg/m	1.67 kg/m
Minimum tensile strength	340 MPa	360 MPa	295 MPa
Yield strength	210 MPa	215 MPa	255 MPa
Radius of gyration	15.7 mm	16 mm	15.6 mm
Cross-sectional area	557 mm^2	453 mm^2	615 mm^2
Moment of inertia	138,000 mm^4	116,000 mm^4	149,000 mm^4
Elastic modulus	5700 mm^3	4800 mm^3	6180 mm^3

Table 18: Dimensions and properties of scaffold tubes

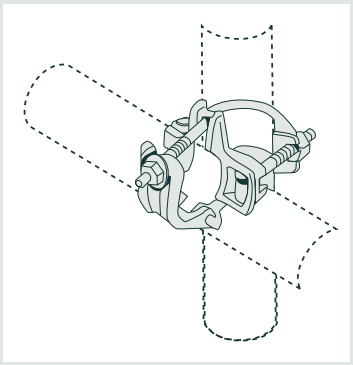
COUPLERS (FITTINGS)

Couplers are used for joining tubes when constructing tube and coupler scaffolds. Couplers are usually made of cast, forged or pressed steel and may also be made of aluminium. Couplers may also be used as an accessory to prefabricated scaffolding systems.

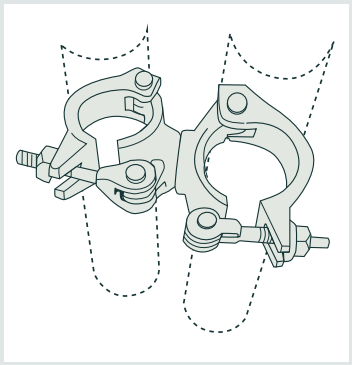
Couplers should comply with the requirements of AS/NZS 1576.2

TYPE OF FITTING	LOADING TYPES	SWL	
		kN	kg
Right angle coupler	Slip along the tube	6.25	640
Swivel coupler	Slip along the tube	6.25	640
Putlog coupler or single coupler*	Force to pull tube axially out of the coupler	0.59	60
Joint pins (expanding spigot couplers)	Shear strength	21	2140
Sleeve coupler	Tension	3.1	315

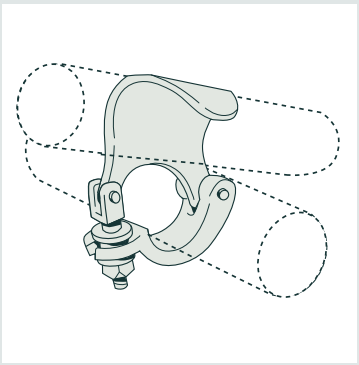
Table 19: Safe working loads (SWL) for couplers



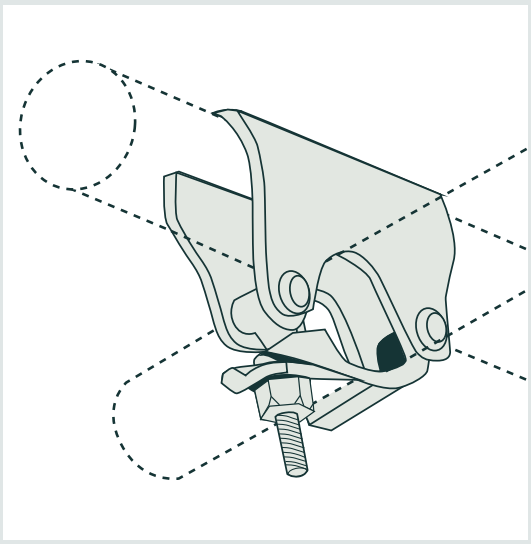
Right angle coupler



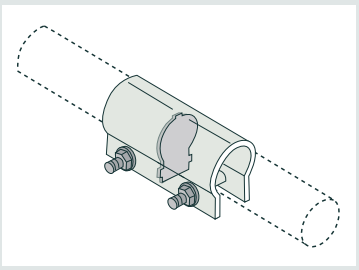
Swivel coupler (Double coupler)

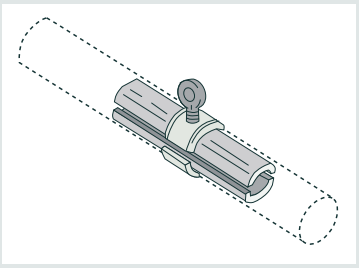


Putlog coupler (Single)



Putlog coupler (Twin blades)





Sleeve coupler Joint pin

Figure 30: Different types of couplers

RIGHT ANGLE COUPLER, 90 DEGREE COUPLER

These are the most commonly used load-bearing coupler to connect tubes at right angles. They may be made of cast, forged or pressed steel.

* The axial load permitted on a putlog coupler is 1/10th of the axial load permitted on a right angle coupler.

SWIVEL COUPLER

These are used to connect two tubes together at any angle. They may be made of cast, forged or pressed steel.

Swivel couplers should not be used to support primary loads unless stated in the manufacturer's specifications as the integrity of the pin cannot be determined.

PUTLOG COUPLER OR SINGLE COUPLER (TWO TYPES)

These are used to connect two tubes at right angles (putlogs to ledgers). They may be made of cast, forged or pressed steel.

Two common types of putlog coupler are blade, half hand, or pigs ear; and double flap or butterfly.

The double flap type must not be used to connect a putlog to a ledger if inside planks are used. Double flaps may be used to connect timber to scaffolds.

SLEEVE OR EXTERNAL JOINER

These are used to connect two tubes end to end. Each side of the joiner must be individually tightened. The joiner must have an internal partition or stopper to centre the fitting.

PIN OR INTERNAL JOINER

These are used to connect two tubes end to end. They have a pin arrangement which expands in the tube. Both tubes must have square cut ends and be regular with the same nominal bore (NB).

10.2 GUIDE TO SPACING FOR TUBE AND COUPLER SCAFFOLDING

DUTY LOADING ON WORKING PLATFORM			Light duty	Medium duty	Heavy duty
DUTY LIVE LOAD (PEOPLE AND MATERIALS)	Max. load/bay – uniformly distributed load)	Kg	225	450	675
		kN	2.2	4.4	6.6
	Max. point load/bay as part of max. loading	(kg)	100	150	200
MAX. STANDARD SPACING	Longitudinal (bay length)	(m)	2.400	2.400	1.800
	Traverse (bay width)	(m)	1.575	1.275	1.275
MAX. NUMBER OF WORKING PLATFORMS IN ONE BAY	Up to 13.5 m high (lifts/bay)		4	2	2
	Up to 33.0 m high (lifts/bay)		2	1	1
FOR TIMBER PLANKS MAX. PUTLOG SPACING		(m)	1.4	1.2	0.9
SCAFFOLD LIFT SPACING (m)	Between working lifts		1.8 – 2.1		
	Base lift to first platform		3		
MIN. BAY WIDTH		(mm)	675	675	675
MIN. UNOBSTRUCTED ACCESS		(mm)	450	450	450

Table 20: Guide to spacing for tube and coupler scaffolding

10.3 RETURNS

Returns (corners) for tube and coupler scaffolding should be planned and measured carefully. This ensures the scaffold will follow the perimeter of the building or structure and will ensure level platforms, consistent scaffold width, and proximity to the building face. Returns for tube and coupler scaffolds (one- or two-pole) need to be based out using double couplers in both directions. All of these aspects ensure the needs of the user are met and that the work can be done efficiently and safely.

If lapped planks are used at returns, additional standards may need to be added where ledgers are used as transoms.

TWO STANDARD (POLE) RETURN

There should be two standards located at each corner or return.

A general rule is:

> if the scaffold turns to the right, two standards go on the left

> if the scaffold turns to the left, two standards go on the right.

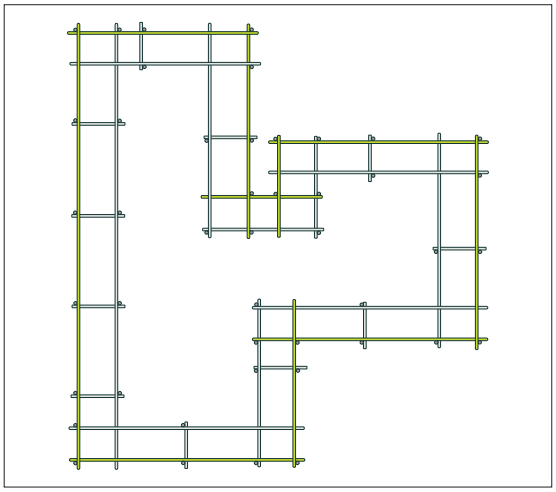


Figure 31: Light duty scaffold where each corner has two standards

SINGLE STANDARD (POLE) RETURN

Note: For light duty scaffolds only.

Single standard returns may be used if the standards in one direction are less than 2.4 m from the corner in one direction, and less than 1.575 m in the other direction.

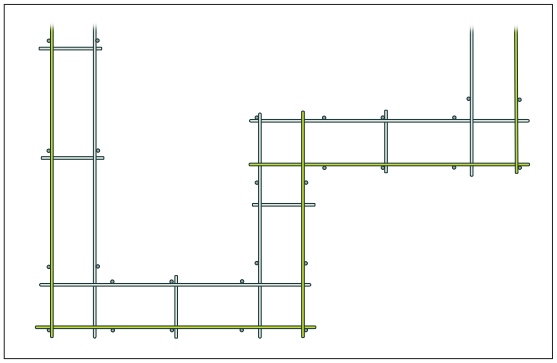


Figure 32: Single pole return basing out

Longitudinal bracing must be used in both directions, starting as low as possible on the single exterior standard, and running along each face of the scaffold. This will transfer the weight of the corner to the other standards should the single corner standard fail.

The advantage of the single standard method is that one elevation of the scaffold can be dismantled without first having to add an additional standard.

On an external return, the two inside standards are generally located approximately 300 mm on either side of the building being scaffolded. If one elevation is dismantled, the two corner standards can be used, and only stop ends are required to complete the end of the scaffold.

10.4 STAGGERING

STANDARDS

For tube and coupler scaffolds, standards must be staggered if the top working platform is higher than the longest length of tube. To stagger standards means erecting

standards so that only one standard in a pair finishes in any one vertical lift.

If possible, use one short standard on the inside face and a longer standard on the outside face.

At the next pair of standards, the long standard should be used on the inside face and the short standard on the outside face.

Where possible, keep the standard joins as close as practicable to and above the deck level to assist topping off or hemping the next standard.

Each set of standards should have a putlog within 300 mm of the standards unless an underslung transom or transom on right angle couplers is in place.

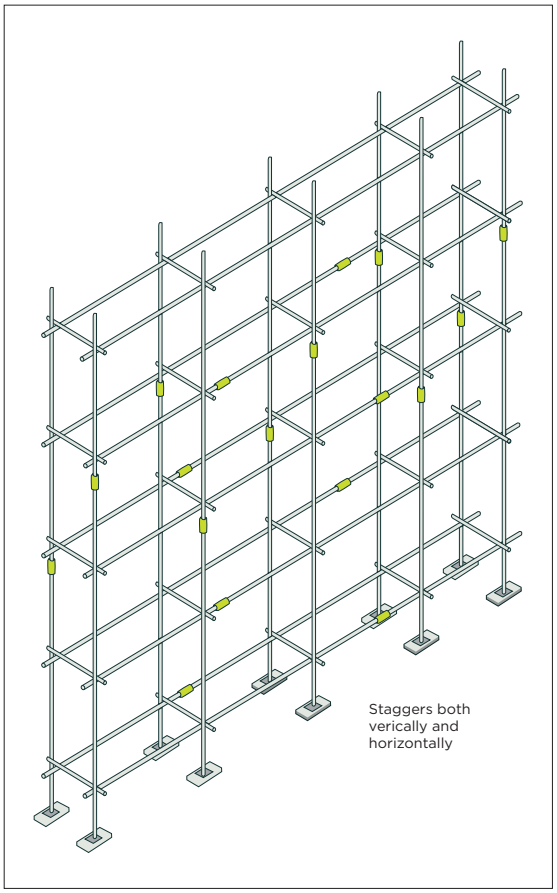


Figure 33: Staggered standards and ledgers

LEDGERS AND GUARDRAILS

Ledgers and guardrails should also be staggered. For example, a ledger finishes in one bay and the next ledger finishes in another bay. Where possible, keep all ledger joins within 300 mm of the standards.

PUTLOGS AND TRANSOMS

Putlogs and transoms must not be joined. They should be cut to the correct length so that they do not protrude from the scaffold and create a hazard. Putlogs must be within 300 mm of standards. There must be a putlog within 300 mm of standards.

10.5 BRACING AND STABILISING

LONGITUDINAL BRACING

Longitudinal bracing is fixed to the outside of the scaffold and should be as close as practicable to 45 degrees (see Figures 34-36). A maximum of four unbraced bays is permitted.

> Brace end bays of every run.

> Fix as close as possible to node points.

> Longitudinal braces are most effective at 45 degrees.

> Connect to the standard with a swivel coupler or to transoms with a right-angle coupler.

> Use external (sleeve) joiners, or splice joints in braces.

Note: On a standard 2.4 m long bay x 2 m high lift, the angle of longitudinal bracing is less than 45 degrees, so it may be attached directly to the standards using swivel couplers to allow the brace to be between 40-50 degrees.

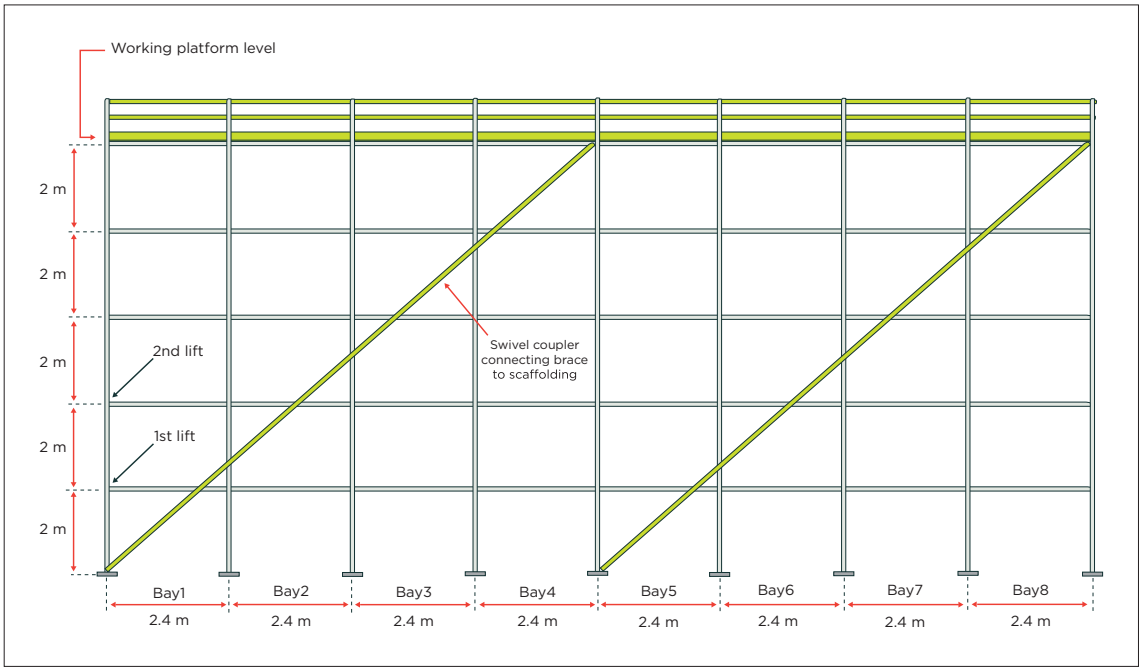


Figure 34: Longitudinal bracing

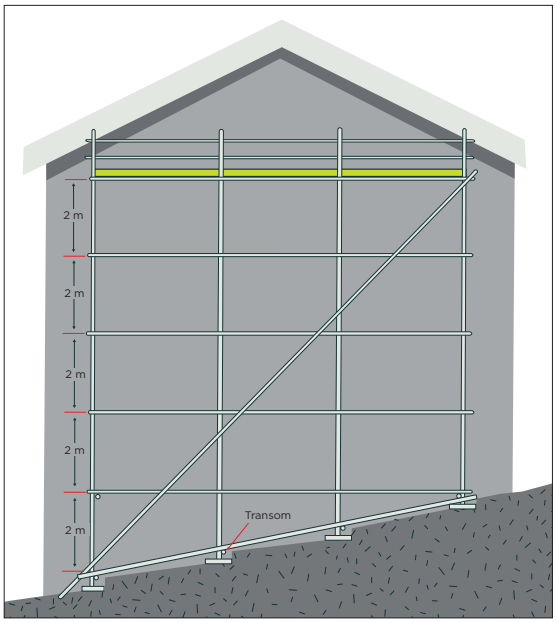


Figure 35: Bracing for tube and coupler scaffold on sloping ground

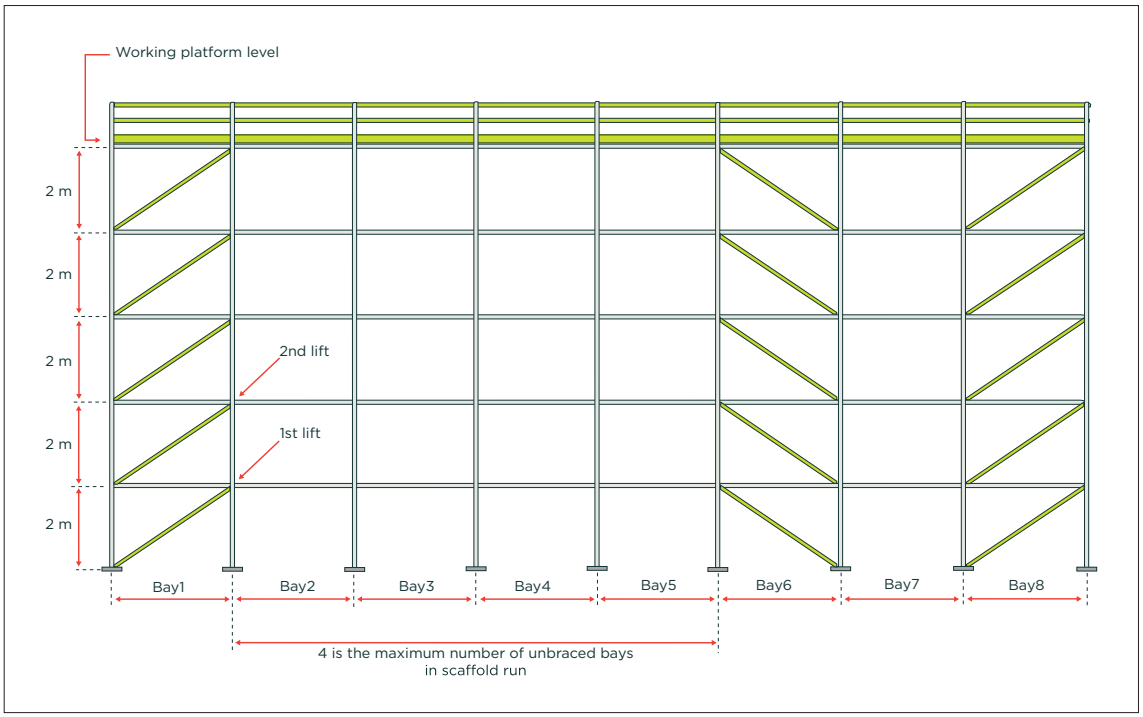


Figure 36: Parallel longitudinal bracing

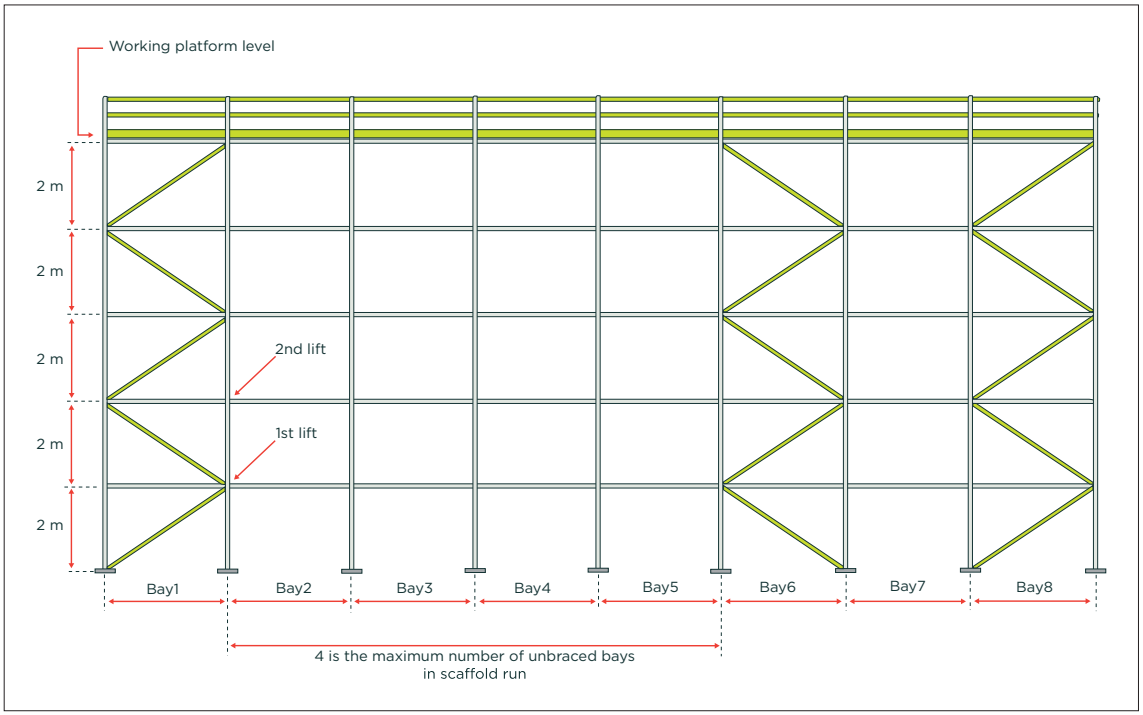


Figure 37: Dogleg longitudinal bracing

TRANSVERSE BRACING

Options for attaching transverse bracing:

> ledger at platform height to the underside of ledger above the lift using right-angle couplers
> standard to ledger above the lift using swivel couplers (this may be necessary to clear the toeboards)
> standard to standard using swivel couplers.

Remember to:

> brace at each end of the scaffold
> fix as close as possible to node points.

For light duty scaffolds: the lower section of the brace may be connected to the standard using a short butt tube and a right-angle coupler.

For tube and coupler scaffolds: it is recommended that transverse bracing be placed at least at every second set of standards and run to the top working platform where possible. This will also be dependent on the tie spacings.

PARALLEL BRACING

This is the most common form of transverse bracing and is installed diagonally between inner and outer standards within each lift on all levels. Braces are parallel to each other.

DOGLEG BRACING

Braces are installed diagonally between standards within each lift. Braces run opposite direction on alternate lifts.

PLAN BRACING

Plan bracing is used to stabilise a scaffold in the horizontal plane. Attaching braces across standards and using right-angle couplers follows the same principle as transverse and longitudinal bracing.

On scaffold such as a tall circular vessel exterior scaffold (chimney scaffold), plan bracing can be used to prevent the rotation of the scaffold when only butt ties can be used against the vessel. When tie spacings cannot be adhered to, plan bracing can be used to reduce the number of ties required.

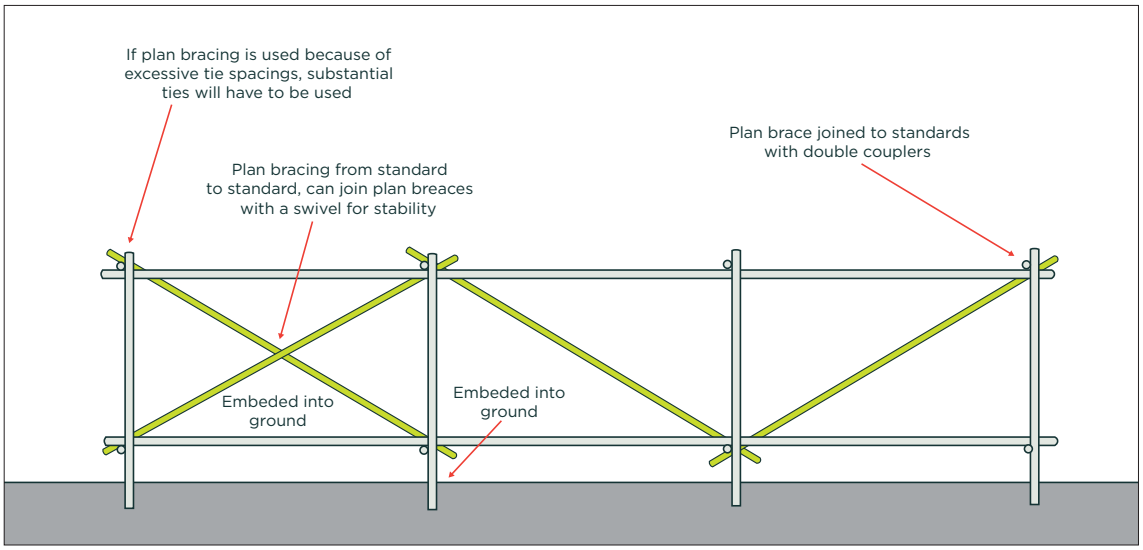


Figure 38: Principles of plan bracing

RAKING TUBES

RAKERS

Attach the raker to the standards of the scaffold or to ledgers or guardrails that are connected with right angle couplers. Rakers should be attached within 300 mm of a standard. Connect the raker to the scaffold with a horizontal knee (tie back tube). This will give rigidity to the raker and ensure it is not dislodged.

See Section 8.10 for more information on rakers.

SPURS

Spurs are inclined load bearing members used to support platforms which are not directly supported by standards.

Spurs are installed in tension or compression and should be secured with right angle couplers to transoms or ledgers also secured with right angle couplers.

Spurs in compression should be braced at maximum 3 m centres to reduce buckling.

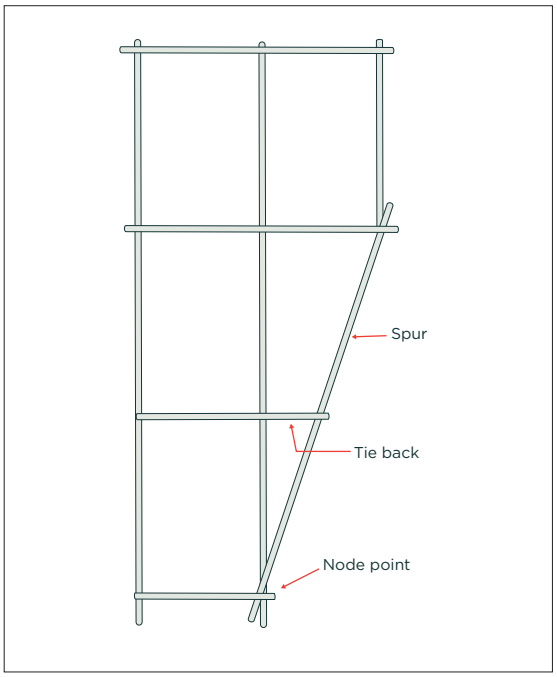


Figure 39: Spurs in compression (inclined load bearing components)

TIES

Ties should be connected to two standards or two ledgers with right-angle couplers, or as per the manufacturer's instruction.

The first tie at any level from the end of a scaffold that has no return must be no more than one bay, or three bays if there is a tied return.

Ties should be spaced at a maximum of 4.8 m in the horizontal plane and 4.2 m in the vertical.

The distance between ties on the horizontal plane must be no more than two bays without additional bracing.

The distance between ties on the vertical plane must be no more than 4.2 m.

Ideally alternate the ties at every second lift and set of standards.

The first level of ties vertically from the supporting surface must be no more than three times the width of the base or 4.2 m, whichever is less.

Temporary ties capable of carrying the design loads may be required to ensure the stability of the scaffold during erection and dismantling.

10.6 BUTT PLANK TUBE AND COUPLER SCAFFOLD

The **base lift** of a typical butt plank scaffold has transoms connected to the standard underneath the ledger using right-angle couplers.

This arrangement provides additional transverse and longitudinal strength (See Figure 38).

All **additional lifts** are erected with the ledger connected to the standard using right-angle couplers and the putlogs for butt planking connected to the ledger with single couplers. There must be a putlog within 300 mm of each pair of standards.

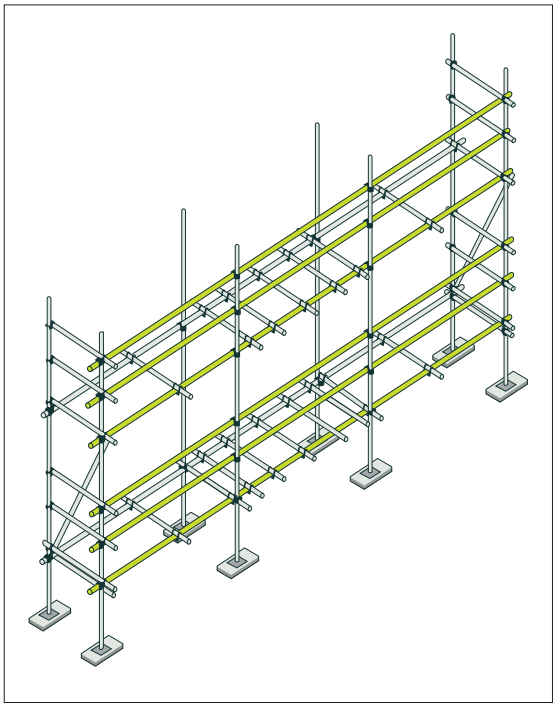


Figure 40: Transoms connected to standards with right angle couplers beneath base ledgers

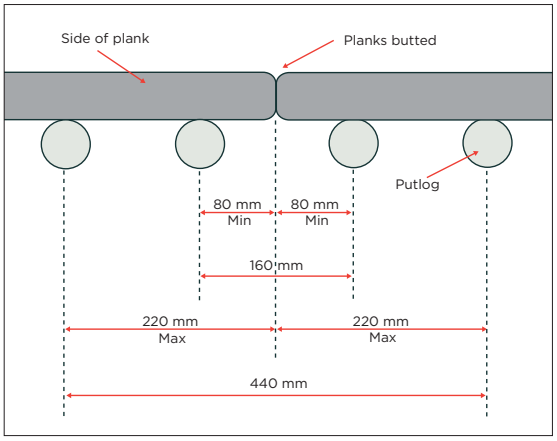


Figure 41: Maximum and minimum overhang of butted planks on tube and coupler scaffold

10.7 TUBE AND COUPLER SCAFFOLDS HIGHER THAN 33 m

Tube and coupler scaffolding higher than 33 m (measured from the ground to the highest component) generally requires additional transverse bracing (dogleg or parallel), ties and double or secondary standards (installed within 300 mm of each primary standard) up at least one third of the scaffold height. The structure is still erected by scaffolders but must be designed by a CPEng.

Secondary standards can be attached to the ledgers of the scaffold with right-angle couplers. These help reduce the loads imposed on the primary standards.

11/

PROPRIETARY OR PREFABRICATED SCAFFOLDS

IN THIS SECTION:

Proprietary scaffold systems are designed by an engineer and must be erected, used and dismantled in accordance with the specifications for the system.

Proprietary scaffold systems can be:

> solely made up of prefabricated components
> made up of prefabricated components but with additional components not covered by the manufacturer's specifications (see below).

Examples of prefabricated scaffold systems include:

> independent scaffold
> tower scaffold
> mobile scaffold
> frame type systems (H frames, speedy frames)
> individual component type systems (ringlock, cuplock, quickstage).

Proprietary scaffolding can also be used to create hanging scaffolds, cantilevered scaffolds, bridges, etc.

11.1 ADDITIONAL COMPONENTS NOT COVERED BY THE MANUFACTURER'S SPECIFICATIONS

Generally, components from different prefabricated scaffolding systems should not be mixed unless the load capacity of the combination has been proven.

Components might be dimensionally compatible, but variations in physical and material properties can result in unpredictable load paths within a structure, and may result in some components being overstressed.

If a proprietary system includes additional components that are not covered by the manufacturer's specifications, those components should be consistent with the general requirements of these guidelines.

If additional components cannot be installed in accordance with these guidelines, the scaffold system is classified as a special duty scaffold and should be designed by a CPEng.

See AS/NZS 1576 parts 1 and 3 for requirements for design and testing of scaffolding systems.

11.2 ALUMINIUM FRAME AND BRACE TOWER SYSTEMS

Aluminium (lightweight) frame and brace proprietary systems are commonly called aluminium towers or aluminium scaffolds. Mobile aluminium scaffold is more commonly used than fixed or static aluminium scaffold, but they generally all use the same components.

Aluminium scaffolds generally consist of prefabricated components including:

> castors or basejacks
> aluminium end frames (generally with horizontal rungs)
> aluminium braces – diagonal, horizontal and plan
> prefabricated captive decks and hatch decks
> aluminium prefabricated ladders or stairs
> aluminium outriggers.

All prefabricated aluminium scaffolds must be erected according to the manufacturer's specifications and instructions, particularly the maximum loads permitted per bay, and maximum height of the system.

ACCESS

An aluminium scaffold more than one bay long must have clear access between adjacent bays. Workers should not climb through the scaffold's frame rungs. Walk-through frames or space frames must be used. Ladder or stair access must be provided to all working platforms.

PLAN BRACING

For mobile aluminium scaffold, if the lowest working platform using prefabricated decks is above 3 m from the supporting structure, plan bracing must be provided at the base of the scaffold. If the aluminium frame is fully decked (captive) below 3 m then a plan brace is not required.

SAFE WORKING LOAD

The designed SWL per bay must be checked and confirmed as adequate for the intended use of the scaffold. Aluminium scaffolding is lighter than other scaffolds and therefore more prone to impact from uneven ground or wind loadings.

When assembled on top of each other, aluminium frames must have a positive connection. This can be accomplished by connecting frames with an exterior joiner or locking pin, or by bracing over the frame join on both sides of the frame.

11.3 EVENT STRUCTURES

Event structures (eg stage platforms, temporary grandstands and other structures that support people and materials) that are erected out of scaffolding components can be classified as special duty scaffolding, but they also fall under the Building Act 2004.

They must comply with:

> the Building Act 2004 and the Resource Management Act 1991

> local government requirements (a building consent may be required).

They should also comply with relevant Standards, and the recommendations within these guidelines.

A CPEng must design or verify the design, as these structures generally need to withstand considerable loads in concentrated areas.

Proprietary stage platforms must be erected according to the manufacturer's specifications and instructions. If the design falls outside of these, a CPEng must verify the design.

12/

SCAFFOLDING CONFIGURATIONS

IN THIS SECTION:

There are many different types of scaffolding. This section covers some of the main types, and methods for erecting and using them safely. It is not an exhaustive list of scaffolding types or systems

12.1 BIRDCAGE SCAFFOLD

A birdcage scaffold is an independent scaffold consisting of two or more rows of standards in both directions connected by ledgers and transoms.

Birdcage scaffolds usually consist of a grid of ledgers and transoms with one single working level at the top. This is used to gain safe access to hard-to-reach areas such as ceilings, church roofs and theatres. The working platform may be stepped to accommodate a sloping or curved area. The side bays may also be decked out to provide access to the walls and supporting structures.

If a proprietary system is used, the manufacturer's instructions must be followed while taking account of the specific considerations listed below.

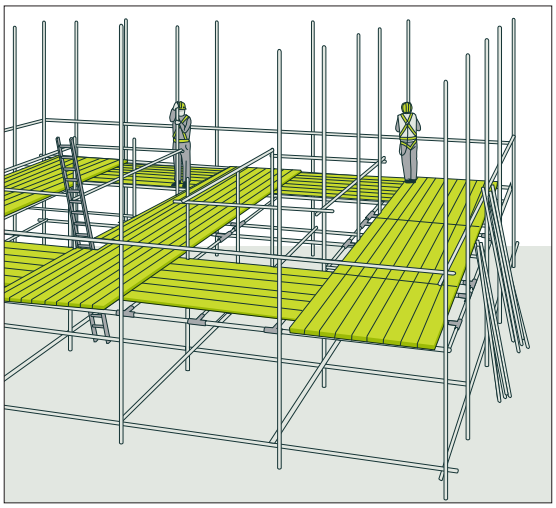


Figure 42: Birdcage scaffold under construction

BASIC RULES FOR BIRDCAGE SCAFFOLDING

- A mobile elevating work platform can be used to help erect and dismantle birdcage scaffolds.
- Control the risk of a fall with advance guard railing, the tunnelling method, or some other suitable method during erection and dismantling. Temporary platforms with edge protection should be provided.
- Rescuing someone who has fallen is a key consideration for multiple-lift birdcage scaffolds – there must be a rescue plan in place.
- Consideration must be given to providing appropriate access to the working platform, depending on the number of people working on it and the type of work being undertaken. If a ladder access is used through the top working platform of the birdcage, the ladder opening must be protected by a trap door, gate or tortured path.
- Plank spans for birdcage should meet standard expectations around duty loading (see Section 7.4).

LOADING

With the exception of the working lifts of the outside bays, the maximum load imposed on the top lift of a birdcage scaffold should be 0.75 kN/m^2, based on standard centres of 2.1 m.

STABILITY

All birdcage scaffolds require bracing or tying to ensure they remain stable and capable of supporting the imposed dead and live loads. Transverse bracing is required in both directions with a maximum of four consecutive unbraced bays permitted in each line. This may form a zig zag pattern, all in one direction or one continuous slope. Plan bracing may also need to be considered. (See bracing for tube and coupler in Section 10.5)

Surrounding structures can be used to butt tie or positive tie the birdcage to provide stability. If a standard is more than give bays from the supporting structure, its bay must also be braced diagonally from the working lift to the base.

A kicker lift may be omitted for access, although the first lift should be no more than 2 m from the supporting surface. Foot ties at each ledger brace must be considered if the kicker lift is omitted.

WORKING PLATFORMS

Gaps in the working platform should not exceed 50 mm unless sufficiently guarded and protected with toe boards.

It is good practice to sheet the top working lift of a birdcage scaffold with plywood or hardboard – resulting imposed dead loads must be considered.

Trip hazards must be minimised by filleting lapped planks or sheets.

Where the platform is required to be stepped, consideration must be given to eliminating the risk of falling between levels.

No scaffolding components, such as standards, should protrude above the top working level. If this is not possible the protruding components must be sufficiently protected.

Lighting levels should be considered, including the proximity to existing lighting systems (heat generation).

All planks and sheeting must be restrained from vertical uplift and horizontal movement.

12.2 HANGING SCAFFOLD

A hanging scaffold is hung from a supporting structure and is different from a suspended scaffold as it cannot be raised or lowered when in use.

Hanging scaffolds are classified as special duty scaffolds. Loads must be calculated by a CPEng if there is not enough information in the manufacturer's instructions or specifications to calculate loads.

Before erecting a hanging scaffold, a plan should be prepared. Each vertical hanging tube should have check couplers at suspension points and underneath the platform or as per the manufacturer's specifications. For proprietary scaffold, standards should be tension-spliced or bolted with rated spigot connections as per the manufacturer's specifications.

For tube and coupler scaffold, it is possible to erect a hanging scaffold lower than the longest standard. Scaffold joiners must never be used to lengthen a standard. However additional standards may be attached to a minimum of two horizontal ledgers or guardrails within 300 mm from the standard. Check clips are used above the ledger and below the ledger supporting the standard.

Cantilevered support rigs and their fixings or supports should be designed or verified by a CPEng.

12.3 TOWER AND MOBILE SCAFFOLDS

These include free-standing scaffolds supported on wheels, castors or other devices for ease of movement on a firm, level supporting structure/surface. All freestanding scaffolds must be stabilised against overturning forces.

Components and systems that can be used to construct mobile scaffolds include:

> aluminium prefabricated systems
> fibreglass prefabricated systems (nonconductive)
> steel frame scaffolds ('H' frame)
> system or modular steel scaffolds
> tube and coupler scaffolds.

Mobile towers generally need to be braced on all sides. They should be plan braced to prevent twisting or racking unless the lowest fully-decked platform is less than 3 m high.

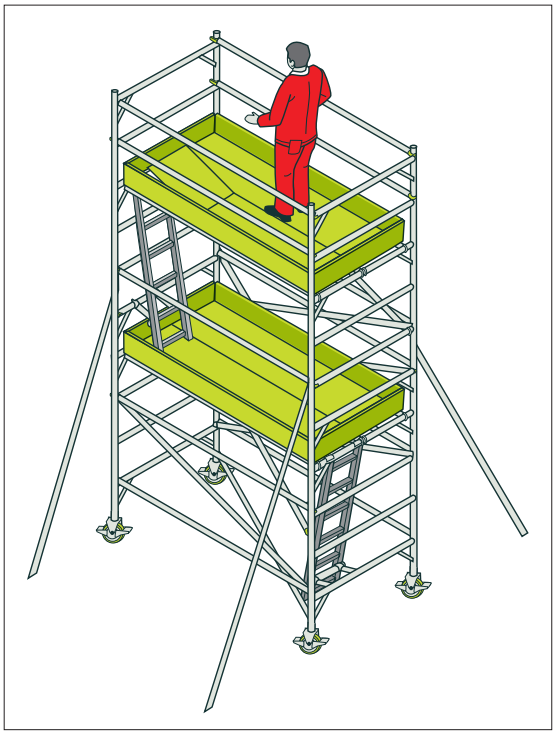


Figure 43: A proprietary mobile tower

Mobile scaffolds are particularly prone to tipping over while in use.

There is a higher risk of tipping where:

> The scaffold suddenly stops while being moved. They must not be ridden while being moved.
> The height to the top most platform is greater than three times the minimum base dimension.
> There are people standing at or near the edge of the platform in conjunction with a sudden movement or action. This creates a temporary high point loading.
> The capacity of the scaffold is based on a distributed load, not a point load at the edge. This means overturning can occur even when the design load capacity of the platform is not exceeded.
> The scaffold is narrow and light.
> The scaffold is exposed to adverse weather conditions.

When moving a scaffold, ensure:

> there are no people or materials on the scaffold
> there are no overhead power lines or other obstructions within 4 m of the line of travel
> the ground is firm, clear and level.

METHODS FOR IMPROVING STABILITY

> Position the scaffold as close as possible to the area being worked on.
> Apply the castor brakes while the scaffold is in use.
> Use outrigger bracing or larger base frames to increase the minimum base dimension.
> Add weight to the scaffold base to improve stability.

- Establish with the manufacturer exactly what the established SWL relates to.
- Don't move mobile scaffolds in windy conditions.
- Maintain the height to width ratio (these apply under normal weather conditions only):
  - for scaffolds over 2 m high, ensure that the height of the top working platform is no more than three times the minimum base dimension
  - for scaffolds under 2 m high, ensure that the height of the top working platform is no more than two times the minimum base dimension

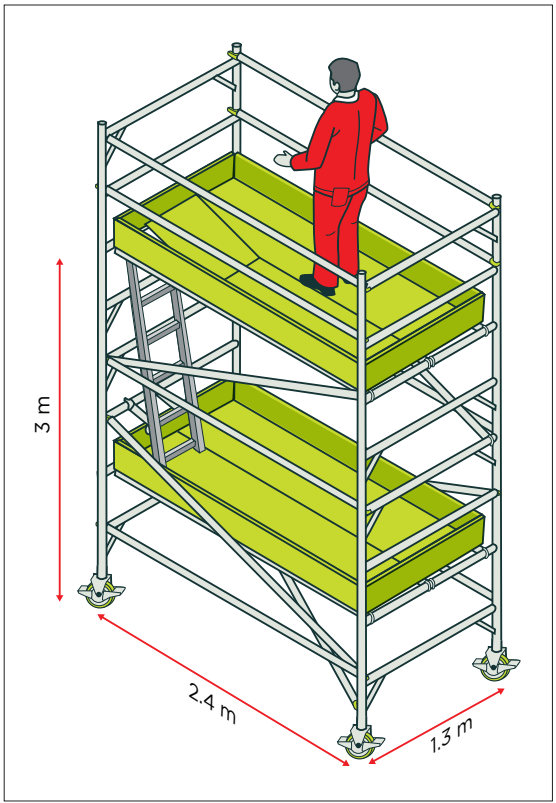


Figure 44: Mobile scaffold showing base dimensions in relation to height

NON-ADJUSTABLE CASTORS

These must:

- be able to support the dead and live loads imposed on the scaffold
- be minimum 125 mm in diameter and be secured to the standard by using an expanding internal pintle that fits into the standard, or a locking device or sleeve externally fitting over the standard to prevent the castor from falling out
- have the SWL clearly labelled
- have a working braking or locking system
- have a minimum 150 mm pintle length (internal pintle length or external socket length).

ADJUSTABLE CASTORS

Adjustable castors have the same requirements as non-adjustable castors but can be adjusted vertically by a threaded pintle or stem with a positioning nut. The threaded extension, while maintaining a minimum of 150 mm pintle length in or over the standard, should not exceed 600 mm adjustment.

It is recommended that the threaded extension, while maintaining a minimum 150 mm pintle length in or over the standard, should not exceed half of the total extension (eg a castor with 500 mm extension should be kept to a maximum extension of 250 mm).

Adjustable castors do not need to be secured to the standard if the pintle length is greater than 300 mm. Castors can be used horizontally as a running device to keep a mobile scaffold off a surface.

ACCESS

Access to mobile towers may be by stairs or ladders. Ladders for mobile scaffolds can be portable or integrated in the scaffold frames.

Portable ladders should be pitched at an angle between 1:4 and 1:6 horizontal to vertical and should be clear of the supporting structure at the base. Access to the working platform should be via a self-closing hatch at the top of the ladder with handholds extending at least one metre past the top of the ladder.

12.4 CANTILEVERED SCAFFOLDS

These are independent, tied standing scaffolds constructed on beams such as RSJs, UBs, soldiers, trusses, etc. that are cantilevered out from the building or structure.

A CPEng must design (or verify the design of) the scaffold to ensure the supporting structure is able to support all loads imposed by the scaffold.

All practicable steps need to be taken to protect the area below the cantilever during the erection and dismantling process. Additional precautions such as full planking and plying the base lift of the scaffold, toeboards and screening should be used to prevent the dislodgement of materials from the working platforms.

The inboard length of the cantilevered beam (known as a needle) is generally attached to the structure by:

> fixing the beam to the floor below by using a positive fixing such as a U-bolt fitted over the beam and through the concrete floor slab

> using counterweights on the beam

> installing props between the top of the beam and the underside of the floor above and securing the props so they cannot be dislodged.

The base of the scaffold should be tied to the needle as close as practicable to the locating U-head jack.

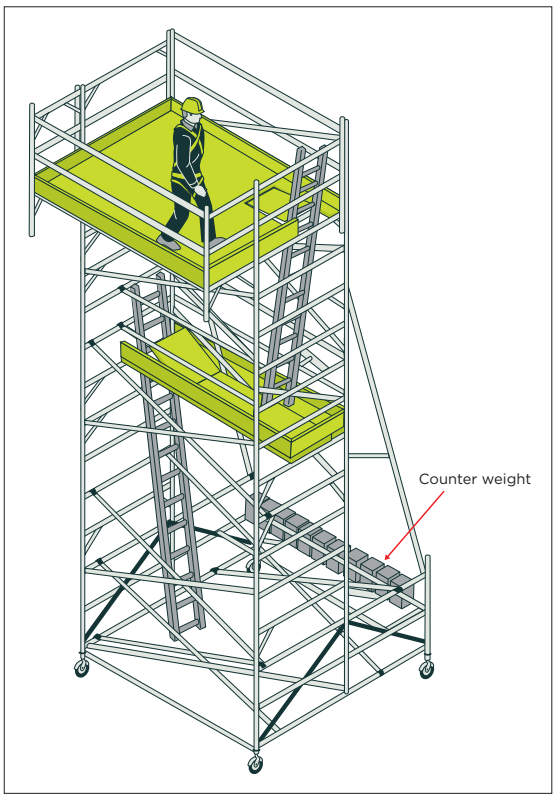


Figure 45: A proprietary mobile tower with cantilevered working platform

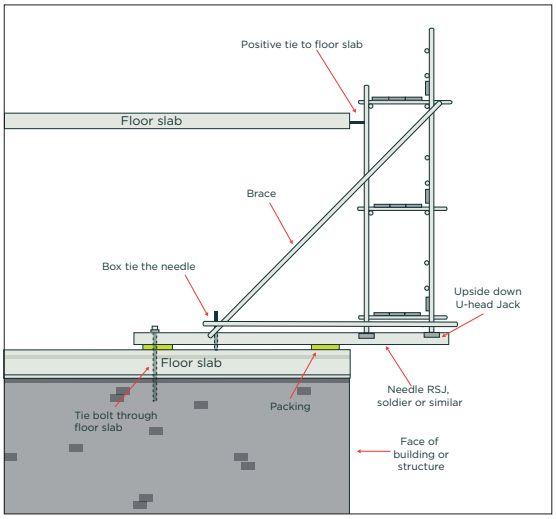


Figure 46: Cantilevered scaffold using a beam arrangement – needles need to be laced together in the horizontal plane

12.5 VESSEL SCAFFOLDS

These encompass the entire face of a vessel (eg a tank or chimney). Vessel scaffolding includes circular, bay/lap, rectangular vessel, and splay scaffolding. Vessel scaffolding around a tank is commonly called tank scaffolding.

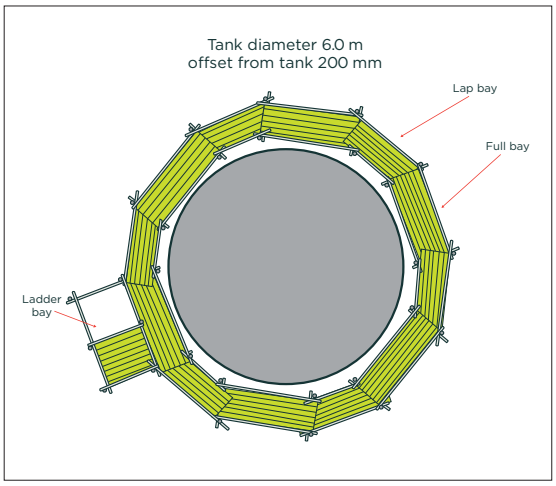


Figure 47: Typical vessel scaffold

12.6 SCAFFOLD OVER A VERANDA OR ROOF

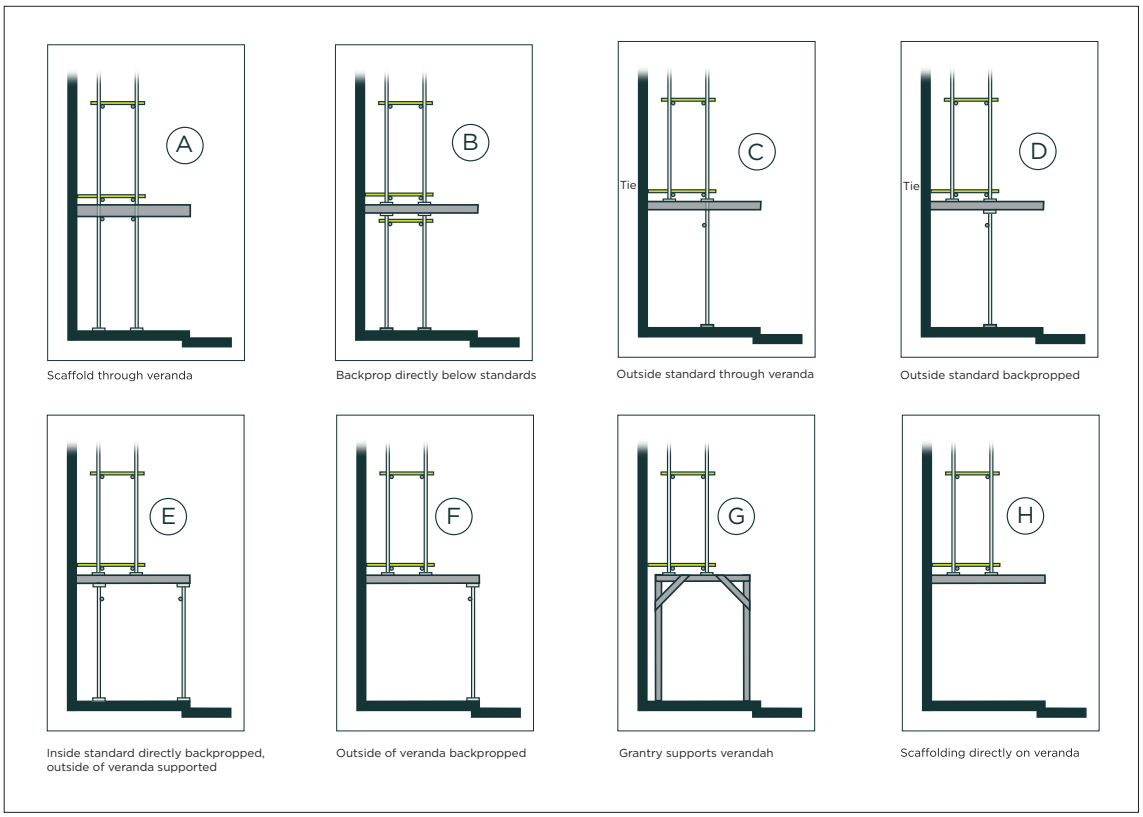


Figure 48: Methods of erecting the scaffold over a veranda or roof

A. Scaffold through veranda.

B. Backpropping directly below standards.
   > Design by CPEng required unless veranda supports are exposed and a direct load path is visible

C. One leg of the scaffold going through the veranda. The inside leg of the scaffold is supported by the veranda or load is transferred to the tie
   > Design by a CPENg required unless you can ensure the outside standard and the tie arrangement could support the load.

D. Scaffold erected on a veranda with only one standard directly below backpropped.
   > Design by a CPENg required if you cannot guarantee that the outside standard and the tie could support the inside standard weight.

E. Scaffold erected above the veranda with the inside leg of the scaffold directly backpropped below but with the outside of the veranda only supported from below.
   > Design by a CPENg required unless you have exposed the veranda supports and ensured that the weight of the scaffold can be transferred through the veranda to the outside prop.

F. Scaffold erected above a veranda with only the outside of the veranda backpropped. Design by a CPEng required.

G. Heavy steel gantry erected on the footpath with the scaffold erected above.
   > Design by a CPENg required for the steel gantry.

H. Scaffold erected directly on a veranda. Design by a CPEng required.

12.7 SLOPING PLATFORMS AND BARROW RAMPS

Sloping platforms may be used to access scaffolds and other structures. They should have platforms and edge protection that comply with these guidelines.

Barrow ramps contain cleats alongside an uncleated board or channel. This allows wheelbarrows or wheeled loads to be moved easily while guarding against slipping.

> For heavy loads (such as a concrete-laden wheelbarrow), gradients of about 1:12 are appropriate

> The maximum recommended slope for a cleated barrow ramp is 20 degrees or around 1:3

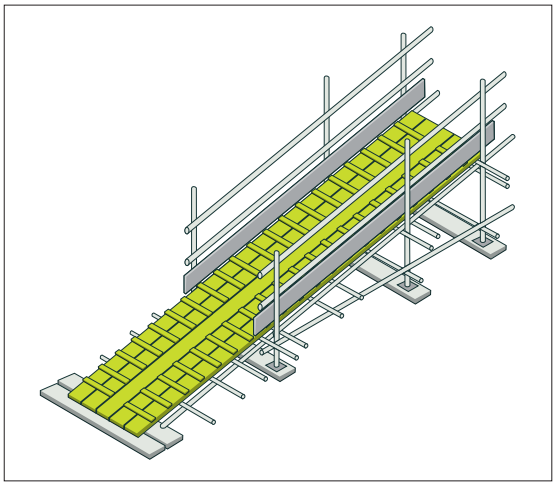


Figure 49: Typical barrow ramp erected using tube and coupler scaffold

12.8 ROOF EDGE PROTECTION USING SCAFFOLDING COMPONENTS

Roof edge protection is a means of protecting workers from a fall where working at height on a roof cannot be eliminated. Scaffolding is usually used for roof edge protection for long duration work, such as roof repair, cleaning and recoating. This section covers roof edge protection using scaffolding components (tube and coupler is often used).

Proprietary systems that attach to the roof, roof truss, or soffit can also be used. These are not considered scaffolding and are not covered in this guide. The designers of these systems should ensure they meet appropriate industry standards.

BASIC RULES WHEN WORKING ON ROOFS

Working on roofs can be dangerous. PCBUs must, so far as reasonably practicable, eliminate the need to access the roof by carrying out all of, or as much as possible of, the job from the ground. Mobile elevating work platforms can be used for short term work on small sections of roof.

Roof edge protection assembled from scaffolding components is considered scaffolding and must be erected by a certified scaffolder if the highest component of the scaffold will be 5 m or more above the ground. The work will also need to be notified to WorkSafe if someone can fall 5 m or more.

Edge protection should be provided on all exposed edges of a roof, including the perimeter of buildings, skylights or other fragile roof material, and any openings in the roof.

It must not be installed by standing on an unprotected edge (eg while standing on the roof or from a ladder unless a restraint system is used).

Single standard scaffolding should not be used. Any scaffolding used for roof edge protection must be correctly constructed and have all necessary guardrails, toeboards and a platform.

A number of factors, particularly roof pitch, will determine what configuration is appropriate (see below). Roofs with a pitch greater than 25% have an increased risk of someone slipping and falling off so have different requirements to roofs with a lower pitch.

Guardrails must be constructed to withstand someone falling against them. They must be able to withstand a load of 600N (62 kg) in any direction without deflecting more than 100 mm and withstand a force of 1200N (123 kg) without failing.

Refer to AS/NZS 4994.1 Roof Edge Protection for load requirements.

Safe access to the work area must be incorporated.

Ensure the scaffold is sufficiently stable to prevent overturning should someone fall from the roof and strike the guardrails. Options include tying to the building, using raker bays or raking tubes, or by widening the base of the scaffold.

Inspect the structure regularly for defects or damage, especially after adverse weather.

CONSIDERATIONS WHEN DESIGNING ROOF EDGE PROTECTION

- How long the work will take.
- How workers will access the scaffold safely.
- How complex the work is.
- How many workers will be on the roof.
- The roof pitch. This will determine what configuration to install.
- The roof height. WorkSafe must be notified if someone could fall 5 m or more.
- What condition the roof is in and what it is made of. Brittle roofs should not be accessed unless the risk of workers falling through is controlled.
- The risks to workers installing the edge protection. Also consider risks to the public or homeowners.
- Work platforms incorporated as edge protection should be designed to Medium duty at least to accept the impact forces of a falling worker.
- How the scaffold will be secured to prevent overturning should someone fall from the roof and strike the guardrails. Methods include:
  - tying to the building
  - using raker bays or raking tubes
  - by widening the base of the scaffold.

CONFIGURATION FOR ROOF PITCH LESS THAN OR EQUAL TO 25 DEGREES

1. Locate the platform as near to the gutter line as practicable and no more than 1 m below the lower edge of the roof surface.
2. Install the mid rail and bottom rail at 500 mm centres. A rail or the toeboard must be positioned within 200 mm of where the roof line projection intersects the guardrailing.
3. Install the top guardrail 900 – 1100 mm above this line.

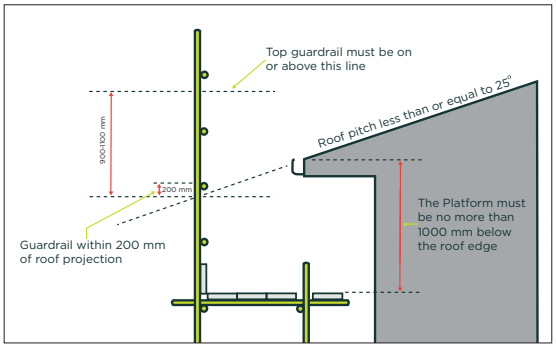


Figure 50: Roof edge protection for a roof pitch less than or equal to 25 degrees

Note: Rails and standards at scaffold end omitted for clarity.

CONFIGURATIONS FOR ROOF PITCH OF GREATER THAN 25 DEGREES

A roof with a pitch greater than 25 degrees has more potential for someone to slip and fall, so the requirements are different.

1. Locate the platform as close as practicable (the gap must not exceed 200 mm). This can be achieved by using a hop up bracket from the outside standard at the roof edge line.
2. Where the platform is located below the roof edge, it should be within 300 mm.
3. Install the mid rail and bottom rail at 500 mm centres.
4. Install the top guardrail 900 – 1100 mm above where the roof line projection intersects the guardrailing.

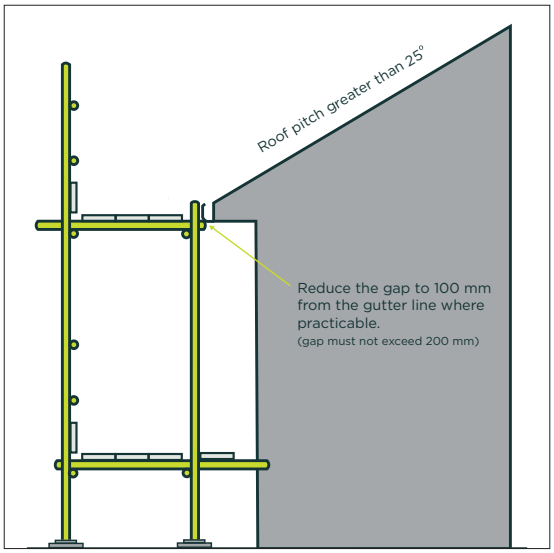


Figure 51: Roof edge protection for a roof pitch greater than 25 degrees

Note: Rails and standards at scaffold end omitted for clarity.

ROOF EDGE PROTECTION FOR GABLE ENDS

Edge protection must be provided as close as practicable to the gable ends with the scaffold no more than 300 mm from the structure. The midrail should be no more than 500 mm above the line of the gable (slope of the roof) and the top guardrail 1 m above the line of the gable.

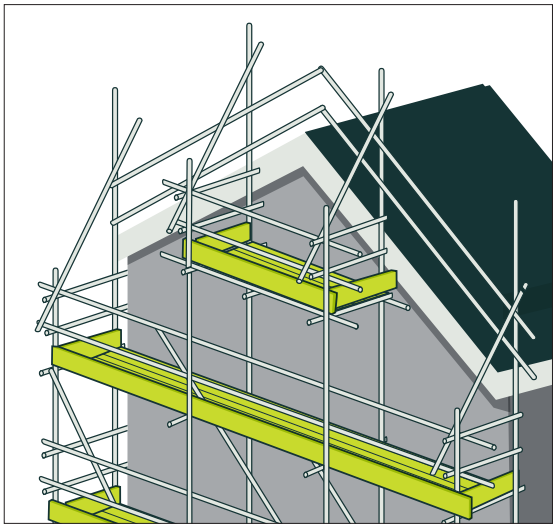


Figure 52: Roof edge protection for gable ends

13/

OTHER STRUCTURES AND SUPPORTS

IN THIS SECTION:

Scaffolding is often used in conjunction with, or relies on, other structures and supports. This section covers the main things to remember when working with these.

13.1 BRACKETS

Bracket scaffold is a scaffold system supported on brackets attached to a building or structure.

The brackets are either horizontal members supported by the floors of the structure, or angle brackets with one arm fixed to a vertical surface and the other projecting horizontally to support the scaffold.

A tube and coupler or proprietary scaffold is generally erected on the supporting brackets to form the working platform.

The working platform is generally below the adjacent work surface, which may result in scaffold users putting themselves at risk by climbing or jumping onto the platform. Extend guardrails 1 m above adjacent surface, provide suitable access to the working platform and ensure decking components will withstand all loads.

Prefabricated scaffold brackets should:

- be designed (or design verified) by a CPEng.
- have adequate and suitable means of attachment to provide vertical support and to resist accidental sideways movement
- be stable in the longitudinal direction of the platform under the applied horizontal force and have a factor of safety of not less than 5:1
- be fitted with guardrails, midrails, and toeboards on all platforms
- have suitable means of access and egress
- have measures to prevent shock loading by workers jumping down from the supporting structure
- have measures to prevent objects falling during erection, use and dismantling.

13.2 HEAVY DUTY GANTRIES

Heavy duty gantries can support heavier loads than scaffolding and may be erected when an overhead supporting structure is required. They must be designed (or design verified) by a CPEng if the design is not covered by the manufacturers specifications.

Heavy duty gantries will usually have:

- primary beams housed in U-head jacks to transfer the load directly down the standard
- secondary beams at maximum 600 mm centres and connected to primary beams
- top surface of plywood sheets or planks or a combination of both to withstand expected distributed and point loads
- adequate longitudinal and transverse bracing or rigidly tied to the supporting structure
- adequate edge protection installed including toeboards, guardrails and screening
- adequately protected from traffic (eg with barriers) and a sufficient distance from any roadway.

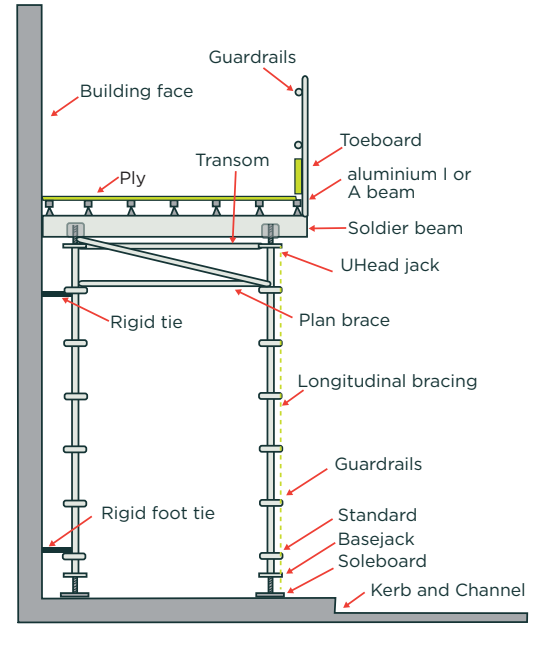


Figure 53: Heavy duty gantry erected from proprietary scaffolding

13.3 MAST-CLIMBING WORK PLATFORMS

Mast-climbing work platforms are progressively tied to the building or supporting structure as they are erected. They can be used as freestanding units or in single or multiple tower configurations. If connected to a scaffold, this must be designed by a CPEng.

Mast climbers must have:

> the manufacturer's specifications and instructions for erection and use

> anchor points or other means of tying the mast-climber to the structure

> the SWL clearly marked

> the foundation able to carry the intended loads

> the base of the mast-climber adequately protected

> the mast erected vertically and all ties approved and in place

> testing, pre-operational checks and servicing requirements carried out.

13.4 FALSEWORK OR PROPPING

Falsework or propping is any temporary structure used to support a structure while that structure is not self-supporting. Falsework may support a combination of dead and live loads. It must be designed (or have the design verified) by a CPEng unless the relevant loads and the structure can be verified.

Falsework typically consists of a large number of components with multitude connections and junctions to produce a supporting structure. Incorrect assembly of any of the connections or junctions may jeopardise the stability and integrity of the supporting falsework structure.

Traditional scaffolding components such as tube and coupler, ringlock, kwikstage system, cuplock, and timber, may be used provided the manufacturer's specifications and instructions or engineered design are followed. Soleboards or bearers must be able to support the intended loads.

The falsework should be regularly checked for any instability as well as:

> immediately before and after loads are applied

> periodically after adverse weather conditions

> before dismantling.

Falsework must have:

> foundations able to support the loads carried by the falsework.

> erection method in accordance with the manufacturer's specification and instructions, and the engineer's design (if required).

> tolerances within allowable design limits.

> all connections and junctions properly constructed.
> adequate access and egress from the propped areas.
> all falsework positioned centrally under the intended loads.
> falsework designed to safely support all imposed loadings.
> a safety factor of 3 in all aspects of the design.
> proprietary system design according to the manufacturer's specifications and instructions.

MATERIAL	LOAD
Sand (wet/dry)	1,680 kg/m^3 – 1,920 kg/m^3
Timber (pinus radiata/m^3)	400-800 kg
Water (per litre)	1 kg
Concrete wheelbarrow (approx. 0.05 m^3)	136 kg
Concrete blocks (400 x 400 x 200 mm)	19 kg/block
Person (average weight)	100 kg
Concrete (average)	2,500 kg/m^3
Concrete (average with 3% steel)	2,550 kg/m^3
Concrete (heavy)	3,200 kg/m^3

Table 21: Typical loadings that may be imposed on falsework

Notes: The mass of 1 metric tonne (1,000 kg) exerts a force of approximately 9.81 kN.
To covert kg to kN: #kg multiplied by 9.81
To convert kN to kg: #kN multiplied by 0.102

U-HEAD JACK AND BASEJACKS

Recommended minimum SWL:

> 53 kN (5405 kg) at 200 mm extension
> 41 kN (4180 kg) at 450 mm extension
> or in accordance with the manufacturer's specifications

Figure 54 shows how beams should be positioned in U-head jacks (or similar) so that the beam remains centred over the standard or support. Jacks must be rotated to ensure the beam is centred, over the standard or prop which is then wedged or chocked to centralise it before being loaded.

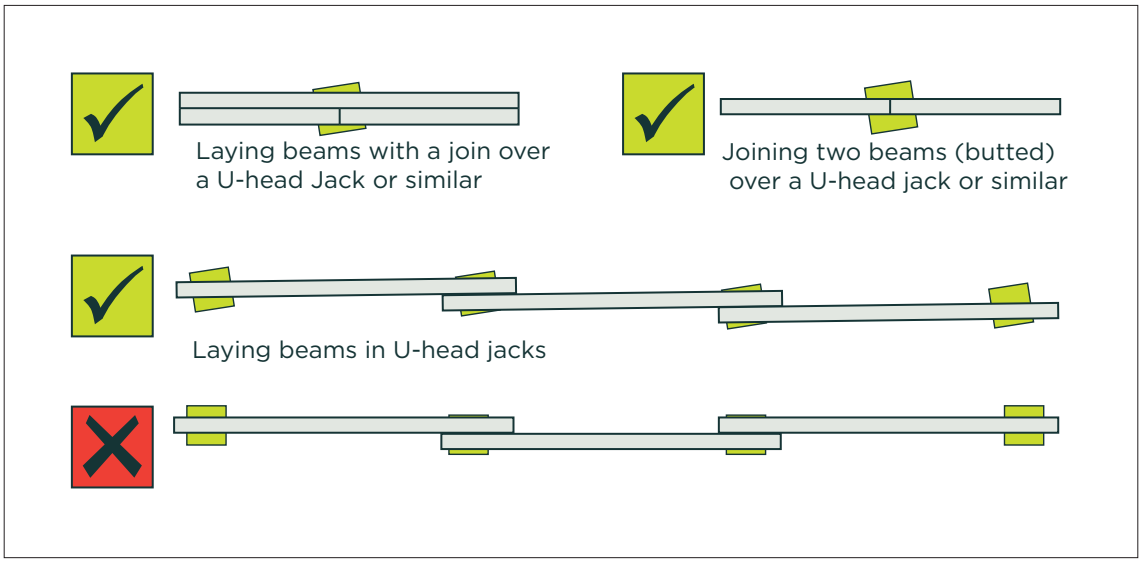


Figure 54: Positioning of U-head jacks or similar

ADJUSTABLE PROPS

These consist of four components:

1. Outer tube (60 mm outside diameter) with welded baseplate
2. Inner tube (48.3 mm outside diameter) with welded top plate
3. Adjusting nut and handle
4. Prop pin.

Prop sizes range from 1.050-4.900 m and can typically support a SWL of between 8.0-42.5 kN (815-4335 kg). The manufacturer's specifications for safe working loads must be followed.

Props should be laced in two directions. It is recommended that lacing be located at one third of the height of the inner prop. Adjustable props must:

> be undamaged and not bent

> be plumb within 1.5 degrees of vertical (less than 25 mm out of vertical over a height of 1 m)

> be placed centrally under the member supported and over any member supporting the prop with no eccentricity exceeding 25 mm

> be adequately laced with lacing positioned one third of the distance up the prop inner.

SHORELOAD FRAMES

Shoreload frames are connected with frame braces to form towers, which can be stacked vertically with frame joiners to achieve the required height. Frames come in different sizes and provide a safe working load of 80-100 kN (8,160-10,195 kg) per frame.

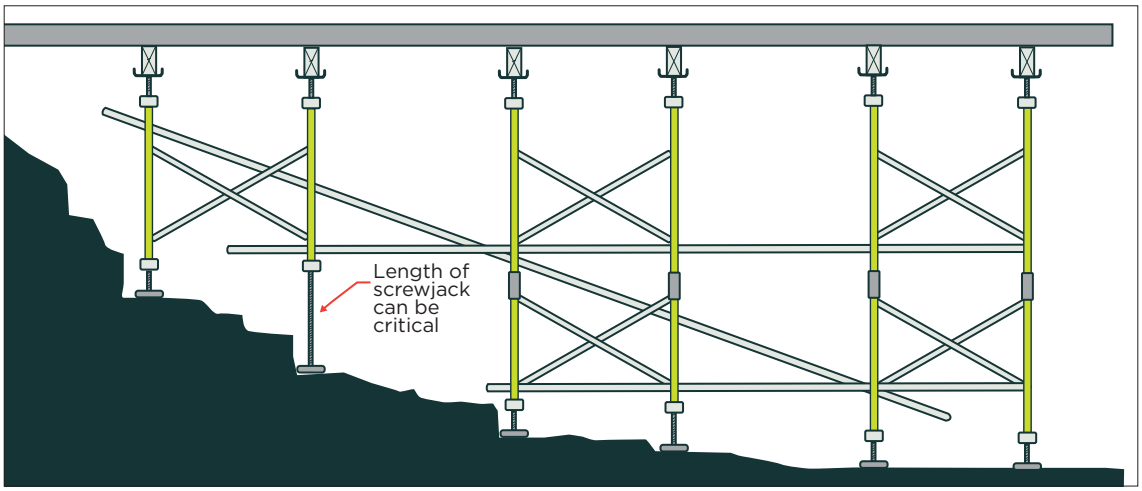


Figure 55: Typical shoreloading set-up

HEADER BEAMS THAT MAY BE USED

> Timber beams
> Rolled steel joists (RSJ)
> Universal beams (UB)
> Composite beams
> Laminated beams
> Aluminium 'A' or 'I' beams with timber infill
> Steel soldier beams

CONCRETE STRUCTURES REQUIRING SUPPORT

Precast concrete such as beams, panels and double-T sections are cast off-site and only require temporary propping while they are supporting loads such as an in situ concrete topping floor.

In situ concrete is poured on site and requires propping of primary and secondary beams supporting the formwork that contains the wet concrete.

13.5 BEAMS AND TRUSSES

Beams or trusses are often used as a bridge that supports scaffolding above an opening in an independent scaffold. They are also commonly used to construct temporary roof structures. The most common method of bridging is to fix a pair of prefabricated beams or trusses above the ledgers and connect them to the outer standard and inner standards of the scaffold.

They should be attached to the inner faces of the standards, above the ledgers and be connected using right-angle couplers, to each standard at the top and bottom chords of the beam or truss. A pair of connections is required at the supporting standards at each side of the opening and at each standard supported by the beams.

The length of the beam or truss should be able to span the opening and connect to the supporting standards on either side. A range of proprietary beams and trusses are available in a variety of lengths.

A selected beam or truss must have enough load-bearing capacity to support the scaffolding above the opening.

Aluminium beams and trusses are lighter than steel but the load-bearing capacity is also reduced, so it is important to select a beam or truss with sufficient load-bearing capacity.

Proprietary beams and trusses should be used according to the manufacturer's specifications and instructions. If loads cannot be verified, a CPEng must verify the design. See Section 7.2 for more information.

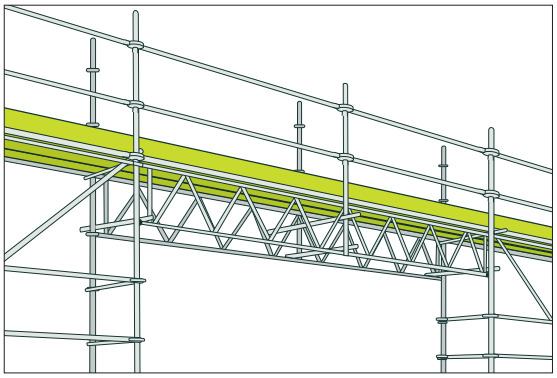


Figure 56: Proprietary trusses forming a bridge

LACING AND BRACING BEAMS AND TRUSSES

Pairs of beams or trusses must be braced with tubes and couplers to prevent lateral buckling and twisting. Lacing and bracing must comply with the manufacturer's instructions or the bracing should be designed or verified by a CPEng. Bracing can be done by:

> lacing tubes – connecting the inner and outer beams or trusses with tubes at the top and bottom chords

> plan bracing

> section bracing – connecting the top chord of one beam or truss to the bottom chord of the other.

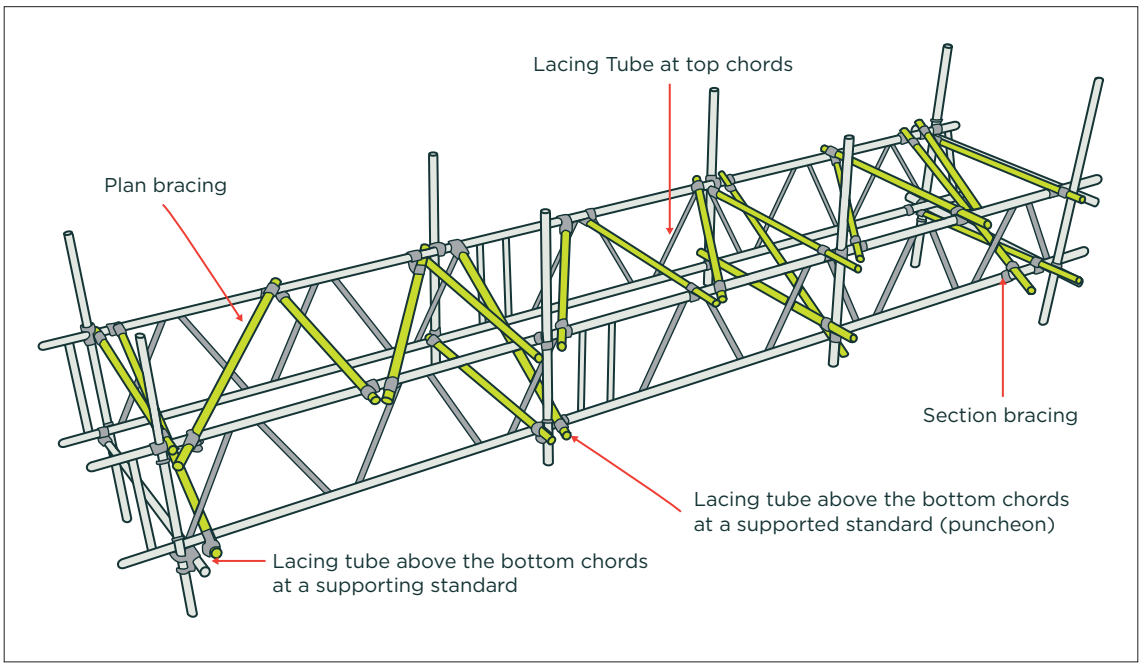


Figure 57: A pair of trusses acting as a bridge between two pairs of supporting standards

LACING TUBES

The top and bottom chords of the beams or trusses are tied together by connecting the inner and outer beams with tubes using right angle couplers. The lacing tubes stabilise the pair of beams or trusses.

PLAN BRACING

Plan bracing should be fixed between the inner and outer beams or trusses, at 1.2 m maximum spacing and fixed with right-angle or swivel couplers. The spacing of the bracing should match the spacing of the lacing tubes at the compression chords.

The compression chords are at the top of the beam or truss when it spans an opening and are supported at both ends. In this case, the plan bracing should be within the top third of the two beams or trusses.

The compression chords are at the bottom of the beam or truss when it is cantilevered (ie it is supported at one end only). In this case, the plan bracing should be within the bottom third of the two beams or trusses.

SECTION BRACING

The section bracing connects the inner and outer beams by connecting the top chord of one beam or truss to the bottom chord of the other using right-angle or swivel couplers. It should be at 2.4 m maximum spacing so is typically provided at each standard position.

13.6 TRESTLE SCAFFOLDS

Trestle scaffolds are metal stands on which a working platform may be laid. Stands may be either telescopic or folding.

Trestles may be used as long as they meet the general requirements of this guide and WorkSafe's *Best Practice Guidelines for working at height*.

GENERAL REQUIREMENTS FOR TRESTLES

> The working platform may not be more than 2 m above the supporting surface.
> The trestle scaffold must not be erected where a person or object can fall more than 2 m (ie at the edge of an open floor).
> Trestles must not be 'piggy-backed' to construct additional lifts.
> Work must only be done from between trestles.
> If the trestle scaffold is more than one bay long, heavy loads such as bricks or blocks must be placed directly over the putlogs.
> Edge protection must be provided where there is a risk of a fall.

13.7 CATCH FANS

Catch fans (including catch platforms, catch screens, catch nets and fans attached to scaffolding using cantilevered assemblies) are cantilevered structures attached to scaffolding to contain falling debris and provide protection below the scaffolding.

REQUIREMENTS FOR CATCH FANS

> Follow manufacturer's instructions and specifications or obtain design or verification from a CPEng.
> Erect spurs from the existing scaffold.
> Brace catch fan:
  - where possible using spurs from below.
  - where necessary using spurs or wire rope from above.
> Brace supporting scaffold.
> Construct additional ties at the level of the catch fan between the scaffold and the supporting structure.
> Attach covering material (may include but is not limited to – planks and ply, ply, screening, chicken mesh).
> Check the stability and compliance of the structure.

13.8 SCAFFOLDING WITH SCREENING OR CONTAINMENT SHEETING

Scaffold sheeting or screening is used for both safety and environmental purposes. Where work is carried out close to pedestrian or vehicle access, scaffolds that are fully screened can minimise the risk to the public from falling objects. Toe boards should be fitted to screened scaffolds.

RISKS OF SCREENED OR CONTAINED SCAFFOLDING

Scaffolds fitted with screening have increased environmental loads (such as wind, snow, or rain loads). This increases the dead load of the scaffold, and the risk of it being blown over.

DESIGN OF SCREENED/CONTAINED SCAFFOLDING

Screened scaffolds must be designed by a CPEng, unless sufficient information is available using the manufacturer's specifications and calculated or known loads.

Screened scaffolds must be notified as special duty scaffolds.

Factors to consider when selecting screening material:

> What is the wind loading?
> What degree of protection is required?
> Is the containment of dust a requirement?
> What chemicals are to be used from the scaffold?
> What are the ventilation requirements?
> How flammable is the screening?
> How much light is needed?
> What size are the sheets of screen sections?
> What are the requirements for fixing the screening?

INCREASING STABILITY OF SCREENED/ CONTAINED SCAFFOLD

Increase stability by increasing the number or strength of ties or by using plan and dogleg bracing, buttresses, counterweights, or combinations of some or all of these measures. Additional braces are needed to prevent rakers from buckling.

Sheeted scaffolds should be designed so that the sheeting will fail (Tear off) at a wind load that is less than the capacity of the scaffold, ie, the sheeting will blow off rather than the scaffold blow over.

Counterweight material must be durable and remain constant under working conditions (eg sand, water or materials that can flow out should not be used as counterweights unless additional measures are used to insure stability).

When using a proprietary scaffolding system that does not have a positive joint between the vertical standards in conjunction with screening, it is recommended that joints be spliced or that additional bracing be provided across the joins to prevent uplift of the joint

Proprietary systems with additional scaffolding components that are not covered by the manufacturer's specifications should be classified as special duty scaffolds.

INSTALLATION RECOMMENDATIONS AND METHODS FOR INSTALLING SCREENING

> Fix it to fully decked and guardrailed platforms
> Fit to the outside of the scaffold unless specified
> Flush the outside of the scaffold to prevent tubes or other items from protruding
> Make it continuous, either by using sufficient overlap (preferable) or by carefully butt-joining the screening

- Secure the top edge of the screening before fixing the bottom edge
- Use a tag line in windy conditions to control the screening during fixing
- Keep the screening taut
- Lap under from the top for containment and lap over from the top for protection
- Keep the ends of the scaffold as close as practicable to the building or structure to prevent the wind getting behind the screening
- Ensure the screening blows into a scaffold so it has the support of the framework. Screening blown away from the scaffolding framework only has the ties to support it
- Toeboards must be fitted.

SCREENING MATERIAL

Common materials used for screening or containment include:

- netting (shadecloth)
- shrink wrap
- sealed panel systems
- Monoflex
- plastic
- keder sheeting.

While there are different varieties of netting, wind must be able to pass through it. This reduces the wind loading on the scaffold and structure. Hessian must not be used as screening as it is a fire risk.

Sheeted scaffolds are often used for encapsulation of areas where work such as asbestos or lead removal is carried out. Risks associated with asbestos and other harmful substances must be managed throughout the erection, use, and dismantling of the scaffold and sheeting. Scaffolds used for encapsulation will often become a confined space. These risks must be identified before work starts, and taken into account when devising the safe system of work.

Encapsulation products greatly increase the loading and pressure on the scaffold and supporting structures. Procedures to relieve this pressure in emergency situations should be documented in the emergency plan.

13.9 TEMPORARY ROOFS

Temporary roofs are commonly constructed using tube and fitting components and/or proprietary systems. They may be supported by an independent scaffold or directly from a supporting structure. They can be mono-pitched or multi-pitched (eg gable roofs).

Temporary roofs must be designed by a CPEng, unless sufficient information is available using the manufacturer's specifications and calculated or known loads.

Temporary roofs are subject to environmental loads that affect the roof structure and the supporting structure. Information on environmental loadings can be found in AS/NZS1576.1 and AS/NZS1170.

TEMPORARY ROOF DESIGN

The design of the temporary roof should take into account:

- the span between supports
- erection options
- the clearance required between the temporary roof and supporting scaffold and the structure it is protecting (vertical and horizontal)
- the area available for supporting scaffold or structure
- the type and area of cladding for roof and supporting scaffold
- how pressure can be relieved in the event of environmental loadings in excess of design loadings
- whether the supporting structure can withstand any imposed loads

- whether the slope is adequate for water run-off
- anchorage methods to resist vertical and horizontal forces with the use of ties, buttresses, counterweights and additional bracing.

ERECTING AND DISMANTLING A TEMPORARY ROOF

Roofs can be erected in situ or prefabricated and craned or rolled into position.

Use a sequential erection method which isolates workers on scaffolds from potential falls while erecting and dismantling roof structure.

Cladding should be attached and removed from within the scaffold or behind edge protection.

Consider using mobile scaffolding or mobile elevating work platforms for erecting and dismantling the roof structure and cladding.

Use a fall restraint system in preference to a fall arrest system if no other fall protection methods are practicable. A rescue plan must be in place if using fall arrest systems.

Ensure that water cannot pool on the roof cladding and that run-off will not create a hazard.

Take precautions to manage hazards specific to working on roofs. For more information refer to WorkSafe's Good Practice Guidelines for *Working on Roofs* and Good Practice Guidelines for *Working at Height in New Zealand*.

Other hazards to take into consideration are wind gusts when fixing tarpaulins or sheets, and the use of heat guns and gas in confined spaces when attaching shrink wrap.

13.10 TIMBER SCAFFOLDS

Independent scaffolds can be erected with timber standards, ledgers, putlogs, guardrails and toeboards. Platforms should be constructed with scaffold planks.

Timber scaffolding should be erected by a competent person with appropriate knowledge and experience. It should be able to take all loads and stresses with enough reserve for unforeseen circumstances.

TIMBER AND FASTENINGS

Pinus radiata and Douglas fir are suitable timbers for constructing scaffolding. Other types of timber may be used if they are of equivalent strength and quality.

Timber should be:

- graded and preservative-treated to appropriate industry standards
- treated to commodity specification C3 if standards and sole plates are in direct contact with the ground (C7 is acceptable if they are not in contact with the ground).

For indoor scaffolding boron-treated timber may be used. Untreated timber may be acceptable if the timber is sound and unlikely to deteriorate during the life of the scaffold.

Fixings used for connecting joints between standards ledgers and braces must be of adequate strength and be maintained in good condition.

SPECIFIC REQUIREMENTS

The design and construction of timber scaffolding should be in accordance with appropriate industry standards. Timber should be of known grade (machine stress graded). Bolts or equivalent connections are recommended on all joints.

COMPONENT	TIMBER SIZE AND SPACING
Standards	90 mm x 45 mm at a maximum spacing of 2.4 m.
Putlogs	140 mm x 19 mm or 90 m x 45 mm at a maximum span of 1.4 m
Bracing	Minimum brace size is 90 mm x 45 mm, or 140 mm x 19 mm. Each standard must be tied to the wall by a putlog and braced longitudinally by a ledger and at least two diagonal braces for the length of the scaffold. An additional diagonal brace at 40º to 50º slope must also be provided for every 20 m length of scaffold.
Guardrail and midrail	Minimum size 90 m m x 45 mm.
Toeboards	All timber scaffolds must have toeboards on all platforms.
Platform/bay width	At least 675 mm with 450 mm clear access.

Table 22: Recommended timber sizes and spacings for scaffolding

14/

SUSPENDED SCAFFOLDING

IN THIS SECTION:

A suspended scaffold consists of a platform, suspended by ropes, which can be raised and lowered manually or by power-operated scaffolding hoists. A suspended scaffold may incorporate a boatswain's chair, cradle, work cage, articulated cradles or multilevel cradles.

14.1 BASIC RULES WHEN ERECTING, USING, ALTERING, AND DISMANTLING SUSPENDED SCAFFOLDING

> Where the structural stability is not verified, a CPEng must verify the supporting structure to ensure it can support all loads imposed by the scaffold.
> Each suspension rig, cradle, hoist, protective device and load-limiting device must be inspected by a competent person before use each day.
> Persons operating suspended scaffolding must be competent and authorised to operate it.
> At least two people should be in the swinging stage at one time.
> All hoists must be fitted with a secondary rope and protective device.
> All hoists must have a load-limiting device.
> A minimum factor of safety of 3 is required to support the suspended load.
> Needles should be laced together where practicable.
> There should be a system to prevent items falling from the cradle.
> There must be a reliable and efficient communication system between the cradle users and other people.
> Emergency procedures, including how to rescue someone or undertake an emergency descent, must be detailed in the emergency plan and communicated to all workers.
> Control boxes should be lockable and secure and have an emergency stop button.
> Every worker on a suspended working platform must wear a safety harness that is secured to a suitable anchor or to an independent lifeline.
> Lateral restraints may be required to stabilise the cradle when in use.

Note: A scaffold platform hung from a structure that cannot be raised or lowered is called a hanging scaffold (see Section 12.2), not a suspended scaffold. A hanging scaffold is classified as a special duty scaffold. It must be designed by a CPEng unless the relevant loads and the supporting structure can be verified.

COMPETENCE REQUIRED TO OPERATE SUSPENDED SCAFFOLDING

Persons operating suspended scaffold must be competent to use it. They must be given an induction by the scaffolder whenever a stage has been installed, altered, or shifted, including completing the required daily pre-start checks.

14.2 TYPES OF SUSPENDED SCAFFOLDING

Boatswain's chair: has a single overhead suspension point and can support one worker in a chair. Raised or lowered by hand or mechanical haulage controlled from the chair. *Minimum load capacity is 120 kg.*

Manual swinging stage: a working platform with a minimum of two points of overhead

suspension and is raised or lowered by hand haulage controlled from the stage. *Maximum combined live load and dead load = 360 kg*

Mechanical swinging stage: a working platform with a minimum of two points of overhead suspension that is raised or lowered by power or air-operated hoists controlled from the stage.

Work cage: has a single overhead suspension point and may support one or two workers. *Minimum load capacity is 120 kg per user*

Multi-point suspended stage: a stage with more than two points of suspension and raised and lowered manually or by power or air-operated or operated hoists controlled from the stage.

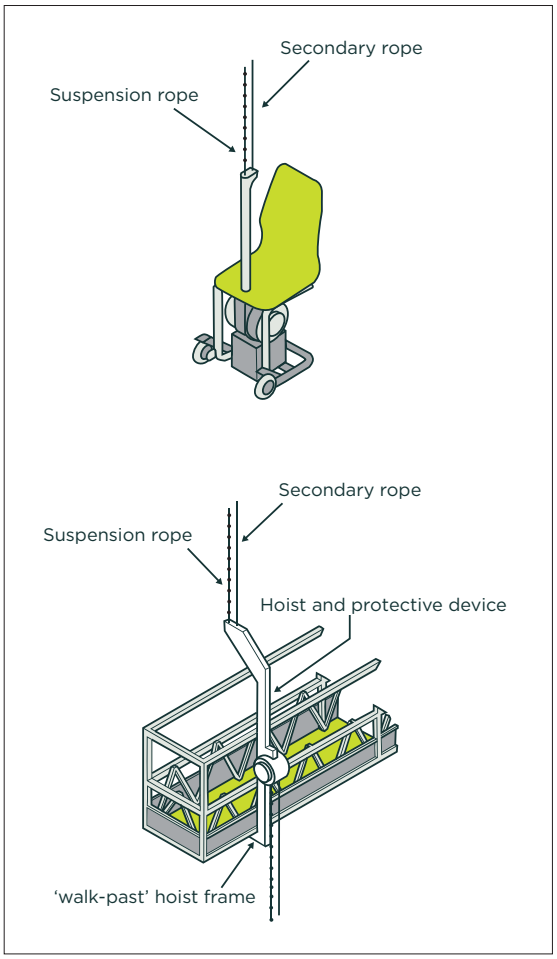


Figure 58: Suspended scaffolding equipment, including boatswain chair

14.3 ERECTION, ALTERATION AND DISMANTLING

Suspended scaffolding must be supplied with clear instructions about safe configurations for installation and the intended uses, load combinations, pre-start checks and emergency procedures.

Before delivery, all suspended scaffolding equipment must be checked to ensure it is fit for use. A hoist test should be carried out along with a check on the load limiting device and safety device by a competent person before the hoist is sent out to a job.

Suspended scaffolding must only be erected, altered or dismantled by or under direct supervision of a holder of a Suspended Scaffolding Certificate of Competence: This person should check that the scaffold is safe to use by inspecting it and all of its components.

Once the scaffolding has been inspected, the scaffolder must attach the necessary tags and issue a handover certificate.

Scaffold structures (other than proprietary needles or parapet brackets) used to support a suspended scaffold must be erected, altered and dismantled by a holder of an Advanced Scaffold Certificate of Competence.

14.4 INSPECTION OF SUSPENDED SCAFFOLDING

PRE-DELIVERY HOIST TESTING

1. Lift a test load of 1.25 times the rated load of the hoist (even if the hoist has a load limiting device) up a distance of not less than 3 m.
2. Lower the load.
   > Arrest and sustain the load in any position without the hoist showing over-straining of any part.

DAILY INSPECTIONS

Suspended scaffolds should be inspected and tested daily by the user prior to use. In order to perform this test adequately, they must have instructions from the scaffolder, who should include this as part of the handover process.

A scaffolder must inspect the scaffold at other times (see below).

INSPECTION FREQUENCY	INSPECTION DONE BY
> Daily as part of the pre-start check.	The user
> Weekly while in use. > Monthly while set up but not in use. > After any storm or event that could adversely affect the safety of the scaffold.	Certified scaffolder
> After each structural alteration, repair, addition or change of anchorage.	Certified scaffolder. An engineer must check the design if the strength of the supporting structure cannot be verified, or if the structure has been engineer designed

Table 23: Recommended inspection frequency

WHAT TO CHECK FOR IN DAILY INSPECTIONS

> The suspension rig and cradle has not been tampered with and does not show any signs of damage.

> The directional switches function correctly.

> All emergency stop button switches function correctly.

> The top limit switches operate.

> The emergency crank handle is fitted, if required, and is left tightened (where the emergency crank handle has an electrical interlock, loosening the handle will cut off power and re-tightening the handle will return power to the controls).

> The overspeed governor operates correctly.

> After a manual tripping, the overspeed device functions correctly after resetting.

> Any slack rope device functions correctly.

> The load limiting device does not show any visible signs of damage to the equipment and connections to the scaffolding hoist or stirrup.

> Damage to scaffold and its supporting structure by traffic, cranes or other plant – load test to insure the stage will support the intended loads.

14.5 ACCESS AND OPERATION

Suspended scaffolds must:

> be controlled from the stage platform or chair

> have a push button or deadman lever control that will stop and automatically lock the motor and hoist when pressure on the control switch or lever is removed

> have independently operated controls

> have a manually operated emergency release mechanism in case of failure

> have safe access and egress points for users required to work from the cradle. Where access is not from the ground or a safe protected landing, safety harnesses and lanyards must be used by all those entering or leaving the cradle and the cradle secured against movement.

Each scaffolding hoist should be operated by an authorised user. Ratchet and pawl manually operated swinging stages must have a positive locking device so that the stage can be securely held at any level and the pawl automatically engages when released from the hand control.

USE OF SAFETY HARNESSES AND LIFELINES

Every worker on a suspended working platform must wear a safety harness that is secured to an appropriate anchor point within the cradle or cage, or to the chair or an independent lifeline. Section 6 contains further information on fall protection.

14.6 LOADINGS

The maximum live load on a swinging stage should be according to the manufacturer's specifications.

The rated load plus the self-weight of the cradle must not be more than the lifting capacity of the hoists supporting it. The lifting capacity must be clearly marked on the hoists.

14.7 SUSPENDED SCAFFOLDING EQUIPMENT

WIRE ROPES

Suspension and secondary wire ropes must be at least 8 mm in diameter and meet the specifications of the manufacturer of the scaffolding hoist and the cradle secondary protective device.

Care should be taken to prevent the ropes from being contaminated with construction materials resulting from work activities.

SUSPENSION AND SECONDARY WIRE ROPES	MINIMUM SAFETY FACTOR
Hand-operated scaffold hoists	7
Power-operated scaffold hoists	8
Fibre ropes	6

Table 24: Safety factors for suspension and secondary wire ropes

LOAD-LIMITING AND PROTECTIVE DEVICES

All powered scaffolding hoists must have:

> a load-limiting (overload) device to act if the platform is overloaded, and

> a secondary rope and protective device to act in the event of overspeed or loss of suspension.

LOAD-LIMITING DEVICES

In the event of an overload on the hoist, this device prevents movement (except lowering) until the overload has been removed.

The device must be designed so it:

> triggers if the load is over 1.25 times the rated capacity of the hoist.

> is able to withstand a static load three times the working load limit (WLL) of the hoist.

The device should be inspected and tested by a competent person before being sent to a job. They should check the device stops operation of the scaffolding hoist at a load not more than 25% above the load setting marked on the device.

Where the load is limited by an electric current limiting device, the test should be carried out with the supply voltage reduced to typical site conditions.

PROTECTIVE DEVICES AND SECONDARY ROPES

Every hoist must be fitted with a secondary rope and a protective device. This can be incorporated in the hoist or mounted separately on the scaffold cradle.

The protective device is designed to act without delay in the event of overspeed or loss of suspension.

The suspension rig and supporting structure must be designed so it is able to withstand the impacts of the suspension load transferring to the secondary rope when the device is triggered.

The device itself must be designed so it is able to withstand the combined weight of the WLL and the equipment while in motion.

ANCHORAGES

Hoisting wires or tackle must be anchored to:

> a secure part of the structure
> needles
> designed brackets
> parapet hooks, or
> directly to the counterweights.

All structures and supports must be able to support the anchorage without danger of failure or distortion and to give a safety factor of at least 3 under the worst conditions. The cantilevered structural member that supports a scaffold is called a needle.

NEEDLES

Needles and supporting beams consist of scaffold tubes and couplers, or structural beams designed for the intended loads.

For proprietary needles refer to the manufacturer's instructions and specifications. The design of non-proprietary needles must be done or verified by a CPEng.

CALCULATING COUNTERWEIGHTS FOR NEEDLE STABILITY

NEEDLE STABILITY

Needles must be counterweighted or directly fixed to the supporting structure.

Suspended load: The activation setting on the load-limiting device + the suspension and secondary ropes (cables) + weight of the hoist + power leads + any counterweights on the bottom of the ropes.

Outboard: Distance from the fulcrum to the suspension point in metres.

Inboard: Distance from the fulcrum to the fixing point (prop or tie down), or to the centre of the counterweights.

SWINGING STAGE SETUP	EACH NEEDLE MUST BE DESIGNED TO CARRY...
Two points of suspension	The entire load of the working platform including hoists, as well as the full live load of persons and materials on the working platform, plus the factor of safety.
More than two points of suspension	The full dead and live load for each section between suspension points, plus the factor of safety.

Table 25: Needle design for mechanically operated swinging stage

Unless specifically designed by a CPEng, each needle for a mechanically operated swinging stage must:

- be at least equivalent in strength to a 152 mm x 89 mm x 17.09 kg/m rolled steel joist when suspending a maximum load of 400 kg
- be at least 3.6 m in length when counterweighted
- be located so they do not project more than 1.5 m beyond the outer point of the support on the building or structure (maximum 1.5 m outboard from the fulcrum)
- not have the outboard end of the needle lower than the inboard end.

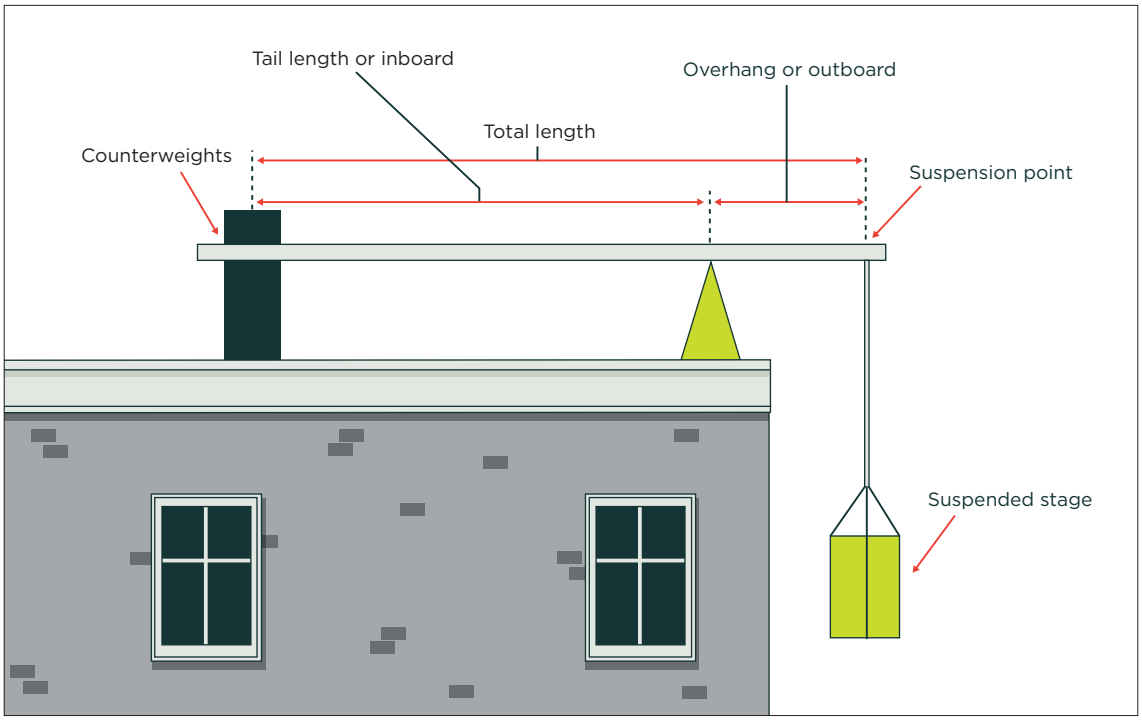


Figure 59: Suspended scaffold showing counterweights

COUNTERWEIGHT CALCULATION FOR SWINGING STAGE WITH OVERLOAD DEVICE BELOW HOIST

$$\text{Counterweight} = \frac{\text{rope tension (kg) x outboard}}{\text{Inboard}} \times 3$$

Example

Cut off setting on stage	(600) kg
+ motor	(50) kg
+ suspension and secondary rope	(100) kg
+ power lead	(20) kg

Rope tension = 770 kg

Inboard portion of needle = 4 m

Outboard portion of needle = 0.5 m

Counterweight = (770 x 0.5/4) x 3 = 288.75 kg total counterweight per needle

BRACKETS AND PARAPET HOOKS

Brackets, parapet hooks, parapet brackets and attachments must be designed by a CPEng. A minimum factor of safety of 3 is required on the combined dead and live loading of the suspended scaffold. All welding for these structural components must be done by a certified welder.

Parapet hooks and brackets may only be used if:

> the parapet is structurally sound – it must be verified by a CPEng
> the hook fits the parapet correctly
> the parapet is deep enough to allow at least 300 mm of the hook down the inside of the parapet.

SECONDARY SAFETY FOR NEEDLES OR PARAPET HOOKS

Every suspended working platform supported by needles or parapet hooks should have a secondary safety method of securing the needles or parapet hooks to the supporting structure. Stage wire ropes and wire rope grips or bulldog clips can be used. Lace the wire rope through the needles or parapet hooks and secure the wire rope around part of the structure. (See WorkSafe's Approved Code of Practice for *Load-lifting Rigging*.)

SUSPENSION RIGS

Suspension rigs should only be erected or altered in accordance with design specifications. Its built-up framework should be purpose-built to engineering principles or constructed from scaffold tubes and couplers that are tied together with at least two rows of uprights, fixed with ledgers and transoms and provided with longitudinal, transverse and plan bracing systems.

Counterweights must be fixed to the needle in such a way that they cannot be removed without the use of a tool or key.

The ratio of stability of a cantilever suspension rig supporting a suspended scaffold must not be less than 3.

WORKING PLATFORMS

Guardrails, midrails and toeboards must be provided on both sides and both ends of all suspended scaffolds other than boatswains chairs.

CRADLES

The cradle should be kept tidy and clear along its entire length. Adequate personal protective equipment should be present in the cradle and used correctly.

Where automatic levelling devices are not fitted, the cradle should be maintained as close as practicable to the horizontal during climbing and descending operations by synchronised operation of the hoists.

Ensure that apart from any purpose-designed buffer rollers, no part of the cradle comes into contact with the structure (including protruding scaffold tubes, timber, open swivel or pivot windows) while it is climbing, descending or traversing.

Lateral restraint may be required to stabilise the cradle (eg in wind). These include:

> lanyards
> tensioned wire rope systems
> removable ties
> fan units
> suction units.

WORKING LOAD LIMITS

The total load in the cradle, including users, materials and equipment, must not be in excess of the WLL of the suspended scaffold.

A sign clearly displaying the WLL should be securely fixed to:

> the inside of the cradle, or

- for articulated cradles, the inside of each bay, or
- for multi-decked cradles, each level.

The width of the platform of a cradle should not be less than 450 mm. The cradle should not be cantilevered past the scaffolding hoist by more than the design distance of the cradle.

EMERGENCIES

A reliable and efficient communication system between the cradle users and other persons outside is essential. In an emergency, there should be a means for rescuing those in the cradle, such as fire brigade on standby, crane-lifted work boxes and industrial rope access. An emergency descent should not be operated while power is connected to the scaffolding hoist.

14.8 ELECTRICAL EQUIPMENT AND CONTROLS

Any central control box should:

- be fully enclosed, lockable, shatterproof and weatherproof
- include socket outlets for hoists, an emergency stop button and a power-on light
- be removable for safety and security reasons
- be attached securely to guardrails of the cradle when in use and situated on the side away from the working face
- have spring loaded/deadman buttons and levers.

Type II devices must be designed so they are unaffected by direct currents.

Residual current devices complying with VDE 0664-20 or JIS C 8221, JIS C 8222 and JIS C 8201-2-2 may also be used.

APPENDICES

IN THIS SECTION:

APPENDIX A: SCAFFOLDING REGULATIONS

All work involving scaffolding must comply with the requirements of HSWA and all relevant regulations. These include both the HSE regulations and the GRWM Regulations.

SCAFFOLDING DEFINITION

Scaffolding:

> means any advanced scaffolding, basic scaffolding, or suspended scaffolding or any framework or structure, of a temporary nature, used or intended to be used:
  - for the support or protection of persons carrying out construction work or work connected with construction work, for the purpose of carrying out that work; or
  - for the support of materials used in connection with any such work; and
> includes any scaffolding constructed as such and not dismantled, whether or not it is being used as scaffolding; and
> includes any coupling, device, fastening, fitting, or plank used in connection with the construction, erection, or use of scaffolding.

Regulations 22, 27, 35, and 53 of the HSE Regulations apply specifically to scaffolding. In addition, regulation 21 of the HSE Regulations and regulations 24 and 25 of the GRWM Regulations are very relevant to a scaffolding worksite.

REGULATION 21, HSE REGULATIONS – HEIGHTS OF MORE THAN 3 METRES

In this regulation, the term employer does not include any employer who employs any employee to carry out any agricultural work in a workplace under the control of that employer. The definitions of employer and employee that apply to this regulation are outlined in Regulation 12.

Every employer must, so far as is reasonably practicable, ensure, in relation to every workplace under the control of that employer, that, where any employee 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.

REGULATION 22, HSE REGULATIONS – SCAFFOLDING

In this regulation, the term **employer** means:

> every employer, in relation to every workplace under the control of that employer in which any construction work is carried out; and
> every person who controls a workplace in which any construction work is carried out.

Every employer must, so far as is reasonably practicable, ensure that, where any construction work cannot be carried out safely without the use of scaffolding:

> scaffolding is provided; and
> the scaffolding so provided is:
  - suitable for the purpose for which it is to be used; and
  - properly constructed of sound material; and
  - constructed with a sufficient reserve of strength having regard to the loads and stresses to which it may be subjected; and
  - sufficient in amount for the purpose for which it is to be used.

REGULATION 27, HSE REGULATIONS – CERTIFICATES OF COMPETENCE

The following kinds of certificates of competence may be issued under regulation 38:

> a certificate of competence as a diver
> a certificate of competence as a powder-actuated tool operator
> a certificate of competence as a scaffolder.

A certificate of competence as a scaffolder shall authorise the holder to erect, maintain, repair, or dismantle 1, some, or all of the following types of scaffolding:

> basic scaffolding
> advanced scaffolding
> suspended scaffolding.

REGULATION 31, HSE REGULATIONS - REQUIREMENTS OF APPLICANTS

An applicant for a certificate of competence shall:

> fulfil the requirements of regulation 35
> be physically and mentally able to perform any task that it is reasonable to expect the holder of such a certificate to perform; and
> be of good character and reputation.

REGULATION 35, HSE REGULATIONS – REQUIREMENTS OF A SCAFFOLDER

An applicant for a certificate of competence as a scaffolder shall:

> have a thorough knowledge of the use or uses to which the type or types of scaffolding in respect of which the applicant seeks a certificate may be put; and
> have a thorough knowledge of the erection, maintenance, repair, and dismantling of the type or types of scaffolding in respect of which the applicant seeks a certificate; and
> have a thorough knowledge of the practices that must be followed to enable scaffolding of the type or types in respect of which the applicant seeks a certificate to be used, erected, maintained, repaired, and dismantled safely; and
> have had suitable recent training, including suitable recent experience, in the use, erection, maintenance, repair, and dismantling of scaffolding of the type or types in respect of which the applicant seeks a certificate.

REGULATION 53, HSE REGULATIONS – SCAFFOLDER

Every employer must, so far as is reasonably practicable, ensure that every employee who, in the course of carrying out construction work, erects, maintains, repairs, or dismantles scaffolding (being scaffolding any part of which is 5 metres or more above the ground) is the holder of a current certificate of competence with respect to:

> basic scaffolding, where the scaffolding being erected, maintained, repaired, or dismantled is basic scaffolding; or
> advanced scaffolding, where the scaffolding being erected, maintained, repaired, or dismantled is advanced scaffolding; or
> suspended scaffolding, where the scaffolding being erected, maintained, repaired, or dismantled is suspended scaffolding.

Nothing in this regulation prevents an employee training to become the holder of a certificate of competence as a scaffolder from erecting, maintaining, repairing, or dismantling scaffolding (being scaffolding any part of which is 5 metres or more above the ground), in the course of carrying out construction work, under the direct supervision of the holder of such a certificate, being a current certificate that authorises the holder to erect, maintain, repair, or dismantle scaffolding of the type that the employee is erecting, maintaining, repairing, or dismantling.

The definitions of employer and employee in regulation 50 apply to this regulation.

REGULATION 24, GRWM REGULATIONS – MANAGING RISKS ASSOCIATED WITH WORKING UNDER RAISED OBJECTS

A PCBU must manage, in accordance with regulations 5 to 8, risks to health and safety associated with work being done under any object that has been raised or lifted by any means.

If it is not reasonably practicable to eliminate the risk referred to in subclause (1), the PCBU must minimise the risk by, so far as is reasonably practicable, providing supports or other devices to be placed or used under the raised object so that the object cannot fall or be lowered while a worker or other person is under it.

REGULATION 25, GRWM REGULATIONS – MANAGING RISKS ASSOCIATED WITH FALLING OBJECTS

A PCBU must manage, in accordance with regulations 5 to 8, risks to health and safety associated with a falling object if the object is reasonably likely to fall on and injure a person.

If it is not reasonably practicable to eliminate the risk referred to in subclause (1), the PCBU must minimise the risk by providing and maintaining a safe system of work that includes:

> measures for preventing an object from falling freely, so far as is reasonably practicable; or
> if it is not reasonably practicable to prevent the object from falling freely, a system to arrest the fall; or
> if it is not reasonably practicable to comply with paragraph (a) or (b), providing an exclusion zone that persons are prohibited from entering.

OTHER REQUIREMENTS

Consider the requirements of any applicable laws, regulations, codes of practice, Territorial Local Authorities (TLA), District Plans, Engineering Standards, by-laws, and any subsequent amendments.

Relevant legislation to consider may include the following Acts and regulations made under them:

> Land Transport Management Act 2003
> Building Act 2004
> Resource Management Act 1991
> Electricity Act 1992
> Gas Act 1992
> Local Government Act 2000
> Telecommunications Act 2001

TLA requirements:

> Consolidated By-law

> District Plan Provisions

RESOURCE CONSENT REQUIREMENTS

It is important to obtain the necessary resource consents before work starts. Check the relevant TLA District Plan provisions to find out if resource consents are necessary.

WORKSAFE POSITIONS BY HEIGHT OF SCAFFOLDING

HEIGHT	LEGAL REQUIREMENT	WORKSAFE POSITION
Any height	Section 36, HSWA Primary duty of care	> Scaffolding must comply with AS/NZS1576
0 – 3 metres		> Best Practice Guidelines for *Working at Heights 2012* state that if there is a potential for a person at work to fall from any height, reasonable and practicable steps must be taken to prevent harm from resulting > Erected by a 'competent person' > All scaffolds should comply with these guidelines
3 – 5 metres	Regulation 21, HSE Regulations Regulation 22, HSE Regulations	> Erected by a 'competent person' > All scaffolds should comply with these guidelines
5 – 33 metres	Regulation 53, HSE Regulations	> Scaffolding must comply with AS/NZS1576 > All scaffolds should comply with these guidelines > Erected, maintained, repaired, dismantled by a holder of a current certificate of competence
Greater than 33 metres		> Tube and coupler scaffolding higher than 33 metres is outside the scope of AS/NZS1576 Part 6 and these guidelines > Requires specific engineering design unless manufacturer's design and instructions cover more than 33 metres in height

Table 26: Requirements and WorkSafe positions by height

APPENDIX B: NOTIFICATIONS TO WORKSAFE

NOTIFICATION OF PARTICULAR HAZARDOUS WORK

Employers (including persons who control the workplace) must notify WorkSafe at least 24 hours' before doing any hazardous work (as defined below).

These notices help WorkSafe plan workplace visits to promote health and safety for everyone in or near a workplace.

Notify WorkSafe by either:

> filing a Notification of Particular Hazardous Work online at: www.worksafe.govt.nz

> downloading the notification form and posting or faxing it to WorkSafe.

WORK THAT NEEDS TO BE NOTIFIED TO WORKSAFE

Defined in the HSE Regulations as:

> any commercial logging or tree-felling

> any construction work where:

- workers could fall 5 m or more (excluding work on a house up to two-storeys high, a power or telephone line, or carried out from a ladder only, or minor or routine maintenance or repair work)
- scaffolding from which someone could fall 5 m or more while being put up or dismantled
- an appliance (other than a self-propelled mobile crane, excavator or forklift) has to lift weights of half a tonne (500 kg) or more higher than 5 m
- workers have to work in a pit, shaft, trench or other excavation that is more than 1.5 m deep and which is deeper than it is wide at the top
- workers need to work underground in any kind of excavation, heading or drive, where there is ground cover overheard
- work in any excavation in which any face has a vertical height of more than 5 m and an average slope steeper than a ratio of 1 horizontal to 2 vertical
- work where explosives are used, or stored on site for this purpose
- workers need to breathe air that is or has been compressed or breathe a respiratory medium other than air. (There is an exception in regulation 26(4), HSE Regulations).

NOTIFIABLE EVENTS

A notifiable event is when someone dies or when a notifiable incident, illness or injury arises from work. WorkSafe must be informed of all notifiable events.

A notifiable illness is when someone becomes seriously ill as a result of work, and this is a notifiable event. All illnesses which require a person to be admitted to hospital for immediate treatment are also notifiable.

A notifiable injury is when someone has been seriously injured as a result of work then this is a notifiable event. All injuries which require a person to be admitted to hospital for immediate treatment are also notifiable.

A notifiable incident is when someone has been exposed to a serious and immediate risk because of an unplanned or uncontrolled work incident then this is a notifiable event.

NOTIFIABLE INCIDENTS

HSWA requires PCBUs to notify WorkSafe if there is an unplanned or uncontrolled incident in relation to a workplace that exposes a person (worker or otherwise) to a serious risk to their health and safety because of immediate or imminent exposure to:

> a substance escaping, spilling, or leaking
> an implosion, explosion or fire
> gas or steam escaping
> pressurised substance escaping
> electric shock
> the fall or release from height of any plant, substance or thing
> damage to or collapsing, overturning, failing or malfunctioning of any plant that is required to be authorised for use
> the collapse or partial collapse of a structure
> the collapse or failure of an excavation or any shoring supporting an excavation
> the inrush of water, mud, or gas in workings in an underground excavation or tunnel
> the interruption of the main system of ventilation in an underground excavation or tunnel
> a collision between two vessels, a vessel capsize, or the inrush of water into a vessel
> any other incident declared in regulation to be a notifiable incident.

APPENDIX C: FURTHER INFORMATION

STANDARDS

Standards relating to but not limited to, scaffolding and scaffolding components

STANDARD	TITLE/SUBJECT
AS/NZS 1664.1	Aluminium structures – Limit state design
AS/NZS 1170.0	Structural design actions – Part 0: General principles
AS/NZS 1170.1	Structural design actions – Part 1: Permanent, imposed and other actions
AS/NZS 1170.2	Structural design actions – Part 2: Wind actions
AS/NZS 1170.3	Structural design actions – Part 3: Snow and ice actions
AS/NZS 1170.5	Structural design actions – Part 5: Earthquake actions – NZ
AS/NZS 1554.1	Structural steel welding – Welding of steel structures
AS/NZS 1554.2	Structural steel welding – Stud welding (steel studs to steel)
AS/NZS 1554.2	Structural steel welding – Welding of high strength quenched and tempered steels
AS/NZS 1576.1	Scaffolding – General requirements
AS/NZS 1576.2	Scaffolding – Couplers and accessories
AS/NZS 1576.3	Scaffolding – Prefabricated and tube-and-coupler scaffolding
AS/NZS 1576.4	Scaffolding – Suspended scaffolding
AS/NZS 1576.5	Scaffolding – Prefabricated splitheads and trestles
AS/NZS 1576.6	Scaffolding – Metal tube and coupler scaffolding (deemed to comply with AS/NZS 1576.3)
AS/NZS 1577	Scaffold decking components
AS/NZS 1665	Welding of aluminium structures
AS/NZS 1892.1	Portable ladders – Part 1: Metal
AS/NZS 1892.3	Portable ladders– Reinforced plastic
AS/NZS 1892.5	Portable ladders – Selection, safe use and care
AS/NZS 3012	Electrical installations – Construction and demolition sites
AS/NZS 4994.1	Temporary edge protection – General requirements
AS/NZS 4994.2	Roof edge protection- Installation and dismantling
AS/NZS 4994.3	Installation and dismantling for edges other than roof edges
AS/NZS 4357	Structural Laminated Veneer Lumber
NZS 3602	Timber and wood-based products for use in building
NZS 3603	Timber structures standard
NZS 3609	Specification for timber ladders

STANDARD	TITLE/SUBJECT
NZS 3631	New Zealand timber grading rules
NZS 4781	Code of practice for safety in welding and cutting
AS 2865	Confined spaces
Standards relating to the design, use and maintenance of industrial fall-arrest systems and devices	
AS/NZS 5532	Manufacturing requirements for single-point anchor device used for harness-based work at height
AS/NZS 1891.1	Industrial fall-arrest systems and devices – Harnesses and ancillary equipment
AS/NZS 1891.2	Industrial fall-arrest systems and devices – Horizontal lifeline and rail systems
AS/NZS 1891.2 (Supplement 1)	Industrial fall-arrest systems and devices – Prescribed configurations for horizontal lifelines (Supplement to AS/NZS 1891.2:2001)
AS/NZS 1891.3	Industrial fall-arrest systems and devices – Fall-arrest devices
AS/NZS 1891.4	Industrial fall-arrest systems and devices – Selection, use and maintenance
AS/NZS 1891.4:2009	Selection, use and maintenance for fall arrest equipment **Note**: The AS/NZS 1891 series applies primarily to fall arrest techniques and equipment
AS/NZS 4488.1	Industrial rope access systems – Specifications
AS/NZS 4488.1	Industrial rope access systems – Selection, use and maintenance
Standards relating to personal protective equipment	
AS/NZS 1270	Acoustics – Hearing protectors
AS/NZS 1337.1	Personal eye protection
AS/NZS 1715	Selection, use and maintenance of respiratory protective equipment
AS/NZS 1716	Respiratory protective devices
AS/NZS 1801	Occupational protective helmets (protection from falling objects only)
AS/NZS 2161: 1-3	Occupational protective gloves
AS/NZS 2210: 1-6	Occupational protective footwear
AS/NZS 4602.1	High visibility safety garments – Garments for high risk applications
NZS 5823:2005	Specification for buoyancy aids and marine safety harnesses and lines

GUIDANCE

Approved Code of Practice for Operator Protective Structures on Self-Propelled Mobile Mechanical Plant
WorkSafe New Zealand www.worksafe.govt.nz

*Code of Practice for Temporary Traffic Management: Part 8 of the Traffic Control Devices Manual*New Zealand Transport Agency www.nzta.govt.nz

New Zealand Electrical Code of Practice for Electrical Safe Distances (NZECP 34:2001)

WorkSafe New Zealand www.energysafety.govt.nz

Mobile Elevating Work Platforms
WorkSafe New Zealand www.worksafe.govt.nz

Construction Quick Guide
WorkSafe New Zealand www.worksafe.govt.nz

Working with Ladders and Stepladders
WorkSafe New Zealand www.worksafe.govt.nz

Workplace Exposure Standards and Biological Exposure Indices
WorkSafe New Zealand www.worksafe.govt.nz

Safe Use of Machinery
WorkSafe New Zealand www.worksafe.govt.nz

Construction fact sheets
WorkSafe New Zealand www.worksafe.govt.nz

Industrial Rope Access
WorkSafe New Zealand www.worksafe.govt.nz

Working at Height
WorkSafe New Zealand www.worksafe.govt.nz

ENVIRONMENTAL PROTECTION AUTHORITY

For information about how to manage hazardous substances visit the Environmental Protection Authority's website: www.epa.govt.nz or call 0800 376 234.

NEW ZEALAND LEGISLATION

To access all legislation including Acts and regulations visit the New Zealand Legislation website: www.legislation.govt.nz

WORKSAFE NEW ZEALAND

For information and guidance about health and safety visit WorkSafe's website: www.worksafe.govt.nz or call 0800 030 040.

For information and guidance specifically about electrical or gas safety visit WorkSafe's website: www.energysafety.govt.nz or call 0800 030 040.

LOCAL COUNCIL

Your council might have additional rules that need to be met. Check with your local council for specific rules that apply in your region.

LOCAL UTILITY OWNERS

Check any local utility owners' websites for additional procedures that may need to be met – look for headings like *safety*, *working safely* or *public safety*.

APPENDIX D: GLOSSARY

TERM	BRIEF EXPLANATION
Access platform	A platform that gives access to and from places of work for persons, materials or equipment.
Accessory	A fitting that is able to be attached to a structural member of a scaffold, or to join a structural member to something else.
Act	The Health and Safety at Work Act 2015.
Adjustable baseplate	A baseplate with an adjustable leg.
Adjustable leg	A threaded bar or tube with nut designed to fit inside a standard to support the load from the standard. Used for levelling in conjunction with a baseplate, U-head or castor.
Anchor point	A secure point of attachment to a structure to which a fall arrest system or anchorage line may be attached.
Anchorage	Components cast or fixed (temporarily or permanently) into the building or structure for the purpose of attaching a scaffold tie and/or a (fall arrest) harness system. Also refers to the holding down system for cantilevered beams when referring to suspended scaffolds or cantilevered scaffold.
Anchorage line	A rigid rail or a flexible line secured to an anchorage point along which a Type 1 fall arrest device or a Type 2 or 3 fall arrest device unreels from.
Barrow ramp	Scaffold designed with a sloping ramp with cleats to prevent slipping, and used to push a wheel-barrow up and down on (a type of sloping platform – see figure 57).
Base lift or kicker lift	A grid of ledgers and transoms close to the ground to provide extra rigidity to the scaffold or provide support for a low level platform.
Basejack	See adjustable baseplate.
Baseplate	A steel plate that distributes the load from a vertical loadbearing member to the supporting structure.
Bay length	The horizontal distance between two longitudinal adjacent standards or the horizontal distance between support points on a suspended swinging stage.
Bay width	The horizontal distance between any two transversely adjacent standards or the width of a suspended swing stage.
Beam chaffer	A short length of material (sometimes half round) used to protect the sharp edge of a beam when using ropes, slings or chains.
Beam clamp	A fitting that is able to secure tube, sling or chain to a universal beam (UB) rolled steel joist (RSJ) or tapered flange beam.
Birdcage scaffold	An independent scaffold generally used to access a large area like a ceiling.
Boatswain's chair	A suspended scaffold of which the platform is a chair or similar device suitable for one person. It can be raised or lowered mechanically or by hand haulage.
Box tie	A tie assembly that is positively fixed around every side of a column or beam.
Brace	A member fixed diagonally to two or more members of a scaffold to provide rigidity to the scaffold.
Bracket	Engineer designed bracket that is attached to a structure to support a scaffold.

TERM	BRIEF EXPLANATION
Bracket scaffold	A scaffold system with brackets attached to the face of a structure such as a tank, duct, boiler, structural beam or similar.
Brickguard	A meshed panel secured between standards that hangs between the top guardrail to the deck level. It sometimes incorporates a toeboard.
Butt	A short length of tube commonly fixed to a scaffold and butted up against another structure.
Butt plank	Standard scaffold planks butted end to end (as opposed to overlapping).
Butterfly coupler	Double flap putlog coupler.
Cantilevered scaffold	A scaffold that is supported on load-bearing members that are extended from the structure and held within the structure by through bolts or propping.
Castor	A swivelling wheel attached to the lower end of a standard, for the purpose of supporting a moving scaffold.
Catch fan	A cantilevered platform or structure attached to a scaffold to contain falling debris and provide protection below the scaffolding. Also used generically for catch platforms & catch screens.
Catch platform	A platform attached to a scaffold, to contain falling debris.
Catch screen	A screen attached to a scaffold to contain falling debris.
Certificate of competence	Required under HSE Regulations for a scaffolder to erect, alter and dismantle specified scaffolds.
Chartered professional engineer (CPEng)	A statutory quality mark that indicates current competence to practice in New Zealand. A public CPEng register is available at: www.ipenz.org.nz/ipenz
Check coupler	Check coupler: A right angle coupler or swivel coupler that is fixed hard up against a load bearing coupler to restrict or prevent slippage of the load bearing coupler along the tube.
Chord	A principal longitudinal member of a scaffold beam or truss.
Column tie	See box tie.
Competent person	A person who has acquired through training, qualification, or experience the knowledge and skills to carry out a task.
Containment sheeting	Screening attached to a scaffold to prevent the dislodgment of tools and materials from a working platform or to protect people using the scaffold from the elements.
Counter weight	A weight or series of weights that counterbalance a scaffold against overturning.
Coupler	A fitting that joins two tubes.
Cradle	The portion of a suspended scaffold that incorporates a suspended platform.
Crane	A mechanical lifting machine (tower crane or mobile crane).
Direct supervision	Within reach or visual contact to ensure immediate assistance can be provided in the event of an emergency.
Dismantle	To disassemble a scaffold.

TERM	BRIEF EXPLANATION
Dogleg brace	A transverse brace.
Double coupler	See right angle coupler.
Double rope suspension system	A method of suspending a swinging stage or boatswains chair using two ropes per suspension point.
Drop scaffold or Dropper	See hanging scaffold.
Dunnage	Packing used under a load to allow forklift access or slinging devices to be passed under the load. Can be used to distribute the load or to support part of the load.
Duty load	Live loads permitted on a scaffold bay (light, medium, heavy or special) including persons, materials and equipment.
Edge protection	A barrier or system to prevent a fall from height.
Egress	Exit an area or work platform (opposite to access).
Electrical conductor wires	Power lines.
End-to-end coupler	A coupler used to join two tubes end to end (joiner, internal or external).
Erection	To assemble a scaffold.
External joiner	A coupler used to join two tubes end to end that fits over the outside of the tubes (must have a separation plate between the tubes).
Eye bolt	A component that attaches to a structure with an eye to enable something to be secured.
Face brace	A longitudinal brace.
Factor of safety	The ratio between the ultimate and permissible stress.
Fall arrest device	A self-locking device to arrest a fall that works by travelling along a fixed or flexible anchorage line, or letting out a spring-loaded anchorage line.
Fall arrest harness (safety harness)	An assembly of interconnected shoulder and leg straps, with or without a body belt, and used where there is likelihood of free or restrained fall.
Fall arrest system	An assembly of interconnected components comprising a harness connected to an anchorage point or anchorage system either directly or by means of a lanyard or pole strap, and whose purpose is to arrest a fall in accordance with the principles and requirements of AS/NZS 1891. Collective fall arrest systems include safety nets and soft landing systems.
False standard	See puncheon.
Falsework	Any temporary structure used to support a permanent structure while the permanent structure is not self-supporting.
Flange clamp	A load-bearing clamp for connecting tube to a flange of a structural steel member.
Forkhead	U-Head jack used for supporting and locating a standard over a bearer or a bearer over a standard.
Foundations	The support beneath a scaffold or structure that distributes the imposed loads (eg the ground).

TERM	BRIEF EXPLANATION
Frame scaffold	A scaffold assembled from prefabricated frames, braces and accessories.
Freestanding scaffold	A scaffold that is not attached to any other structure and is stable against overturning on its own account or if necessary assisted by stabilisers, needles, or raker or bolster bays.
Fulcrum point	The pivot point of a suspension rig about which the balancing moments of a suspension rig are calculated.
Gantry	A structure that is primarily intended to support a protection deck or portable building. A gantry can be constructed from scaffolding, structural steel or timber.
Gin wheel	A wheel hung from a scaffold that a rope runs through to raise and lower materials.
Girder clamp	A flange clamp or beam clamp.
Girder trolley	An assembly that locks over a steel flange and can be rolled along the flange.
Guardrail	A structural member fixed parallel to a platform, walkway, stair or landing to prevent persons from falling.
Hand balling	Passing equipment from one level of a scaffold to another.
Hand over certificate	A certificate certifying a scaffold is safe and giving its individual specifications that the client signs and returns.
Hand rail	A rail to provide handhold on a platform or stairway. It may form part of a guardrail.
Hanging scaffold	A working platform hung by tubes, bolts, fixed rope slings or other methods and not intended for raising or lowering while in use (also known as a hung scaffold).
Hazard	A situation or thing that could harm someone, and includes a person's behaviour. For example, an unguarded machine, hazardous substances etc.
Health and safety policy	Statement of intent and commitment to provide a safe place of work and is normally signed by senior management.
Heavy duty	The duty loading of a scaffold to 675 kg per bay, for persons, materials and equipment.
Height	The distance a person can fall from a scaffold.
Height of scaffold	The vertical distance from the supporting structure to the highest working component.
Hemping	The process of joining additional standards to the top of existing standards (also referred to as topping up).
H-Frame	A prefabricated frame in the shape of an H.
Hoardings	Panels and perimeter fences used to partition areas like walkways, to protect workers and others.
Hoist	Mechanical assembly for raising and lowering persons or materials. The name given for the powered drive of a suspended scaffold.
Inboard	The portion of a suspension rig that is on the inside of the fulcrum (tail length) of a needle.
Inside Diameter (ID)	The distance across the inside of a circular object, tube or similar.
Internal joiner	An internal end to end coupler for joining two tubes.

TERM	BRIEF EXPLANATION
Joiner	A coupler for joining two tubes end to end (external and internal).
Joint pin	See internal joiner.
Keeper clip	See check coupler.
Key	Scaffold spanner.
Kickboard	See toeboard.
Kicker lift or base lift	A grid of ledgers and transoms close to the ground to provide extra rigidity to the scaffold or provide support for a low level platform.
Ladder	An appliance on which a person may ascend or descend, consisting of two stiles joined at regular intervals by cross pieces (cleats, rungs steps or treads).
Ladder access bay	An independent scaffold bay attached to a scaffold with internal ladder access provided.
Ladder beam	A scaffold beam with chord stiffeners at right angles to the chords (a beam in the basic shape as a ladder on its side).
Ladder clamp	A fitting incorporating a bolt and a nut used to secure a ladder to a scaffold tube.
Landing	A level area providing access to a stairway or ladder, or located at an intermediate level in a system of stairways and landings.
Lanyard	An assembly designed to connect a harness to an anchor point.
Ledger	A horizontal structural member that longitudinally spans between adjacent standards.
Level	A device used to find the vertical, horizontal and sometimes 45 degrees of a scaffolding member.
Lever arm	The distance between the fulcrum point and the centre of gravity of a suspension rig.
Lift	The vertical distance from the supporting surface to the lowest ledger of a scaffold or level at which a platform can be constructed. Also, the vertical distance between adjacent ledgers of a scaffold at which a platform can be constructed (eg average lift 2 m).
Light duty	The duty loading of a scaffold to 225 kg per bay, for persons, materials and equipment.
Load limiting device	A device that limits the lifting capacity of a scaffold hoist to a load lighter than the stalling load of the hoist.
Loading bay	A platform on a scaffold for the storage of materials and equipment (also known as a loading platform).
Longitudinal brace	A brace in the vertical plane on the face of a scaffold to stop longitudinal movement of the scaffold.
Mast climber	A mast climbing work platform. A work platform used for temporary purposes to raise persons and materials to a working position, or to a working floor level by means such as a rack and pinion drive mounted on an extendable mast, which can be tied to a building.
Medium duty	The duty loading of a scaffold to 450 kg per bay, for persons, materials and equipment.

TERM	BRIEF EXPLANATION
Member	Anything that forms part of the scaffold assembly.
Mesh	Screening used on a scaffold to prevent dislodgment of plant and materials and to protect workers from environmental conditions.
Mesh panels	See brickguard.
Midrail	A member fixed parallel to and above a platform, between the guardrail and the platform.
Minor scaffold	Lightweight, portable, single bay scaffolds, with a working platform that cannot be higher than 2 m.
Mobile scaffold	An independent freestanding scaffold that is mounted on castors.
Modular scaffold	A prefabricated scaffold assembly with individual components, braces and accessories of set sizes.
Needle	A cantilevered structural member that supports a scaffold.
Ninety degree coupler	A right angle coupler.
Node point	A fixed junction between a ledger or transom and a standard.
Nominal Bore (NB)	The inside diameter of a tube (40 mm NB).
Notifiable event	This is defined in HSWA as: > the death of a person > a notifiable injury or illness > a notifiable incident.
Notifiable work	Particular hazardous work, as listed in the Health and Safety in Employment Regulations, that must be notified to WorkSafe in a written notification form.
Officer	Defined in HSWA, in summary it means a person that exercises significant influence over the PCBU's management. For example, the CEO, a director, or a partner in a partnership.
Outboard	The portion of a suspension rig that is on the outside of the fulcrum point (overhang).
Outrigger	A component that increases the effective base dimension of a tower and is attached to a vertical load bearing member.
Outside Diameter (OD)	The distance across the outside of a circular object.
Parallel coupler	A load bearing coupler for making a lap or splice joint between tubes.
Parapet	A vertical element usually located at the edge of a balcony, roof, bridge or similar.
Parapet hook	A clamp or bracket placed over a parapet from which to suspend a scaffold.
Person conducting a business or undertaking (PCBU)	Has the meaning provided in HSWA. In general, it means any legal person (whether an individual or a legal entity) running a business or undertaking. For example, a limited liability company, partnership, trust, incorporated society, etc.
Personnel hoist	A mechanical hoist designed to carry persons.
Pintle	A projection at the top of a castor that is used to locate the vertical member of a mobile scaffold (150 mm minimum stem).

TERM	BRIEF EXPLANATION
Plan brace	A brace in the horizontal plane that is attached to standards on opposite sides of a scaffold.
Plank	A component used to form a working platform or deck.
Platform	An elevated surface.
Platform bracket	A bracket attached to a scaffold that allows a platform to be placed between the scaffold and the building or structure.
Podger hammer	A steel tool used for the locking and releasing of modular scaffolding fixing devices which has a tapered end for centring holes in two objects placed together.
Prefabricated platform	A framed assembly of one bay length, incorporating a walking surface, that is capable of connecting to its support structure (deck or hatch deck).
Prefabricated scaffold	A scaffold assembly from prefabricated components and manufactured so that the components of the scaffold are predetermined.
Producer statement	A suite of documents (PS1¬PS4) to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate.
Prop	A scaffold assembly used to support a load that is adjustable.
Puncheon	A vertical supporting member supported from another structural member of a scaffold.
Putlog	A horizontal structural member spanning between ledgers or standards (tube transom) that is intended to support a platform.
Putlog coupler	A coupler for fixing a putlog to a ledger (see Single coupler).
Rafter clip	A fitting that is able to fix a timber bearer to a scaffold (eg Butterfly coupler).
Raker	A component that increases the effective base dimension of a scaffold.
Reduction coupler	A right angle coupler or swivel that is able to join two tubes of different outside diameters (3x2 coupler). It should be marked and clearly identifiable.
Return	A part of a scaffold set up around a corner of a building or structure.
Return transom	A transom used in modular scaffolding that is able to fix a scaffold return at right angles to the run of scaffold by being secured to or part of a ledger.
Reveal	Internal side surface of an opening or recess.
Reveal tie	A scaffolding assembly used in compression within a reveal to secure a scaffold to a structure.
Right angle coupler (RA)	A non-swivel load bearing coupler (other than a putlog coupler) for connecting two tubes at right angles.
Risk	The likelihood of a specific level of harm occurring from a hazard.
Risk assessment	Involves considering what could happen if someone is exposed to a hazard and the likelihood of it happening.
Roof edge protection	A barrier or system to prevent workers falling from the roof.

TERM	BRIEF EXPLANATION
Safe Working Load (SWL)	The maximum load permitted upon an item or assembly that is deemed safe, which is well below the breaking load, failure load or maximum load which can be placed on the item or assembly.
Safety harness system	Fall arrest system for arresting a fall, consisting of harness, lanyard, shock absorber and scaffold hook.
Safety helmet	Protective headwear.
Safety rope	A secondary rope.
Scaffold	Any advanced scaffolding, basic scaffolding, or suspended scaffolding or any framework or structure, as defined in the HSE Regulations.
Scaffold Spanner	A scaffolding tool 250 mm long for adjusting nuts on scaffold fittings.
Scaffolder	A person engaged in erecting, altering or dismantling scaffolding who holds a certificate of competence.
Scaffolding equipment	Any component, assembly or machine used for the construction of scaffolding.
Scaffolding hoist	A lifting appliance (manual or power operated) through which the suspension rope passes.
Screening	Mesh used on a scaffold to prevent dislodgement of plant and materials and to protect workers from environmental conditions.
Secondary rope	A rope not normally carrying the weight of a cradle, suspended work platform or imposed load but rigged for use with a secondary protective device.
Shackle	A rated component with a removable pin designed to connect a ‘cable’ to a supporting structure (eg D shackle or Bow shackle).
Shutter bracket scaffold	A bracket scaffold where the brackets are attached to formwork shutters.
Side rail	A stile on a ladder.
Single coupler	A putlog coupler either single blade or double bladed.
Sleeve coupler	An external end to end coupler.
Sling	A lifting device (eg web sling, chains, wire ropes and ropes) or a device which can be used as part of a fall arrest system.
Sloping platform	A scaffold platform erected at an angle steeper than 5 degrees from horizontal.
Soleboard or soleplate	A member used to distribute a load through a baseplate to the supporting surface or supporting structure.
Span	The distance measured along a member between the centre lines of support points (eg putlogs supporting a scaffold plank).
Spur	An inclined load-bearing member that transmits a load to another structural member of the scaffold or to a supporting structure.
Spurred scaffold	A scaffold that is partially supported by inclined load-bearing members.

TERM	BRIEF EXPLANATION
Stabiliser	A component that increases the effective base dimensions of a tower and is attached to a vertical load-bearing member.
Stability	Security of a scaffold against movement and overturning.
Stair tread bracket or fitting	A fitting used to fix a stair tread to a stringer in order to support a stair tread to make part of a stair unit.
Stair unit	An assembly of stringers, treads and landings used on a scaffold to transport persons, material and equipment from one level to another.
Stanchion	A vertical member used to support a guardrail, mesh panel or similar.
Standard	A vertical structural member that supports working platforms or loads and transmits a load to a supporting surface or structure.
Stile	A member in a ladder that supports rungs, steps or treads.
Stillage	A scaffold basket or framework designed to hold scaffolding components.
Stop	An attachment that will limit traversing of a suspended work platform.
Stop end	Guardrails fitted to a scaffold between standards at the end of a bay.
Stringer	An inclined member used to support stair treads.
Strut	A scaffolding member that supports a compressive force.
Stud bracket scaffold	A bracket scaffold where the brackets are attached to studs of a timber frame building.
Supporting structure	A structure, structural member or foundation that supports a scaffold.
Suspension point	A point at which a suspension rope is connected to a suspension rig.
Suspension rig	A portion of a structure (including a trolley track) that is mounted at a higher level than that of a cradle and supports and positions the cradle.
Suspension rope	A rope carrying the weight of a cradle and supporting the imposed loads.
Swinging stage	A suspended scaffold platform that can be raised or lowered mechanically or by hand haulage.
Swivel coupler	A coupler for connecting two tubes at any angle.
Three by two	A right angle coupler or swivel that is able to join two tubes of different outside diameters (3x2 coupler).
Through tie	A tie assembly that is positively fixed to both sides of an opening through a building or structure.
Tie	A member or assembly of members used to tie a scaffold to a supporting structure.
Toeboard	A scaffold plank or purpose designed component fixed on edge at the edge of the platform to prevent materials falling from the platform. Also called a kick board.
Toeboard clip	A fitting used to secure a toeboard to a standard or stanchion.
Transom	A horizontal structural member transversely spanning an independent scaffold between standards.

TERM	BRIEF EXPLANATION
Transverse brace	A brace in a plane that is vertical and at right angles to the building or structure (eg dogleg or parallel brace).
Trap door	A hatch or opening platform.
Traversing suspension rig	A suspension rig mounted on wheels or castors supporting a cradle.
Trestle scaffold	A scaffold consisting of trestles and planks.
Trolley	A wheeled mechanism that is able to support a hoist and is capable of travelling along a suspended track.
Trolley track	A suspension rail that supports and guides trolleys in traversing.
Tube and fitting covered way	An independent tube and fitting scaffold that is primarily intended to provide overhead protection.
U-head jack	A fork head jack.
Uniformly Distributed Load (UDL)	A load distributed evenly along the length of a member.
Truss	A scaffold beam that incorporates diagonal chord stiffeners.
Vessel scaffolding	Scaffolding that is erected around a structure with a curved profile (eg a tank or chimney). It generally encompasses the entire face of the vessel.
Webbing slings	A sling or sling device made of webbing.
Whipping	The wrapping or tying of an end of cut rope to stop fraying or unravelling.
Winch	Mechanical assembly for raising and lowering materials.
Wire rope grips	Devices used to grip a wire rope to form an eye or loop.
Worker	Has the meaning provided in HSWA. In general, it is a person who carries out work in any capacity for a PCBU. It covers almost all working relationships, including employees, contractors, sub-contractors, and volunteer workers.
Worker representative	In relation to a worker, means: > the health and safety representative for the worker > a union representing the worker > any other person the worker authorises to represent them (eg community or church leaders, lawyers, occupational physicians, nurses, respected members of ethnic communities).
Working load limit (WLL)	The maximum working load that may be applied to any component or system, under general conditions of use.
Working platform	A platform that is intended to support persons, materials and equipment.

APPENDIX E: SOME COMMON SCAFFOLDING RISKS AND CONTROLS

RISK	CONTROL
Fall from height	> Adequate edge protection. > Communication. > Follow correct procedures and instructions. > Fall arrest systems must be used by those with appropriate training. > Check equipment regularly for defects. > Access ways should be maintained and kept clear. > Roofs must be assessed for stability and brittleness. > Access ways should be maintained and kept clear. > Appropriate PPE must be supplied and used.
Manual handling injuries	> Use lifting aids where practicable. > Ensure equipment is fit for purpose and in good condition. > Educate workers on how to lift, unload and transport equipment.
Hit by falling object	> Follow correct procedures for transporting equipment. > Use good housekeeping practices. > PPE must be provided. > Prevent unauthorised entry into the working area.
Slips and trips	> Ensure working platforms are fit for purpose. > Keep platforms tidy and clutter free.
Structural collapse	> Foundations must be verified that they can take all imposed loads – if in doubt talk to a CPEng. > Ensure the scaffold is stabilised. > Follow correct procedures and instructions. > Check equipment regularly for defects.
Electric shock	> Ensure electrical equipment is maintained and regularly inspected and tested. > Plan so electrical services are identified and if possible disconnected. > Ensure scaffold is at least 4 m from any conductor unless the line owner has given written authority and measures are in place to eliminate or isolate the risk.
Hit or injured by mobile plant	> Plan work to avoid people and machinery being in close proximity unless required. > Install clear signage and keep communication lines open. > Ensure operators are trained.
Exposure to hazardous substances	> Workers are most at risk when working with asbestos that is dry, cracked or being cut for removal or scraped off. Controls must be in place at all times. > Workers should be informed of hazardous substances on site, and if required be trained in how to avoid injury from them.

APPENDIX F: EXAMPLE FORMS AND TEMPLATES

Safe work method statement

Job/Operation:	Job/Site and location:	Sub Contractor:	Supervisor:
PPE required:		Date: DD / MM / YEAR	
Plant required:		Approved: (title and signature)	Date: DD / MM / YEAR
Signature required:			

SEQUENCE OF BASIC STEPS		POTENTIAL SIGNIFICANT HAZARDS		HAZARD CONTROL METHOD
List the steps required to complete the job. (Follow the flow of the Product or the Process.)		**List the potential significant hazards beside each step.** Focus on what can cause harm and what can go wrong. Use Seven Point Analysis as a guide.		**List the control methods required to ELIMINATE or MINIMISE each SIGNIFICANT hazard.**
Step No		**Step No**		**E/M**

SEVEN POINT ANALYSIS: TO HELP IDENTIFY HAZARDS, FOR EACH STEP ASK – CAN I?

- > Strain or sprain my back or other muscle?
- > Be caught in, on or between anything?
- > Slip, trip or fall from height, on the same or lower level?
- > Be injured by poor plant/job design?
- > Be struck by or against anything?
- > Come in contact with a hazardous substance?
- > Come in contact with an energy source?

HAZARD IDENTIFICATION AND RISK MANAGEMENT REPORT

The purpose of this procedure is to inspect the work site for hazards, and to assess and manage the risks.

Person in charge:	Location:
Job description:	

Work party details

WORK GROUP MEMBER	TASK RESPONSIBILITY	INITIALS

Hazard prompt

Personal protection equipment required?	Yes	No	Evacuation procedures?

Is the equipment you are working on clearly identified? Is there any risk attached to access to the site? Could any further risk arise during the work?

Hazard identification and control

HAZARD	EXISTS	METHOD OF CONTROL (To eliminate, then if risk remains minimise)
Fall	☐ Yes ☐ No	
Power lines	☐ Yes ☐ No	
Confined Spaces	☐ Yes ☐ No	
Fire	☐ Yes ☐ No	
Public Protection	☐ Yes ☐ No	
Traffic	☐ Yes ☐ No	
Overhead Dangers	☐ Yes ☐ No	
Stacked Materials	☐ Yes ☐ No	
Insecure Scaffold	☐ Yes ☐ No	
Wind	☐ Yes ☐ No	
Vehicle Loads	☐ Yes ☐ No	
Power leads/source	☐ Yes ☐ No	
Faulty Plant	☐ Yes ☐ No	
Others:	☐ Yes ☐ No	

Site supervision signature:	Date: DD / MM / YEAR

EXAMPLE INSPECTION REPORTS

Scaffold inspection report

Date: DD / MM / YEAR Time: H : M	Project:
Client:	Location:
Scaffolder:	

COMPLIANCE ITEM	COMPLIANT	REMEDIAL WORK DUE BY	COMPLIANT DATE
Does the scaffold have a tag system attached to the entry point?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the tag say who erected it, show their contact details and when they erected it?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the tag show the purpose and duty loading?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is the scaffold suitable for the purpose for which it is being used?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is the scaffold stable?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the scaffold have base plates or base jacks centred on the sole boards?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are the standards vertical and the ledgers horizontal?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are standards and ledgers staggered where possible?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is the scaffold more than 300 mm from the work face?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
If so, does the scaffold have inside guardrails and mid-rails?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the scaffold have face bracing a max of every 6 bays?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the scaffold have transverse bracing a max every 4 bays?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the scaffold bracing follow the manufacturer's specs?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are the platforms a min 675 mm wide or follow the manufacturer's specs?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is there clear access of 450 mm on each platform?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR

COMPLIANCE ITEM	COMPLIANT	REMEDIAL WORK DUE BY	COMPLIANT DATE
Are the platforms secured?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are there gaps of more than 50 mm in the platform?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is there safe access to every platform?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are ladders secured top and bottom?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are all ladder access openings protected with a gate, hatch or tortured path?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Do external ladders extend up to a max of 2 lifts high?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are internal ladders offset a max of every 2 lifts?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are ties a max of 4.8 m in the horizontal and in the vertical?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are rakers connected to the standards or within 300 mm of the standards?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are rakers connected to guardrails, midrails, or ledgers secure or checked?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Do the rakers have a horizontal brace connected back to the scaffold?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is screening required to protect the public or vehicles?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are the scaffolders trained and wearing safety harnesses?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are the people using the scaffold trained in its use?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
If the scaffold is compliant as per the Inspection List the tag should read 'SAFE'	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Comments:			
Name:		Signature:	

Mobile Scaffold Inspection Report

Date: DD / MM / YEAR Time: H : M	Project:
Client:	Location:
Scaffolder:	

COMPLIANCE ITEM	COMPLIANT	REMEDIAL WORK DUE BY	COMPLIANT DATE
Does the scaffold have a tag system attached to the entry point?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the tag say who erected it, show their contact details and when they erected it?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the tag show the purpose and duty loading?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is the scaffold suitable for the purpose for which it is being used?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
If the scaffold becomes unsafe, or erecting and dismantling is incomplete, remove tag and mark 'UNSAFE' or similar	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is the scaffold stable (3 to 1 for 2 m or above, 2:1 for under 2 m) see below?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the mobile have outriggers to increase the min base dimension, which are used and in contact with the ground?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are the castors lockable and marked with their SWL?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the mobile have ladder access to all deck levels?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the mobile have midrails, guardrails, and toeboards at all levels?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are the top guardrails between 900 mm and 1100 mm high?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the mobile have diagonal bracing on both sides?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is the mobile fully decked, with the decks secured from moving?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR

COMPLIANCE ITEM	COMPLIANT	REMEDIAL WORK DUE BY	COMPLIANT DATE
If the mobile is not fully decked does it have guardrails to protect the voids?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Does the mobile have a plan brace if not fully decked within 3 m of the base?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Is the mobile more than 2.0 m away from the edge of a building and any floor penetrations, voids etc?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are the people using the mobile trained in its use?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Are the scaffolders trained and wearing safety harnesses?	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
If the scaffold is compliant as per the Inspection List the tag should read 'SAFE'	☐ Yes ☐ No	DD / MM / YEAR	DD / MM / YEAR
Comments:			
Name:		Signature:	

SCAFFOLD REGISTER

Project:	Site address:
Main contractor:	Contact:
Client(s):	Contact:
Scaffolding contractor:	Contact:
Scaffolder:	Certificate of competence number:

Register for each standing scaffold over 5 m high.

1. Type of Scaffold: (tick one)	☐ Tube and Coupler ☐ Prefabricated ☐ Proprietary ☐ Timber	2. Duty: (tick one)	☐ Light ☐ Medium ☐ Heavy ☐ Special

3. Safe duty load of _____ kg per platform (enter number of kg's)

Maximum number of working platforms per bay which may be used on metal tubular or framed scaffolding are given in the following table:

MAXIMUM HEIGHT OF SCAFFOLD	MAXIMUM NUMBER OF WORKING PLATFORMS THAT MAY BE USED IN ANY BAY			
	Light duty	Medium duty	Heavy duty	Special duty
Up to 13.5 m	4	2	2	As specified by designer
Up to 33 m	2	1	1	

Light Duty:
225 kg per work platform contained within each scaffold bay (including a single point load of 100 kg).

Medium Duty:
450 kg per work platform contained within each scaffold bay (including a single point load of 150 kg).

Heavy Duty:
675 kg per work platform contained within each scaffold bay (including a single point load of 200 kg).

Special Duty: SWL as specified by designer.

Inspection record

Location of scaffold on site:			
Length: _____ m	Number of bays:	Height: _____ m	Number of lifts:
Limitations:			
Comments:			

DATE	TIME	INSPECTOR	SIGNATURE	COMMENTS
DD / MM / YEAR	H : M			
DD / MM / YEAR	H : M			
DD / MM / YEAR	H : M			

SUSPENDED SCAFFOLD REGISTER

Project:	Site address:
Main contractor:	Contact:
Client(s):	Contact:
Scaffolding contractor:	Contact:
Scaffolder:	Certificate of competence number:

Safety Harness:
All users of suspended scaffolding must wear a full body safety harness attached to an approved anchor or independent safety line. Workers must be trained in harness use, and have an emergency retrieval plan.

Emergency Descent:
All users of suspended scaffolding must be familiar with the operational controls, including the emergency descent system.

SWL: All users of suspended scaffolding must ensure the safe working load is not exceeded.

Weather: Suspended scaffolding must not be operated during adverse weather conditions.

General Safety:
Ensure all areas below suspended scaffold operation are barricaded to prevent entry by unauthorised persons.

Register for each suspended scaffold.

Location of scaffold on site:			
Safe Live Load: _____ kg	Counterweight: _____ kg	Overhang length: _____ m	Total length: _____ m
Limitations:			
Comments:			

DATE	TIME	INSPECTOR	SIGNATURE	COMMENTS
DD / MM / YEAR	H : M			
DD / MM / YEAR	H : M			

SCAFFOLD HAND-OVER CERTIFICATE

The scaffold hand-over certificate releases the scaffold(s) to the client. The scaffold(s) have been inspected by the client and has been erected to the client's requirements. All scaffolds have been erected as per the requirements of the Good Practice Guidelines for *Scaffolding in New Zealand*. The client undertakes to control the use, and users of the scaffold structure(s) while under their control as required by the Health and Safety at Work Act 2015 (HSWA), and the Health and Safety in Employment Regulations 1995 (HSE Regulations).

Client:		
Location:		
Description:		
Comments: (special conditions)		
Authorised foreman/client: (print name clearly)	Signature:	Date: DD / MM / YEAR
Scaffolding representative: (print name clearly)	Signature:	Date: DD / MM / YEAR

Note: Scaffolding over 5.0 m high is notifiable work and the erection/dismantling or alterations including the movement of planks, can only be carried out under the supervision of a Scaffolder holding a current Certificate of Competency.

Scaffold notified to WorkSafe: ☐ Yes ☐ No		
Number of lifts fully planked with full edge protection:		
Ladder/stair access bays to all working lifts:		
Screening:		
Scaffold register locations:		
Light duty 225 kg per bay	Useable lifts per bay	Limitations:
Medium duty 450 kg per bay	Useable lifts per bay	
Heavy duty 675 kg per bay	Useable lifts per bay	
Special duty	Useable lifts per bay	

DISCLAIMER

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