

MANAGING THE RISK OF FALLS AT WORKPLACES

Code of Practice

MARCH 2015



safe work australia



Safe Work Australia is an Australian Government statutory agency established in 2009. Safe Work Australia consists of representatives of the Commonwealth, state and territory governments, the Australian Council of Trade Unions, the Australian Chamber of Commerce and Industry and the Australian Industry Group.

Safe Work Australia works with the Commonwealth, state and territory governments to improve work health and safety and workers' compensation arrangements. Safe Work Australia is a national policy body, not a regulator of work health and safety. The Commonwealth, states and territories have responsibility for regulating and enforcing work health and safety laws in their jurisdiction.

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FOREWORD

This Code of Practice on how to manage the risk of falls in the workplace is an approved code of practice under section 274 of the *Work Health and Safety Act* (the WHS Act).

An approved code of practice is a practical guide to achieving the standards of health, safety and welfare required under the WHS Act and the Work Health and Safety Regulations (the WHS Regulations).

A code of practice applies to anyone who has a duty of care in the circumstances described in the code. In most cases, following an approved code of practice would achieve compliance with the health and safety duties in the WHS Act, in relation to the subject matter of the code. Like regulations, codes of practice deal with particular issues and do not cover all hazards or risks that may arise. The health and safety duties require duty holders to consider all risks associated with work, not only those for which regulations and codes of practice exist.

Codes of practice are admissible in court proceedings under the WHS Act and Regulations. Courts may regard a code of practice as evidence of what is known about a hazard, risk or control and may rely on the code in determining what is reasonably practicable in the circumstances to which the code relates.

Compliance with the WHS Act and Regulations may be achieved by following another method, such as a technical or an industry standard, if it provides an equivalent or higher standard of work health and safety than the code.

An inspector may refer to an approved code of practice when issuing an improvement or prohibition notice.

This Code of Practice has been developed by Safe Work Australia as a model code of practice under the Council of Australian Governments' Inter-Governmental Agreement for Regulatory and *Operational Reform in Occupational Health and Safety* for adoption by the Commonwealth, state and territory governments.

A draft of this Code of Practice was released for public consultation on 7 December 2010 and was endorsed by the Workplace Relations Ministers' Council on 10 August 2011.

Scope and application

This Code applies to all workplaces covered by the WHS Act and Regulations where there is a risk of a fall by a person from one level to another that is reasonably likely to cause injury.

This Code provides practical guidance to persons conducting a business or undertaking, including those persons who design, construct, import, supply or install plant or structures, on how to manage health and safety risks arising from falls. It includes information on a range of control measures to eliminate or minimise the risks.

HOW TO USE THIS CODE OF PRACTICE

In providing guidance, the word 'should' is used in this Code to indicate a recommended course of action, while 'may' is used to indicate an optional course of action.

This Code also includes various references to sections of the WHS Act and Regulations which set out the legal requirements. These references are not exhaustive. The words 'must', 'requires' or 'mandatory' indicate that a legal requirement exists and must be complied with.

1. INTRODUCTION

Falls are a major cause of death and serious injury in Australian workplaces. Fall hazards are found in many workplaces where work is carried out at height, for example stacking shelves, working on a roof, unloading a large truck or accessing silos. Falls can also occur at ground level into holes, for example trenches or service pits.

1.1 Who has health and safety duties in relation to falls?

A person conducting a business or undertaking has the primary duty under the WHS Act to ensure, as far as reasonably practicable, that workers and other persons are not exposed to health and safety risks arising from the business or undertaking.

A person conducting a business or undertaking has more specific obligations under the WHS Regulations to manage the risk of a fall by a person from one level to another, including requirements to:

- ensure, so far as is reasonably practicable, that any work involving the risk of a fall is carried out on the ground or on a solid construction
- provide safe means of access to and exit from the workplace
- minimise the risk of falls so far as is reasonably practicable by providing a fall prevention device, work positioning system or a fall arrest system.

Designers, manufacturers, suppliers, importers and installers of plant or structures that could be used for work must ensure, so far as is reasonably practicable, that the plant or structure is without risks to health and safety. Designers of plant or structures have an important role in eliminating or minimising the risks of falls in the design stage (see Chapter 10 of this Code).

Officers, such as company directors, have a duty to exercise due diligence to ensure that the business or undertaking complies with the WHS Act and Regulations. This includes taking reasonable steps to ensure that the business or undertaking has and uses appropriate resources and processes to eliminate or minimise risks of falls from one level to another that are likely to cause injury.

Workers have a duty to take reasonable care for their own health and safety and that they do not adversely affect the health and safety of other persons. Workers must comply with any reasonable instruction given by the person conducting the business or undertaking.

1.2 The meaning of key terms

Fall means a fall by a person from one level to another.

Risk of a fall means a circumstance that exposes a worker while at work, or other person while at or in the vicinity of a workplace, to a risk of a fall that is reasonably likely to cause injury to the worker or other person. This includes circumstances in which the worker or other person is:

- in or on plant or a structure that is at an elevated level
- in or on plant that is being used to gain access to an elevated level
- in the vicinity of an opening through which a person could fall
- in the vicinity of an edge over which a person could fall
- on or in the vicinity of a surface through which a person could fall
- on or near the vicinity of a slippery, sloping or unstable surface.

Risk control means taking action to eliminate health and safety risks so far as is reasonably practicable, and if that is not possible, minimising the risks so far as is reasonably practicable. Eliminating a hazard will also eliminate any risks associated with that hazard.

Competent person means a person who has acquired through training, qualification or experience the knowledge and skills to carry out the task.

Further definitions relating to fall control measures are listed in Appendix A.

1.3 What is required to manage the risk of falls?

Regulation 34-38

In order to manage risk under the WHS Regulations, a duty holder must:

- identify reasonably foreseeable hazards that could give rise to the risk
- 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 by implementing control measures in accordance with the hierarchy of control
- maintain the implemented control measure so that it remains effective
- review, and if necessary revise, risk control measures so as to maintain, so far as is reasonably practicable, a work environment that is without risks to health and safety.

This Code provides guidance on how to manage the risks of persons falling from one level to another by following a systematic process that involves:

- identifying hazards that may cause injury
- if necessary, assessing the risks associated with these hazards
- implementing risk control measures
- reviewing risk control measures to ensure they are effective.

Guidance on the general risk management process is available in the [Code of Practice: How to Manage Work Health and Safety Risks](#).

CONSULTING WORKERS

Consultation involves sharing of information, giving workers a reasonable opportunity to express views and taking those views into account before making decisions on health and safety matters.

Section 47

The WHS Act requires that you consult, so far as is reasonably practicable, with workers who carry out work for you who are (or are likely to be) directly affected by a work health and safety matter.

Section 48

If the workers are represented by a health and safety representative, the consultation must involve that representative.

You must consult your workers and their health and safety representatives at every step of the risk management process. By drawing on their experience, knowledge and ideas, you are more likely to identify fall hazards and develop effective control measures.

CONSULTING, CO-OPERATING AND CO-ORDINATING ACTIVITIES WITH OTHER DUTY HOLDERS

Section 46

The WHS Act requires that you consult, co-operate and co-ordinate activities with all other persons who have a work health or safety duty in relation to the same matter, so far as is reasonably practicable.

Sometimes you may share responsibility for a health and safety matter with other business operators who are involved in the same activities or who share the same workplace. In these situations, you should find out who is doing what and work together with other duty holders in a co-operative and co-ordinated way so that all risks are eliminated or minimised, so far as is reasonably practicable.

For example, the owner of a transport company with large trucks should consult the goods suppliers as well as the businesses having the goods delivered about how the risk of falls will be controlled during loading and unloading. This may include checking whether suitable equipment is available at each site so that workers do not have to climb on top of loads on the truck and be at risk of falling.

Further guidance is available in the [Code of Practice: Work Health and Safety Consultation, Co-operation and Co-ordination](#).

2. MANAGING THE RISK OF FALLS

2.1 How to identify fall hazards

You must identify all locations and tasks that could cause injury due to a fall. This includes access to the areas where work is to be carried out. Tasks that need particular attention are those carried out:

- on any structure or plant being constructed or installed, demolished or dismantled, inspected, tested, repaired or cleaned
- on a fragile surface (for example, cement sheeting roofs, rusty metal roofs, fibreglass sheeting roofs and skylights)
- on a potentially unstable surface (for example, areas where there is potential for ground collapse)
- using equipment to work at the elevated level (for example, when using elevating work platforms or portable ladders)
- on a sloping or slippery surface where it is difficult for people to maintain their balance (for example, on glazed tiles)
- near an unprotected open edge (for example, near incomplete stairwells)
- near a hole, shaft or pit into which a worker could fall (for example, trenches, lift shafts or service pits).

INSPECT THE WORKPLACE

Walk around the workplace and talk to your workers to find out where work is carried out that could result in falls. A checklist may be useful in this process. Key things to look for include:

- surfaces:
 - the stability, fragility or brittleness
 - the potential to slip, for example where surfaces are wet, polished or glazed
 - the safe movement of workers where surfaces change
 - the strength or capability to support loads
 - the slope of work surfaces, for example, where they exceed 7 degrees.
- levels—where levels change and workers may be exposed to a fall from one level to another
- structures—the stability of temporary or permanent structures
- the ground—the evenness and stability of the ground for safe support of scaffolding or a work platform
- the working area—whether it is crowded or cluttered
- entry and exit from the working area
- edges—protection for open edges of floors, working platforms, walkways, walls or roofs
- holes, openings or excavations—which will require guarding
- hand grip—places where hand grip may be lost.

In some situations, advice may be needed from technical specialists, such as structural engineers, to check the stability of structures or load bearing capacity.

REVIEW AVAILABLE INFORMATION, INCLUDING INCIDENT RECORDS

You should check your records of previous injuries and 'near miss' incidents related to falls.

Information and advice about fall hazards and risks relevant to particular industries and work activities is also available from regulators, industry associations, unions, technical specialists and safety consultants.

2.2 How to assess the risk

A risk assessment will help you determine:

- what could happen if a fall did occur and how likely it is to happen
- how severe a risk is
- whether any existing control measures are effective
- what action you should take to control the risk
- how urgently the action needs to be taken.

A risk assessment is unnecessary if you already know the risk and how to control it.

When assessing the risks arising from each fall hazard, the following matters should be considered:

- the design and layout of elevated work areas, including the distance of a potential fall
- the number and movement of all people at the workplace
- the proximity of workers to unsafe areas where loads are placed on elevated working areas (for example, loading docks) and where work is to be carried out above people and there is a risk of falling objects
- the adequacy of inspection and maintenance of plant and equipment (for example, scaffolding)
- the adequacy of lighting for clear vision
- weather conditions—the presence of rain, wind, extreme heat or cold can cause slippery or unstable conditions
- the suitability of footwear and clothing for the conditions
- the suitability and condition of ladders, including where and how they are being used
- the adequacy of current knowledge and training to perform the task safely (for example, young, new or inexperienced workers may be unfamiliar with a task)
- the adequacy of procedures for all potential emergency situations.

GENERIC RISK ASSESSMENT

If you are responsible for a number of different work areas or workplaces and the fall hazards are the same, you may perform a single (or generic) risk assessment. However, you should carry out a risk assessment on individual fall hazards if there is any likelihood that a person may be exposed to greater, additional or different risks.

2.3 How to control the risk

There are a number of ways to control the risks of falls. Some control measures are more effective than others. Control measures can be ranked from the highest level of protection and reliability to the lowest. This ranking is known as the *hierarchy of control*. The WHS Regulations require duty holders to work through this hierarchy to choose the control that most effectively eliminates or minimises the risk in the circumstances. This may involve a single control measure or a combination of two or more different controls.

In managing the risks of falls, the WHS Regulations require the following specific control measures to be implemented, where it is reasonably practicable to do so:

1. *Can the need to work at height be avoided to eliminate the risk of a fall?*

- Carry out any work that involves the risk of a fall on the ground

2. *Can the fall be prevented by working on solid construction?*

- A building or structure that is used as an existing place of work and includes safe access and egress from which there is no risk of a fall from one level to another, for example properly constructed stairs with fixed handrails, flat roofs with a parapet or permanently installed guard rails around the edges.

It is usually not necessary to implement additional control measures to manage the risk of falls for workplaces in buildings that already comply with the requirements of the National Construction Code of Australia, for example in relation to stairs, mezzanines and balconies.

3. *Can the risk of a fall be minimised by providing and maintaining a safe system of work, including:*

- providing a fall prevention device (for example, installing guard rails) if it is reasonably practicable to do so, or
- providing a work positioning system (for example, an industrial rope access system) if it is not reasonably practicable to provide a fall prevention device, or
- providing a fall-arrest system, so far as is reasonably practicable, if it is not reasonably practicable to provide a fall prevention device or a work positioning system.

In some cases a combination of control measures may be necessary, for example using a safety harness while working from an elevating work platform.

Control measures are needed where there is a risk of injury irrespective of fall height. For low falls, you should assess the risk and provide reasonably practicable measures that reflect the risk. For example, there may be a risk of injury to workers standing on a narrow 1.7 metre high platform next to a production line where they have to work with their back to the open edge or where there is a risk of falling onto an uneven surface with sharp edges or protrusions. In this situation it may be reasonably practicable to install a guard rail along the edge of the platform.

Sometimes it may not be reasonably practicable to provide guard rails, for example at the edges of railway platforms or vehicle inspection pits. Other safe systems of work to provide adequate protection should be implemented, for example brightly painted lines to designate edges.

Work of long duration and higher frequency will usually require control measures higher up the hierarchy to provide adequate protection, for example using a mobile scaffold instead of a ladder.

You should also ensure that the control measures you select do not create new hazards, for example electrical risks from contact with overhead power lines or crushing and entanglement from plant such as elevating work platforms.

Regulation 37

IMPLEMENTING AND MAINTAINING CONTROL MEASURES

You must ensure that the control measures you implement remain effective. This includes checking that the control measures are fit for purpose; suitable for the nature and duration of the work; are installed and used correctly.

To allow the chosen control measures to operate effectively, you should:

- *develop work procedures* on how to correctly install, use and maintain the control measure.

The procedures should include a planned program of inspections and maintenance for the control measures. The inspection regime should include details of:

- the equipment to be inspected (including its unique identification)
- the frequency and type of inspection (pre-use checks, detailed inspections)
- action to be taken on finding defective equipment
- means of recording the inspections
- training of users
- the system of monitoring the inspection regime to verify that inspections are carried out appropriately.
- The manufacturer and/or supplier of the equipment should be consulted for any product specific requirements. If any signs of wear or weakness are found during the inspection, the components or means of attachment must be withdrawn from use until they are replaced with properly functioning components.
- *provide information, training and instruction* to workers, including procedures for emergency and rescue. You should also cover:
 - the type of control measures used to prevent falls
 - procedures for reporting fall hazards and incidents
 - the correct selection, fitting, use, care, inspection, maintenance and storage of fall-arrest and restraint equipment
 - the correct use of tools and equipment used in the work (for example, using a tool belt instead of carrying tools)
 - control measures for other potential hazards (for example, electrical hazards).
- *provide supervision* by ensuring that workers exposed to a risk of a fall are adequately supervised by a competent person, especially if they are undergoing training or are unfamiliar with the working environment. Check that:
 - only workers who have received training and instruction in relation to the system of work are authorised to carry out the work
 - workers use the fall control measure in the correct manner.

2.4 How to review control measures

The control measures that are put in place to prevent falls must be reviewed, and if necessary revised, to make sure they work as planned and to maintain an environment that is without risks to health and safety.

Regulation 38

A person conducting a business or undertaking must review and as necessary revise fall control measures:

- when the control measure does not control the risk so far as is reasonably practicable
- before a change at the workplace that is likely to give rise to a new or different health and safety risk that the control measure may not effectively control
- if a new hazard or risk is identified
- if the results of consultation indicate that a review is necessary
- if a health and safety representative requests a review.

Control measures may be reviewed using the same methods as the initial hazard identification step.

Consult your workers and their health and safety representatives and consider the following:

- Are the control measures working effectively in both their design and operation?
- Are all fall hazards being identified?
- Are workers using the control measures in accordance with the instruction and training that has been provided?

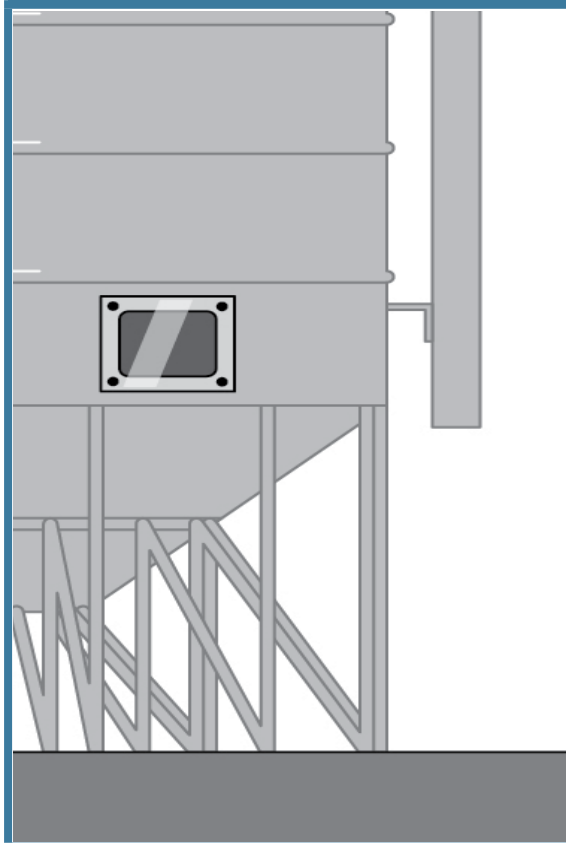
3. WORK ON THE GROUND OR ON A SOLID CONSTRUCTION

3.1 Work on the ground

Eliminating the need to work at height is the most effective way of protecting workers from the risk of falls. Examples of eliminating the risk by working on the ground include:

- prefabricating roofs at ground level
- prefabricating wall frames horizontally, then standing them up
- using mechanical tarp spreaders to cover loads on trucks from the ground
- fitting outlets, inlets and controls of large tanks and silos near the ground (see Figure 1)
- reducing shelving heights so that workers can access items from ground level
- using tools with extendable handles, such as paint rollers (the risk of musculoskeletal disorders will need to be considered when deciding whether to use such tools)
- installing windows that pivot to enable cleaning from a safe position inside a building
- lowering a concert hall chandelier to repair it.

FIGURE 1 A silo showing sight glass and ground delivery tube



3. WORK ON THE GROUND OR ON A SOLID CONSTRUCTION

3.2 Work on a solid construction

Working on a solid construction provides an environment where the likelihood of a fall may be eliminated. 'Solid construction' means an area that:

- is structurally capable of supporting workers, material and any other loads applied to it
- is provided with barriers around its perimeter and around any openings from or through which a person could fall
- has an even, accessible surface and gradient
- has a safe means of entry and exit.

STRUCTURAL STRENGTH

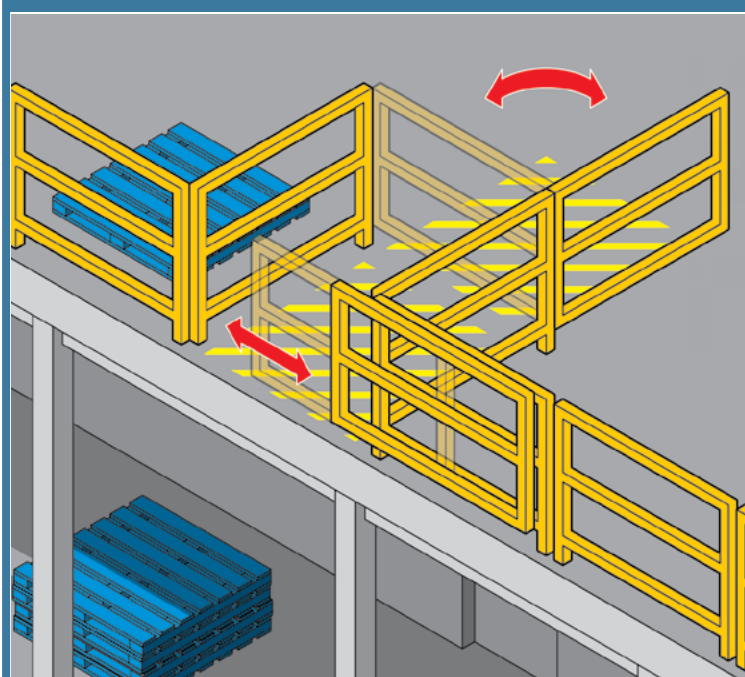
Different types of work involve different loads on the supporting surface. The surface and its supports must be able to safely carry the expected loads, including workers, materials, tools and equipment. When in doubt, have a structural engineer determine the safe load capacity before use.

BARRIERS

Barriers (or edge protection) to prevent a person falling over edges and into holes should be provided on relevant parts of a solid construction. These include:

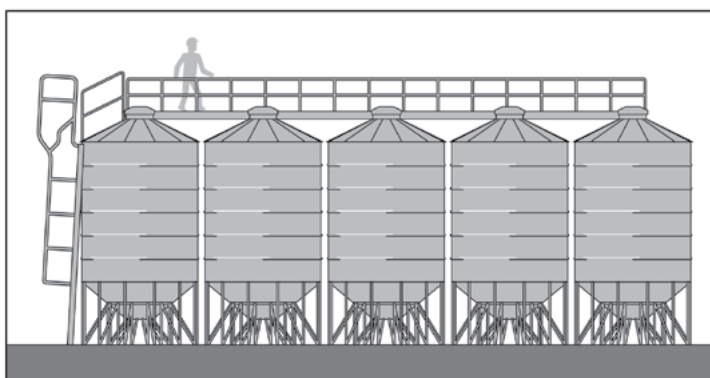
- the perimeters of buildings or other structures
- mezzanine floors (see Figure 2)
- openings in floors
- the open edge of a stair, landing, platform or shaft opening (see Figure 3).

FIGURE 2 A barrier on a mezzanine floor



3. WORK ON THE GROUND OR ON A SOLID CONSTRUCTION

FIGURE 3 A platform with guard rails installed above silos



The barrier should be designed and constructed to withstand the force of someone falling against it.

Edge protection should consist of guard rails, solid balustrades or other structural components, for example wire mesh supported by posts and provided with a reinforced top edge. The top of the guard rail or component should be between 900 mm and 1100 mm above the working surface. If a guard rail system is used, it should also have mid-rails and toe boards or wire mesh infill panels.

If access is required to equipment (for example, a hoist) it should be protected with gates, safety chains or other means to prevent a person falling.

PROTECTION OF OPENINGS AND HOLES

Holes, penetrations and openings through which a person could fall should be made safe immediately after being formed.

If a cover is used as a control measure, it must be made of a material that is strong enough to prevent persons or objects falling through and must be securely fixed to prevent any dislodgement or accidental removal.

FIGURE 4 4mm mesh embedded in the concrete floor. The hole should also be covered to prevent things falling through.

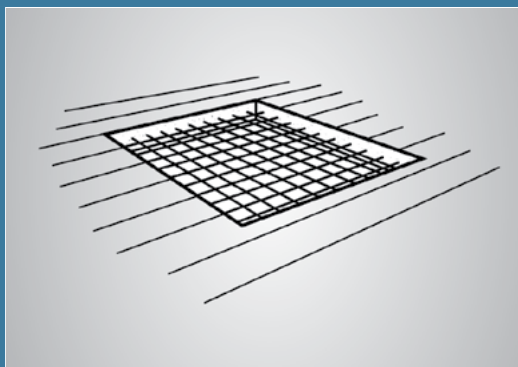


FIGURE 5 Example of the type of danger sign to be affixed to the hole cover.



3. WORK ON THE GROUND OR ON A SOLID CONSTRUCTION

SURFACE AND GRADIENT

Surfaces of solid construction should be non-slip, free from trip hazards and should generally not exceed 7 degrees (1 in 8 gradient). Cleated surfaces, which provide greater slip-resistance, should not be steeper than 20 degrees (1 in 3 gradient).

If grid mesh or checker plate flooring is used for walkways and working platforms, ensure that:

- flooring panels are securely fixed and assembled in accordance with manufacturer's specifications
- where possible, they are fitted to the structure prior to it being lifted into permanent position
- each panel is fixed securely before the next panel is placed in position
- during installation, this type of flooring is secured by tack welding, panel grips or other means to prevent movement before being fixed permanently
- if panels of grid mesh or checker plate flooring are removed, edge protection is provided and the gaps left due to removed panels are protected.

ENTRY AND EXIT

The solid construction must have a safe means for people to get to, from and move around the work area, for example permanently installed platforms, ramps, stairways and fixed ladders.

Further guidance is available in *AS 1657 Fixed platforms, walkways, stairways and ladders – Design, construction and installation*.

Safety considerations include:

- exposure of access systems to the weather (for example, rain can make surfaces slippery and strong winds can cause loss of hand grip)
- the provision of adequate natural or artificial lighting to all access ways
- the clearance of obstructions so that persons are able to move easily to and from the workplace.

Portable ladders should only be used where the use of safer systems is not reasonably practicable.

4. FALL PREVENTION DEVICES

A fall prevention device is any equipment that is designed to prevent a fall for temporary work at heights, and once in place does not require any further adjustment by workers using the device.

4.1 Temporary work platforms

A 'temporary work platform' is a working platform, other than a permanently installed fixed platform, used to provide a working area for the duration of the job. The design of the platform prevents workers from falling. Temporary work platforms include scaffolds, elevating work platforms, mast climbers, workboxes, building maintenance units, portable or mobile fabricated platforms or any other platform that provides a working area and is designed to prevent a fall.

SCAFFOLDING

Scaffolding can be very effective protection in preventing falls; however, there are specific requirements that apply to some types of scaffold under the WHS Regulations.

Regulation 225

A person with management or control of a scaffold must not allow the use of a scaffold from which a person or object could fall more than four metres unless a competent person provides written confirmation that the scaffold has been completed. The person must also ensure that:

- the scaffold and its supporting structure is inspected by a competent person before use, after any incident that could affect its stability (such as a severe storm), after any repairs, and at least every 30 days
- unauthorised access is prevented on scaffolding that is incomplete and left unattended (for example, by attaching danger tags and warning signs at appropriate locations).

Scaffolding work platforms are generally rated as light, medium or heavy duty. Safety considerations include:

- scaffolding conforms to AS/NZS 4576 *Guidelines for scaffolding* and the AS/NZS 1576 *Scaffolding* series
- all scaffolding is erected, altered and dismantled by competent persons. Any scaffold from which a person or object could fall more than four metres must be erected, altered and dismantled by or under the direct supervision of a licensed scaffolder.
- prefabricated scaffolds are of the same type and not mixed components, unless the mixing of components has been approved by the manufacturer
- safe access to and egress from the scaffold is provided
- edge protection (hand rails, mid-rails and toe boards) is provided at every open edge of a work platform (see Figure 5).

4. FALL PREVENTION DEVICES

Information, instruction and training for workers using scaffolds

Where work is performed from a scaffold, you must ensure that the relevant workers understand:

- what loads the scaffold can safely take
- not to make any unauthorised alterations to the scaffold (such as removing guard rails, planks, ties, toe boards and braces)
- that working platforms need to be kept clear of debris and obstructions along their length, and
- that incomplete or defective scaffolds must never be accessed.

Where work is performed using mobile scaffolds, workers should be trained to ensure the scaffold:

- remains level and plumb at all times
- is kept well clear of powerlines, open floor edges and penetrations
- is not accessed until the castors are locked to prevent movement
- is never moved while anyone is on it
- is only accessed using internal ladders (see Figure 7).

FIGURE 6 Perimeter scaffold with a fully decked working platform, guardrails and toeboards.

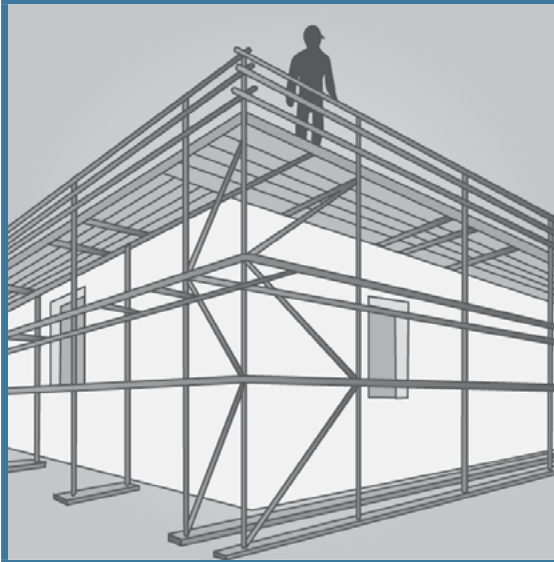
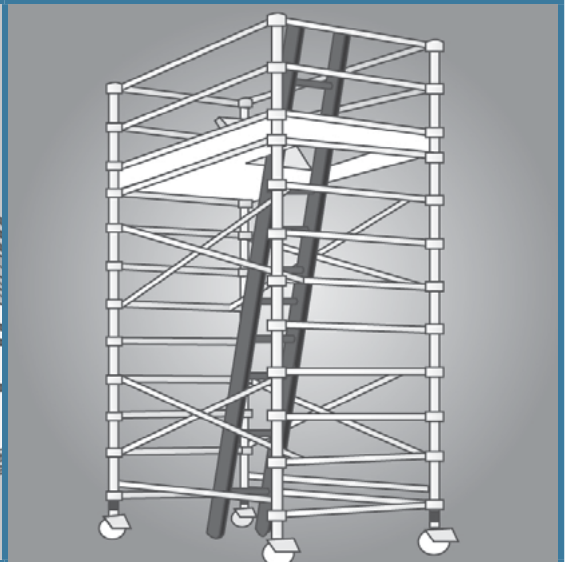


FIGURE 7 Mobile scaffold with an access ladder and trapdoor to provide the largest possible hazard-free working platform.



LIGHT DUTY SUSPENDED SCAFFOLD

A suspended scaffold incorporates a suspended platform that is capable of being raised or lowered when in use (see Figure 8). Common types of suspended scaffolds include:

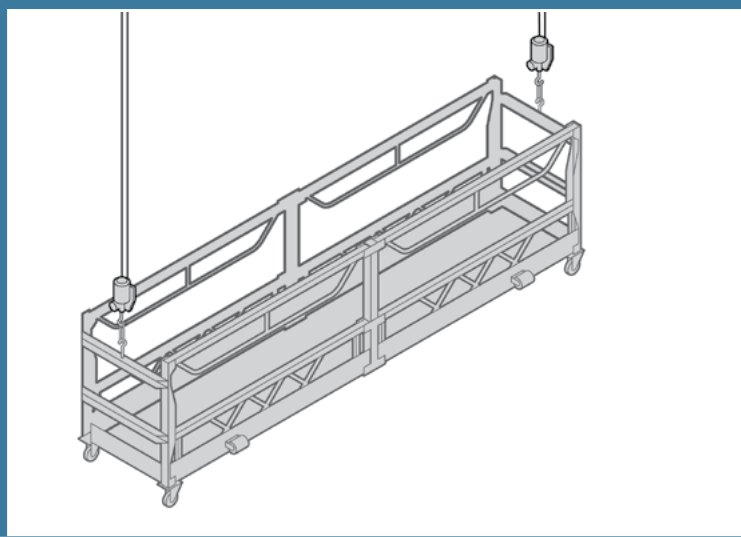
- swing stages which have cradles supported by a single row of suspension ropes
- double rope scaffolds, with cradles supported by two rows of suspension ropes
- work cages which are small cradles supported by one suspension rope only
- false cars, which are specialised forms of suspended scaffolding and are often used in the construction of lifts before lift cars are installed.

There are specific safety considerations for swing stages, including that:

- the working load and specifications are in accordance with AS 1576.4 *Scaffolding – Suspended Scaffolding*
- persons operating light duty suspended stages are trained in safe operation
- persons installing or servicing a light duty suspended stage hold a licence for advanced rigging or advanced scaffolding
- where the swing stage is suspended by two wire ropes to each winch, a safety harness and restraint lanyard is attached to a suitable anchor point of the swing stage.

Further guidance on the safe design, erection and use of scaffolding, including suspended scaffolding, is available in the *Scaffolding Code of Practice [under development]*.

FIGURE 8 Example of a light duty suspended scaffold with two wire ropes to each winch. The platform must remain horizontal when moving it up or down.



4. FALL PREVENTION DEVICES

ELEVATING WORK PLATFORMS

Elevating Work Platforms (EWPs) include scissor lifts, cherry pickers, boom lifts and travel towers. There are battery powered and internal combustion engine types. Some are designed for hard flat surfaces only, while others are designed to be operated on rough terrain.

Safety considerations include that:

- workers operating the platform are trained and instructed in safe operating procedures for the particular brand and type of equipment, as well as the safe use of fall-arrest equipment and emergency rescue procedures
- the platforms are only used as working platforms and not as a means of entering and exiting a work area unless the conditions set out in *AS 2550.10 Cranes, hoists and winches – Safe use – Mobile elevating work platforms* are met
- unless designed for rough terrain, the platforms are used only on a solid level surface
- the surface area is checked to make sure that there are no penetrations or obstructions that could cause uncontrolled movement or overturning of the platform
- the manufacturer's or supplier's instructions are consulted for information on safe operation
- persons working in travel towers, boom lifts or cherry pickers wear a properly anchored safety harness
- workers are licensed when operating boom-type elevating work platforms with a boom length of 11 metres or more.

FIGURE 9 An example of a boom-type elevating work platform. The safety harness and lanyard assembly are not shown for purposes of clarity. The lanyard should be as short as possible and should be attached directly to the designated anchor point on the EWP, not to the handrail.

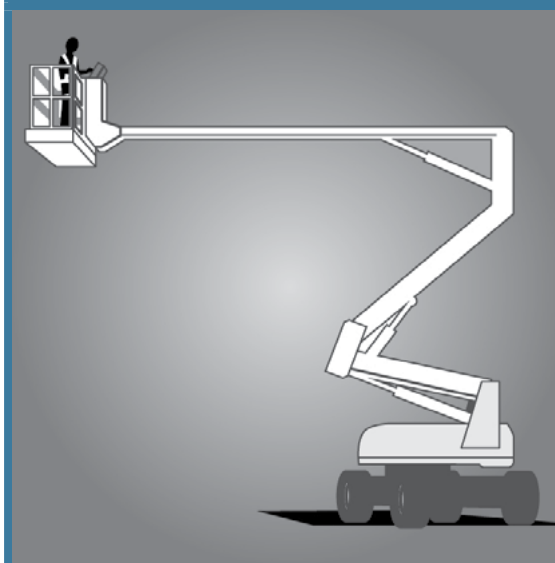


FIGURE 10 An example of a scissor-lift elevating work platform.



MAST CLIMBING WORK PLATFORMS

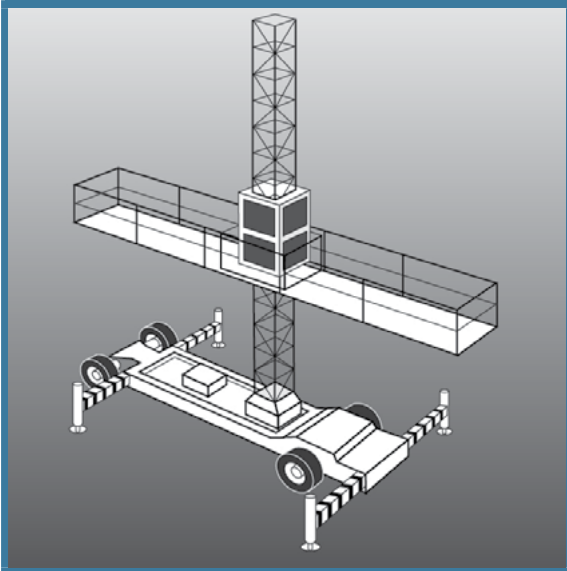
Mast climbing work platforms are hoists with a working platform that is used to raise workers and material to a temporary working position. They use a drive system mounted on an extendable mast, which may need to be tied to a building under circumstances prescribed by the manufacturer.

Mast climbing work platforms can be set up in either single-mast or multi-mast configurations. They are generally not suitable for use if the profile of a structure changes at different elevations (for example, if the upper floors of a building 'step' back or balconies protrude from the building).

The erection and dismantling of mast climbing work platforms must be carried out, or be directly supervised, by a person holding an appropriate rigging or scaffolding licence.

Further information on mast climbing work platforms is provided in AS 2550.16 *Cranes—Safe Use—Mast climbing work platforms*.

FIGURE 11 An example of a typical mast climbing work platform.



WORKBOXES

A workbox is designed to be supported by a crane, hoist, forklift truck or other mechanical device to provide an elevated work area for persons working from the box. It consists of a platform surrounded by an edge protection system and should be designed in accordance with AS 1418.17 *Cranes (including hoists and winches) —Design and construction of workboxes*.

Where reasonably practicable, other working platforms, such as an elevating working platform or scaffold, should be used as an alternative to the workbox.

The safety requirements and considerations include that:

- the workbox is not suspended over persons
- the workbox is designed for the task and securely attached to the crane. The workbox, lifting attachments and records should be checked by a competent person before use
- the workbox is fitted with a suitable anchorage capable of withstanding the fall forces specified in AS/NZS 1891.4 *Industrial fall-arrest systems and devices—Selection, use and maintenance*. Workers must be attached to the anchorage by a lanyard and harness unless the workbox is fully enclosed
- workers remain within the workbox while they are being lifted or suspended
- workers do not enter or leave the workbox when it is suspended (except in an emergency)
- the crane is fitted with the means to safely lower it in an emergency or a power supply failure
- the crane is suitably stabilised at all times while the workbox is used
- the crane has 'drive up' and 'drive-down' controls on both the hoisting and luffing motions and those controls are used. No declutching allowing free fall is to be used while a workbox is in use
- an effective means of communication between any person in the workbox and the operator is provided
- the crane is fitted with a safety hook and moused (lashed) accordingly
- the operator remains at the controls of the crane at all times.

For specifications for the use of crane workboxes refer to AS 2550.1 *Cranes, Hoists and Winches—Safe Use—General Requirements*.

Forklifts with a work box

A workbox fitted to a forklift must be securely attached to the forklift carriage and engineer-designed and constructed in accordance with AS 2359 *Powered Industrial Trucks* (see Figure 12).

Safety considerations include that:

- people are not raised on the tynes of forklift trucks or the pallet
- no other device (for example, ladder or pallets) is used to gain additional height (see Figures 13 and 14)
- the safety gate is self-locking and kept shut when in the elevated position.

4. FALL PREVENTION DEVICES

FIGURE 12 An example of an engineer-designed workbox with safety harness and lanyard assembly, correctly positioned on the forklift tynes.

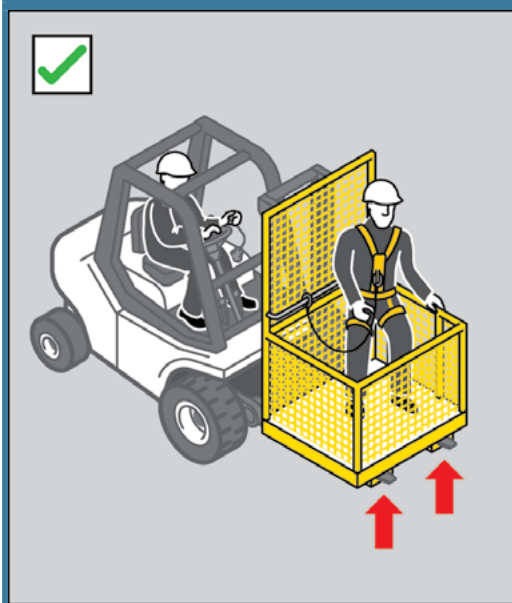
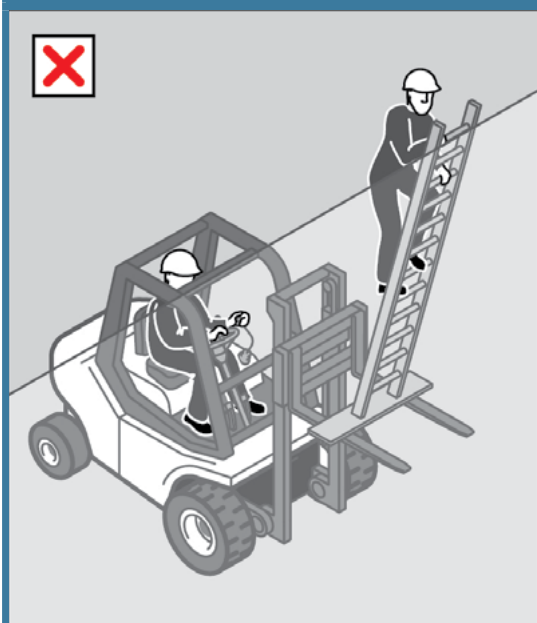


FIGURE 13 Using a forklift as a working platform or to gain extra height by standing on the tynes or a pallet is an unacceptable practice.



FIGURE 14 Unacceptable practice with ladder on forklift.



BUILDING MAINTENANCE UNITS

Designers of buildings should consider the methods by which maintenance, repairs or cleaning will be undertaken on buildings or structures.

A building maintenance unit is a power-operated suspended working platform that is fixed permanently to a building or structure. It is used for access for building maintenance or window cleaning (see Figure 15).

Safety considerations include that:

- the platform has sufficient, clearly designated safety harness anchorage points designed to withstand the forces caused by a fall of any person located anywhere on the platform
- the units are designed in accordance with AS 1418.13 *Cranes (including Hoists and Winches) —Building Maintenance Units* and operated by competent persons in accordance with AS 2550.13 *Cranes—Safe Use—Building Maintenance Units*.

PLATFORMS SUPPORTED BY TRESTLE LADDERS

Trestle ladder scaffolds are only suitable for use at heights greater than two metres when guard rails and toe boards are incorporated to prevent people and material falling off the working platform. The system (including planks) should be assembled according to the manufacturer's specifications with the complete set of compatible components.

Some trestle ladder scaffolds include outriggers to increase stability (see Figure 16). Trestle ladder scaffolds are only suited to light duty tasks such as painting and rendering. Work should only be performed between the trestles. The minimum width of the working platform should not be less than 450 mm.

Alternatives to trestle ladders should be considered, such as small scissor lifts, light duty aluminium mobile scaffolds, boom arms and modular scaffolding.

FIGURE 15 An example of a building maintenance unit with safety harness and restraint line

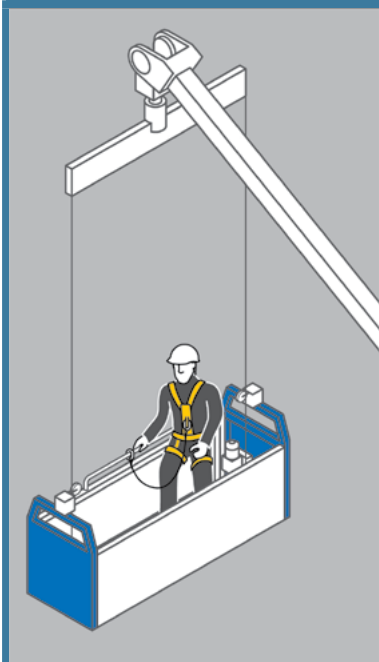
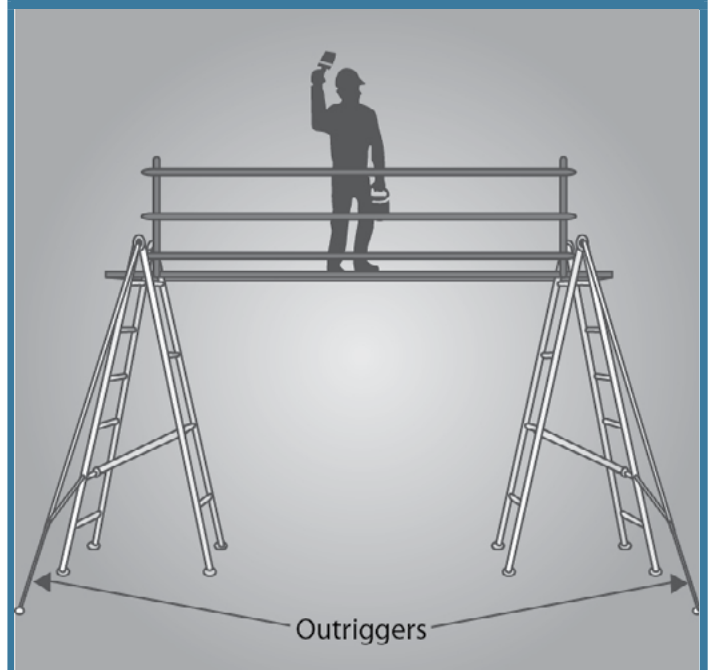


FIGURE 16 Trestle ladder scaffold with guard rails and outriggers for stability.



4.2 Perimeter guard rails

Guard rails may be used to provide effective fall prevention:

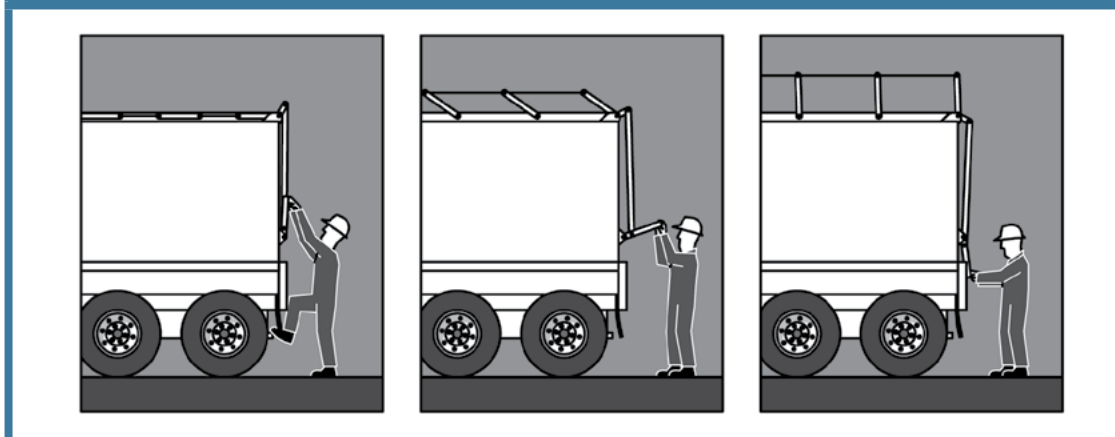
- at the edges of roofs
- at the edges of mezzanine floors, walkways, stairways, ramps and landings
- on top of plant and structures where access is required (see Figure 17)
- around openings in floor and roof structures
- at the edges of shafts, pits and other excavations.

Guard rails should incorporate a top rail 900mm to 1100 mm above the working surface and a mid rail and a toe board.

Before using a guard rail system you should check that it will be adequate for the potential loads. The required load resistance will depend on the momentum of a falling person. For example, the momentum of a person falling from a pitched roof will increase as the pitch (or angle) of the roof increases.

Refer to *AS/NZS 4994—Temporary Edge Protection* series for further guidance.

FIGURE 17 Guard rails installed on top of a tanker to enable safe access to tank hatches.



4.3 Safety mesh

Safety mesh is designed to prevent internal falls through a roof. If securely fixed, safety mesh provides fall protection for roof installers and offers long-term protection against falling for maintenance and repair workers.

Safety mesh does not prevent falls from the edge of a roof or through holes in a roof, so it should always be used in conjunction with appropriate edge protection, guard rails or fall-arrest systems.

Safety mesh should comply with AS/NZS 4389 *Safety mesh*, which specifies the minimum requirements for the design, construction, testing and installation of safety mesh for use in domestic, commercial and industrial building applications.

The mesh should be formed from 2 mm diameter wire of not less than 450 MPa tensile strength, welded into a mesh with the longitudinal wires not more than 150 mm apart and the cross wires not more than 300 mm apart.

Safety mesh should be installed in accordance with the manufacturer's instructions by competent persons, who should be protected against the risk of falling by using appropriate control measures such as scaffolding, elevating work platforms or fall-arrest systems.

Particular care is required to ensure that the mesh is securely connected to the structure and the overlap between adjacent sections of mesh is sufficient to generate the necessary strength to resist the force of a person falling onto it. The safety mesh should be covered by the roof cladding as soon as reasonably practicable after it has been installed.