

# SAFE WORK ON ROOFS

## PART 1: COMMERCIAL AND INDUSTRIAL BUILDINGS

CODE OF PRACTICE 2009

**Disclaimer**

This publication may contain occupational health and safety and workers compensation information. It may include some of your obligations under the various legislations that WorkCover NSW administers. To ensure you comply with your legal obligations you must refer to the appropriate legislation.

Information on the latest laws can be checked by visiting the NSW legislation website ([www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au)) or by contacting the free hotline service on 02 9321 3333.

This publication does not represent a comprehensive statement of the law as it applies to particular problems or to individuals or as a substitute for legal advice. You should seek independent legal advice if you need assistance on the application of the law to your situation.

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# 1. WHAT IS AN APPROVED INDUSTRY CODE OF PRACTICE?

An approved industry code of practice is a practical guide for employers and others who have duties under the *Occupational Health and Safety Act 2000* (OHS Act) and the *Occupational Health and Safety Regulation 2001* (OHS Regulation) with respect to occupational health, safety and welfare.

An industry code of practice may be approved by the Minister administering the OHS Act, having regard to any recommendation by WorkCover. An approved code of practice comes into force on the day specified in the code or, if no day is specified, on the day it is published in the NSW Government Gazette (Gazette). It may be amended (or revoked) by publication in the Gazette.

Although not mandatory, it is recommended that an approved industry code of practice should be adopted unless an alternative course of action that achieves the same or a better level of health, safety and welfare at work is being followed.

An approved industry code of practice is intended to be used in conjunction with the requirements of the OHS Act and the OHS Regulation but does not have the same legal force. It is advisory rather than mandatory. Its purpose is to provide guidance on occupational health and safety (OHS) obligations. However, in legal proceedings under the OHS Act or OHS Regulation, failure to observe a relevant approved industry code of practice is admissible as evidence concerning an offence under the OHS Act or OHS Regulation.

A WorkCover NSW inspector can draw attention to an approved industry code of practice in an improvement or prohibition notice as a way of indicating the measures that could be taken to remedy an alleged contravention or non-compliance with the OHS Act or OHS Regulation. Failure to comply with an improvement or prohibition notice without reasonable excuse is an offence.

## **In summary, an approved industry code of practice:**

- gives practical guidance on how health, safety and welfare at work can be achieved
- should be adopted unless an alternative course of action that achieves the same or a better level of health, safety and welfare in the workplace is being followed
- can be referred to in support of the preventive enforcement provisions of the OHS Act or OHS Regulation
- can be used as evidence to support a prosecution for failing to comply with or contravening the OHS Act or OHS Regulation.

## 2. WHAT IS THIS CODE OF PRACTICE ABOUT?

This *Code of Practice for Safe Work on Roofs – Part 1: Commercial and Industrial Buildings* (the Code) provides clients, employers, self-employed persons, contractors, subcontractors and workers with practical advice on preventing injury to persons engaged in work on roofs. This edition of the Code replaces and revokes the version published in 1993. It has been updated to reflect changes in legislation and industry practice since that time.

The Code has been developed by an industry working party and has involved extensive consultation with construction industry stakeholders.

The scope of the Code:

- a. applies to the planning, preparation and conduct of work for the installation and maintenance of roofs, the maintenance of roof-mounted equipment and structures, the removal of roof coverings, and the movement of those working on roofs, on commercial and industrial buildings
- b. does not apply to work carried out by emergency service personnel – including the state emergency service, fire, police and ambulance personnel – as part of emergency procedures
- c. does not apply to work associated with the erection of the roof supporting structure.

This is an industry code of practice approved by the Minister under section 43 of the OHS Act on the recommendation of WorkCover NSW.

The Code takes effect on 1 October 2009.

The Code incorporates several Australian Standards, listed under ‘further information’ at the end of this document.

### 3. CONSULTATION AND RISK MANAGEMENT

The OHS Act and the OHS Regulation require employers to address workplace health and safety through a process of risk management and consultation. Self-employed persons must address workplace health and safety through a process of risk management and coordination – see 3.3 Coordination of responsibilities.

To effectively implement the Code, employers should be aware of these requirements and have procedures in place to comply with them.

Employers and self-employed persons are advised to refer to the OHS Act and the OHS Regulation, as well as the *Code of Practice for Occupational Health and Safety Consultation* and the *Code of Practice for Risk Assessment* for details of these requirements and how they can be met.

#### 3.1 CONSULTATION AT THE WORKPLACE

Employers must consult with their workers when taking steps to assess and control workplace risks. They must set up consultation arrangements and develop consultation procedures.

##### 3.1.1 Consultation arrangements

Section 16 of the OHS Act provides three alternatives for OHS consultation arrangements.

Arrangement	Number of workers	Circumstances
OHS committee	20 or more workers	<ul style="list-style-type: none"><li>• if requested by a majority of workers, or</li><li>• if directed by WorkCover</li></ul>
OHS representative	any size	<ul style="list-style-type: none"><li>• if at least one worker requests an election, or</li><li>• if directed by WorkCover</li></ul>
Other agreed arrangements	any size	<ul style="list-style-type: none"><li>• if agreed to by both the employer and workers (in a small workplace it may be a regular safety meeting with workers)</li></ul>

Before using the code, an employer should ensure that consultation arrangements are in place. Clause 27 of the OHS Regulation outlines the obligations of the employer, including the requirement for them to record the decided consultation arrangements and to advise all existing and new workers.

### **3.1.2 When should consultation be undertaken?**

Employers must consult their workers when decisions are being considered that may affect a worker's health, safety or welfare at work. This includes assessing, reviewing and monitoring risks to health and safety. This may be when:

- a. eliminating or controlling risks to health and safety
- b. planning for new premises, or modifying existing premises or plant
- c. purchasing new plant, equipment or substances
- d. planning, designing or changing work tasks or jobs
- e. determining or reviewing workplace amenities
- f. determining or reviewing consultation arrangements.

Other decisions that could also affect health and safety include:

- g. developing procedures for investigating incidents or accidents
- h. developing emergency procedures.

Any procedures that are developed to encompass these activities should incorporate consultation. It may not be practicable or reasonable to involve the OHS committee or the OHS representative in, for example, every purchase decision or task change, but they must be consulted on what process is used.

### **3.1.3 How should consultation be undertaken?**

Employers must:

- a. share all relevant information with their workers – eg if an employer is going to change a work task, workers must be told of any risk to health and safety that may arise and what will be done to eliminate or control those risks
- b. give workers the opportunity to express their views and to contribute in a timely fashion to the resolution of OHS issues
- c. value the views of workers and take them into account when the decision is made to resolve the matter – in many cases, agreement will be reached on how the safety issues are to be addressed.

## **3.2 RISK MANAGEMENT**

A hazard identification and risk assessment process must be carried out at the planning and preparation stage, in consultation with the persons doing the work, to determine what risks may arise when the work is being carried out. Safe systems of work must then be put in place to eliminate or control these risks.

### **3.2.1 Hierarchy of control measures**

Clause 5 of the OHS Regulation prescribes a hierarchy of controls that must be used when eliminating or minimising a risk to health and safety in the workplace.

The hierarchy of controls involves:

- a. eliminating the risk – eg discontinue the activity, don't use the plant, fabricate the roof on the ground and lift into position with a crane

- b. minimising the risk by:
  - i. substituting the system of work or plant (with something safer)
  - ii. isolating the hazard – eg introduce and enforce a restricted work area
  - iii. introducing engineering controls – eg guardrails or scaffolding
  - iv. adopting administrative controls, such as safe work practices – eg hazard warning signs ('persons working above', 'nail gun in use') – and specific training and work instructions – eg for brittle or fragile roofs
  - v. using personal protective equipment (PPE) – eg fall arrest equipment, safety footwear, eye protection.

Eliminating the risk gives the best results and should be adopted where possible. When minimising the risk, the control measures in the hierarchy of controls apply in descending order. Usually, the measures higher up in the hierarchy are more effective and require less frequent reviews of the controls than those lower down. In some situations, a combination of control measures may be used, such as engineering means and PPE.

Risk control measures identified by contractors must be incorporated in the safe work method statement (SWMS) and supplied to the principal contractor, who must include them in the OHS management plan for the site.

### **3.2.2 Risk assessment and control measures**

To determine what risks may arise when the work is being carried out, a hazard identification and risk assessment process must be carried out at the planning and preparation stage by the employer, self employed person or contractor. Safe systems of work must then be put in place to eliminate or control these risks – and these systems must be documented in the SWMS.

The process of risk management includes:

- a. identifying the hazards – eg access to heights above ground level
- b. assessing the risks from the hazards – eg serious injury or death
- c. using appropriate control measures to eliminate or control the risk
- d. reviewing control measures from time to time to ensure their continued effectiveness – including supervising workers to ensure that the control measures are used.

### **3.2.3 Monitor and review risk assessments and control measures**

Clauses 12 and 37 of the OHS Regulation state that employers and controllers of premises must review a risk assessment and any measures adopted to control a risk, whenever:

- a. there is evidence that the risk assessment is no longer valid
- b. an injury or illness results from exposure to a hazard to which the risk assessment relates
- c. a significant change is planned to the place of work, work practices or work procedures to which the risk assessment relates.

### **3.2.4 Planning by the designer**

Architectural and engineering designs of roofs, including the supporting structure and cladding, should take into account whether the work practices necessary to carry out the installation and maintenance of the roof can be carried out safely.

With due regard to the hierarchy of controls, the designer should consider:

- a. designing buildings that minimise work at heights, as far as practicable – eg pre-assembling sections on the ground and installing guard-railing systems or brackets
- b. the ease of installing fall prevention equipment, such as guardrails or guardrail attachments at the perimeter, where appropriate
- c. measures to prevent falls through the roof, such as safety mesh and pedestrian-grade roof cladding
- d. providing anchorage points for a fall arrest system, where required, for use during installation, subsequent work on the roof and maintenance – see 5.5 Fall arrest systems
- e. the strength of roof members and other elements of the building to which guardrails are attached, or which act as an anchorage point for a fall arrest system
- f. providing permanent safe access to the roof for future maintenance purposes
- g. providing safe access to all sides of the roof
- h. providing parapet walls as edge protection.

### **3.2.5 Planning by the principal contractor**

Clause 210 of the OHS Regulation requires a principal contractor to be appointed:

- where the cost of the construction work is over \$250,000, or
- where the work involves high-risk construction work (including work at a height above three metres), or
- for demolition work or asbestos removal work, for which a licence is required under chapter 10 of the OHS Regulation.

For information on work on asbestos cement roofs and principal contractors, see chapter 8 of the OHS Regulation.

Note: In some instances, the roofing contractor may become a principal contractor.

Where the cost of construction work is over \$250,000, the principal contractor must prepare and implement an OHS management plan in accordance with clause 226 of the OHS Regulation.

If a principal contractor is not appointed and the cost of construction is over \$250,000 or it is high-risk construction work, the owner is taken to be the principal contractor. For demolition or asbestos removal work that requires a licence, the person carrying out the work is taken to be the principal contractor.

Before roof operations start, the principal contractor, in consultation with the contractors doing the work, must undertake an assessment of the risks involved in carrying out the work and:

- a. where practicable use building methods that reduce work at heights
- b. consider the type and placement of scaffolding required for access and falls prevention
- c. consider the most effective methods of controlling the risk of falls and injury, over the perimeter and through the roof
- d. ensure that the roof structure is complete and braced
- e. ensure that the strength of the roof members is adequate to support the system to be used for controlling the risks of a fall injury, including, where appropriate, a fall arrest system
- f. provide suitable and safe access to and from the construction site, including the working areas on the roof
- g. implement specific risk controls if slippery, brittle or fragile roofing materials are encountered, or the work involves the removal of asbestos cement – see 5.6 and 5.7
- h. place roofing materials in a position on the ground so that risks (including falling material) from moving and lifting to the roof are minimised
- i. plan for positioning of bundles of roof materials to avoid excessive point loading on the structure
- j. plan to prevent materials slipping or rolling off roofs
- k. provide a firm, level surface for mobile plant
- l. ensure that electrical safety and systems of work conform with WorkCover's *Code of Practice: Electrical Practices for Construction Work*
- m. observe the distances from overhead powerlines recommended in the *Code of Practice for Work Near Overhead Powerlines*
- n. identify the presence of any asbestos at the worksite or in the roof
- o. ensure that all workers have received appropriate training and instruction
- p. ensure that all contractors and subcontractors have been provided with the parts of the site safety management plan that are relevant to their work on the roof
- q. obtain SMWSs from the subcontractors, that adequately describe the work to be carried out.

### **3.2.6 Planning by contractors**

In addition to coordinating with the principal contractor, all contractors doing work must:

- a. undertake an assessment of the risk involved in carrying out the work – see relevant hazards outlined in the OHS Regulation
- b. determine the most effective methods of controlling the risk of falls, falling objects and other incidents by taking into account the nature of the work being done, such as:
  - i. roof work – eg installing the cladding, roof mesh, slippery conditions
  - ii. accessory work – eg penetrations, roof capping, interior box gutters
  - iii. perimeter work – eg eaves, gutters, box gutters at permanent edge
  - iv. manual raising and lowering of materials, tools and equipment
- c. maintain suitable and safe access to and from the roof
- d. provide a written SWMS, describing how the work is to be done safely – it should take into account an assessment of the risks involved in carrying out the work

- e. plan to distribute materials and other equipment that is placed on the roof so that excessive point loading on the roof structure is avoided
- f. implement specific risk controls if brittle or fragile roofing material is encountered, or if the work involves removal of material containing asbestos
- g. install roof-edge protection, anchor points or other fall prevention measures resulting from (b)
- h. ensure that everyone carrying out or affected by the work is provided with appropriate PPE if required – see 3.3, Coordination of responsibilities. The use of PPE is the least preferred means of controlling risks – see 3.2.1, Hierarchy of control measures.

The contractor should also:

- i. place roofing materials in an appropriate position to assist in manual handling – see 5.8
- j. distribute roofing material and other equipment so that excessive point loading on the roof structure is avoided
- k. consider the experience and training of a worker when allocating tasks, so as to minimise risks
- l. as far as reasonably practicable, perform tasks at ground level – in order to reduce the risk to workers from falling and falling objects (eg tools)
- m. ensure that safety systems for electrical work conform with *WorkCover's Code of Practice for Electrical Practices for Construction Work* and, when work is near powerlines, with the *Code of Practice for Work Near Overhead Powerlines*
- n. develop a system, prior to installing the roof cladding, to ensure that safety mesh (when used) is inspected and certified by a competent person as being installed in accordance with the manufacturer's recommendations
- o. avoid storing old roofing material on the roof; instead, they should transfer it from point of removal to the ground
- p. prevent anyone from entering the area below the roof while any sort of roof work is being carried out, including the raising and lowering of material
- q. minimise skin exposure to sunlight
- r. control exposure to excessive electromagnetic radiation from devices such as antennas
- s. control exposure to harmful biological agents – eg bacteria in cooling towers.

### **3.2.7 OHS management plan**

Before work commences, where the legislation requires the appointment of a principal contractor, the principal contractor must ensure that a site-specific OHS management plan has been prepared for each place of work at which construction work is to be carried out. The plan must be maintained and kept up-to-date during the course of the work. The principal contractor must provide subcontractors with a copy of relevant parts of the plan and should brief them on the contents of the plan and the risks to which they may be exposed.

The plan must include:

- a. the OHS responsibilities of specific people and/or positions
- b. the arrangements for OHS induction training as set out in part 8.2 of the OHS Regulation

- c. the arrangements for managing OHS incidents, including identity and contact details of the person responsible for managing OHS incidents
- d. site-safety rules and how they are communicated to any person on site
- e. SWMSs for relevant work activities.

### **3.2.8 Safe work method statement (SWMS)**

The SWMS:

- a. describes how the work is to be carried out
- b. identifies the work activities assessed as having safety risks
- c. identifies the safety risks
- d. describes the control measures that will be applied to work activities
- e. is site-specific
- f. includes a description of the equipment used in the work, the standards or codes to be complied with, the qualifications of the personnel doing the work and the training required to do the work.

An SWMS should show the work method in a logical sequence. The hazards associated with each process should be identified, and the measures for controlling these hazards specified. Employees should be involved and consulted during the development and implementation of any SWMS. All persons involved in carrying out the work should understand the SWMS before commencing the work.

The SWMS may be used to nominate the competencies, the number of workers and the items of plant that are required to safely perform the work tasks, together with any permits and licences that are required under the OHS Regulation. It may also be useful to provide copies of relevant documents and training records with the SWMS.

### **3.2.9 Preparing for work to commence**

Before work commences, all controls outlined in the OHS management plan, the SWMS and the risk assessments must be put in place and checks made that no new hazards have been created.

To control risks, preparing for the commencement of work should include checking or assessment of:

- a. fall prevention systems – eg scaffolding, guardrails, safety mesh, netting
- b. access to and from the workplace – eg whether persons can pass through the edge protection system without having to climb over rails
- c. the climatic and environmental conditions – eg moisture, lichen or dust on the roof, wind, weather forecast
- d. PPE
- e. induction training
- f. specific instructions for workers
- g. electrical practices – eg portable electrical tools and equipment
- h. emergency and rescue procedures – eg rescuing a worker from a fall arrest harness

- i. the identified dedicated areas for the operation of plant, such as cranes, elevating work platforms, elevators and personnel hoists
- j. the crane placement schedule.

Prior to commencing work on an existing roof, an inspection should be conducted by a competent person to determine:

- k. the presence and integrity of safety mesh
- l. the structural soundness of the roof and supporting structures
- m. the fragility of the roof and roof sheets
- n. the presence of asbestos
- o. the presence of sky lights.

To ensure the necessary control measures are being applied as the construction of the roof progresses, an ongoing review of the work should be carried out.

### **3.3 COORDINATION OF RESPONSIBILITIES**

There may be a number of parties involved in a construction project, such as:

- a. the principal contractor
- b. controllers of premises, plant or substances
- c. designers
- d. employers (principal contractors or subcontractors) who employ persons at the site, including labour hire agencies providing persons to the site
- e. self-employed persons
- f. suppliers of plant, materials or prefabricated components
- g. manufacturers of plant.

Where more than one party has responsibilities at a specific workplace, clause 8 of the OHS Regulation provides that each party retains their legal responsibilities and discharge their responsibilities in a coordinated manner.

When coordinating responsibilities, all the parties in the workplace should be aware that:

- h. the person controlling the work has obligations, not only to their workers but also to contractors and their workers
- i. the level of responsibility for health and safety matters is related to the degree of control the person has over the work or premises, regardless of the number of contractors and subcontractors involved
- j. contractors should obtain information on the hazards presented by the roofs located on their premises, such as the presence of brittle roofing, skylights or asbestos – for information on work on asbestos cement roofs, see chapter 7
- k. if asbestos is present, the controller of the premises must update the register of asbestos – see chapter 7
- l. information about health and safety matters must be communicated to those who may be affected by these matters
- m. those affected should be consulted when deciding how to eliminate or control risks.

### 3.4 TRAINING AND SUPERVISION

The OHS Regulation places specific requirements upon employers and self-employed persons to help ensure the health and safety of all workers on construction sites, in particular those involved in high-risk construction work on roofs – see chapter 8, part 8.2 of the OHS Regulation.

All those involved in work on roofs must be trained to follow systems of work and work practices that enable them to perform their work in a manner that is safe and without risks to the health of themselves and others. Only those who have received appropriate training and instruction may carry out work on roofs.

To ensure that safe systems and work practices are being followed, workers and systems of work should be monitored, and, where necessary, refresher training should be provided. Training and instruction must include:

- a. work activities and site inductions
- b. measures contained in the SWMS, such as:
  - i. methods to load materials onto the roof, and to handle, position and fix materials
  - ii. control measures to prevent injuries or falls
  - iii. methods to gain access to the roof and all areas of the roof
  - iv. the use, care and storage (according to manufacturers' instructions) of PPE – including fall arrest systems – and tools and equipment
  - v. the use of plant and associated equipment, including electrical equipment and hazardous substances
- c. procedures in the event of an incident, injury or emergency.

Employers must ensure that workers are provided with such supervision as may be necessary to ensure the health and safety of the workers and anyone else at the employer's workplace. Supervision must be undertaken by a competent person and should take into account the competence, experience and age of each worker.

## 4. LEGISLATIVE REQUIREMENTS – PREVENTING FALLS FROM HEIGHTS

Clause 56(1)(a) of the OHS Regulation requires an employer or self-employed person to ensure that risks associated with falls from a height are controlled. They must provide and maintain:

- i. a stable and securely fenced work platform – eg scaffolding
- ii. if compliance with subparagraph (i) is not reasonably practicable, secure perimeter screens, fencing, handrails or other forms of physical barriers that are capable of preventing the fall of a person, or
- iii. if compliance with subparagraph (ii) is not reasonably practicable, other forms of physical restraints that are capable of arresting the fall of a person from a height of more than two metres.

These requirements constitute a ‘hierarchy of controls’. An employer or self-employed person must apply the first control measure or, if not reasonably practicable to use it, consider the next one – and so on – see clause 5 of the OHS Regulation, and 3.2.1 of this code.

The OHS Regulation does not specify a minimum height at which the control measures must be implemented – risks are associated with working from any elevated position. Where there is a risk of falling, control measures are required. However, if fencing, guardrails and the like are impracticable, a restraint or fall arrest system capable of arresting the fall must be used. In some cases, multiple control measures may be appropriate. If the controls highest in the hierarchy are considered impracticable, the reasons should be documented.

## 5. HAZARDS AND CONTROL MEASURES

### 5.1 ACCESS TO ROOFS

Safe access must be provided to all areas in a workplace, including access to different levels and to all parts of the roof. Before choosing a type of access, consideration should be given to:

- a. any tools and equipment that may be required while on the roof – and the risks of carrying them
- b. the frequency of access for routine maintenance
- c. the number of people required to access the roof
- d. the nature of the work.

Particular risk control measures are prescribed for brittle or fragile roofs – see 5.6.

Common types of access include:

- e. scaffolds
- f. personnel hoists
- g. permanent access, where feasible
- h. ladders
- i. mobile elevating work platforms.

Some limitations apply. If a ladder is used, it should:

- j. be manufactured for industrial use and comply with the relevant parts of AS 1892 *Portable ladders*
- k. have non-slip feet, and be secured at its top and bottom against movement
- l. be positioned on firm, level ground
- m. extend at least one metre above the landing place
- n. be at least three metres clear of powerlines (or any electrical conductors) if it is a metal or wire-reinforced ladder – otherwise use a non-conducting ladder
- o. not be placed so that it requires a person to climb over the top guardrail or mid-rail of any edge protection.

For further information on the safe use of ladders, see WorkCover's guide *Portable ladders, Working off stepladders* (a position paper) and AS 1892.5 *Portable ladders Part 5 – Selection, safe use and care*.

Elevating work platforms are not intended as a means of access but, in some instances, they may be the safest option to access a roof. If a person is required to leave the basket of an elevating work platform, they should conform with the procedure specified in AS 2550.10 *Cranes, hoists and winches Part 10 – Safe use – Mobile elevating work platforms*.

## 5.2 PROTECTION AT THE EDGE OF A ROOF

### 5.2.1 Use of scaffolding and guardrail systems

There are many types of purpose-designed roof-edge protection systems, including modified scaffolding. The design requirements for these systems, including the strength to withstand the impact of someone falling against them, are outlined in AS/NZS 4994.1 *Temporary edge protection, Part 1 – General requirements*. Roof-edge protection systems, including the use of scaffolding as roof-edge protection, should conform to the requirements of this standard.

AS/NZS 4994.2 *Temporary edge protection, Part 2 – Roof edge protection – Installation and dismantling* provides guidance on determining the appropriate type of roof-edge protection system and explains how to use it. These standards apply to roofs with a pitch not greater than 35 degrees and should be used at the planning stages to ensure that systems of work conform to the requirements.

To determine the best type of roof-edge protection, ensure that it is strong enough to withstand the force of someone falling on it. The force will depend upon the momentum of the falling person, which in turn depends upon:

- a. the type of roof surface – a person is likely to generate more momentum when falling down a slippery roof, eg when it is wet or ice is formed on the surface
- b. the pitch of the roof – the steeper the pitch, the more speed that is generated
- c. the length from the top ridge to the roof-edge protection – a person will generate more speed the further they fall.

Regardless of the pitch of the roof, guardrails (including those on scaffolding) must have a top rail, mid-rail and a toe-board (bottom rails may be used in place of toe-boards if risks of falling objects can be controlled using rails) – or a top rail and an infill panel that serves the function of a mid-rail and toe-board. When the pitch of the roof exceeds 26 degrees, infill panels should be used in addition to mid-rails and toe-boards, so that the forces imposed by a falling person is spread along the guardrail and an injury caused by the mid-rail or toe-board is minimised.

The top rail should be at least 900 mm above the point where a person could stand on the roof. For a slope greater than 10 degrees, this is measured at not less than 300 mm from the edge of the roof structure. Ensure this height is maintained when the guardrails are erected at the edge of a sloping roof.

When installing safety mesh or other material that spans the roof, a roof-edge protection system that incorporates a platform, including scaffolding, has the advantage of providing a firm surface from which to work.

### 5.2.2 Particular requirements for scaffolding

Clause 58(d) of the OHS Regulation requires that the erection and dismantling of scaffolds and temporary erected structures – intended or used to support sheetings, hoardings, guardrails, means of access or egress, or entertainment equipment – be carried out in accordance with AS/NZS 1576.1 1995 *Scaffolding Part 1 – General requirements*.

Scaffolding, when used to provide edge protection, should have working or access platforms brought as close as practicable to the underside of the roof, no lower than one metre beneath the edge of the roof. A suitable access platform bay or stairs should be provided between the roof edge and the platform.

A person who erects or alters a scaffold from which a person or object can fall four metres or more must hold a scaffolding certificate of competency. There are three certificate levels, dependent upon the complexity of the scaffolding required.

Figure 1 shows a scaffold that has been adapted as a form of roof-edge protection.

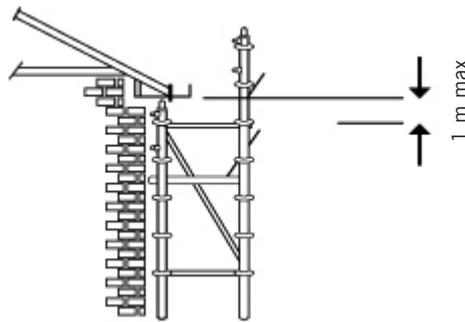


Figure 1: Scaffold as roof-edge protection (end guardrail omitted for clarity)

### 5.2.3 Guardrail systems

Before installing a guardrail system at the edge of a roof, ensure that it is suitable for that particular roof. Ensure that the supporting members can support the load of a person falling against the rails. The roof design engineer should be consulted for advice on the roof's compatibility with different guardrail systems.

Ensure that the system can be erected to follow the roof's profile, and will contain no gaps through which a person could fall. Buildings with unusual plan profiles or roof construction may pose additional hazards. If a system is not available to fully secure the edge, gaps between the roof and the guardrail system should be in-filled on-site.

Before commencing work on a roof, a guardrail system should be in place and it should not be removed until all work on the roof (or a section of the roof) is complete. If the guardrail is removed from a section of roof, access to that section should be prevented.

A method must be developed that allows the guardrail system to be safely installed and dismantled. If it does not involve scaffolds, a temporary work platform may be required, such as an elevating work platform.

Some guardrail systems use sacrificial brackets that are left connected when the roof is completed. A competent person should assess both the brackets and their fixings before they are to be used for subsequent work on the roof.

Guardrail systems should only be erected and dismantled by a competent person.

Figures 2 and 3 indicate the use of various types of roof-edge protection systems according to the pitch of the roof. More detailed examples are given in AS/NZS 4994.1.

Guardrails should be installed as close as practicable to the eaves, no more than 100 mm away from the edge. Provide means of preventing objects falling through the gap, if there is such a risk.

#### 5.2.4 Roofs with a pitch between 26–35 degrees

Where the pitch of the roof is 26–35 degrees, a platform should be constructed to minimise the likelihood of a person falling onto the top rail, or over the guardrailing system – see figure 2. The platform should be no less than 450 mm wide (two scaffold planks), and should include guardrails and infill panels on its outside perimeter. The platform should not be used for any purpose that may lead to additional hazards – eg trips and slips, falls onto materials.

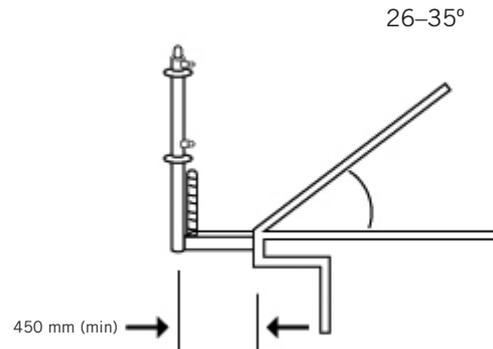


Figure 2: Roofs with pitch between 25 and 35 degrees require a two-plank platform guardrail system (end guardrail omitted for clarity)

#### 5.2.5 Roofs with pitch greater than 35 degrees

Where the pitch of the roof exceeds 35 degrees, a risk assessment should be undertaken to determine the additional safeguards required. Consider wider platforms, higher guardrails, mesh infill panels, fall arrest systems, perimeter scaffolding (see figure 3), or use boom-type elevating work platforms (cherry pickers).

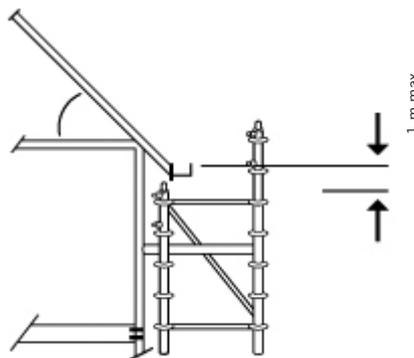


Figure 3: Scaffolding as edge protection for roofs greater than 35 degrees pitch (end guardrail omitted for clarity).

### 5.3 PROTECTION FROM FALLING THROUGH THE ROOF

Those working away from the roof's edge must also be safeguarded against the risks of falling through a partially complete or fragile roof, or through openings in the roof. Safety mesh is a commonly-used means of preventing falls through a roof.

### 5.3.1 Safety mesh

Safety mesh is often installed between the roof structure and the cladding, irrespective of the spacing of the purlins or rafters. It is used to protect those who install cladding at the leading edge of the roof and to protect those who undertake maintenance work on the roof.

Safety mesh is not designed as a working platform and should not be walked upon unless it is designed for that purpose.

#### a. Criteria

If safety mesh is used, ensure that it:

- i. conforms to AS/NZS 4389 *Safety mesh* – ie comprises 2 mm diameter wire of at least 450 mega Pascals tensile strength, welded into a mesh with longitudinal wire spacing of 150 mm and cross wire spacing of 300 mm
- ii. is appropriate for the roof – ie truss (lateral) and purlin (longitudinal) layout, pitch and span length
- iii. is installed safely and in accordance with the manufacturer's instructions (have this verified in writing by a competent person – this record should be kept, together with details of the mesh and an outline of the installation process – see appendix B)
- iv. has its integrity inspected by a competent person, prior to roof maintenance or removal.

The principal contractor should issue a copy of the safety mesh verification record to the owner of the building – see appendix B.

All those involved in the installation of safety mesh must be properly trained, competent to perform the task and provided with appropriate supervision to ensure they work safely.

#### b. Obligations related to information

There are a number of parties that hold obligations in relation to safety mesh and they include:

- i. safety mesh designers – should provide information on handling, storage, how to select for the intended purpose, how to use and limitations
- ii. manufacturers and suppliers – should ensure the mesh complies with AS/NZS 4389 and should ensure that all relevant information is included with the mesh (eg lapping adjoining lengths of mesh, minimum lap lengths, maximum span and the like) to confirm it is adequate for its intended purpose and to enable its correct installation
- iii. contractors – must ensure that all relevant information has been made available to workers.

#### c. Installing safety mesh

##### i. Set-up

- Use mesh complying with AS/NZS 4389.
- Ensure the longitudinal wires are parallel to the sheeting corrugations and in contact with the top of the immediate sheeting supports.
- Ensure the transverse wires (cross wires) are at right angles to the direction of the corrugations – transverse wires should be on top of the longitudinal wires.

- Cut a length of mesh from the roll and run out over the roof using a continuous mechanical or manual rope system.
- Work safely from a scaffold or an elevating work platform, positioned at each side of the roof – see figure 4.

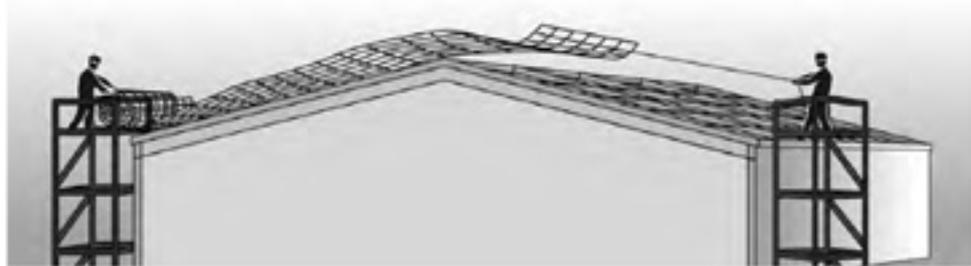


Figure 4: Installing mesh  
(Image provided by WorkSafe Victoria)

### ii. Fixing to end purlins

- Fix the mesh to metal purlins by passing each longitudinal wire through a hole drilled in the top of the purlin or wrap every longitudinal wire around the purlin – see figure 5. If practicable, drill holes in the purlins before installing them on the structure.
- Tie off each longitudinal wire at least four full turns around the same wire – see figure 5.
- If fixing to timber purlins, ensure that each longitudinal wire is firmly fixed using 40 mm x 3.5 mm or larger staples, or wrapping around as shown in figure 5.
- Wrap each tail wire at least four times around the same wire.

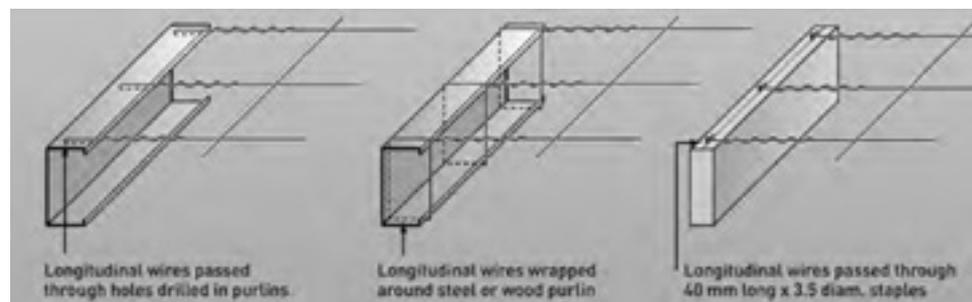


Figure 5  
(Image provided by WorkSafe Victoria)

### iii. Side laps

- Side-lap runs of mesh by at least 150 mm (one opening width).
- If the purlin spacing exceeds 1.7 m, side-laps of runs should be joined together using staples, ties or twitches, or as per the manufacturer's recommendations.
- Staple lap joints from underneath.

#### iv. End joints

- Order the mesh in long lengths so that longitudinal joints can be avoided.
- For longitudinal end joints, knot and tie using the full length of each tail wire – ie 300 mm long.
- To get a 300 mm tail wire, the longitudinal wire should be cut close to the joint.
- Tie the first tail wire at least three times around the knot.
- Place the other tail wire under the longitudinal wire and tie around the transverse wire at least three times.
- The joint should be the full width of the mesh, and every longitudinal wire should be joined (see figure 6).

Alternatively, instead of joining two ends of the mesh, secure the ends of the two parts of mesh to the purlins (see figure 5).

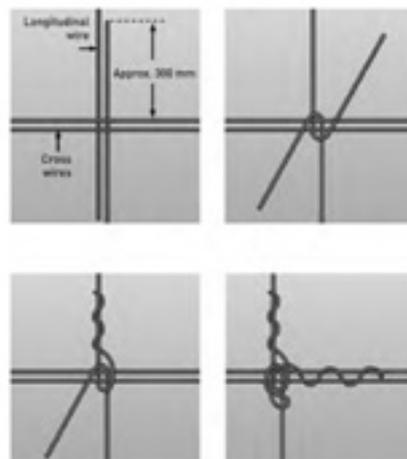


Figure 6  
(Images provided by WorkSafe Victoria)

## 5.4 RESTRAINT SYSTEMS

A restraint system provides control of a person's movement, by connecting them to an anchor in such a way that it will physically prevent the person from reaching a position at which there is a risk of a fall, eg over an edge or through a surface. If there are adjustable components, the system should prevent access to a fall location regardless of any adjustment.

The system should have sufficient controls to maintain its effectiveness as a restraint, eg preventing the users from introducing longer lanyards that would enable them to reach a position of risk.

Note: Restraint systems are not necessarily designed for the impact loads applied in fall arrest. If there is a risk of a person falling, a fall arrest system should be used (this can include a hybrid restraint/fall arrest system, appropriately configured).

## 5.5 FALL ARREST SYSTEMS

### Clause 56(2) of the OHS Regulation

If a fall arrest device is provided for use by persons at work, the employer must ensure that:

- a. all anchorage points for the device are inspected by a competent person before their first use and then on a regular basis so they are capable of supporting the design loads, and
- b. if the load-bearing capacity of an anchorage point is impaired, the anchorage is immediately made inoperable so as to prevent its use, and
- c. any harness, safety line or other component of the device that shows wear or weakness to the extent it may cause the device to fail is not used, and
- d. all persons using the device have received training in the selection, assembly and use of the system, and
- e. adequate provision is made for the rescue of a person whose fall is arrested by a fall arrest device.

A fall arrest system is designed to arrest a person's fall and minimise injuries. It provides a lesser level of risk control than preventing the fall in the first place. A fall arrest system should only be used when it is not practicable to control the risk with a higher-level control measure, such as scaffolding or edge protection. However, a fall arrest system is often used in conjunction with higher-level control measures, such as elevating work platforms.

The user of a fall arrest system should be competent in its set-up and use, and should inspect it for wear and damage before and after use, storage and transport. They should ensure that it is effective, creates no new hazards (such as trip hazards) and allows movement so that the task can be performed safely.

Components of an industrial fall arrest system should be used in accordance with the manufacturer's instructions and should conform to the relevant parts of AS/NZS 1891. Parts 1 to 3 of this standard provide design, testing and marking requirements, and part 4 provides information on selection, use and maintenance. Employers should request confirmation from the supplier that the equipment complies with the relevant parts of the standard and ensure that the manufacturer's instructions are provided. The manufacturer's instructions are not a substitute for training and instruction.

The various components of a fall arrest system should be compatible. The anchorage points should also be compatible with the host structure. All connections should fit together so as to avoid excessive wear, jamming, failure of the locking mechanism or loading of the latch gate (this is especially relevant when components from different manufacturers are used).

### 5.5.1 Anchorage points

Anchorage points, and the connections and structures to which they are connected, should be designed and selected to resist maximum likely force. AS/NZS 1891.4 *Industrial fall arrest systems* Part 4 – *Selection, use and maintenance* specifies that the ultimate capacity of a single fall arrest anchorage point for one person is 15 kN (or approximately 1500 kg) – equivalent to the weight of a family sedan. AS/NZS 1891.4 specifies capacity requirements for other situations, apart from proprietary static lines (ie horizontal lifelines), whose anchorage loads are provided by the supplier as they can depend on the system design.

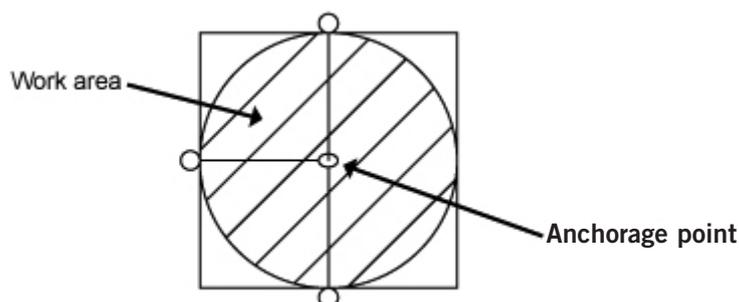
Anchorage points should be inspected in accordance with AS/NZS 1891.4, either on a scheduled basis or prior to use (if used infrequently).

Roof trusses can only be used as an anchorage point if they are capable of supporting anchors. Roof trusses with temporary bracing should not be used as anchorage points.

### 5.5.2 Configuration

- a. Where practicable, a fall arrest system should be used in restraint mode to prevent a worker moving to unsafe areas on the roof. Figure 7 indicates a single anchor and fixed-length lanyard used in restraint mode, which prevents the user falling off the edge, only allowing them to reach the edge at four isolated points.
- b. If the work is to be performed at the edge of the roof, the fall arrest system should be configured so as to reduce the potential fall distance (generally, the greater the fall, the greater the potential for injury). A fall arrest system with a harness must be configured so that it begins to arrest the fall before the worker has fallen more than two metres.
- c. Although the fall arrest must begin within two metres, the worker continues to fall, so there must be sufficient clearance to arrest the fall before the worker hits the ground. AS/NZS 1891.4 provides guidance on calculating the appropriate clearance distances.
- d. If a line and rope-grab fall arrester device is used, it is manually operated from the front. A harness with a front-fall arrest connection point should be considered.
- e. There should be minimum slack in the lanyard or safety line between the person and anchorage attachment.
- f. Energy absorbers should be used as part of the lanyard to reduce shocks to the body and anchorage point, unless the system configuration ensures the load will not exceed 6 kN (approximately 600 kg).
- g. The lines of inertia reels should be maintained without slack during use. Attachment of lanyards should be avoided as they may introduce slack.
- h. The fall arrest system should be selected by a competent person and all users should be adequately trained in its safe use.
- i. Those using a fall arrest system must be attached to the system at all times. If transferring from one anchorage to another, a second lanyard attached to the harness should be used. Connect the second lanyard to the next anchorage before disconnecting the first.
- j. Snap-hooks should not be connected to each other.
- k. For multiple users, the system should be configured and used to avoid crossed or tangled lanyards and lines.

Figure 7



### 5.5.3 Inertia reel systems

- a. Inertia reels are not designed for continuous support but become effective in the event of a fall. They should not be used as working supports by locking the system and allowing it to support the user during normal work. For some applications, such as stopping someone sliding down the inclined surface of a pitched roof, inertia reels may be less effective and so manufacturers should be consulted when selecting inertia reels.
- b. Most inertia reels are designed to operate with the extended line close to vertical – ie anchored almost directly above the user.
- c. Where the manufacturer permits the use of the inertia reel in a horizontal position, the configuration should not allow for the webbing or rope line from the inertia reel to travel over sharp edges in the event of a fall.

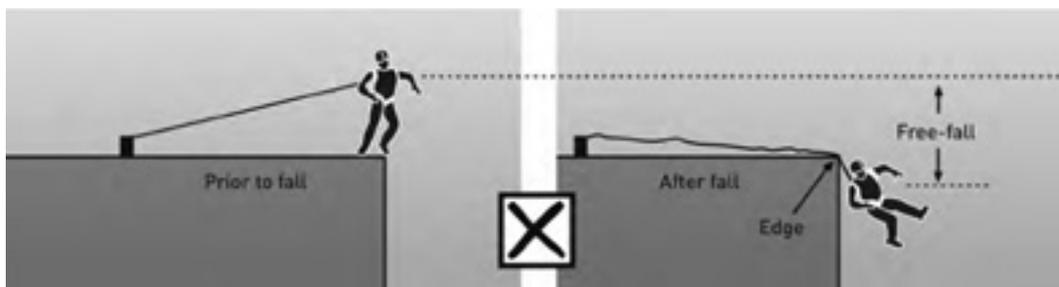


Figure 8  
(Images provided by WorkSafe Victoria)

### 5.5.4 Horizontal lifelines

- a. Horizontal lifelines (known as static lines or safety lines) should conform to AS/NZS 1891.2 *Industrial fall arrest systems and devices Part 2 – Horizontal lifeline and rail systems*.
- b. The installation of horizontal lifelines should be carried out by a person holding a certificate of competency as a rigger or scaffolder, who is competent in installing lifelines, in accordance with the manufacturer's or designer's specifications.
- c. The horizontal lifeline should be anchored above the harness connection points on those connected to it. Working above the lifeline will allow someone to fall more than two metres before fall arrest commences.

### 5.5.5 Pendulum effect

The 'pendulum effect' is a potential hazard when using a fall arrest system, especially when using an inertia reel, long lanyard or anchorage line with a rope-grab fall arrester. The pendulum effect can occur – both for falls off the roof and through the roof – if the inertia reel allows for too much unsupported line to be connected to the user. The two types of pendulum effect are swing down and swing back.

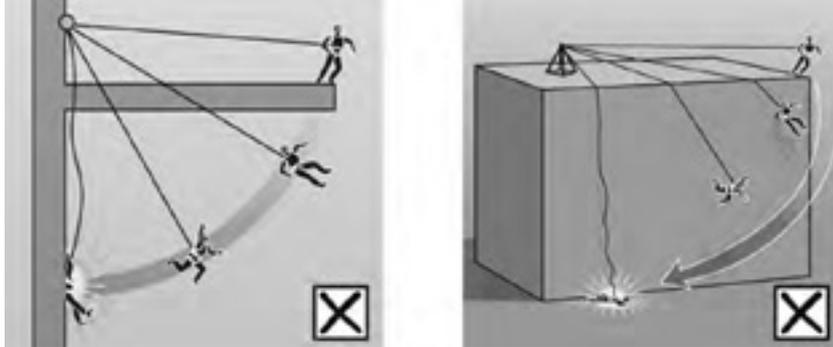


Figure 9  
(Images provided by WorkSafe Victoria)

#### Swing down

Swing down can occur if an inertia reel, lanyard or anchorage line is extended so that the line is not approximately perpendicular to the roof's edge – see figure 9. In this situation, the forces generated in an arrested fall over the edge will cause the line to rotate or slide back along the roof perimeter, until it reaches a position in line with the anchorage point and at right angles to the roof's edge.

As the line moves back, the section overhanging the roof lengthens, dropping the worker further than the original (arrested) fall distance. If the length of the unsupported line is equal to the height of the building, the worker will hit the ground. Even if the worker can't hit the ground, the pendulum increases the fall distance and enhances the likelihood of hitting another object – and increases the potential for the line to be damaged as it rotates and slides along the edge of the roof.

To eliminate the swing down effect:

- a. use a secondary anchorage point and lanyard (or line)
- b. place the anchorage point approximately perpendicular to the roof's edge at the work location – a mobile anchorage on a horizontal lifeline or rail system achieves this for a wider range of work locations.

#### Swing back

Swing back can occur when a person is anchored to one side of a void but is working on the other side of it. If the person falls into the void, they may then swing back into the building. This effectively increases the fall distance and can lead to the person hitting the building. Use anchorage configurations to avoid these situations.

### 5.5.6 Monitoring those using a fall arrest system

Those using fall arrest systems should be constantly monitored and, should they fall, immediate action should be taken to rescue them.

### **5.5.7 Rescue**

Adequate provision should be made for the rescue of someone who falls while using a fall arrest system.

### **5.5.8 Suspension trauma**

When a person is suspended motionless in a harness, blood begins to pool in the limbs – and suspension trauma occurs. It is like standing to attention for a long period of time – fainting may result. If someone faints while suspended in a harness, their condition will deteriorate and death may result. Depending on the circumstances and the condition of the person at the time of the incident, trauma can arise within minutes.

Suspension trauma is unrelated to a person's fitness level.

The easiest way to prevent or delay the onset of suspension trauma is to have the suspended person's knees lifted so they are in a sitting position. This can be achieved using a webbing strap as a seat under the thighs or by placing the feet in an appropriate length sling.

## **5.6 BRITTLE OR FRAGILE ROOFS AND ROOF OPENINGS**

Before carrying out any work on roofs, a risk assessment should be carried out to identify safe access and whether there are any brittle or fragile roofs, skylights or roof openings within the work area. Hazardous areas should be clearly marked as 'no go' zones during set up. Persons working on-site should be informed of the existence of such areas and how to identify them in case any were overlooked – eg by inclusion in the site induction, in toolbox talks, and in the SWMS.

Where openings or other 'no-go' zones have been identified, measures must be taken to prevent persons walking in to them – eg by barricading or using a restraint system. When workers need to be near these features and it is impracticable to physically prevent access to them, a fall arrest system incorporating a safety harness and effective anchorage point should be used.

If a roof, or part of a roof, is fragile or brittle, clause 39(b) of the OHS Regulation requires the owner or controller of the building to provide warning signs that contain the words DANGER – BRITTLE ROOF and are affixed to each individual slope, curve or section of the roof, and to all other places from which access to the roof may be obtained. Clause 3a(c) requires that walkways be provided and maintained.

Clause 60 of the OHS Regulation also requires the employer or self-employed person to provide permanent walkways or, if this is not practicable, adequately secured temporary walkways or other means to prevent falls, such as:

- a. scaffolding and fall arrest systems, including anchorages for everyone working on the roof
- b. temporary roof ladders for anyone working on a sloped part of the roof.

## **5.7 ASBESTOS CEMENT ROOFS**

Asbestos is a hazardous substance made from naturally occurring fibrous silicate minerals found in some rock formations.

The disturbance of asbestos products may cause fine asbestos fibres to become airborne, presenting a health risk. When airborne, the fibres can be inhaled and can penetrate the deepest part of the lungs, causing lung cancer, mesothelioma or asbestosis.

Many buildings built before 1986 contain asbestos. The most common areas where asbestos is found include flat (fibro) lagging and pipe insulation, asbestos insulation, corrugated or compressed asbestos-cement (A-C) sheeting, guttering and down pipes.

### **5.7.1 Identifying materials containing asbestos**

It is a legal requirement to identify all materials within a workplace that contain asbestos. These materials must be recorded in an asbestos register, which forms part of an overall asbestos management plan.

Prior to commencing any work on roofs, the asbestos register should be reviewed as part of the risk assessment process.

However, it is not satisfactory to rely solely on the asbestos register when conducting a risk assessment.

A visual inspection of the work area and the identification of all hazards should be conducted as part of the risk assessment process. If it is suspected that some materials contain asbestos, they should be tested to confirm whether or not asbestos is present.

### **5.7.2 Performing asbestos work**

Asbestos work means work where exposure to airborne asbestos fibres may occur. It includes any work that involves repairing, removing or disturbing asbestos or material containing asbestos – eg repair work on an asbestos roof.

All asbestos work must have a documented risk assessment. The risk assessment and the work performed must be conducted in accordance with the following codes of practice:

- *Code of Practice for the Management and Control of Asbestos in the Workplace* [NOHSC:2018 (2005)]
- *Code of Practice for the Safe Removal of Asbestos, 2nd Edition* [NOHSC: 2002 (2005)].

These codes are referred to in the OHS Regulation.

The *Code of Practice for the Management and Control of Asbestos in the Workplace* sets out the steps to be taken to eliminate, or otherwise minimise, the risks of exposure to airborne asbestos fibres, including the identification of materials containing asbestos, risk assessments and the implementation of control measures.

The *Code of Practice for the Safe Removal of Asbestos* sets out the requirements for the safe removal from workplaces of materials containing asbestos.

These documents can be found on the Safe Work Australia (SWA) website, [www.safeworkaustralia.gov.au](http://www.safeworkaustralia.gov.au)

### **5.7.3 Asbestos licensing system**

Without a licence from WorkCover, it is illegal to work with bonded asbestos that is above a certain threshold limit. The threshold limits are outlined on [www.workcover.nsw.gov.au](http://www.workcover.nsw.gov.au)

Working with bonded materials containing asbestos above the legislated threshold limit requires a person to be licensed. WorkCover's licensing system is implemented to protect asbestos removal workers, building occupants and the public by ensuring that contractors have the appropriate skills, training and experience in asbestos removal work to prevent occupational and environmental contamination.

Where bonded asbestos work above the threshold limit is undertaken, WorkCover must be notified. This notification system allows WorkCover to monitor asbestos removal projects on a job-by-job basis, ensuring compliance with legislation and nationally-agreed work methods.

There are two types of licences for asbestos work:

- a. bonded asbestos licence
- b. friable asbestos licence.

Bonded asbestos is any asbestos containing material in a bonded matrix. It may consist of Portland cement or various resins or binders, and it cannot be crushed by hand when dry. If fire, hail or water-blasting damages bonded asbestos, or the material is showing signs of wear from water and age, it may become friable asbestos material.

Note: Water blasting of the surface of asbestos or material containing asbestos is illegal – see clause 259(6) of the OHS Regulation.

Friable asbestos is any asbestos containing material in a powder form, or material that can be crushed by hand when dry.

The removal of friable asbestos must only be undertaken by a WorkCover-licensed friable asbestos removalist. The removalist must also obtain a site-specific permit from WorkCover to carry out this type of work.

A person licensed for friable asbestos removal work does not need an additional licence for bonded asbestos removal work.

Further information about obtaining a licence for asbestos work can be found on [www.workcover.nsw.gov.au](http://www.workcover.nsw.gov.au)

## **5.8 MANUAL HANDLING**

### **5.8.1 Risk assessment**

Manual handling tasks include a wide range of activities that require a person to use their body to perform work. These include work that involves the use of force for lifting, lowering, pushing, pulling, carrying, moving, holding or restraining any person, animal or item. Manual handling at work can involve repetitive actions, sustained postures and exposure to vibration.

Most jobs involve some aspect of manual handling. Not all manual handling tasks are hazardous. However, almost half of all workplace injuries occur as a result of manual handling.

The OHS Regulation requires employers to design all objects, work practices and work environments so that manual handling risks are eliminated or controlled, as far as reasonably practicable.

An employer must assess the risks involved in carrying out manual handling tasks and then implement appropriate control measures. This must be done in consultation with those workers who are required to carry out the manual handling tasks, and the risks and the control measures should be included in the SWMS.

Risk assessment for manual handling tasks must take into consideration the following factors (if relevant):

- a. actions and movements, including repetitive actions and movements
- b. workplace and workstation layout
- c. working posture, position and balancing items
- d. duration and frequency of manual handling
- e. location of loads and distances moved
- f. weights and forces
- g. characteristics of loads and equipment
- h. work organisation
- i. work environment
- j. skills and experience
- k. age
- l. clothing
- m. special needs (temporary or permanent)
- n. any other factors considered relevant by the employer, the workers or their representatives on health and safety issues.

### **5.8.2 Controlling risks**

Where the nature of manual handling tasks is constantly changing, the risk assessment and control process, and training, should be conducted on an ongoing basis. Guidance on identifying, assessing and controlling manual handling risks can be found in the *National Code of Practice for the Prevention of Musculoskeletal Disorders from Performing Manual Tasks at Work* (August 2007).

If it is not reasonably practicable to eliminate the risk arising from manual handling, an employer must design the work activity to control the risk and, where necessary, they must:

- a. modify the design of the objects to be handled or the work environment (to the extent that it is under the employer's control), taking into account work design and work practices
- b. provide mechanical aids or make arrangements for team lifting, or both – as far as reasonably practicable, an employer must achieve risk control by means other than team lifting
- c. ensure that the persons carrying out the activity are trained in manual handling techniques, correct use of mechanical aids and team lifting procedures, appropriate to the activity.

Examples of possible controls include:

- using pallets and bulk-handling systems
- purchasing materials in lighter containers
- minimising double-handling by better placement of materials
- using waist-height storage areas
- using work platforms that minimise extensive reaching
- introducing modifications that reduce lifting, twisting, slips and trips
- rotating tasks to avoid prolonged repetition of manual handling tasks.

### **5.8.3 Mechanical lifting equipment**

Where appropriate, mechanical lifting equipment – eg cranes, elevating work platforms, tile elevators and builders' hoists – should be provided in order to minimise the risk of manual handling injuries.

If tile elevators or builders' hoists are used, consider the risk of:

- a. manual handling injuries during installation and removal of cladding
- b. injuries from unguarded drive mechanisms or nip points on elevator belts
- c. injuries from falling objects or from moving machine parts – barricades to prevent access should be used.

When using, installing or removing mechanical lifting equipment, effective roof-edge protection should be maintained. If parts of the edge protection are removed, alternative protection measures should be provided and the removed components should be replaced as soon as the equipment is installed or no longer required.

An appropriate certificate of competency is often required by anyone operating plant, such as builders' hoists and elevated work platforms.

## **5.9 FALLING OBJECTS**

Clause 57 of the OHS Regulation requires employers to ensure that risks associated with falling objects are controlled by the use of:

- a. a safe means of raising and lowering plant, materials and debris in the workplace
- b. a secure physical barrier to prevent objects falling freely from buildings or structures in, or in the vicinity of, the workplace
- c. measures to arrest the fall of objects, if it is not possible to provide a secure physical barrier
- d. appropriate PPE.

Measures to prevent falling objects should be implemented when:

- e. apertures in the safety mesh allow material to fall through
- f. there is a gap between the top of the roof cladding and the bottom of a toe-board or infill panel – eg to slide roof cladding onto the roof
- g. working from elevated structures, such as working platforms, formwork, ladders or scaffolding.

Controls that can reduce the risk of objects falling from heights include:

- h. modifying the design – eg toe-boards, chutes, splash plates
- i. prohibiting work above other workers
- j. installing screens, overhead protection, protected walkways
- k. isolating danger areas as 'no-go' zones
- l. housekeeping floors and access ways, cleaning spillage, using lanyards on tools
- m. providing appropriate training.

## 5.10 ELECTRICAL SAFETY

### 5.10.1 Work in close proximity to overhead powerlines

The OHS Regulation outlines specific safety measures that must be complied with when carrying out work in close proximity to overhead powerlines, including a written risk assessment and a safe system of work.

All work near overhead powerlines should conform to the recommendations and guidance provided in the *Code of Practice for Work Near Overhead Powerlines*.

Overhead powerlines located near the worksite are a potential hazard to those working on roofs. Where low voltage (below 1000 volts ac or 1500 volts dc) powerlines are in close proximity, the following approach distances should be observed:

- a. four metres where any conductive metal material or scaffolding is being handled
- b. 1.5 metres where only non-conductive material, such as dry timber battens, is being handled.

### 5.10.2 Hazard identification

Before undertaking any work that might come closer than the approach distances in 5.10.1, an inspection must be carried out at the worksite and reasonable care taken to identify any potential hazards. Hazards may include:

- a. live overhead powerlines, including low voltage overhead service lines and aerial consumers' mains
- b. deteriorated or broken insulation on the conductors or electrical apparatus
- c. scaffolding coming into contact with overhead powerlines
- d. the possibility of hand-held tools, equipment or roofing materials coming into contact with overhead powerlines
- e. the possibility of cranes, crane ropes or suspended loads coming into contact with overhead powerlines – eg while lifting roofing material.

### 5.10.3 Risk assessment

If a hazard involving overhead powerlines has been identified, a written risk assessment must be undertaken by the employer to determine the risk to those encroaching within the approach distances in 5.10.1. This will help to determine the level of risk associated with the identified hazards and establish a priority list based on the level of risk.

The following factors may be included in the risk assessment:

- a. the type of work activities being undertaken, and the tools, equipment, scaffolding and roofing materials being used
- b. the proximity of the work activity or scaffolding to the overhead powerlines
- c. environmental conditions, such as wind, which may bring a risk of unexpected movement of the roofing material, tools, equipment or scaffolding.

#### 5.10.4 Eliminating or controlling risks

Once the hazards associated with working on roofs near overhead powerlines have been identified and assessed, control measures must be implemented to eliminate the risk. If it is not practicable to do so, the risks must be controlled.

The use of specific control measures to eliminate or control identified risks should be done on the basis of the risk assessment. In particular, consider:

- a. eliminating the hazard – this could involve de-energising the overhead powerlines during the work, following consultation and agreement with the electricity network operator. Consideration may also be given to re-routing the overhead powerlines from the roofing work, or replacing existing overhead powerlines with underground cables
- b. separating the hazard – this could involve erecting a physical barrier on the roof to prevent someone (or something) encroaching within the approach distances in 5.10.1
- c. minimising the risk by engineering means – this could involve substituting the scaffold with another means of access and egress, such as an elevated work platform
- d. introducing administrative controls – this could involve planning and, where relevant, documenting the SWMS before starting work, using a safety observer to warn people before they encroach within the approach distances of 5.10.1 or making the hazard visible by arranging for the electricity network operator to identify exposed live low voltage conductors (up to and including 1000 volts ac) by using approved visual indicators, such as ‘tiger tails’ (tiger tails should not be regarded as providing protection from electrical hazards)
- e. using appropriate PPE.

If no single measure is sufficient, a combination of the above control measures is required so as to minimise the risk to the lowest level reasonably practicable.

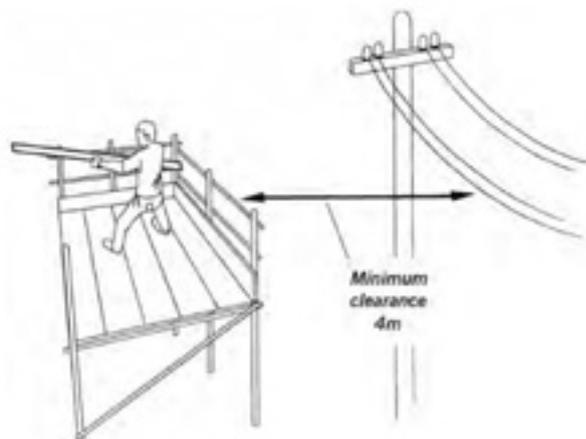


Figure 10: A four-metre distance applies in any direction where metallic scaffold is erected, used or dismantled near overhead powerlines (end protection omitted for clarity) Consideration must also be given to the sag and swing of the conductors.

### 5.10.5 Electrical practices for roofing work

Employers should ensure that temporary construction wiring, switchboards and portable electrical equipment used in roofing work complies with the *Code of Practice for Electrical Practices for Construction Work*. This code outlines specific safety measures that should be followed when carrying out construction work, including:

- a. ensuring that temporary construction site switchboards are of a robust design, mounted securely and constructed from materials able to withstand mechanical damage
- b. protecting all temporary construction wiring and portable electrical equipment by 30 mA residual current devices (RCDs)
- c. ensuring portable electrical equipment, extension leads and portable power tools are maintained in good condition and regularly inspected, tested and tagged.
- d. ensuring extension leads – where linked together, used outdoors or on metal roofs – are protected, by design or enclosure, against separation of the plug and socket, or the ingress of water

Maximum length of single phase cord extension set		
Current rating (A)	Conductor size (mm <sup>2</sup> )	Maximum length (metres)
10	1.0	25
	1.5	35
15/16	1.5	25
	2.5	40
20	2.5	30
	4.0	50

**Note:** lengths quoted for flexible cords are taken from AS/NZS 3199 and are based on a voltage drop of 5% of 230V at rated current for the conductor size.

For further information, see the *Code of Practice for Electrical Practices for Construction Work*.

### 5.11 PERSONAL PROTECTIVE EQUIPMENT

Note: Fall arrest systems are covered under 5.5.

The use of PPE to control risks is lowest on the hierarchy of control measures – see 3.2.1. The measures at the lower levels of the hierarchy are less effective and require more frequent reviews of the hazards and systems of work. They should only be used when other control measures are impracticable, or where a residual risk exists after implementing other controls.

### 5.11.1 Provision of PPE

#### **Clause 15 of the OHS Regulation requires PPE to be provided to workers**

The employer (or self-employed person) must provide each person at risk with PPE and ensure that:

- a. the equipment provided is appropriate for the person and controls the risk for that person
- b. the person is informed of any limitations of the equipment
- c. the person is provided with the instruction and training necessary to ensure that the equipment controls the risk for the person
- d. the equipment is properly maintained, and is repaired or replaced as frequently as is necessary, to control the risk for the person
- e. the equipment is provided in a clean and hygienic condition to the person
- f. the equipment is stored in a place provided by the employer for that purpose
- g. areas in places of work where PPE must be used are clearly identified.

### 5.11.2 PPE selection and suitability

Where PPE is to be used, it should be appropriate for the risk and should conform to the relevant Australian Standard. PPE should be selected by a competent person and inspected and maintained according to the manufacturer's recommendations. There should be sufficient supervision and monitoring conducted to ensure PPE is used and that workers are competent in its use.

PPE that may be required for roof work includes:

- a. fall arrest equipment – fall arrest harnesses, lanyard assemblies and associated equipment should be comfortable, protect the wearer, allow freedom of movement, and permit access to all areas where work is required
- b. footwear – rubber-soled shoes with herringbone, non-slip tread are recommended for work on roofs; footwear should have good grip, be flexible, and allow the wearer to 'feel' the roof. This footwear may not be suitable for use in other work areas
- c. eye protection – dust, flying objects and sunlight are the most common sources of eye damage in construction work. When someone is carrying out welding, cutting, grinding or chipping of concrete or metal, they should be provided with eye protection that conforms to AS/NZS 1337 *Eye protectors for industrial applications*. Eye protection should also be provided when carrying out other work, such as carpentry or handling chemicals, where there is a risk of eye injury. Selection, use and management systems should conform to AS/NZS 1336 *Recommended practices for occupational eye protection*
- d. protection from sun – use a sunscreen with an SPF (sun protection factor) rating of at least 30+, and wear a hat, long-sleeve shirt and trousers. Ensure exposed parts of the body are adequately covered with sunscreen, supervise and monitor workers so they are not exposed to extensive periods of sunlight or reflections from glazed tiles and metal roofing materials, and implement administrative control measures, such as starting and finishing work early.

### 5.11.3 Clothing

Clothing should be comfortable, suitable for the work, and appropriate for the weather conditions. Avoid loose clothing that may snag or create a trip hazard.

## 6. DEFINITIONS

Definitions are usually taken from the OHS Act, the OHS Regulation, or from other relevant legislation, codes of practice or Australian Standards. For current legal obligations, a person should always refer to the relevant legislation.

**anchorage point** – a secure point of attachment on a structure to which a fall arrest device or anchorage line may be secured, or a secure point on a fall arrest device to which a lanyard may be secured.

**anchorage line** – a line that extends from a fixed anchor, to which a person attaches their fall arrest equipment.

**commercial and industrial buildings** – all buildings except residential buildings (see 'residential buildings').

**competent person** – for any task, a person who has acquired through training, qualification or experience, or a combination of these, the knowledge and skills to carry out that task.

**construction work** –

- a. excavation, including the excavation or filling of trenches, ditches, shafts, wells, tunnels and pier holes, and the use of caissons and cofferdams
- b. building, including the construction – and the manufacturing of prefabricated elements of a building at the place of work concerned – alteration, renovation, repair, maintenance and demolition of all types of buildings
- c. civil engineering, including the construction, structural alteration, repair, maintenance and demolition of airports, docks, harbours, inland waterways, dams, river, avalanche and sea defence works, roads and highways, railways, bridges and tunnels, viaducts, and works related to the provision of services such as communications, drainage, sewerage, water and energy supplies.

**contractor** – the person or entity responsible for the installation, maintenance, repair or removal of the roof coverings and any other operation involving the movement of those working on roofs on commercial and industrial buildings (depending on the contractual arrangements that are in place, the contractor doing the work may be an employer, self-employed person or the principal contractor).

**controller of premises** – a person who has control of premises that are used by people as a place of work, including a person who has only limited control of the premises and a person who has, under any contract or lease, an obligation to maintain or repair the premises (in which case any duty imposed on a controller under the OHS Act or OHS Regulation applies only to the matters over which the person has control).

**employee** – a worker; an individual who works under a contract of employment or apprenticeship.

**employer** – a person who employs people under contracts of employment or apprenticeship; may include a self-employed person. In some parts of the OHS Regulation the term 'employer' also refers to a self-employed person in terms of their duties to other persons.

**energy absorber** – a component, whether separate or incorporated into another item, designed to be used in connection with fall arrest equipment, that reduces the shock to the body and anchorage point by absorbing some of the fall energy.

**fall arrest device** – a self-locking device with the function of arresting a fall. It can be either:

- a. type 1 – a fall arrest device that travels along an anchorage line and, when loaded, locks to the line
- b. type 2 – a fall arrest device from which a spring-loaded anchorage line pays out, and which locks when loaded.

**fall arrest harness** – also known as a ‘safety harness’, an assembly of interconnected shoulder and leg straps designed for attachment to a lanyard or fall arrest device.

**fall arrest system** – a system consisting of a fall arrest harness and other components connecting the harness to an anchor point to minimise the distance and severity of a fall.

**fall restraint** – a system that incorporates a safety line secured to an anchorage that prevents a person from reaching the edge of the roof or a defined opening within it.

**guardrail system** – a structural roof edge protection system that may comprise posts, rails, infill panel or toe-boards, or a combination of these, that is designed to prevent persons falling from the edge of a roof.

**high risk construction work** –

- a. construction work involving structural alterations that require temporary support
- b. construction work at a height above three metres
- c. construction work involving excavation to a depth greater than 1.5 metres
- d. demolition work for which a licence is not required under chapter 10 of the OHS Regulation
- e. construction work in tunnels
- f. construction work involving the use of explosives
- g. construction work near traffic or mobile plant
- h. construction work in or around gas or electrical installations
- i. construction work over or adjacent to water, where there is a risk of drowning.

**inertia reel** – a type 2 fall arrest device.

**infill panel** – a panel, typically fabricated from steel wire mesh and connected to the top rail of an edge protection system, used in place of a mid-rail and bottom rail or toe-board. It can be a structural panel, which does not require backing rails to transfer loads to its supporting posts, or a non-structural panel, which does require backing rails.

**lanyard** – a flexible line, rope or strap, usually as part of a lanyard assembly, used to connect a fall arrest harness to an anchorage point or static line.

**lanyard assembly** – the combination of a lanyard and a personal energy absorber.

**must** – indicates that the requirements are mandatory under OHS legislation.

**person** – an individual, a corporation, a body corporate or politic.

**place of work** – premises where people work.

**premises –**

- any land, building or part of any building
- any vehicle, vessel or aircraft
- any installation on land, on the bed of any waters or floating on any waters
- tent or moveable structure.

**principal contractor** – in relation to construction work – or a construction project involving construction work – a person who is, under clause 210 of the OHS Regulation, for the time being, appointed, or taken to be, the principal contractor for the construction work. Where construction work is being undertaken and the owner has not appointed a principal contractor, the owner is taken to be the principal contractor for the construction work. Principal contractors have special duties under the OHS Regulation. The principal contractor is usually the main contractor – ie the contractor undertaking the construction works.

**OHS Act** – the *Occupational Health and Safety Act 2000*.

**OHS Regulation** – the *Occupational Health and Safety Regulation 2001*.

**owner** – a person who is the owner of a place of work and who is required by clause 210 of the OHS Regulation to appoint a principal contractor. For the purposes of clause 210, owner has the same meaning as in the *Local Government Act 1993*.

**residential building –**

- a. single dwelling house – a dwelling used, or adapted for use, solely for habitation by no more than one family, including a dwelling in a row of two or more dwellings attached to each other (but not a flat) that is commonly known as a semi-detached or terrace building
- b. residential flat building – a building containing two or more dwellings.

**rope-grab fall arrester** – reduces the potential free fall distance and may absorb much of the energy of a fall while allowing mobility along the line. The rope grab fall arrester can be manually moved along the line or locked in place, or it can be an automatic device.

**safety mesh** – a membrane installed between the roof structure and its cladding to safeguard those installing the cladding, or otherwise working on the roof.

**safe work method statement** – SWMS, a statement that:

- a. describes how work is to be carried out
- b. identifies the work activities assessed as having safety risks
- c. identifies the safety risks
- d. describes the control measures that will be applied to the work activities.

The SWMS also includes a description of the equipment used in the work, the standards or codes to be complied with, the qualifications of the personnel doing the work and the training required to do the work.

**scaffold** – a temporary structure specifically erected to support access or working platforms.

**self-employed person** – a person who works for gain or reward otherwise than under a contract of employment or apprenticeship, whether or not they employ others. In some parts of the OHS Regulation, ‘employer’ also refers to a self-employed person in terms of their duties to other persons.

**should** – indicates a recommendation to do something that is not a mandatory requirement under OHS legislation.

**site safety plan** – the site specific OHS management plan referred to in clause 226 of the OHS Regulation.

**static line** – also known as ‘horizontal lifeline’, a substantially horizontal line in tension, attached to two or more anchorage points to which a lanyard may be attached, and designed to arrest a fall.

**work** – work as an employee or self-employed person.

**worker** – any individual person who does work. See ‘employee’ and ‘self-employed person’.

## 7. FURTHER INFORMATION

### 7.1 WORKCOVER NSW PUBLICATIONS

- *Code of Practice for OHS Consultation*
- *Code of Practice for Electrical Practices for Construction Work*
- *Code of Practice for Occupational Health and Safety Induction Training for Construction*
- *Code of Practice for Work Near Overhead Powerlines*
- *Code of Practice for Risk Assessment*
- *Portable ladders*
- *Working with asbestos*
- *Working off stepladders*
- *Skin cancer and outdoor workers – a guide for workers*
- *Skin cancer and outdoor workers – a guide for employers.*

### 7.2 SAFE WORK AUSTRALIA PUBLICATIONS

The below publications marked † are referred to in the OHS Regulation and must be complied with. Those marked ‡ are called up under the OHS Act as an industry code of practice.

- *Code of Practice for the Safe Removal of Asbestos*
- *Code of Practice for the Management and Control of Asbestos in the Workplace*
- *Guidance note on the membrane filter method for estimating airborne asbestos fibres*
- SWA publications can be downloaded from [www.safeworkaustralia.gov.au](http://www.safeworkaustralia.gov.au)

### 7.3 AUSTRALIAN STANDARDS

The standards listed below are referred to in this Code. Readers should refer to the latest version of a standard, where necessary, to ensure compliance with their regulatory obligations or to obtain advice in helping to establish a safe workplace.

- ‡ AS 1337 *Eye protectors for industrial applications*
- † AS/NZS 1576 *Scaffolding: General requirements*
- ‡ AS 1657 *Fixed platforms, walkways, stairways and ladders – Design construction and installation*
- ‡ AS 1891.1 *Industrial fall arrest systems and devices Part 1 – Safety belts and harnesses*
- ‡ AS/NZS 1891.2 *Industrial fall arrest systems and devices Part 2 – Horizontal lifeline and rail systems*
- ‡ AS 1891.3 *Industrial fall arrest systems and devices Part 3 – Fall arrest devices*
- ‡ AS 1891.4 *Industrial fall arrest systems and devices Part 4 – Selection, use and maintenance*
- AS 1892.5 *Portable ladders Part 5 – Selection, safe use and care*
- AS 2210 *Occupational protective footwear – Guide to selection, care and use*
- AS/NZS 4389 *Safety mesh*

- AS 4994.1 *Temporary edge protection Part 1 – General requirements*
- AS 4994.2 *Temporary edge protection Part 2 – Roof edge protection – Installation and dismantling*
- AS 2550.10 *Cranes, hoists and winches – Safe use Part 10 – Mobile elevating work platforms*

# APPENDIX A: SAFE WORKING ON ROOFS – HAZARD CHECKLIST

This checklist helps identify the hazards associated with carrying out work on roofs of commercial and industrial buildings. It covers the main topics outlined in this Code, but does not cover all risks associated with working on roofs.

A tick in any 'No' box indicates that further measures may be required to eliminate or control the risk.

<b>Site address:</b>
<b>Principal contractor:</b>
<b>Roofing contractor:</b>
<b>Site supervisor:</b>

Hazards and control measures	Checked OK
Has a perimeter scaffold or guardrail system been installed?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using scaffolding or a guardrail system, has it got guardrails, mid-rails and toe-boards, or guardrails and infill screens with kick plates?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using scaffolding or a guardrail system on a roof with a pitch greater than 26 degrees, does it have infill panels?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using scaffolding, does it conform to AS/NZS 1576?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using scaffolding, is the platform one metre or less below the edge of the roof?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If the scaffolding's platform is more than four metres above the surrounding ground, has it been erected by a certified scaffolder?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using a guardrail system, is it appropriate for the type of roof?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If not using scaffolding or a guardrail system, are the reasons why it is impracticable to do so recorded?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using a fall arrest system, have the anchorage points been inspected by a competent person?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using a fall arrest system, has a safe system for attaching to and detaching from the anchorage points been established?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using a fall arrest system, have all relevant personnel been trained in its use?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using a fall arrest system, has a rescue procedure for falls been established?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Is safety mesh being used?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If safety mesh is being used, has the supplier of the safety mesh provided all relevant information regarding its correct usage?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Is the safety mesh appropriate for the roof?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Have those installing safety mesh been trained in its installation?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Are those installing safety mesh safeguarded against the risk of falling?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Has the safety mesh been certified as being installed correctly?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If using existing safety mesh has it been inspected to ensure that it will withstand someone falling on it?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If the roof structure requires modification or bracing to support the safeguards identified in the SWMS, has it been so modified?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Is there a safe system of roof access and egress that reduces the risk of slips, trips and falls?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Are ladders properly set up and secured?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Are there clearly defined unloading and storage areas for the delivery and removal of materials and plant?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If mechanical lifting equipment is not used to transport material to the roof, is there a system that controls manual handling risks?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If a crane or builders' hoist is used, is the operator certified?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Does the builders' hoist conform to AS 1418.7?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>

Does the crane conform to AS 1418.4 for tower cranes or AS 1418.5 for mobile cranes?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Are appropriate warning signs (eg 'Persons working above', 'Nail gun in use', 'Elevator in use') displayed in a prominent position?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Have designated no-go zones been cordoned off – eg areas beneath the tile elevator?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If there are electrical hazards within four metres of the roof, have power sources been disconnected, insulated or otherwise made safe before proceeding with roof work?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Has induction training been provided to new workers?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Are procedures in place to discontinue work if inclement weather renders roof work dangerous?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Have manual handling risks been identified and relevant control measures been put in place?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Has a residual current device been attached to the leads or power source for portable electric power-tools? (This is particularly important when leads are being dragged over sharp-edged metal roofs.)	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If asbestos is being handled, have all the necessary precautions been implemented?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Have workers been provided with the appropriate PPE and the training to properly use it?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
Is waste material isolated and contained for safe removal from the site?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If working near electromagnetic energy-emitting devices such as mobile phones, microwaves and commercial antennas, have safety distances been established or other appropriate control measures been put in place?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>
If water cooling towers are installed on the roof, is there a system in place to control biological agents – eg bacteria – in the tower?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/a <input type="checkbox"/>

Checklist completed by (print name) \_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

**If NO is indicated, take action to eliminate or control the hazard.**

## APPENDIX B: ROOF SAFETY MESH HANDOVER AND ROOF ACCESS CERTIFICATE

Project name: \_\_\_\_\_

Location: \_\_\_\_\_  
(Address and sub-site)

Mesh installer: \_\_\_\_\_ Roof section: \_\_\_\_\_

**To be completed by the roof contractor**

<p><b>Mesh criteria</b> Do the safety mesh materials comply with the performance requirements of AS/NZS 4389:1996?</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>Material certification</b> Test certificate for the mesh attached Manufacturer's label or equivalent attached</p>	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>Placement of mesh</b> Has the safety mesh been installed in accordance with AS/NZS 4389:1996? If not, has the safety mesh been installed in accordance with the manufacturer's recommendations?</p>	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>Do the side laps comply with the following?</b> The runs of safety mesh are side lapped by at least 150 mm or as per the manufacturer's recommendations. (The width of side lap does not usually depend on the purlin spacing.)</p> <p><b>OR</b> If purlin spacing is 1700 mm or higher, the side laps are joined together at locations between the purlins (using 2 mm staples, twitching, tying, etc) as per the manufacturer's recommendations.</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>  Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>Do the end joins comply with the following?</b> The mesh is fixed to metal purlins and joined by passing each longitudinal wire through a hole drilled in the top of the purlin and tying it off with at least four full turns around the wire.</p> <p><b>OR</b> The mesh is fixed as per the longitudinal wire joining method without fixing to purlins.</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>  Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>Roof guardrail installed in accordance with AS 4994.2</b></p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><b>Roof access installed</b></p>	Yes <input type="checkbox"/> No <input type="checkbox"/>

Comments

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_ Position: \_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Roof access

To be completed by a nominated representative of the principal contractor or the controller of the premises.

***The information above has been received and sighted and access is granted to the following section of roof:***

(Refer to grid and other limitations to define approved area of access)

---

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Comments

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Name: \_\_\_\_\_ Position: \_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_\_









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