Incolink

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Health and Safety Handbook for the Building and Construction Industry

Last revised and printed: March 2025

This *2025 Health and Safety Handbook* is intended solely for use within the Victorian Construction Industry and is not applicable in any other state or territory of Australia.

The information contained herein is current as at March 2025.

Any legislative or regulatory changes made after this date are not reflected in this Handbook. Users are advised to consult the latest legislative and regulatory updates and seek professional advice to ensure compliance with current legal requirements. By using this Handbook, users acknowledge and accept that it is their responsibility to verify the accuracy and applicability of the information to their specific circumstances.

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EMERGENCY CONTACTS

WorkSafe Victoria 24 hr Emergency Response Advisory Service Line	**132 360** **1800 136 089**
Police, Fire, Ambulance (From a mobile phone)	**000** **112**
Energy Safe Victoria City Southbank Office Free Call	 **9203 9700** **1800 800 158**
Victorian State Emergency Service (Flood and Storm Emergencies) Information on emergencies Administration www.ses.vic.gov.au	 **132 500** **1800 226 226** **9256 9000**
Victorian Bushfire Information Line	**1800 226 226**
Traffic Hazards and Freeway Conditions	**13 11 70**
Fire Brigade **Severe Flooding** e.g. water main ruptures	**000**
Gas Emergency Call WorkSafe Advisory Service Line	**1800 427 532**
Dangerous Goods	**1800 136 089**
Poisons Information Centre	**13 11 26**
Gas Emergencies General AusNet Australian Gas Networks Multinet Gas	**1800 427 532** **136 707** **1800 427 532** **132 691**
Electrical emergencies General CitiPower Powercor AusNet Services Jemena United Energy	**1800 000 922** **131 280** **132 412** **131 799** **131 626** **132 099**

ACKNOWLEDGMENTS

In the preparation of this 2025 edition of the Health and safety handbook funded by Incolink (The Redundancy Payment Central Fund Ltd), the efforts of the following members of the Incolink Insights Committee were greatly appreciated:

UNIONS	EMPLOYER ASSOCIATIONS
Dr. Gerry Ayers and Liam O'Hearn (CFMEU)	**Samuel Smith** (MBAV)
Chris Giblin and Steve Rocco (PPTEU)	**Zane Martin** (Master Plumbers Association)
Alex Del Grosso (ETU)	**Alex Del Grosso** (ETU)
Sarah Ross (AMWU)	**Simon Mossman** (CCF Vic)

INCOLINK
Benjamin Maxfield Alexander Bourjaili Megan Veness

CONSULTANT
Fergus Robinson

CONTACTS

INCOLINK

INCOLINK VICTORIA

Melbourne
General enquiries: 1800 337 789
Office contact: (03) 9639 3000
Counselling: 1300 000 129
Multi-lingual enquiries:
1300 462 654
Email: support@incolink.org.au
Office: 1 Pelham Street,
Carlton, VIC, 3053

INCOLINK NEW SOUTH WALES

Sydney
General enquiries: 1800 337 789
Multi-lingual enquiries:
1300 462 654
Email: support@incolink.org.au
Office: 56 Harris Street,
Pyrmont, NSW, 2009

INCOLINK SOUTH AUSTRALIA

Adelaide
General enquiries: 1800 337 789
Counselling: 1300 000 129
Multi-lingual enquiries:
1300 462 654
Email: support@incolink.org.au
Office: 2-3 Greenhill Road,
Adelaide, SA, 5000

VICTORIAN CONTACTS

Worksafe Victoria
Ph: 1800 136 089
24/7 emergencies: 13 23 60
Email: info@worksafe.vic.gov.au
www.worksafe.vic.gov.au

Energy Safe Victoria
City Southbank Office
Ph: (03) 9203 9700
Ph: 1800 800 158
Email: info@energysafe.vic.gov.au

EPA
Ph: 1300 372 842
Email: contact@epa.vic.gov.au

Dial Before You Dig
Ph: 1100
www.1100.com.au

Master Builders Association of Victoria
Ph: (03) 9411 4555
Email: mbassist@mbav.com.au

CFMEU VIC
Ph: (03) 9341 3444
Email: vicqueries@cfmeu.org

Master Plumbers and Mechanical Services Association of Australia
Ph: (03) 9329 9622
Ph: 1800 133 871
Email: membership@plumber.com.au

AMCA
Ph: 1300 475 615
Ph: (03) 8831 2800

NECA
Ph: 1300 300 031
Email: necavic@neca.asn.au

CEPU Plumbing Division
Ph: (03) 9662 3388
Email: info@ppteu.asn.au

ETU
Ph: (03) 8329 0000
Freecall: 1800 134 835
Email: etu.members@etuvic.com.au

AMWU
Ph: 1300 732 698
Ph: (03) 9230 5700
www.amwu.org.au

SOUTH AUSTRALIAN CONTACTS

SafeWork South Australia
Ph: 1300 365 255
Emergencies: 1800 777 209

Master Builders Association of South Australia
Ph: (08) 8211 7466
Email: reception@mbasa.com.au
www.mbasa.com.au

AMCA
Ph: 1300 475 615

NECA
Ph: (08) 8272 2966
Email: neca@necasa.asn.au

CFMEU South Australia
Ph: (08) 8231 5532
Email: saqueries@cfmeu.org

CEPU
Ph: (08) 8234 2130

NEW SOUTH WALES CONTACTS

SafeWork NSW
Ph: 13 10 50
Email: contact@safework.nsw.gov.au

Master Builders Association of NSW
Ph: (02) 8586 3555
Ph: 1800 622 679
Email: enquiries@mbansw.com.au

AMCA
Ph: 1300 475 615
Ph: (02) 8458 3330

NECA
1300 361 099
Email: member.services@neca.asn.au

CFMEU NSW
Ph: (02) 9749 0400

CEPU Plumbing Division NSW
Ph: (02) 9310 3411
Email: officeadmin@nswplumbersunion.com.au

ETU
Ph: (02) 9267 4844
Email: etunsw@etunsw.asn.au



Introduction

The 2025 Health and Safety Handbook is a collaboration between building and civil construction industry employer associations and the respective trade unions.

It has been designed to provide workers with a common set of basic safety requirements applicable to all sites, regardless of their size.

The Handbook lays down the basic principles for working safely on building and construction sites.

The objective of this Handbook is to assist employers and workers to work together in establishing and maintaining safe construction sites, free from injuries and disease.

The information in this Handbook – which deals with hazards which potentially produce high levels of risks – offers the appropriate safety measures to control the hazards and minimise the risk.

The control measures identified in the Handbook should be incorporated in "Safe Work Method Statements" (SWMS) developed for particular High Risk work tasks.

The Handbook can be used as an adjunct to general industry and site-specific inductions. It is also a useful reference for supervisors, Health and Safety Representatives and employees in determining appropriate standards of safety.

Parties should consider referencing the Health and Safety Handbook in Certified Agreements as an appropriate guide for safety management and control of risks.

Adequate and appropriate consultation during the production of the Health and Safety Handbook has ensured that the content and substance of the document will remain valid and relevant despite any regulatory legislative changes which may come into effect.

Addendum and special note

In January 2012, the Model Work Health and Safety Act (WHS) and Regulations were introduced under the auspices of Safe Work Australia as a national OHS Harmonisation initiative. A number of Australian States have adopted this new legislative /regulatory package – which includes national model codes of practice.

However, the State of Victoria has continued to retain its existing OHS legislative and regulatory framework – the OHS Act 2004, OHS Regulations 2017 and associated compliance codes.

Link to Safe Work Australia model laws and codes of practice: www.safeworkaustralia.gov.au





PART 1:

Safety responsibilities and organisation on site

What an employer must provide for employees

The Victorian Occupational Health and Safety Act 2004 requires employers to provide and maintain so far as is reasonably practicable a working environment that is safe and without risks to health.

This includes requirements to:

- Provide and maintain plant that is safe to use.
- Provide and maintain safe systems of work.
- Provide safe arrangements for the use, storage and transport of plant and (hazardous) substances.
- Maintain the workplace in a condition that is safe and without risks to health.
- Provide adequate information on hazards, as well as instruction, training and supervision to enable employees to work safely.
- Provide adequate amenities/facilities to the standard described in WorkSafe's Compliance Code Facilities in Construction Edition 1 March 2018.
- Monitor the health of employees.
- Monitor conditions at the workplace.
- Provide information in languages other than English where appropriate.
- Keep information and records on the health and safety of employees.
- Obtain OHS advice from people who are qualified in OHS.

Under Part 4 of the Act, employers must also consult with employees regarding health and safety, involving Health and Safety Representatives (HSRs) where they exist.

Employers must make sure these health and safety requirements are available for their employees, regardless of which site they are working on, or who has control of the site.

References:

- Victorian Occupational Health and Safety Act 2004 https://content.legislation.vic.gov.au/sites/default/files/2024-03/04-107aa044-authorised.pdf
- Victorian Occupational Health and Safety Regulations 2017 https://content.legislation.vic.gov.au/sites/default/files/2024-11/17-22sra016-authorised.pdf
- AS/NZS 4804 Occupational health and safety management systems - General guidelines on principles, systems and supporting techniques
- AS/NZS ISO 45001 Requirements with guidance for use Occupational health and safety management systems - Requirements with guidance for use https://saiassurance.com.au/iso-45001
- Safe Work Australia Construction Work Code of Practice November 2024 https://www.safeworkaustralia.gov.au/sites/default/files/2024-11/model_code_of_practice-construction_work-nov24.pdf

What is expected of employees

Under Victorian OHS Legislation employees must:

- Take reasonable care for their own health and safety.
- Ensure that their actions don't endanger other persons.
- Cooperate with their employers with any action they take to comply with the OHS Act or Regulations.

Above all, at the end of the day workers should be able to go home safely to family and friends.

Reference:

- Victorian Occupational Health and Safety Act 2004 -Division 4- Duties of employees https://content.legislation.vic.gov.au/sites/default/files/2024-03/04-107aa044-authorised.pdf

What is expected of all site personnel

Site rules and behaviour

All site personnel are expected to maintain an acceptable civilised standard of behaviour while at work and to treat all other personnel with dignity and respect.

In particular, unacceptable behaviour that will not be tolerated includes:

- the taking of, or being under the influence of drugs or alcohol
- engaging in violence of any kind
- bullying, pranks or horseplay
- sexual harassment; or
- racial vilification.

Breaching these rules can result in disciplinary proceedings, prosecution and fines.

If site personnel are subjected to any of the above, it should be reported straight away to site management and to the Health and Safety Representative.

Psychosocial hazards

Psychosocial hazards are work-related factors with potential to cause harm, such as bullying, sexual harassment, aggression or violence and exposure to traumatic events.

In NSW, the Work Health and Safety Amendment Regulation 2022, specifically Division 11, mandates the management of psychosocial risks in the workplace by defining psychosocial hazards and risks, and clarifying the control measures required.

Note: The Victorian Government has confirmed new psychological health regulations will be introduced by the end of the year 2025.

The new Occupational Health and Safety (Psychological Health) Regulations will put psychosocial hazards on the same footing as physical ones.

The new regulations will focus on risk management and create specific obligations for Victorian employers to identify and control psychosocial hazards in their workplaces.

A supporting compliance code will also be available to provide employers with practical guidance on how to meet their duties under the new regulations.

References:

- WorkSafe Victoria A guide for employers Preventing and managing work-related stress 2021 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2021-02/ISBN-Preventing-and-managing-work-related-stress-guide-2021-02.pdf
- Code of Practice Managing Psychosocial Hazards at Work SafeWork NSW May 2021 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0004/983353/Code-of-Practice_Managing-psychosocial-hazards.pdf

Responsibilities of site manager or principal contractor

The principal contractor (with the active cooperation of all parties on site) is responsible for providing and maintaining proper systems to ensure the safety of workers, visitors and the public. This includes establishing, prior to starting work on a site, systems and processes for:

- site amenities
- site security
- safe condition of site
- coordination of subcontractors and trade activities
- ensure Safe Work Method Statements are developed by the contractors responsible for High Risk Construction Work

- safe operation of plant
- safety supervision
- site safety inductions
- safety signs and notices
- records, registers and forms
- health and safety consultative arrangements.

The Site Manager is typically assigned responsibility for making sure that these measures are applied correctly to safeguard all site operations. The Principal Contractor may delegate these responsibilities to other members of the site team.

Reference:

- Victorian Occupational Health and Safety Act 2004 -Division 2–Main duties of employers https://content.legislation.vic.gov.au/sites/default/files/2024-03/04-107aa044-authorised.pdf

Construction industry basic induction training course

Construction industry basic induction training (White CIT Card) is compulsory under the Occupational Health and Safety Regulations 2017 (Vic) for anyone who is employed or engaged to preform construction work. Workers who have previously undertaken red card induction will be recognised as having met the requirements of the regulations. However, any worker who has been out of the industry for 2 years or more will have to undertake induction training again.

All workers will be required to carry a specified card as evidence that they have completed the construction industry basic induction training.

This basic induction training does not replace an employer's duty to provide site specific and task specific instruction, supervision and ongoing training.

Note: Victorian White CIT cards are recognised in all Australian states. Victoria recognises the authorised induction cards of all other states.

Site specific induction

What is a site-specific induction?

It is an introduction to the site to inform workers about site rules, safety procedures, and Safe Work Method Statements. The site-specific induction makes sure they understand them before starting work, rather than relying on them to "pick it up" as they go along. The initial site-specific induction should be followed by either task specific safety re-freshers or tool-box meetings to help employees work safely and efficiently.

What should the site-specific induction cover?

It should explain to all employees and subcontractors:

1. Site safety rules and policies (e.g. drugs and alcohol, smoking, bullying, horseplay etc).
2. Site amenities and welfare facilities.
3. Emergency evacuation.
4. Site specific hazards and control measures.
5. The requirements for Safe Work Method Statements (SWMS).
6. How safety issues and disputes are sorted out.
7. How to report safety hazards or unsafe work practices.
8. How to report, accidents, incidents, dangerous occurrences and notifiable incidents.
9. What employees should do if they are injured.
10. First aid provisions and WorkCover claims.
11. Details of employee representation on site (as per the OHS Act or a certified agreement).

Who should conduct the site-specific Induction?

The site-specific induction should be conducted by the site management and/or an authorised representative.

References:

- WorkSafe Victoria Construction induction training (white card) 2023 https://www.worksafe.vic.gov.au/construction-induction-training-white-card
- WorkSafe Victoria Sample checklist for site induction 2017 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Sample-site-induction-checklist-2017-06.pdf

Safety consultation and compliance

A healthier work environment and improved productivity can be achieved more easily when employers and employees work together, consult on hazards, discuss and find solutions to problems cooperatively.

Workplace safety consultation is achieved through involvement of employer and employee representatives in accordance with the **Victorian OHS Act 2004 Part 4 Section 35**.

Duty to consult

Employers with HSRs

The OHS Act states that "there is a duty for employers to consult with employees and Health and Safety Representatives on health and safety matters".

Note: Please refer to Section 35 of the OHS Act for the full text of this duty.

An employer needs to consult with the HSR:

- To identify and assess hazards or risks to health and safety in the workplace.
- Before making decisions to control risks to health and safety in the workplace.
- Before changes are implemented that may affect the health and safety of employees.
- Before policies and procedures are introduced.
- Before making decisions about facilities for the welfare of employees.

An employer telling the HSRs what will happen is not consultation.

Therefore, in consulting with HSRs an employer must:

1. **Share information with the HSR.** This information should be provided in a timely way so that the HSR has adequate time to consider the matter.
2. **Give the HSR a reasonable opportunity to express their views about the matter.** HSRs should be encouraged to ask questions, raise concerns, propose options, make recommendations and be part of the problem-solving process.
3. **Take the HSR's views into account.** The views, suggestions and concerns of the HSR must be taken into account by the employer before a final decision is made.

Employers with employees

Employers must consult with employees (including contractors and their employees) on the following matters which are likely to affect their employees' welfare, health or safety:

- Identifying or assessing risks and hazards at the workplace.
- Making decisions about the measures to control those risks.
- Making decisions about resolving health and safety issues.
- Results of any monitoring of a hazardous substance.
- Monitoring the health of employees.
- Providing information and training to employees.
- Determining membership of safety committee.
- Proposing changes to the workplace that may impact on health and safety.

Consultation must follow the process of:

a. sharing information
b. giving employees an opportunity to express their views; and
c. taking those views into account.

If workers are represented by a Health and Safety Representative, consultation must involve that HSR. The OHS Regulations specify how the HSR is to be involved. Where there are HSRs, the employer must:

- share information with the HSRs before other employee
- invite and meet with the HSRs
- give an opportunity for HSRs to express their views; and
- take their views into account.

References:

- WorkSafe Victoria Checklist for Health and Safety Consultation 2012 https://www.worksafe.vic.gov.au/resources/checklist-health-and-safety-consultation
- WorkSafe Victoria Consultation guide for employees 2024 https://www.worksafe.vic.gov.au/consultation-guide-employees
- WorkSafe Victoria Consultation guide for employers 2024 https://www.worksafe.vic.gov.au/consultation-guide-employers

Employer's representative

The principal contractor may nominate a member of its staff to act as the employer's representative who may also be the safety officer. This person will be responsible for managing safety on site and consulting with employees and their Health and Safety Representatives on all the above matters.

Reference:

- WorkSafe Victoria Employer Representative Competencies 1st Edition July 2005 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/employer_rep_comp.pdf

Designated work groups

Employees may ask their employer to establish Designated Work Groups (DWGs) in their workplace. Employees in a DWG share similar workplace health and safety concerns and conditions. They elect one or more HSRs and/or Deputy HSRs to represent them on health and safety.

An employer must ensure that a written list of each Health and Safety Representative and Deputy Health and Safety Representative for each Designated Work Group (if any) is prepared and kept up-to-date; and a copy of the list is displayed at each workplace under the management and control of the employer, or otherwise readily accessible to all employees of the employer.

Employee Health and Safety Representatives

The OHS Act 2004 recognises the important role of Health and Safety Representatives (HSRs) play in representing the health and safety interests of employees.

Health and Safety Representatives can:

- Be assisted by elected deputies and whenever necessary, seek the assistance of any person.
- Attend to safety issues raised by workers.
- Inspect the workplace.
- Accompany a WorkSafe Inspector.
- Be present at interviews and meetings concerning health and safety matters.

Health and Safety Representatives also have the power to: a) issue Provisional Improvement Notices (PIN) to ensure outstanding health and safety issues are rectified; and b) direct that work which involves an immediate threat to the health and safety of workers ceases. Under the OHS Act these powers can only be exercised by the HSR after proper consultation with the employer.

During any period for which work has ceased in accordance with such a direction, the employer may assign any employees whose work is affected, to suitable alternative work.

Employers should consult fully with Health and Safety Representatives at all stages of the job planning and encourage open and frank two-way communication and cooperation.

Where members of a DWG elect one of their own as their Health and Safety Representative, the employer must, if requested by an HSR, allow that HSR time off work with pay, to attend a WorkSafe approved training course. (This includes an initial OHS training course or a yearly refresher). This is provided that the request is made no less than 14 days before the course date.

All time spent attending a course by a HSR is treated as time at work and paid as if the HSR was at work.

It should be noted that the HSR or Deputy has the right to choose the course they want to attend, in consultation with the employer (section 67 of the Act), subject to the course being approved by WorkSafe.

Health and Safety Committee

The Health and Safety Committee provides a formal means of discussing and resolving health and safety issues. Where a Health and Safety Representative requests it, the employer is required to establish a Health and Safety Committee within three months. At least half the members of the Committee must be employees. Where there are HSRs or deputy HSRs, they will normally be the employee representatives.

The Health and Safety Committee can:

- Participate in regular formal site safety inspections.
- Review safe work method statements for scheduled high risk construction work (e.g. structural trades – where there is a risk of a person falling more than 2 metres).

- Assist the employer to monitor overall health and safety conditions on site.
- Develop safety policies and standards as issues arise on site.
- Ensure the Alcohol and Drug Policy is implemented.

Safety issue and disputes resolution

For OHS issues which may arise on sites, the procedure set out in the Issue Resolution Procedures (Part 2.2 of the Occupational Health and Safety Regulations 2017) – or any specific safety dispute resolution contained in certified agreements with equivalent fairness and employee involvement – must be followed.

Reference:

- WorkSafe Victoria Powers of Health and Safety Representatives 2019 https://www.worksafe.vic.gov.au/information-about-powers-health-and-safety-representatives

WorkSafe inspectors

WorkSafe inspectors are appointed under the Occupational Health and Safety Act 2004 to deal with health and safety issues.

WorkSafe inspectors are authorised to enter workplaces at any time and to issue whatever directions are necessary for them to carry out their functions. In this capacity they must take reasonable steps to make themselves known to the occupier and HSR.

WorkSafe inspectors can issue a direction to stop a person or persons working in a way that could endanger his or her life or the lives of other workers).

They are also authorised to:

- Issue Non-disturbance Notices – to ensure that particular parts of the site being investigated by inspectors (including plant equipment and substances) are not interfered with or subject to disturbance.
- Issue Improvement Notices – directing employers to fix safety problems within a specified time.
- Issue a Prohibition Notice – directing employers to cease unsafe activities that have immediate risks to the health and safety of workers.
- Conduct interviews and make enquiries.
- Take photographs, samples, recordings and measurements.
- Examine and copy documents.
- Adjudicate in health and safety disputes between employers and employees, including those between ARREOs (authorised union officials) and employers).

If requested by a WorkSafe Inspector, construction personnel must cooperate and provide assistance. It is an offence for which a person could be fined and/or jailed – to obstruct, impede or hinder, threaten or assault an inspector.

Reference:

- WorkSafe Victoria What to expect if your workplace is inspected by WorkSafe 2022 https://www.worksafe.vic.gov.au/what-expect-if-your-workplace-inspected-worksafe

Drug and alcohol policy/procedure

1. Safety is paramount on building sites.
2. This policy applies to everyone on site without distinction.
3. A person who presents a non-negative test result for drugs or alcohol or who is otherwise affected, will not be allowed to work until that person can work in a safe manner.
4. The decision on a person's ability to work in a safe manner will be determined in accordance with the company policy in consultation by the employer and/or their representatives.

5. A person affected by drugs or alcohol may be subject to disciplinary action in accordance with company policy.
6. The Health and Safety Committee may provide information to persons seeking help for their drug or alcohol problem.
7. Leave may be negotiated to enable rehabilitation and counselling.

Where there is no Health and Safety Committee, site safety supervisors/safety officers in consultation with worker Health and Safety Representatives will implement the policy.

Note: New technology may become available in the near future to test for "impairment" and not merely for the "presence" of particular drugs/medications. The use of any such technology/ technological advancements, needs to be done in full consultation and agreement with employees and their OHS Representatives.

The policy shown above, incorporating points 1-7 has been the long standing Incolink Drug and Alcohol Policy.

In 2016, however, the Building Industry Group developed and published a comprehensive Drug & Alcohol Management Program (DAMP). This document expands on the Incolink Policy.

Education (DAMP)

The employer should ensure initial drug and alcohol training for each employee. This education will include:

- The adverse effects that drugs and alcohol may have on health, and the related risks to safety and the environment.
- The availability of alcohol testing equipment for personnel who wish to test themselves voluntarily before the start of their normal shift.

Support (DAMP)

The employer will make available support to employees in respect of drug and alcohol issues. This will include:

a. allowing access to any Union support programs; and
b. providing an employer funded Employee Assistance Provider (EAP) to be available to employees.

DAMP references the chemical substances for testing

- alcohol
- amphetamine-type stimulants
- benzodiazepine and similar chemical compounds
- cocaine and its metabolites
- opiates: morphine, codeine and 6- acetyl morphine.

DAMP outlines the testing objectives and methods

- The overarching objective of testing is to identify employees who are not fit to perform the inherent requirements of their position.
- The drug testing will be conducted by an accredited person.
- The testing body will be accredited and independently audited by an organisation such as ISO or NATA.
- Alcohol testing may only be done by use of an Accredited Breath Test device.
- Drug testing may only be done by oral fluid testing.

DAMP explains test results

- Alcohol test results – All workers will be considered to have not passed their BAG test if their test result indicates they have a BAC of more than 0.00 mg/ml.
- Drug test results – An employee will be considered to have not passed their drug test if their test result indicates they have equal to or above the relevant cut-off levels of these substances referred to in AS 4760. Note: Benzodiazepine level to be provided by the prescribed testing laboratory.

- The employer will only be advised whether the test result is positive or negative for drugs. No other detail will be provided to the employer.
- The employee will receive the full drug test results report (as per AS 4760).
- The results will be provided in a sealed envelope, marked private and confidential from the relevant tester.

DAMP explains consequences of test results

a. Employees recording an onsite non-negative result (fail) will NOT be permitted to return to work and the oral fluid sample will be sent immediately for confirmatory testing at an accredited laboratory in line with AS 4760. With all reasonable assistance provided, the employee will then leave the workplace when practicable.

b. If the confirmatory test shows a negative result (pass), the employee will return to work at the start of their next allocated shift and without any loss of pay.

c. An employee who has received three confirmed positive(fail) test results for alcohol or drugs which has been detected in a 12-month period may be dismissed under the employer's disciplinary processes.

d. No disciplinary action will be taken in respect of positive (fail) test results from a self-test.

DAMP provides a checklist to ascertain whether a person is impaired by alcohol or drugs.

Appendix A - Observable Impairment Assessment Checklist

DETAILS	
Name of individual being assessed:	
Date/time:	
Contact number:	
Name of responsible persons: (Management Representative & Employee Representative)	
ASSESSMENT TRIGGER	
List behaviour / actions / observations noted prior to this assessment:	
PHYSICAL INDICATORS	
INDICATOR	**OBSERVED**
Strong smell of alcohol on the breath	
Slurred, incoherent or disjointed speech (losing track)	
Unsteadiness on the feet	
Poor coordination / muscle control	
Drowsiness or sleeping on the job during work breaks	
Inability to follow simple instructions	
Nausea / vomiting	
Reddened or bloodshot eyes	
Jaw clenching	
Sweating / hot and cold flushes	

Reference:

- Building Industry Group Drug & Alcohol Management Program (DAMP)

Injuries and first aid

First aid facilities must be provided in accordance with WorkSafe Victoria Compliance Code First Aid in the Workplace November 2021.

All site personnel should know where first aid facilities are located. All sites should have first aid kits and First Aiders sufficient for site requirements.

The names of First Aiders, first aid procedures and emergency contact phone numbers should be displayed in prominent locations visible to all workers.

First aid qualifications

Construction Industry First Aiders should have received training in the following units of competency:

- HLTAID009 Provide cardiopulmonary resuscitation. This unit describes the skills and knowledge required to perform cardiopulmonary resuscitation (CPR).
- HLTAID010 Provide basic emergency life support. This unit describes the skills and knowledge required to recognise and respond to life-threatening emergencies.
- HLTAID011 Provide First Aid. This unit describes the skills and knowledge required to provide a first aid response to a casualty in line with first aid guidelines.

First aid kits

Construction industry first aid kits should contain the following contents:

1. EPIPEN® and EPIPEN JR® Auto-Injectors (used to treat life-threatening, allergic emergencies in people who are at risk for or have a history of serious allergic emergencies).
2. Snake bite kit.
3. Dust proof container storage.

4. Pen and notepad (for recording).
5. Eye pads (for covering eye wounds).
6. Tape (1.25cm and 2.5cm) for securing dressings.
7. Wound dressings (No.13, No.14, No.15) for bleed control.
8. Triangular bandages (for slings and bandages).
9. Crepe Bandages (5cm, 7.5cm, 10cm) for retaining dressings and supporting soft tissue injuries.
10. Universal shears (for cutting dressing, bandage, or clothing).
11. Disposable scissors and tweezers (for hygiene).
12. Opsite and primapore dressings (for minor wound cover).
13. Medical gloves (medium/large) for infection control.
14. Eye wash (disposable) for eye irrigation.
15. Melolin/melolite dressings (various sizes) for burns and wound cover.
16. Clip seal bags (various sizes) for amputations or dislodged teeth.
17. Universal dressings (large) for wound cover.
18. Thermo accident blankets (for shock management).
19. Instant ice packs/cold compress (for soft tissue injuries).
20. Gauze swabs (for wound cleaning).
21. Wound swabs/sachets (for wound cleaning).
22. Shaped dressings (for wound care).
23. Pocket mask with one-way valve (for resuscitation).
24. Safety pins (12 in a pack) for securing dressings and slings.
25. Sugar (e.g. jelly beans, lollies) for diabetes management.
26. Digital thermometer (for observations).
27. Pen flashlight (for observations).
28. Disposable dressing packs (for wound care).
29. Eye goggles (for hygiene).
30. Disposable apron (for hygiene).
31. Ventolin (for asthma management).
32. Spacer (for asthma management).

Automated External Defibrillators (AEDs)

Employers should ensure that AEDs are in the workplace to provide emergency treatment for persons who may suffer a cardiac arrest in the workplace.

AEDs should be installed in well-known, visible and accessible locations. They should not be locked and should be clearly signed. AEDs should be maintained according to the manufacturer's instructions – serviced yearly – including replacing batteries and pads at the specified intervals.

Registering the AED with Ambulance Victoria (registermyaed.ambulance.vic.gov.au) alerts the ambulance call taker to the presence of an AED allowing the call taker to give instructions and support before an ambulance arrives.

What to do if someone needs first aid treatment

- Ensure the designated First Aider is contacted.
- If anyone needs immediate, emergency first aid and the First Aider cannot be located, the site office should be contacted to arrange for an ambulance. If the office is unattended "000" (or "112" from a mobile phone) should be called to ask for an ambulance and provide:
  - name and address of site/building
  - specific location of person injured
  - a contact telephone number
- A person should be sent to the main site entry point to direct the ambulance.
- Whilst waiting for the emergency services, ensure any injured parties are not moved unless there is a higher risk of being injured. All necessary assistance should be provided to safeguard injured persons and to keep them comfortable pending arrival of the emergency services.

Details of first aid treatment given by First Aiders should be recorded in the First Aid Treatment Book.

Safe disposal of used syringes

Site procedure. Ensure that:

1. The First Aider is the appropriate person to remove discarded syringes from site.
2. Suitable warning signage displayed to prevent people from entering the area where syringe had been found.
3. Gloves worn.
4. Before removing the syringe, there is available a suitable container with a lid to put the syringe into.
5. The container placed in readiness on a flat, stable surface.
6. The syringe is picked up by using tongs or an 'ezy hold' mechanical hand (if you have to pick it up by hand, make sure you are wearing gloves and hold it by the plastic barrel, with the needle end pointing away from you).
7. Gently place the syringe, needle end first, into the container.
8. Never put the cap back on a needle used by someone else. Also never try to blunt the needle or break it off.
9. To arrange for collection of needles – or if your disposal is full and needs replacing – contact your Local Council's Health Department or the Incolink Drug Worker on 9639 3000 or mobile 0419 560 958 (make sure a spare empty disposal bin is kept on site at all times).
10. Where there is a continuing problem with syringes being discovered on site, the Victorian Building Industry Alcohol and Drug Worker can arrange for your site to be supplied with approved syringe disposal bins or packs.

In case of needlestick injury:

Don't panic!

1. Allow the wound to bleed a little.
2. As soon as possible wash the wound with soap and cold running water.
3. Attend the First Aid Shed.

4. Cover the wound with a band–aid.
5. Notify the Site Management, the Health and Safety Representative and Health and Safety Committee if available.
6. Consult a doctor.

References:

- WorkSafe Victoria Compliance Code for First Aid in the Workplace 2021 https://www.worksafe.vic.gov.au/resources/compliance-code-first-aid-workplace
- WorkSafe Victoria Use of an Automated External Defibrillator (AED) in the workplace 2022 https://www.worksafe.vic.gov.au/use-automated-external-defibrillator-aed-workplace

Construction facilities and amenities

The Worksafe Victoria Compliance Code – Facilities in construction, was introduced in March 2018. It outlines the standard of amenities which are allocated to both women and men – depending on the ratio of gender representation on building and construction sites.

This section will therefore primarily focus on information relating to the respective allocation of amenities to male and female workers on construction sites.

Male and female toilets

Separate male and female toilet facilities need to be provided where there are both males and females onsite.

Although unisex toilets are permissible for ten employees or less, it should be noted that the employer has a duty to consult 'before making decisions about facilities for the welfare of employees'. Women on site may prefer to have their own separate toilet amenities.

For males the number of closets and urinals need to be provided in accordance with the following scale:

Male employees/ contractors	Number of closets	Number of urinals
1-5	1	Nil
6-10	1	1
11-20	2	2
21-35	3	4
36-50	4	6
51-75	5	7
76-100	6	8

For each additional 20 males, one additional closet and one additional urinal. Where more than 200 males, for each additional 35 males, one additional closet and urinal.

For females the number of closets need to be provided in accordance with the following scale:

Female employees/contractors	Number of closets
1-5	1
6-10	2
11-20	4
21-35	7
36-50	10
51-75	12
76-100	14

For each additional 20 females, two additional closets. Where more than 200 females, for each additional 35 females, two additional closets.

A sanitary disposal unit needs to be provided in at least one in every three closets.

Where a separate female toilet needs to be provided due to the number of females, separate female hand washing facilities also need to be established.

Showers

- Shower facilities need to be provided where dirty or dusty work is involved.
- Shower facilities need to include access to hot and cold water.
- Where showers are required, at least one shower cubicle needs to be provided for every 10 employees.
- Separate shower facilities need to be provided for male and females. However, in small or temporary workplaces where privacy can be assured, one unisex shower can be provided if:
  - the shower and adjacent change room walls are full height
  - shower and adjacent change room doors can be locked from the inside.

Change rooms

- Change rooms should be provided with enclosures that can be reasonably used by persons of either gender with privacy maintained.
- Change rooms should have enough space to hang and dry clothing.
- A bench should also be provided to allow a person to sit when dressing or undressing.
- The temperature in the change rooms needs to be at a comfortable level.

Providing access to facilities

Employees should be able to readily access any facilities provided:

- On multi-storey sites, toilet facilities should be located at least on each fifth floor.
- Drinking water should be provided on every fifth floor (at least), and on the top floor of construction.
- Additional drinking water should be located close to areas where hot or strenuous work is being undertaken (e.g. work on exposed formwork decks).

Drinking water

- Clean drinking water needs to be provided for employees at all times.
- The water needs to be needs to be hygienically provided (for example, disposable cups).
- Drinking water taken from mains water supply needs to be from separate taps to those supplying water for washing, general site water and not be located inside toilet areas.
- Drinking water taps need to be labelled to avoid confusion
- Where a connection to mains water supply is not practicable, drinking water needs to be provided by another means, bulk water dispenser or individual disposable bottles.

Meal facilities

A meals area should:

- Be separate from any work processes.
- Be maintained with a comfortable temperature range (this can be achieved through artificial heating and cooling).
- Have lined ceilings and walls.
- Have washable surfaces.

Personal storage

Employees need to be provided with accessible, secure storage at the workplace for personal property (such as bags, jewellery, keys, mobile phones or personal medications).

Reference:

- Worksafe Victoria Compliance Code – Facilities in Construction 2018 https://www.worksafe.vic.gov.au/resources/compliance-code-facilities-construction

Hygiene in the installation of site amenities

To raise the awareness of the health effects in relation to the use of second-hand fittings and fixtures when installing site amenities:

- Working with used fixtures and contaminated pipework and fittings when decommissioning site amenities.
- Installation of pipework and fixtures to an acceptable Standard.

Hazards

Biological hazards from human excrement are numerous when working with live sewage and contaminated fittings and fixtures. Some biological hazards that may be present are: Bacteria, Fungus, Parasites, and Viruses. They can be transmitted by hand-to-mouth, inhalation or skin contact.

Risk controls

- Eliminate the use of contaminated pipework.
- Eliminate the use of contaminated fittings.
- When decommissioning fixtures such as pans, cisterns, urinals and wash-troughs, ensure they have been disinfected with a Grade 3 alcohol-based disinfectant and have been high temperature steam cleaned.
- Re-use of fixtures such as pans, cisterns, troughs (stainless steel) and urinals (stainless steel) should be discouraged. However, ensure evidence is provided if they have been decontaminated with a Grade 3 alcohol-based disinfectant and have been high temperature steam cleaned prior to re-use.
- It is strongly advised that all workers be vaccinated for Hepatitis A and B, Tetanus and Diphtheria.
- All workers must be provided with appropriate PPE relevant for the task.
- Good hygiene principles applied such as hand washing and welfare facilities provided such as clean water, soap, disposable towels and first-aid facilities (i.e., sterile wipes for cleansing wounds.

Reference:

- PPTEU Hazard OHandS Hazard alerts Installation of site amenities https://www.ppteu.asn.au/occupational-health-safety/hazard-alerts/installation-of-site-amenities

Recording and reporting injuries

Work related injuries or illness must be reported to the employer within 30 days of becoming aware of it. Failure to do so may jeopardise workers' compensation claims being made.

The "if you are injured" poster must be displayed at the workplace. Details of all injury/illness (s) should be recorded in the Register of Injury kept at the workplace.

Emergencies

Ensure all sites have an emergency plan that explains what to do in case of:

- fire
- bomb threats
- gas and chemical leaks
- collapse of the building or structure
- other emergencies.

Make sure the emergency plan covers the following:

- the alarm signal for evacuation
- the correct way to exit the building
- what a person should do and what a person should not do in an emergency situation
- the safe assembly point
- the site personnel in charge of emergencies
- contacts for emergency and rescue services.

Where appropriate, an emergency evacuation drill should be conducted. The principal contractor should ensure that evacuation routes are planned, monitored and revised as necessary.

As part of the site's emergency response plan, the principal contractor should designate the evacuation routes for the site work areas. The suitability of routes should be regularly reviewed over the life of the project to ensure they remain effective as the site layout changes. In multi-storey buildings each active stairway should be treated as an evacuation route.

Reference:

- HB 76 Dangerous goods – Initial emergency response guide https://www.intertekinform.com/en-au/standards/saa-snz-hb-76-2010-129526_saig_as_as_273972/

Evacuation lighting on constructions sites

Principal contractors have an obligation to ensure lighting is sufficient for:

a. workers to safely evacuate in emergencies; and
b. permit emergency or repair personnel to access the site.

On sites where natural lighting is insufficient, evacuation lighting is normally provided by installing battery powered emergency lighting and exit signs. A minimum light level of 20 lx should be provided for a minimum of one hour following the loss of normal lighting.

Principal contractors should ensure evacuation lighting is installed on designated evacuation routes to enable safe exit from the work areas and to provide lighting for access by emergency or repair personnel. Emergency lighting should also be installed at switchboards that control site lighting to allow normal lighting to be restored after a fault.

As evacuation routes on construction sites often contain construction materials, electrical switchboards, portable equipment and other obstructions, the routes should be regularly reviewed to determine whether higher emergency lighting levels are required to enable workers to safely evacuate.

Exit signs locations and types

Ensure Exits signs are not positioned more than one metre above, or two metres in front of, the exit. Where the evacuation route does not lead directly to an emergency exit, then make sure exit direction arrow signs that point in the direction of the emergency exit are installed at the change of direction.

Exit signs, including exit directional arrow signs should be the self-illuminating type to be visible through smoke.

Evacuation light fittings should be manufactured from impact resistant material (e.g. polycarbonate) or be fitted with mechanical protection (e.g. wire cages).

Reusing evacuation light fittings

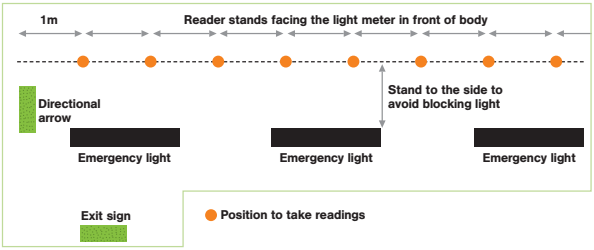
Ensure evacuation light fittings reused from previous sites or other temporary installations are assessed and evaluated to maintain minimum evacuation lighting levels.

Periodic testing of evacuation lighting

Ensure Evacuation lighting are inspected and electrically re-tested every 6 months, including a discharge test to make sure evacuation lighting maintains the 20 lx lighting level for at least one hour after the loss of normal lighting. Records of testing should be kept on site or made available for auditing.

Taking readings

- With a calibrated light meter held horizontally.
- At a height of one metre above the floor.
- One metre from the start of the route and at one metre intervals along the route.
- Where shadows are not cast onto the meter (see suggested process below).



Add all the readings together and divide by the number of readings taken to calculate the average light level. This should not be less than 20 lx. Records of lighting levels should be kept onsite for reference.

Examples

A: (25 + 18 + 15 + 12 + 16+ 22) divide by 6 readings = average of 18.0 lx (Fail)

B: (30 + 22 + 18 + 5 +19 + 30) divide by 6 readings = average of 20.7 lx (Pass)

References:

- WorkSafe Victoria Evacuation Lighting on Construction Sites 2012 https://www.worksafe.vic.gov.au/emergency-lighting-construction-sites
- AS 2293.Set Emergency escape lighting and exit signs https://www.intertekinform.com/en-au/standards/as-nzs-2293-1-2018-98876_saig_as_as_207928/

Notification of incidents and dangerous occurrences

If workers become aware of an incident, dangerous occurrence or a 'near miss' at their workplace, they should report it to their immediate supervisor, even if it does not result in immediate injury or damage. Site management can then determine if the incident requires notification to WorkSafe and conduct an investigation to establish the cause of the incident and to prevent it happening again.

Under Section 37 of the OHS Act 2004, the employer with management or control of the workplace is responsible for reporting by telephone (132 360) certain incidents and dangerous occurrences to WorkSafe immediately upon becoming aware of it. Written details of the incident must be sent to WorkSafe on the prescribed form within 48 hours.

The list of dangerous occurrences and near misses that must reported to WorkSafe can be found in *OHS Act 2004 Part 5 – Duties relating to incidents – 37 Incidents* to which this Part applies.

Note: As from 1 July 2024, there are now new obligations and new types of plant and equipment that must be additionally notified to WorkSafe if they are involved in an incident.

Under OHS regulation 74, from 1 July 2024 employers and self-employed persons are required to notify WorkSafe when they become aware of an incident that immediately or imminently exposes a person a serious risk to their health or safety due to collapse, overturning, failure, or malfunction of, or damage to:

- plant that lifts or moves persons or materials (not including a ship, boat, aircraft, or vehicle designed to be used primarily as a means of transport on a public road or rail)
- pressure equipment
- tractors
- earth moving machinery
- scaffolds
- temporary access equipment
- explosive-powered tools
- turbines
- amusement structures.

Except for essential action to protect persons' health and safety, to aid injured persons or to prevent further occurrence, the scene of any notifiable incident MUST NOT be disturbed until an inspector directs that it may be disturbed.

The relevant contact numbers for emergencies involving gas or electricity appear on the inside front cover of this Handbook.

The Police or Fire Brigade must also be notified of certain incidents involving dangerous goods.

Preserving the site of a fatal incident

WorkSafe, the Police and the Coroner's Office attending the scene of a workplace death require the site of a fatality to be left untouched. It is against the law to tamper with or disturb the scene of a fatality unless otherwise directed by a WorkSafe inspector. The scene of a fatality must not be disturbed unless this is necessary to:

- help someone who is injured
- protect someone's health and safety
- take essential action to make the site safe to prevent a further incident.

Dealing with trauma and counselling

It is important to remember that anyone on a site where a workplace accident occurs may be emotionally distressed and/or in shock and need counselling to deal with the trauma.

For trauma counselling assistance Incolink Trauma Coordinator can be called on **1300 000 129** to discuss and arrange support processes.

Reference:

- WorkSafe Victoria Report an incident: Criteria for notifiable incidents 2024 https://www.worksafe.vic.gov.au/report-incident-criteria-notifiable-incidents



PART 2:

Hazard identification and control of risks

Hazards on construction sites

The majority of injuries on construction sites – for which there are WorkCover claims – are back injuries, sprains and strains due to manual handling tasks such as lifting, pushing, pulling and stretching. Statistics show that construction workers are most likely to be killed through:

- falling from heights, particularly off roofs
- electrocution
- being hit or crushed by powered mobile plant.

Other hazards common in the construction industry are:

- falling objects
- cuts from sharp materials, objects and tools
- structural collapse
- collapse of trenches
- compressed air
- hazardous substances (paints, solvents, glues, chemicals etc.)
- hazardous dusts and fibres (silica, asbestos, wood dust, Medium Density Fibreboard [MDF] Synthetic Mineral Fibres [SMF])
- explosive powered tools
- noise
- welding fumes, gases and arcs
- confined spaces
- lasers
- sun exposure leading to skin cancer.

Before commencing tasks, ensure all foreseeable hazards (for example, falling off a roof, falling objects) and actual risks (e.g. death, serious injury) are identified and appropriate safety measures put in place (e.g. install guard railing, prevent access under a roof being constructed).

Control measures are selected by working through steps 1-6 of the Risk Control Hierarchy on the following page.

Reference:

- WorkSafe Victoria Construction Everything for the construction industry in one place 2024 https://www.worksafe.vic.gov.au/construction

Hierarchy of control

This is a methodology designed to ensure that the control measure which provides the greatest level of safety is selected.

To be applied where reasonably practicable in the order shown:

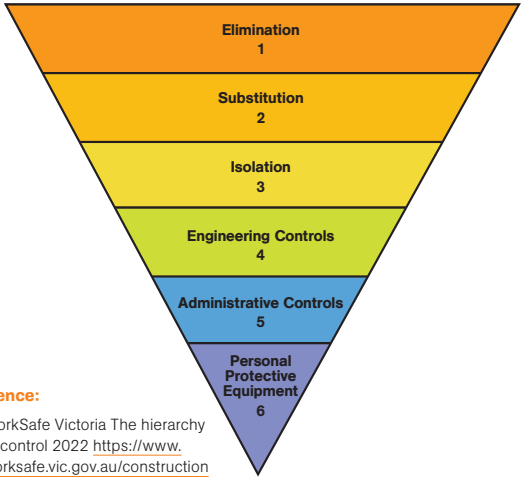
1. **Elimination** – remove the specific risk entirely by adopting another way of doing the job.
2. **Substitution** – reduce the risk significantly by using another method or process.
3. **Isolation** – ensure that people are removed from proximity to the hazard.
4. **Engineering controls** – using machinery or equipment to perform a task which protects persons from the risk.
5. **Administrative controls** – implementing safety instructions to minimise exposure to the risk.
6. **Personal protective equipment (PPE)** – may be used when it is simply not possible to use other methods – or as an adjunct to the other controls. It should always be seen as the last resort.

The following examples demonstrate how the Hierarchy of Control should be applied creatively and intelligently to provide the best safety outcome:

- To *eliminate* the fall hazard involved in the removal of an old roof from a building under demolition, the roof can be demolished from equipment on the ground.
- By *substituting* a much safer product the exposure of workers to highly toxic termite control chemicals can be reduced.

- By *isolating* a section of a roof as a No Go Zone – by introducing a warning line system – the fall hazard at the perimeter edge can be controlled. A roof permit system as an administrative control should also be used.
- An *engineering* control in the erection of structural steel is the use of scissor lifts and booms to prevent falls from height. PPE in the form of a safety harness, energy absorber/lanyard is required for work out of booms.
- An *administrative control* may consist in a work instruction/Safe Work Method Statement which limits the use of A frame step ladders – under controlled conditions – in situations where a restricted space prevents a safer form of work platform.
- *PPE* in the form of dust masks may be necessary for workers involved in the internal strip- out of a building under refurbishment.

Hierarchy of Control



Reference:

- WorkSafe Victoria The hierarchy of control 2022 https://www.worksafe.vic.gov.au/construction

Safe work method statements

The 2017 Victorian OHS Regulations Part 5.1 – Construction requires a Safe Work Method Statement (SWMS), for all High-Risk Construction Work involving the following work activities:

a. where there is a risk of a person falling more than 2 metres
b. on telecommunications towers
c. involving demolition
d. involving the removal or likely disturbance of asbestos
e. involving structural alterations that require temporary support to prevent collapse
f. involving a confined space
g. involving a trench or shaft if the excavated depth is more than 1·5 metres
h. involving a tunnel
i. involving the use of explosives
j. on or near pressurised gas distribution mains or piping
k. on or near chemical, fuel or refrigerant lines
l. on or near energised electrical installations or services
m. in an area that may have a contaminated or flammable atmosphere
n. involving tilt-up or precast concrete
o. on or adjacent to roadways or railways used by road or rail traffic
p. at workplaces where there is any movement of powered mobile plant
q. in an area where there are artificial extremes of temperature
r. in, over or adjacent to water or other liquids where there is a risk of drowning
s. involving diving.

Under the regulations a safe work method statement (SWMS) means a document that:

- Lists the High-Risk Construction Work being done.
- States the health and safety hazards and risks arising from that work.
- Describes how the risks will be controlled.
- Describes how the risk control measures will be put in place.

The 2018 WorkSafe document – How to prepare and use a safe work method statement (SWMS) for high risk construction work (HRCW) and who needs to prepare one – contains the following advice:

- A generic SWMS is not acceptable unless further work is done to make it 'site-specific'.
- Whilst contractors can address non-HRC hazards within a SWMS, this must not weaken the focus on HRCW activities.
- Risks should be managed in accordance with the Hierarchy of Control.
- The employees performing the work should be consulted when developing a Safe Work Method Statement and should be inducted into their SWMS before starting work.
- The effectiveness of the control measures should be reviewed following implementation of the Safe Work Method Statement.

High risk construction work should never be undertaken without an appropriate SWMS.

Reference:

- WorkSafe Vic Information about How and when to prepare and use a safe work method statement 2023 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2023-10/Information-about-safe-work-method-statements-2023-10.pdf

Health and safety co-ordination plan (HSCP)

The OHS Regulations 2017 state that for projects of a value of $350,000 or more, the principal contractor must make sure that a health and safety co-ordination plan is prepared for any construction work before the work starts.

A HSCP is document which describes how safety will be managed on site.

Where reasonably practicable, the principal contractor must consult with site personnel (including a HSR where applicable) when developing the plan. This may mean consulting with the main subcontractor trades involved in the most hazardous work.

During the project, the principal contractor must review the HSCP to make sure that it remains accurate and deals with all the construction work actually being done.

The principal contractor must make sure that the HSCP is kept until the construction project is finished and is readily available to site personnel.

The principal contractor must make sure that new starters are aware of, and are given access to, the HSCP before they start construction work at the workplace.

What must a Health and Safety Co-ordination Plan contain?

1. The names, positions and responsibilities of all people who look after health and safety.
2. The way health and safety will be coordinated on site.
3. Arrangement for managing incidents.
4. Site safety rules.



PART 3:

Height safety and work platforms

Falls from height are the most common cause of fatalities on building and construction sites. The following situations are particularly hazardous:

- Work near unprotected open edges of floors or roofs.
- Work near unguarded holes, penetrations and voids.
- Work near unguarded excavations, trenches, shafts, lift wells.
- Work from unstable structures (for example, incomplete scaffolding).
- Work on, or near fragile, brittle surfaces (for example, cement sheet roofs, fibreglass roofs, skylights).
- Work from unprotected formwork decks.
- Work from unsecured ladders.

It is a legal requirement under Prevention of Falls Part of the Occupational Health and Safety Regulations 2017 to provide fall protection for anyone who could fall more than 2 metres. However, employers under the Victorian OHS Act 2004 also have a duty to ensure that the risk of serious injurious falls at heights of 2 metres or lower are also controlled.

Remember that at any height a fall onto concrete can cause serious injury or death.

For workers' safety remember the following points:

- Employers ensure employees do not work in any situation where there is a risk of falling.
- Workers have the right to remove themselves from any work location where there is an imminent risk to their health and/or safety.
- Ensure fall hazards are reported. The Site Supervisor and Health and Safety Representative to be made aware of any dangerous situations.

- If required to use fall arrest equipment ensure workers have been properly trained in its use.
- Solutions to fall hazard problems should be raised with the supervisor and Health and Safety Representative. The opinions of workers are important and valuable.

Work at heights next to an exposed edge should never be performed without some form of fall protection.

Preferred methods of preventing falls

The Prevention of Falls Part of the OHS Regulations 2017 requires that fall protection for persons working at height more than 2 metres be based on selecting control measures in the following order of priority 1-5.

The risk is controlled by:

1. Arranging for the task to be undertaken on the ground or on a solid construction.
2. Ensuring that a passive fall prevention device such as properly erected scaffolds, perimeter guard railing, or elevating work platforms (EWP) is used.
3. Using a work positioning system:
    a. an industrial rope access system
    b. a travel restraint system; or
    c. any other equipment, other than a temporary work platform (e.g. EWP) that enables a person to be positioned and safely supported at a work location for the duration of the task being undertaken at height.
4. Putting in place a fall arrest system.
5. By ensuring that a fixed or portable ladder is used, or an administrative control documented in a SWMS is used.

Controls 4 and 5 clearly offer the lowest level of protection and should only be adopted if it can be demonstrated that controls 1 and 3 are not reasonably practicable.

Reference:

- WorkSafe Victoria Compliance Code for Prevention of Falls in General Construction 2019 https://www.worksafe.vic.gov.au/resources/compliance-code-prevention-falls-general-construction

Scaffolding

General safety requirements for an erected scaffold

Ensure scaffolds from which a person or object could fall more than 4 metres, are erected, altered and dismantled by, or under, the direct supervision of a person with a certificate of competency or High Risk Work Licence of the right class.

Scaffolding should only be worked off if it is:

- On a stable foundation with proper base plates and level.
- Complete, properly braced and tied to the supporting structure.
- Not overloaded (225 kg max. per platform, per bay for light duty scaffold; 450 kg max per platform, per bay for medium duty; 675 kg max per platform, per bay for heavy duty).
- Fully planked and fitted with guardrails, mid-rails and toe boards on the working deck wherever a person or material could fall more than 2 metres.
- Fitted with a safe, secure temporary stairway or ladder to access the working deck.
- No closer than 5 vertical metres and 4.6 horizontal metres from powerlines (see Electrical Safety – Powerlines NO GO Zones), unless permission has been obtained from the power authority and a SWMS has been developed.

Ensure scaffolding also complies with the following:

- All long-term scaffolds, regardless of height, need to be checked regularly for structural integrity by a competent person (such as an engineer experienced in the design of temporary structures or a licensed scaffolder).
- Scaffolds exceeding four metres in height need to be inspected and tagged by a competent person (such as a licensed scaffolder) before use, after any alteration or at intervals of not more than 30 days. (Scaftag or similar system applies).
- A scaffold that is incomplete and left unattended scaffolding needs to have danger tags and warning signs attached at particular locations to prevent use and have access points to the incomplete scaffold blocked off.

Defective or incomplete scaffolding is not be used and should be sign posted "Scaffold Incomplete/ Do Not Use".

Consultation NSW and Victoria

Consultation is a legal requirement under OHS and WHS legislation.

Information is key

- A scaffold contractor cannot design, supply or modify a scaffold without information from the principal contractor regarding the project needs.
- A principal contractor cannot manage scaffolding on site without information from the scaffold designer about the correct use of a particular design.
- Workers cannot use or co-ordinate use of scaffold on site without information and instruction from the principal contractor.
- Engineers cannot assess or verify scaffold designs if they have not received sufficient design information.

Consultation arrangements must:

- Ensure who is responsible for which aspects of the scaffold design.
- Identify responsibility for ongoing scaffold management processes.
- Involve the actual people or entities undertaking the work.
- As the scaffold constantly changes with the building during construction, effective consultation is required.

References:

- NSW Scaffolding Industry Safety Standard SafeWork March 2022 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0006/1057596/scaffolding-industry-safety-standard.pdf
- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Emerging technology

New technologies are becoming available that may further aid management of scaffolds in service. These should be considered during the tendering and detailed scaffold design phases.

Examples include:

- Tamper-resistant locking devices to prevent unauthorised removal of components.
- Real-time (app-based) monitoring of scaffold components and live load.
- QR codes for tracking components and documentation.
- Geo fencing for handover certificate (must be in location to issue certificates).
- Augmented reality technologies.
- Building Information Modelling/Scaffold Information Modelling.
- Radio frequency identification (RFId) on ScaffTags.

New technologies that attach to, or modify the use of, existing scaffold components should only be implemented in consultation with the scaffold contractor and scaffold system supplier/ manufacturer. Ensure new technologies do not adversely affect the performance of scaffolding components whilst in service.

Reference:

- NSW Scaffolding Industry Safety Standard SafeWork March 2022 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0006/1057596/scaffolding-industry-safety-standard.pdf

Scaffold handover certificate

A handover certificate needs to be provided before first use of the scaffold after scaffolders have completed their scaffolding work i.e. after a new scaffold has been erected, or an existing scaffold has been repaired or altered.

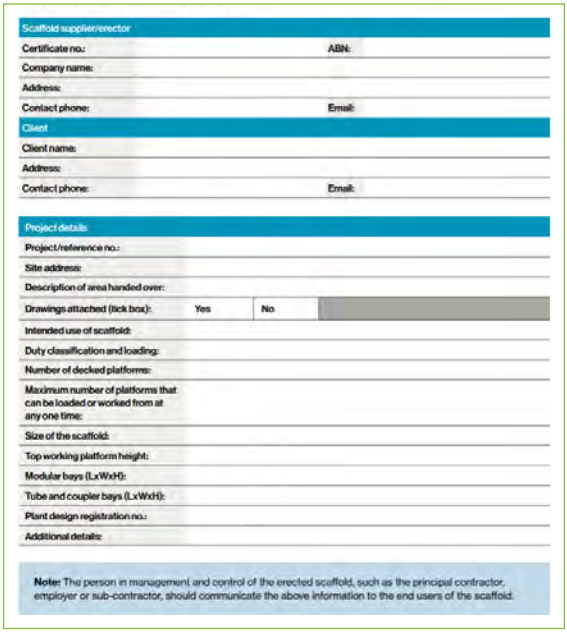
Examples of alterations requiring an inspection and new handover certificate include:

- adding/removing additional bays or lifts
- changing ties or tie locations
- changing platforms, hop-ups and decking component locations
- changing edge protection or containment
- partial disassembly or removing components (e.g. create an access opening).

Hand over certificate

Below is an example of a typical scaffold handover certificate that a scaffolder would provide to the persons in management and control of the erected scaffold (for example, principal contractor, employer or sub-contractor) after the erection of a completed scaffold.

The scaffold handover certificate is 2 pages.



Scaffold supplier/erector			
Certificate no.:			ABN:
Company name:			
Address:			
Contact phone:			Email:
Client			
Client name:			
Address:			
Contact phone:			Email:
Project details			
Project/reference no.:			
Site address:			
Description of area handed over:			
Drawings attached (tick box):	Yes	No	
Intended use of scaffold:			
Duty classification and loading:			
Number of decked platforms:			
Maximum number of platforms that can be loaded or worked from at any one time:			
Size of the scaffold:			
Top working platform height:			
Modular bays (LxWxH):			
Tube and coupler bays (LxWxH):			
Plant design registration no.:			
Additional details:			

Note: The person in management and control of the erected scaffold, such as the principal contractor, employer or sub-contractor, should communicate the above information to the end users of the scaffold.

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Preventing unauthorised access to scaffolds

Both principal contractors and scaffolders have obligations to prevent access to:

- Incomplete scaffolds.
- Scaffolds that do not have valid handover certificates.
- Scaffolds that have not been inspected.
- Scaffolds that have not been repaired/rectified following an incident.
- Scaffolds that have not been repaired/rectified following unauthorised modifications.
- Closed scaffold platforms.
- Unless the person(s) accessing the scaffold holds a scaffold HRWL.

Wind damage to scaffolding

Environmental conditions such as storms should be monitored while scaffold is erected, used and dismantled.

Inspect scaffolds after poor weather conditions to ensure they have not been damaged.

If scaffold has been damaged and deemed unsafe, it needs to be closed until a scaffolder or other suitably competent person can inspect – and repair the damage.

Look for:

- signs of movement at the scaffold base
- slipping/loosening of ties and tie anchorages
- damage to load-bearing parts such as standards or ladder beams.

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Required high risk licences for types of scaffolding work

High risk licence class	Description
Basic scaffolding licence (SB)	1. Scaffolding work involving any of the following: ▪ prefabricated scaffolds (includes modular scaffolds) ▪ cantilevered material hoists with a maximum working load limit of 500 kg (materials only) ▪ ropes ▪ gin wheels ▪ safety nets and static lines ▪ bracket scaffolds (tank and formwork).
Intermediate scaffolding licence (SI)	1. Scaffolding work included in the scope of work for basic scaffolding licence; and 2. Scaffolding work involving any of the following: ▪ cantilevered crane-loading platforms ▪ cantilevered scaffolds ▪ spur scaffolds ▪ barrow ramps and sloping platforms ▪ scaffolding associated with perimeter safety screens and shutters ▪ mast-climbing work platforms ▪ tube and coupler scaffolds (including tube and coupler covered ways and gantries).
Advanced scaffolding licence (SA)	1. Scaffolding work included in the scope of work for intermediate scaffolding licence; and 2. Scaffolding work involving any of the following: ▪ cantilevered hoists ▪ hung scaffolds, including scaffolds hanging from tubes, wire ropes and chains ▪ suspended scaffolds.

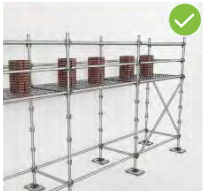
Scaffold duty rating, loading, dimensions and use

Duty rating	Maximum live load	Minimum width of the scaffold bay	Examples of use
Light duty	Up to 225 kg per platform per bay, including a concentrated load of 120 kg	At least 450 mm wide	Painting, electrical, carpentry work and other light tasks
Medium duty	Up to 450 kg per platform per bay, including a concentrated load of 150 kg	At least 675 mm wide	General trades like tiling and light steel framing
Heavy duty	Up to 675 kg per platform per bay, including a concentrated load of 200 kg	At least 900 mm wide	Concrete block laying, bricklaying, concreting, demolition work and most other tasks involving heavy loads or heavy impact forces
Special duty	Has a designated allowable load as designed, with minimum of light duty rating	Needs to maintain clear access: ▪ minimum of 450 mm for people and tools (two planks) ▪ minimum of 675 mm wide for people and materials (three planks)	Special uses such as loading bays

Example of load calculations per bay:

Quantity	Description	Weight
1	Tradesperson	100 kg
1	Mortar to service one bricklayer	50 kg
125	Bricks @ 3.4 kg per brick	425 kg
	Total	**575 kg**

Outcome



The bricks have been evenly distributed with approximately 125 bricks on each bay. This scaffold bay is loaded correctly within its duty rating.

Note:

- Do not stack materials on hop-up extension bracket.
- Reduce brick quantities in wet weather.
- For every extra person working in a scaffold bay, reduce the number of bricks accordingly.
- Scaffolds should not be used to support formwork and plant (such as hoist towers and concrete pumping equipment) unless the scaffold is designed for this purpose.

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Loading multiple platforms simultaneously

- Duty rating is the maximum load that can be placed onto a scaffold platform. The most common duty ratings are Light (225 kg), Medium (450 kg), Heavy (675 kg) and Special (specified by the designer).
- Duty rating only indicates the maximum load that can be placed on a platform. It does not indicate how many platforms on the scaffold can be loaded at any one time- this information must come from the scaffold designer.
- Ensure loading multiple platform levels simultaneously does not occur unless the scaffold was specifically designed for such use.
- Where simultaneous loading is to occur, the loads need to be managed to ensure they do not exceed that allowed by the scaffold designer. This requires keeping track of every platform level in every bay, and specifying whether it can be loaded to a particular duty rating or is closed and thus cannot be loaded.
- Platforms may be re-categorised as the project progresses provided this is approved by the scaffold designer.

Reference:

- NSW Scaffolding Industry Safety Standard SafeWork March 2022 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0006/1057596/scaffolding-industry-safety-standard.pdf

Scaffolding used for demolition work

Ensure scaffolding used for demolition work is no less than heavy duty class. Care should be taken to prevent damage to scaffold planks and components from falling debris. Damaged planks and components should be removed and replaced by the scaffold supplier or licensed scaffolder. The scaffold should be dismantled progressively as the structure is demolished, otherwise what will remain above the structure will be an unstable scaffold with increased risks of internal falls.

Scaffold Access

Advice on ladders

- Use ladders only as a secondary access system unless it is not reasonably practicable to provide other ways of access. Portable ladders should only span a single lift.
- Where this cannot be achieved, the maximum height between successive landings, serviced by a portable ladder, should not exceed 4 m or two lifts.
- The step down from the lowest landing to the ground should not exceed 300 mm.
- Ladders should be pitched at a slope of not less than 1:4 and no more than 1:6 (horizontally to vertically).
- Openings in working platforms for ladders should be guarded by self-closing gates or a trapdoor over the opening.
- Base of a ladder should be offset from the head of the ladder below to ensure more ladders do not take the form of a single continuous ladder.
- Ladders should extend a minimum of 900 mm above the landing or top departure point.
- Nothing should be carried by hand when using a ladder.



Use of external ladder access with self-closing safety gate



Use of internal ladder hatch

Advice on stairs

Ensure the step height to any access or egress point is no more than 300 mm.

Note: This will be a requirement from 12 months from the date of this standard is published (i.e. December 2025). Before this date, the minimum standard of 300 mm is strongly recommended.

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria

Scaffolding inspection checklist

1.0	Documentation/signage	Yes	No	N/A
1.1	Is there a handover certificate for the scaffold?			
1.2	Is there a current scaffold tag displayed in a visible location? For example, scaffold access points.			
1.3	Does the scaffold tag show the duty rating per bay?			
1.4	Are appropriate danger tags and warning signs such as 'No entry. Scaffold incomplete' or 'Danger – workers above' in place and in obvious locations to warn people of hazards?			
1.5	Are incomplete scaffolding platforms blocked with a physical barrier?			
1.6	Are scaffold inspections recorded and available upon request? Minimum 30 days.			
1.7	After an inspection, are the identified safety issues addressed to ensure safe use of scaffold?			
2.0	**Foundations, soleboards, baseplates**	**Yes**	**No**	**N/A**
2.1	Is trenching or other excavation works that could affect the foundation of the scaffold isolated from the vicinity of the scaffold?			
2.2	Have the ground conditions been assessed as suitable for the loads and duty rating of the scaffold before the scaffold is erected?			
2.4	Are base plates of suitable dimensions and, where required, positioned centrally on the soleboards?			
2.5	Are the standards sitting plumb and firm on the base plates?			

3.0	Isolation from mobile plant, other vehicles and public	Yes	No	N/A
3.1	Is there a system in place to prevent the scaffold being struck by vehicles, plant moving near the scaffold? For example, blocks, para-webbing, hoarding and traffic management.			
3.2	Have risks to pedestrians been controlled?			
4.0	**Scaffold structure**	**Yes**	**No**	**N/A**
4.1	Are the standards plumb through the full height?			
4.2	Are ledgers and transoms level?			
4.3	Is bracing in place at the traverse ends of the scaffold?			
4.4	Is bracing located on the scaffold as per design?			
4.5	Does bracing extend to the full height?			
4.6	Are working load limits for each bay and working deck communicated, identified and maintained? Refer to the handover certificate.			
4.7	Are procedures in place for any alterations?			
5.0	**Access and egress**	**Yes**	**No**	**N/A**
5.1	Is there access and egress to all working platforms, where applicable?			
5.2	If there is access to the structure, has adequate fall protection been installed between the structure and scaffold?			
5.3	Where access ladders are used: a) Are they fitted internally?			
	b) Are they adequately secured?			
	c) Are they pitched 1:4?			
	d) Do they extend 900mm above the landing?			
	e) Are they in good condition and free of defects?			
	f) Is edge protection or hatch provided to the void created by the ladder access?			
5.4	Where access stairs are used: a) Are they bearing squarely and adequately on transoms?			
	b) Are there no excessive gaps between the platform and transoms?			

6.0	Electrical	Yes	No	N/A
6.1	Is scaffolding erected outside of the No Go Zone of overhead power lines? (4.6 m horizontally either side and 5 m vertically below power lines) Refer to the asset owners and Energy Safe.			
6.2	If scaffolding is erected within the No Go Zone, is written permission available from the asset owners?			
6.3	Are insulated hooks available so that leads are elevated rather than being in contact with any scaffold components such as handrails and ledgers, or wound around ties or couplers?			
7.0	**Containment sheeting**	**Yes**	**No**	**N/A**
7.1	Has the scaffold been designed for wind loading on any containment sheeting? For example, hoardings, signage, temporary fencing, wire mesh or shade cloth.			
7.2	Has sufficient sheeting or brick guards been provided to protect workers or members of the public who might be exposed to a risk of falling materials from the scaffold?			
7.3	Are the fixing ties secure?			
7.4	Is the integrity of the containment sheeting being maintained? For example, no gaps, rips or tears.			
8.0	**Edge protection**	**Yes**	**No**	**N/A**
8.1	Are guardrails, midrails and toeboards installed on all working decks and access platforms from which a person or object could fall, and are they secure?			
8.2	Where the gap between the structure and the scaffold is more than 225 mm, has edge protection been provided? Minimum guard rail and midrail.			
8.3	Where any changes to the structure have occurred; for example, removal of cladding or formwork, is the gap between the structure and the scaffold still less than 225 mm?			
9.0	**Platform/decks**	**Yes**	**No**	**N/A**
9.1	Are working platforms fully decked? For example, no gaps or missing boards or planks.			
9.2	Are boards and planks secured when required? For example, from uplift from wind and sliding.			

9.0	Platform/decks	Yes	No	N/A
9.3	Are planks uniform and in good condition? For example, no splits, cracks, knots or bends.			
9.4	Are platforms free of obstructions? For example, electrical leads, building rubble and debris causing tripping hazards.			
9.5	Where materials are stacked on platforms, is there sufficient access provided? Minimum 450 mm wide for persons and tools, minimum 675 mm wide for persons and materials.			
9.6	Where brick guards are used, are bricks or other material stacked below the height of the brick guards?			
9.7	Are the loads on working platforms within their design load?			
10.0	**Supporting structures**	**Yes**	**No**	**N/A**
10.1	Is the supporting structure in good condition?			
10.2	Has the supporting structure been assessed to have adequate strength by a suitably competent person?			
10.3	Are there sufficient controls to prevent deterioration of the supporting structure?			
10.4	Have all measures to strengthen the supporting structure been deemed adequate by a suitably competent person?			
10.5	Is the risk of the supporting structure being overloaded from other sources adequately controlled?			
11.0	**Ties and connections**	**Yes**	**No**	**N/A**
11.1	Is the scaffold secured to the structure with ties?			
11.2	For unclad scaffolding, are ties being maintained at roughly every 2nd lift vertically and every 3rd bay horizontally?			
11.3	Is the scaffold stable when standing on the decks?			
11.4	Is there a system to ensure that if ties need to be removed or relocated, it will not affect the design of the scaffold and the integrity of the structure?			
11.5	Are all components secure? For example, handrail, midrail, transom and ledger connections.			

12.0	Hop-up brackets	Yes	No	N/A
12.1	If a hop-up bracket is to be used outside of its intended design on the working face of a scaffold, has this been considered, approved and documented by the manufacturer/supplier or a competent person?			
12.2	Are hop-up brackets being maintained within 500 mm above or below the working platform?			
12.3	Is each hop-up bracket secured in a way that prevents it from moving or planks falling out? For example, with a tie bar.			
13.0	**Mobile scaffolds**	**Yes**	**No**	**N/A**
13.1	Is the supporting surface hard and flat?			
13.2	If the ground surface is unstable, are boards or steel channels used? For example, on dirt, uneven ground or a muddy or sloping surface.			
13.3	Is bracing erected correctly and is a plan brace included at the base of the scaffold?			
13.4	Are controls in place for any hazards in the operation area of the mobile scaffold? For example, floor penetrations, slab edge, powerlines.			
13.5	Are the castor wheel locks in working order?			
13.6	Are the castor wheel locks locked before workers work on the scaffold?			
13.7	Where the working platform is over 2 m in height, are handrails, midrails and toeboards being maintained and is there internal ladder access provided?			
13.8	Is the working deck complete? For example, no split decks.			

Suspended scaffolds (swing stages)

Common types of suspended scaffolds in the construction industry include:

- Swing stages
- Double-rope scaffolds, with cradles supported by two rows of suspension ropes
- Work cages, which are small cradles supported by one suspension rope only
- Boatswain's chairs, where the platform is a seat for one person
- False cars, which are specialised forms of suspended scaffolding. They are often used in the construction of lifts.



Example of swing stage scaffold

Erection of the suspended scaffolding

- The person carrying out or directly supervising erection or modification work on any suspended scaffold must have an Advanced Scaffolding Licence.
- Ensure the person supervising the work has a copy of the design plan prior to the erection/ modification of the suspended scaffold.
- Fall protection, which may include safety harnesses/lanyards with adequate anchorage points, should be in place for the scaffolders at the building edge.
- To prevent injury to persons from dropped cables, rigging components or tools, a sufficiently large area below the scaffold should be barricaded off to prevent access. A spotter may need to be positioned.
- Ensure a secondary protective device is provided for each scaffolding hoist, to operate on the suspension wire rope above the hoist or on a secondary wire rope. This device provides an emergency brake to hold the cradle if the hoist or wire rope within the hoist fails.
- If used, the secondary wire rope for any scaffolding hoist should be attached to the suspension rigging, at a point that is independent of the main suspension rope attachment.
- A sign, clearly displaying the safe working load limit, in kilograms, should be fixed to the inside of each cradle.
- The cradle should have guardrails, midrails and toe boards fitted. The working deck needs to be fixed, of a non-slip type and with adequate drainage holes.
- A competent person or the certificate or the Advanced Scaffold Licence holder responsible for erecting or altering the scaffold should supply a written statement that the scaffold is complete and safe for use.

Suspended scaffold operation

- The employer of persons working in the suspended scaffold should have procedures and safe systems of work in place.
- The employer must provide operator(s) with information, training and instruction.
- Ensure the supplier of the suspended scaffold provides written operating and safe use instructions and daily safety checklists.
- Ensure procedures are in place for the rapid retrieval of the suspended people in the event of an emergency.
- Ensure effective communications are in place between the cradle or chair and other workers to alert others on site in case of an emergency.
- Ensure measures are in place to protect debris from higher work, falling onto workers in the cradle.
- Where access and egress is not from the ground or a protected landing, make sure safety harnesses and lanyards are provided and used when entering or leaving the cradle.
- If the scaffold is subjected to movement due to wind or the work procedures being undertaken, lateral restraints are required.
- The cradle platform should be in a tidy condition with unobstructed access along the entire length.
- During meal breaks etc, the platform should be secured to the structure and the power disconnected from the scaffold hoists or supply point.
- For overnight or longer periods, make sure the platform is parked in its storage position and secured to the structure.
- A competent person should inspect the cradle and suspension system at not greater than monthly intervals.
- Ensure all portable electrical equipment including scaffolding hoists and cabling are inspected and tested every 3 months. The RCD protection devices are to be tested monthly.

Monitor wind speeds

- Give workers using a swing stage information about its operational wind speed limits and any other constraints.
- Implement a system of work to assess and monitor local wind speeds and weather conditions before, and while, using a swing stage. This could include using building, handheld wind speed meters (anemometers) and monitoring local weather updates online, to ensure the swing stage operates only within acceptable limits.

Electrical installation for swing-stages

Switchboards supplying power to swing-stages should be designed so that electrical power cannot be inadvertently disconnected. They should also be designed so that a person must complete a deliberate action before disconnection can occur.

The principal, scaffold and electrical contractors must ensure switchboards are suitable for swing-stages in the following way:

- Positioning switchboard close to the swing-stage.
- Ensuring wiring is designed to limit voltage drop to a maximum of 5 per cent, based on:
  - 2 per cent to the switchboard
  - 3 per cent for the flexible supply cord for the swing-stage
- Having a dedicated circuit for each swing-stage protected by separate Residual Current Devices (RCDs).
- Hard wiring the supply cord into the switchboard.
- Securing plug-tops to socket-outlets with purpose-designed locking rings.
- Using a dedicated switchboard, so the switchboard can be locked to prevent access.
- Label supply cords with, ‘Do not remove’ or similar.

Checklist for the erection and installation of a suspended scaffold

No.	Scaffold erection and installation	Yes	No	N/A
1	Is the suspension rig stable?			
2	Is the wire rope used the correct size and type for the hoist?			
3	Is each hoist fitted with a secondary protective device?			
4	Has the secondary protective device been adjusted for the size of wire rope fitted?			
5	Are all wire ropes independently attached to the rigging?			
6	Has the suspended cradle been assembled correctly?			
7	Is the safe working load limit displayed in the cradle?			
8	Is the cradle in good mechanical condition?			
9	Has the scaffold been erected as per the design plan?			
10	Has safe access been provided for workers to enter and leave the cradle?			
11	Has the scaffold been erected as per the design plan, with any modifications or changes approved and recorded on an amended plan?			
12	Has an adequate power supply been provided for the suspended scaffold?			
13	Have the voltage drop requirements for suspended flexible cable been taken into consideration?			
14	Is the construction power-board situated near the support rigging of the suspended scaffold?			
15	Can the suspended flexible cable be accidentally removed from the power-board?			
16	Has the suspended flexible cable been correctly secured to the support rigging and the cradle?			
17	Is the suspended flexible cord the correct type?			
18	Has the suspended cable adequate running clearance?			
19	Is the suspended cable of sufficient length?			
20	Is the control box attached to the outside guardrail?			
21	Are the electrical cables from the control box to each hoist correctly installed?			
22	Are the cables from the control box to each hoist adequately protected from mechanical damage?			

Other suspended scaffold checklists

- Checklist for suppliers of suspended scaffolds.
- Checklist for designers of suspended scaffold installations.
- Checklist for erectors of suspended scaffold.
- Swing stage and Boatswain's chair in-service checklist.
- False cars in-service checklist.

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Hanging bracket scaffold

Hanging bracket scaffolds are scaffold planks supported by frames on buildings or other structures.

Hanging brackets are often made from braced L-shaped brackets, where the vertical arm is hung from or secured to the structure. The other arm projects horizontally to support the scaffold planks. Posts are installed at the end of the horizontal members to support guard railing.

Bracket scaffolds are sometimes set up to provide a catch platform. This is to safeguard roof workers, like tilers or roof plumbers, from falling to the ground or a lower level of the building under construction.

Usually when this is done, the same scaffold provides a working platform for other tasks, such as facia and gutter installation.

Toe boards

They need to be in place where:

- the potential fall height from the platform exceeds 2 m
- there is a likelihood of a person:
  - working below a bracket scaffold
  - being struck by any materials, tools or debris falling from the platform.

Secure toe boards

To ensure toe boards cannot become dislodged or removed, they need to be positively fixed to the scaffolding components.



Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Scaffold erection

Unsafe method

Both the *Victorian Industry Standard for the safe use of scaffolding in the workplace* and the *NSW Scaffolding Industry Safety Standard* recognise that the sequential erection method – working on live edge while installing guardrails – is an unsafe method of scaffolding erection.



Unsafe sequential erection method – working on live edge while installing guardrails

Safe method

1 metre lift method.



1 m lift scaffold erection method – Some scaffold components such as toe boards and access ladders are omitted for clarity

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard
- NSW Scaffolding Industry Safety Standard SafeWork March 2022 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0006/1057596/scaffolding-industry-safety-standard.pdf

Advanced guardrail system, scaffold erection method



Advanced guardrail system, scaffold erection method. Some scaffold components such as toeboards are omitted for clarity.



Another advanced guardrail system scaffold, erection method. Some scaffold components such as toe boards are omitted for clarity. The mid-rail is being installed after the temporary handrail (in yellow).

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Scaffolds lifted by cranes

When a pre-erected scaffold is to be lifted by crane, the following safe work practices should be followed:

A crane should not be used to lift aluminium mobile scaffolds.

- Before the lift, assess factors such as weight of scaffold, site conditions, weather and obstructions along the route.
- A suitably competent engineer needs to design the lift plan (including lifting points and slinging arrangements). It should be peer-reviewed by a third-party suitably competent engineer.
- Documentation, such as manufacturer's instructions, lift plan and SWMS, needs to be communicated and accessible for crane, scaffold crews and HSRS.
- Ensure scaffold is assembled on suitable ground conditions and is stable before lifting. All loose components, such as base jacks, need to be secured. Any additional bracing required in the design should be in place.
- A suitably competent person should do a pre-lift inspection.
- Designate location verified as suitable to land the scaffold.
- Any required ties are kept in place until suitable lifting gear has been attached to the scaffold. Make sure the load is slung by a licensed dogger or rigger and maneuvered in a way that ensures the load remains stable.
- Select a crane that is suitable for the weight and height of the scaffold, ensuring it has the necessary reach and capacity.
- Once lifted, guide the scaffold into the designated location and ensure it is placed securely onto the suitable supporting structure.
- Lifting gear is to remain in place and connected to the crane until the scaffold has been secured via ties, as set out in the design.

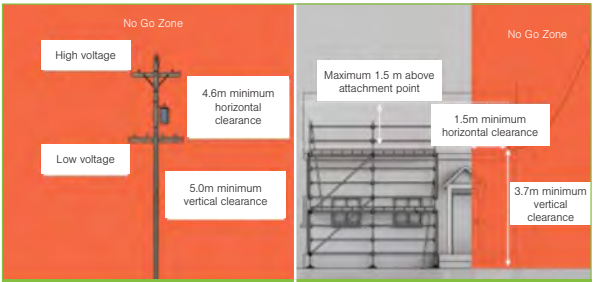
- A suitably competent person should do a post-lift inspection of the scaffold to ensure it was not damaged or affected during the lift and placement process.
- A scaffold handover certificate and scaffold tag need to be completed before it is commissioned.

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Electrical hazards for scaffolding

Power lines and service lines



'No Go Zone' for scaffold near power lines | **Clearance distances for scaffolds near service lines**

Flexible extension cords

Where flexible extension cords pass through scaffolding, they should be run on insulated hangers.

This reduces the risk of mechanical damage that could result in an electric shock.

Reference:

- Industry standard for the safe use of scaffolding in the workplace Edition 1 December 2024 WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard

Mobile scaffolds

Who can erect a mobile scaffold?

If the fall-height from the mobile scaffold's top working platform is more than 4 metres, anyone erecting, altering or dismantling the scaffold at a workplace must hold an High Risk Work Licence for scaffolding (basic as minimum) or be a trainee under the direct supervision of a Licence holder. The fall-height is taken to be the vertical distance from the top working platform to the lowest point to which an object could fall. A low-height scaffold located adjacent to the edge of an elevated floor can have a potential fall-height exceeding 4 metres, and would require a Certificate/Licence to erect.

Safety standards for mobile scaffold erection:

- Follow the manufacturers'/suppliers' written instructions for correct erection, use and dismantling.
- The height of any light-duty tower-frame scaffold should not exceed 9 m (unless otherwise specifically stated in the supplier's documented information).
- The duty rating (load rating for a particular scaffold should be established from the supplier's information.
- A working platform should be the full width of the scaffold frames.
- Generally, a ladder access to a platform supported by a tower-frame scaffold should be constructed within the framework with a hinged trapdoor in the working platform.
- The ladders should be single, industrial-grade ladders pitched at a slope of not less than 1:4 and not more than 1:6 and secured against displacement.
- Wherever a person or object could fall a distance of 2 m or more from a platform, edge protection in the form of guardrails, midrails and toe boards is required to be fitted to all open sides and ends of the platform.
- For mobile scaffolds erected at heights of 2 metres or less it is permissible to climb the scaffold's end frames but not the diagonal braces. Care should be taken when climbing the mobile scaffold if it is used near an edge (with guardrail protection at a standard height.

Basic rules for using mobile scaffolds (mounted on castors) safely:

- Only use the scaffold on a hard, flat surface. (On soil, use steel channels or similar to provide a hard, flat surface).
- For castors with no height-adjustment, make sure the surface is level.
- For castors with adjustable legs, ensure the scaffold is used on surface gradients greater than 5 degrees, unless provision is made to take the load off the castors during the use of the scaffold.
- Ensure the scaffold is kept well clear of live electrical powerlines. The minimum safe clearance distances are 4.6 m horizontally and 5.0 m vertically. The 5.0 m clearance is from the top of the guardrail on the scaffold. Only if written permission is obtained from the power supply company and a SWMS is developed, is encroachment on these No Go Zones allowed.
- Ensure the scaffold is not positioned closer than 1 m to any slab edge, penetration or step-down unless a positive means to prevent it crossing the edge is in place, such as a fixed fence, rail or suitably high upturn.
- Ensure the scaffold is not accessed until all its castors are locked to prevent movement.
- Ensure the scaffold is not moved or relocated while anyone is on it.
- Ensure the scaffold is not covered with containment sheeting such as shade cloth, unless it has been specifically designed for that purpose and it is only used in an enclosed, wind-protected environment.

Scaffold guardrails should never be used to gain extra height or to support equipment or loads.

List of other important, additional areas covered in the Victorian and NSW standards

WorkSafe Victoria Industry standard for the safe use of scaffolding in the workplace	Page/s
Suitably competent engineers	17
5 Sole boards and baseplates	29
4.4 Foundations and bearing capacity	30
Scaffold ties	31
Common types of scaffold ties	33-36
Scaffold planks	41
Lapboards	41
Hop-up (bay extension) platforms	41
Guardrails	43
Midrails	43
Toe boards	43
Panels	44
Containment sheeting (encapsulation)	44
Openings in edge protection	44
Omission of edge protection	44
4.11 Gantries	45
5.2 Altering scaffolds	52
5.3 Dismantling scaffolds	52
6.1 Electrical hazards	54-55
6.2 Scaffold collapse hazards	56-57
Overloading	58-59
Mix and match scaffold components	60
Mobile scaffolds	60-62
6.4 Falling objects hazards	62-23
6.5 Collision hazards	64
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Part 7: Emergency procedures	66

NSW Scaffolding Industry Safety Standard [Major focus on systems and processes]	Page/s
2.2 Scaffold project milestones	6
2.4 Tenders or request for quotes	8
3.4 Scaffold structural and operational requirements:	16
3.7 Documentation and provision of design information	19
3.8 Project and scaffold design changes	20
5.3 Safe work method statements	29
When must handover certificate be issued	31
Staged handover certificates	32
5.6 Independent verifications of higher complexity scaffolds	33
6.4 Preventing unapproved modifications	39
6.5 Preventing unapproved loading or overloading	40
6.6 Managing planned alterations	42
7.2 Issue rectification process	45
7.3 Identifying and responding to unapproved modifications	46-57
7.4 Identifying and responding to overloading	48
7.5 Identifying and responding to damage to scaffolding	49

Perimeter guard railing

Guardrails may be used to provide effective fall protection at:

- The perimeters of building or other structures.
- The perimeters of skylights or other fragile roof materials.
- Openings in floor or roof structures.
- Edges of pits, shafts or other excavations.

The guardrail system should:

- Be 900-1100 mm above the working surface.
- Incorporate a mid-rail or mesh panels.
- Incorporate a toe board.
- Be designed to resist the live loads, which may be put on it.

Guardrail systems intended to be used in conjunction with steel structures or tilt-up construction, should have guardrails and fixings attached to the panels prior to the structures being raised from the ground.

Where the slope of a roof exceeds 40 degrees, guard railing should not be used as the sole means of fall protection. In this situation, guard railing should be used in conjunction with individual fall arrest systems and roof ladders. A scaffold deck at the perimeter edge would be an effective means of overcoming the fall hazard caused by the extreme slope of the roof.

Reference:

- WorkSafe Victoria Compliance Code for Prevention of Falls in General Construction 2019 https://www.worksafe.vic.gov.au/resources/compliance-code-prevention-falls-general-construction

Fall arrest systems and travel restraint systems

This is Personal Protective Equipment (PPE), which should not be used unless other means of providing fall protection, such as scaffolds, guardrails and elevating work platforms have been considered and are not practicable.

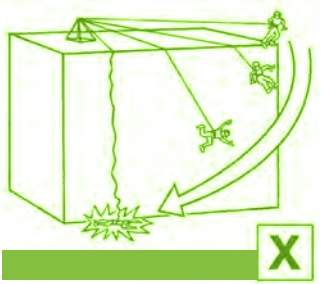
Before using an individual fall arrest system or a travel restraint system, workers should be trained in its use.

- Fall arrest systems are a type of plant and must be subject to hazard identification prior to use. It is good practice also to carry out a risk assessment.
- Where practicable select a travel restraint system (designed to prevent a person entering the fall hazard zone) in preference to a fall arrest system.
- Anchorage points must be able to withstand 15 kilonewtons (1500 kgs of force) or 21 kilonewtons (2100 kgs of force) if two persons are attached to the one anchor. This dynamic loading or force is based on the weight of one or two persons falling 2 metres.
- Prior to use, a fall rescue plan should be developed. Workers using fall arrest systems should not work alone.
- Full body safety harness should be worn not waist belts.
- Lanyards and inertia reels should be attached to the rear shoulder attachment point of the harness.
- Make sure lanyard systems are installed so that the maximum distance a person equipped with a harness would free fall before the fall arrest system takes effect is 2 metres.



Back View (Note D-Ring)

- Ensure energy or shock absorbers are used with all lanyard, harness and inertia reel systems.
- Lanyards should not be used in conjunction with inertia reels as this can result in an excessive amount of free fall before the fall is arrested.
- Snap hooks need to be of the double action type, requiring at least two simultaneous, deliberate actions to open.
- Do not directly attach a lanyard snaphook to an anchorage point, i.e. a ring, use a Karabiner passed through the eye of the lanyard thimble to make the connection.
- Avoid using inertia reels in a horizontal configuration where, in the event of a fall, the line can be snagged on sharp edges and be severed.
- Beware of using an inertia reel when working on a steeply pitched roof. In a fall down the inclined surface of a steeply pitched roof the inertia reel line may not lock up.
- An arrest line may fail if it contacts an edge in a fall. Make sure that verification has been obtained from the manufacturer or supplier that it is safe to use with the specific type of edge involved in the work process.
- Inertia reels should not be used as working supports by locking the system and allowing it to support the user during normal work.
- To avoid roll-out make sure you use the same fall arrest manufacturer's recommended hardware such as energy absorbers, karabiners, etc.
- Seek advice when you set up an inertia reel. Avoid the pendulum effect (graphic shown to the right).
- Only a qualified rigger or scaffolder or other suitably trained person should install a static line system.



- Maintenance records on inertia reels should be available on request.
- Suitably competent persons should undertake inspection of fall arrest systems.

Reference:

- WorkSafe Victoria Compliance Code for Prevention of Falls in General Construction 2019 - Appendix G – Safety harness fall arrest systems https://www.worksafe.vic.gov.au/resources/compliance-code-prevention-falls-general-construction

Elevating Work Platforms (EWP)

Only operators of boom-type elevating work platforms where the boom length is 11 metres or more are required to hold a High Risk Work License.

Ensure operators of all other types of EWPs are competent and able to demonstrate they have received instruction or training in operation and safe use of the EWP.

Ensure Certificates of competency (CoP) issued by a Registered Training Organisation (RTO) list the plants covered by the CoP.

To operate a boom type elevated work platform (boom length greater than 11 metres) the operator must hold a “Licence to Perform High Risk Work” (WP classification) issued by a Registered Training Organisation (RTO) on behalf of WorkSafe Victoria. (Strict exceptions may apply in regard to training the operator).

To operate a scissor/cougar lift, ensure the operator (and their employer) is able to demonstrate they have been trained in the safe use of both types of plant; the scissor lift (SL) and/or the cougar lift (VL). Both require separate certificates of competency, as do all types of Plant. Proof of training cards are generally issued by RTO’s.

Reference:

- WorkSafe Victoria Industry Standard Elevating work platforms - For the safe use of elevating work platforms June 2023 Edition 4 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2023-06/Elevating-work-platforms-edition-4-2023-06.pdf



Safety rules for EWPs

- The hirer or the supplier of the EWP is to provide the user with training, in the particular EWP to be used. This is particularly important for boom type EWPs.
- The employer should assess the need for refresher training especially in regard to new models and types of EWPs.
- Ensure daily operational checks are undertaken – including operation of audible and visible warning systems – and signed off in the log-book.
- Ensure a slab terrain EWP is never be used on any other surface apart from concrete or level asphalt.
- The capacity of all terrain EWP to travel on uneven surfaces should be carefully assessed as per the manufacturer's safety advice and specifications.
- Ensure an anchored safety harness with an energy absorber is always worn while in a boom type EWP.
- Travel in an EWP with the boom elevated should be performed as slowly as possible. Make sure the clearance is checked before the EWP is moved to a new position.
- Ensure the safe working load written on the EWP is checked to ensure it is not exceeded.
- Reference should be made to EWP Manual Specifications in relation to the raising of pipes or other equipment. Unless the manufacturer specifies their suitability, guardrails of EWPs should not be used for lifting purposes. Special attachments may have to be installed if equipment is to be lifted.
- Where RCD protection is provided on power outlets on EWPs make sure these RCDs are tested and tagged.
- Lifting loads via cables and ropes from the EWP is not permitted.
- The EWP should not be raised in high wind conditions (Refer to operator's manual).

- Make sure the EWP operator knows how to lower the platform in an emergency, or if power is lost.
- Persons should be kept clear of the operating area of the EWP. If used in a thoroughfare, a warning barrier of parawebbing or safety tape should be positioned to prevent persons from passing under the EWP.



Example of a mesh fitted to an EWP

- An EWP should not be entered or exited when elevated (except in an emergency).
- Ensure measures are in place to prevent tools or equipment falling out of boom basket or scissor platform.

Control measures for the safe loading of EWPs

EWP is loaded and unloaded according to the EWP manufacturer's instructions:

- The tilt tray truck is suitable to transport the EWP in the stowed position as determined by the EWP manufacturer.
- The tray or trailer should be long enough for the boom and basket in the travel position.
- The mass of the EWP is within the capacity of the winch, truck and/or trailer.
- Operators of EWPs are provided with operating instructions and must be adequately trained for its operation. This is especially critical in relation to loading and unloading EWPs onto and off tilt trays.

In addition, the following should be considered:

- Transport EWPs on a drop deck trailer (low loader) rather than a tilt tray truck.

- Never drive an EWP onto a truck. It may be driven up to the truck to align the wheels for loading. The EWP should be shutdown and the winch cable attached before the brakes are released. To prevent damage to the EWP brakes and tyres, don't winch it onto the truck with brakes applied (see picture below).
- If stowing the basket onto the tray, lower the basket in a level position, using the ground controls.



Example of an EWP secured to a delivery vehicle for transport



EWP being winched up a tilt tray

Driving scissor lifts and boom type lifts whilst elevated

Some EWPs have lock-out devices or interlocks that prevent them from being driven whilst elevated. Other types do not have these functions. It is not to be assumed simply because they don't have interlocks, that they can be driven safely whilst elevated.

An elevated scissor lift can overturn whilst it is being driven on surfaces such as sub-bases which have been prepared for concreting.

Incidents have occurred in the past, where elevated work platforms have been driven into open trenches, backfilled trenches, live edges, and open penetrations.

Risk controls

- Ensure a SWMS has been developed and reviewed for the system of work being undertaken, and all workers have been tool boxed and consulted into the requirements of the SWMS.
- Ensure operators have the appropriate level of competency to operate the EWP Boom Type Elevated Work Platform (WP) and Scissor/One Man Vertical Lift Type Elevated Work Platform").
- Ensure the type of EWP is suitable for the system of work being undertaken. I.e. rough terrain.
- Provision of a spotter or safety observer on the ground.
- If areas are backfilled, ensure compaction tests have been carried out.
- If operating near live edges, voids, penetrations, and excavations etc., implement a high-level hierarchy of control such as engineering controls including bump stops, water barrier, fencing etc. at an appropriate distance to prevent the EWP from entering such an area.



Increased risk – secondary guarding required

Preventing crush injuries in the use of EWPs

This risk occurs where EWP basket is required to be used near overhead/adjacent fixed structures. To control the risk implement the following:

- Physical barriers attached to the basket which reduce the likelihood of employees being crushed against structures (figure 1).
- Pressure sensing devices positioned over the control panel which detect pending crush incidents and prevent further hazardous movements (figure 2).
- Proximity sensing devices which prevent an MEWP's basket from maneuvering into crushing proximity of fixed structures.



Figure 1: Example of physical barrier



Figure 2: Example of pressure sensing device



Installing overhead pipework

Some safe work practices:

- Use a pipe rack fitted to the EWP, to support the pipes during installation. The pipe rack should be designed by a competent person.
- Ensure that the manufacturer or a competent person has assessed the effects of the pipe rack on the specific EWP and has de-rated the EWP, if required.
- Operating instructions should be developed and operators should be trained in the safe use of any designed attachments.



Examples of pipe racks fitted to EWPs



Example of glaziers' attachment for lifting glass

- Before positioning gas cylinders in an EWP ensure the following:
  - Use of gas cylinders in "enclosed" EWPs (i.e. where both the walls and floors allow the gases to accumulate) is considered unacceptable because of the fire risk from gas vapour emissions.
  - The basket or platform should be of sufficient size to permit a 1 metre clearance between the worker's controls and the gas cylinders.
  - The cylinders are secured to withstand any lateral or vertical movement from the EWP.
  - The cylinders are positioned so as not to upset the balance of the EWP.
  - Cylinder valves, gauges and regulators should not be above the height of the EWP guard railing so as to prevent mechanical damage from obstructions.
  - Gas cylinders should not be attached to the outside of the platform unless the EWP has been specifically designed (or redesigned) for the purpose.
  - The gas cylinders can be safely loaded and unloaded into the EWP.
  - Ensure a fire blanket or extinguisher is in an EWP when gas cylinders are on board.
- Ensure an EWP is not operated anywhere above overhead powerlines or within the following clearance distances (see Electrical Safety – Power line No Go Zones), unless permission has been obtained from the power supply company and a SWMS has been developed.

Power lines on poles – within 3 metres each side (spotter required when operating between 3 and 6.4 metres).

Power lines on towers – within 8 metres each side (spotter required when operating between 8 and 10 metres).

References:

- WorkSafe Victoria Industry Standard Elevating work platforms for the safe use of elevating work platform 2023 https://www.worksafe.vic.gov.au/resources/elevating-work-platforms-industry-standard-edition-4
- Safe work Australia Guide to managing the risks of elevating work platforms Guidance material September 2021 https://www.safeworkaustralia.gov.au/doc/guide-managing-risks-elevating-work-platforms
- WorkSafe Victoria Technical Solution sheet 1 Working safely at height during solar installations https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2023-07/Working-safely-height-during-solar-installations-2023-07.pdf
- Manual handling of solar panels, heavy and bulky items Planning a safe approach to installing solar panels. https://www.worksafe.vic.gov.au/resources/manual-handling-solar-panels-heavy-and-bulky-items
- Energy Safe Victoria Working safely when installing photovoltaic (PV) systems 2018 https://www.energysafe.vic.gov.au/sites/default/files/2022-12/PV-Installers-Safety-Guideline.pdf
- Safe work Australia Guide to managing the risks of rooftop solar installation work now available2024 https://www.safeworkaustralia.gov.au/media-centre/news/guide-managing-risks-rooftop-solar-installation-work-now-available
- Work Safe Victoria Elevating work platforms Everything about elevating work platforms in one place 2023 https://www.worksafe.vic.gov.au/elevating-work-platforms
- WorkSafe Victoria Alert Employee crushed while using elevating work platform 2023 https://www.worksafe.vic.gov.au/safety-alerts/employee-crushed-while-using-elevating-work-platform

Mast climbing work platforms

Ensure erection and dismantling of mast climbing work platforms is carried out, or directly supervised, by a person holding at least the intermediate scaffolding (class SI) or basic rigging (class RB) certificate of competency or equivalent High Risk Work Licence.

Planning for the set up of a mast climbing platform should be undertaken by a qualified engineer who takes into account the requirements for mast climbers of a tied or free-standing type.

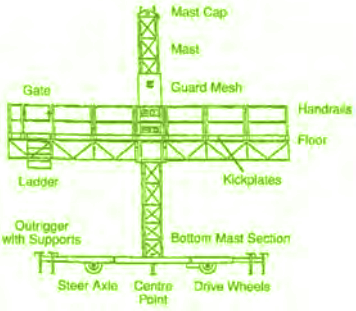
Ensure mast climbing platforms are subject to hazard identification prior to erection and a Safe Work Method Statement (SWMS) developed, taking the following into account:

- Barricading where vehicular and pedestrian traffic is encountered.
- Fencing around the mast climber to prevent unauthorised access.
- The ground conditions/stability and outrigger positioning.
- The proximity of powerlines and electrical equipment.
- The development of an operator's daily checklist.

Safe operation of mast climbers

- Daily operational checks must be undertaken, including operation of audible and visible warning systems.
- Ensure Safe working loads is not exceeded.
- Make sure all persons keep both feet on the platform deck while elevating.
- Ensure the vertical path of travel is checked for obstructions.
- Ensure the mast climber is not moved horizontally while personnel are on the platform.

Ensure a mast climber is not operated unless the person is trained in its use.



Reference:

- WorkSafe Victoria Compliance Code Prevention of Falls in General Construction https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-02/ISBN-Compliance-code-prevention-falls-general-construction-2019-12.pdf

Ladders

The Prevention of Falls Part of the OHS Regulations 2007 states that the use of ladders as a measure to control the risk of falls over 2 metres in height may only be adopted if the following measures in order of priority from 1-4 are not reasonably practicable:

1. on the ground – or solid construction
2. passive fall prevention device
3. work positioning system
4. fall arrest system.

Ladders are primarily a means of access, not a work platform, and should only be used for light work where hand hold and stability can be maintained. They should be fit for purpose, appropriate for the duration of the task and set up correctly.

Given the potential severe injury consequences, resulting from low height falls onto concrete surfaces, the use of A-frame step ladders at any height should be avoided if mobile scaffolding and/or EWPs are practicable for use. If step ladders are necessary, the platform type of ladders should always be selected over "A" frames.

Extension ladders (at heights in excess of two metres) should only be used in circumstances where other forms of safe access cannot be practicably implemented e.g. in restricted spaces, or for limited duration tasks.

Ladders should conform to the following requirements:

- Industrial grade ladders not domestic grade ladders should be used.
- Ladders should be checked for faults before use.
- Ladders should be repaired by manufacturer or supplier.
- Single stage (or extension) ladders should be placed at a slope of 4 (vertical) to 1 (horizontal).
- Single stage (or extension) ladders should be placed on stable, firm footing and secured top and bottom against movement.

- Single stage (or extension) ladders should be footed by a second person positioned at the bottom of the ladder.
- Both hands of persons using ladders should be free to ascend and descend.
- Ensure Work performed off ladders is undertaken facing the ladders.
- Only tools which are easily operated with one hand should be used on ladders.
- Persons using ladders should rest both feet on the ladder stiles.
- The feet of persons using ladders should be no higher than the third tread from the top plate of step ladders or 900 mm from the top of single or extension ladders.
- To avoid overreaching the belt buckle of persons using ladders should always be within the ladders' stiles.
- Persons using ladders should not work over other persons.
- Not more than one person should be on a ladder at any time.

Ladders should not be used:

- In access areas, walkways, traffic ways or within the arc of swinging doors.
- Where the work involves restricted vision or hot work (e.g. welding).
- On scaffolds or elevating work platforms to gain extra height.
- In very windy or wet conditions.
- Near an exposed edge or a guardrail where, if the ladder toppled, a person could fall over that edge.
- Metal or metal reinforced ladders should not be used in the vicinity of live electrical equipment; such ladders should be permanently marked with "do not use where electrical hazards exist".

Reference:

- WorkSafe Victoria Compliance Code Prevention of Falls in General Construction https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-02/ISBN-Compliance-code-prevention-falls-general-construction-2019-12.pdf

Ladders do not constitute a safe work platform. A person can easily fall off a ladder and be injured. Avoid using ladders when other work platforms are available.



Example of correctly set-up straight ladder



Platform stepladder used for work near a ceiling



PART 4:

Electrical safety spotters and safety observers

The term Safety Spotter and Safety Observer should not be used inter-changeably, when describing the role of the person guiding the operator in the safe movement of mobile plant.

The definitions below describes the correct role and function of these two distinct categories:

1. **Electrical Safety Spotter** is a person specifically trained and qualified to guide the operator in proximity (e.g. within 6.4 m of LV on poles) to overhead powerlines. The spotter will have completed an approved training course and be registered with the state electrical authority and hold an Energy Safe Victoria (ESV) electrical spotter card.
2. **Safety Observer** is a worker with line of sight who helps direct the operator with safe movement of mobile plant in the workplace, including loading and unloading from transport, but is not necessarily qualified to guide movement in proximity to overhead powerlines.

Electrical safety spotter

Training and role

22597 VIC Course in Workplace Spotting for Service Assets is designed for people wanting to become safety observers for plant and equipment. A spotter is defined as, a competent and trained person who observes and warns against unsafe approach to overhead assets, Graduates of the course may be registered as a Spotter by Energy Safe Victoria (ESV).

The role of an Electrical Safety Spotter is as follows:

- Provide a first aid response to a casualty in a workplace setting.
- Ensure safe practice as a spotter.
- Identify and address hazards associated with plant operating close to overhead and underground assets.
- Undertake pre-start activities and safety checks.

- Communicate approach limit information to plant operators.
- Facilitate emergency procedures and activities.
- Identify the operational envelope of plant/machinery.

Additional qualifications requirements for Electrical Safety Spotters:

- Have a current competency to 'Provide First Aid' (HLTAID011).
- Hold a current competency to 'Provide Cardiopulmonary Resuscitation' (HLTAID009).
- Hold an appropriate Spotter's Ticket which is valid for a 3-year period.
- Have attained the minimum age 18 years of age for a person to be registered as a Spotter with Energy Safe Victoria.
- Have a Certificate of Competency or WorkSafe Victoria license for that item for which he/she is required to be the Spotter.



Electrical safety spotter warning of boom approach to powerlines

Special note

1. **A person with a Dogman or Rigger class on their Spotter's registration card may act as a Spotter for any type of plant (without holding a ticket or demonstrating competence and experience for that item of plant).**
2. **Ensure for items of plant such as an EWP less than11 metres, or a Vehicle Mounted Crane less than 10 tonne/metres — and other plant where there is no formal WorkSafe operating competency — some evidence of training, competency assessment and or experience will be demonstrated to the RTO to enable that person to obtain a Spotter Registration Certificate.**

Application and limitations

- It should be noted that a Spotter is required for each item of plant or equipment operating in the vicinity of overhead electrical powerlines on any work site.
- Never operate plant within the 'No Go Zone' distances, see diagram above, unless a Permit to Work (PTW) is obtained from the local Power Authority. Obtaining a Permit to Work (PTW) involves the following steps:
  - Notify the Power Authority when planning the work.
  - Permit To Work (PTW) from the Power Authority.
  - Complete pre-start site job.

Reference:

- Energy safe Victoria Spotter registration 2025 https://www.energysafe.vic.gov.au/licensing/electrical-licences/licence-types/spotters-registration

Safety Observer

Reference:

- Safety Action Safety Spotter vs Safety Observer 202 https://www.safetyaction.com.au/blog/safety-spotter-vs-safety-observer

Safety Observer is a worker with line of sight who helps direct the operator with safe movement of mobile plant in the workplace, including loading and unloading from transport – *but is not necessarily qualified to guide movement in proximity to overhead powerlines*.

RIIRTM203E Work as a safety observer/spotter – unit of competency is the qualification that encompasses the skills and knowledge required to work safely as a safety observer in civil construction. This includes identifying and managing worksite hazards, establishing exclusion zones and observing work activities to monitor the safety of the work environment.

The task of a Safety Observer includes the following:

- Confirm working areas permit vehicle, plant and pedestrian access.
- Check where personnel working on foot are in close proximity to moving plant.
- Confirm hazards have been identified and safety controls in place from traffic management plan.
- Operate communication devices to support work activities.
- Maintain exclusion, no-go and pedestrian zones according to job and safety requirements.
- Maintain sight visibility of work being performed.
- Communicate to required personnel any hazards identified during work activities.



Safety observer preventing pedestrian/worker access

Safety observer for EWPS

- Needs to be trained in the operation of the EWP and licensed where required under the legislation for the type of EWP being operated.
- Needs to have a line of sight to, and in direct communication with, the operator from the ground.
- Needs to be trained in the emergency procedures for that specific EWP. Make sure this is practised before using the EWP.
- Should not leave the area until the EWP is lowered to a stowed position and the operator has alighted from the platform.

Special note: Ensure an Electrical Safety Spotter is used when working inside specified clearances near overhead powerlines — as well as a safety observer, as they each have their own specialised task.

References:

- Spotter's registration Information about training and registering as a Spotter in Victoria https://www.energysafe.vic.gov.au/licensing/electrical-licences/licence-types/spotters-registration
- General Requirements to act as a Spotter With plant and equipment working in the vicinity of overhead electrical assets https://www.energysafe.vic.gov.au/sites/default/files/2022-12/GeneralRequirementsForSpotters-2022-update.pdf
- WorkSafe Victoria A handbook for workplaces Edition No. 1 December 2009 Using earthmoving equipment near overhead electrical assets https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Using-earthmoving-equipment-near-overhead-electrical-assets-2009-12.pdf
- Unit of competency RIIRTM203E Work as a safety observer/spotter https://training.gov.au/Training/Details/RIIRTM203E/unitdetails
- WorkSafe Victoria Industry Standard Elevating work platforms For the safe use of elevating work platforms Edition 4 June 2023 – Part 3 Hazards 3.1 Electrical hazards https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2023-06/Elevating-work-platforms-edition-4-2023-06.pdf



PART 5:

Controlling hazards in structural work

Erecting structural steel

Reference:

- WorkSafe Victoria Industry Standard Safe Erection of Structural Steel for Buildings (2009) https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-03/ISBN-Safe-erection-structural-steel-buildings-industry-standard-2009-05a.pdf

Prior to erecting structural steel all workers should be inducted into a task specific SWMS which takes into account the following:

- Structural steel should only be erected by experienced riggers holding at least the Basic Rigging High Risk Work Licence (RB).
- All connections – rafters, purlins, braces etc. and column sling releases – should be performed out of protected work platforms (scissor lifts, boom lifts, crane boxes, mobile scaffolding, and fixed platforms).
- While working out of a boom lift all employees should wear a safety harness/lanyard/shock absorber attached to a fixed anchorage point in the basket. A WorkSafe certificate of competency (class WP) or equivalent class High Risk Work Licence is required for operating a Boom-type EWP with a boom of 11 metres or more.
- The area under which structural steel is being erected should be cordoned off as a No Go Zone for other workers. This also includes the slewing path of the crane.
- The erection design engineer should approve all temporary bracing of structural steel particularly if the area under, or immediately adjacent to, these steel components constitutes a work zone for other trades.
- While under construction, the bolted connections and bracing are effective to ensure the stability of the steel structure in windy conditions.

Where it is necessary to position bundles of roofing sheets on the skeletal frame and to disconnect crane slings, this work should be performed out of a boom lift, or similar.



Construction industry safety practice does not recommend the performance of work off the structural steel itself

Safe Work Method Statement – Structural steel erection (sample)

What are the tasks involved?	What are the hazards and risks?	How will hazards and risks be controlled? (describe the control measures and how they will be used)
3. Erecting stage	Weather makes erection hazardous	▪ Supervisor to check weather forecast and monitor on a continual basis and have a contingency plan in place in the event of extreme weather
	Mobile crane/ EWP ▪ injury through unsafe use ▪ overloading / uncontrolled loads	Operator must: ▪ have a current licence (or be a supervised trainee) ▪ perform a daily check of crane and complete a log ▪ check ground for stability ▪ check overhead for electrical lines ▪ wear and attach a safety harness if operating a boom lift ▪ use crane only within known wind tolerances ▪ not operate the crane outside its load charts ▪ know the weight of each lift ▪ use tag lines where appropriate (minimum 16 mm diameter)

What are the tasks involved?	What are the hazards and risks?	How will hazards and risks be controlled? (describe the control measures and how they will be used)
3. Erecting stage *(continued)*	Incorrect or poorly maintained slings	Riggers/doggers must: ▪ be licenced ▪ only sling load with Grade 80 lifting chain ▪ check that lifting chains are inspected and tagged ▪ not stand under the load
	Not following the sequential erection procedure	▪ The sequential erection procedures must be followed unless authorisation has been approved by both the builder and the erection engineer ▪ Steel frame to be inspected daily for stability and results documented
	Electrical hazards	▪ Do not use electrical equipment that does not have a current tag ▪ Keep leads elevated or adequately protected and away from sharp edges and water hazards ▪ Check that power supply is RCD protected and undamaged
	Injury from releasing load too soon	▪ The riggers and doggers are the only people permitted to release the load ▪ Load is only to be released when adequately fixed and supported
	Loading incomplete bays with panels and roofing	▪ Check that the erection engineer has approved placement load ▪ Check that the placement load is within constraints ▪ Check that columns have been grouted prior to loading
	Unstable structure	▪ Builder or builder's representative and erection supervisor to inspect the frame to ensure it meets the erection engineer's specifications ▪ Check that bolts have been tensioned to specified torques
4. End of shift	Unsecured site	▪ Secure all plant and equipment ▪ Inspect site and clean up area

Roofing

Reference:

- WorkSafe Victoria Compliance Code Prevention of Falls in General Construction https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-02/ISBN-Compliance-code-prevention-falls-general-construction-2019-12.pdf

A Safe Work Method Statement (SWMS) should be developed for each specific roofing contract. The SWMS should address fall protection needs for all roofing tasks such as the installation of the safety mesh, the laying of the sheets, and the installation of the box gutters.

In new roofing work the following fall protection measures should be used:

- 2 mm, 450 MPa wire mesh installed from a safe work platform
- box gutters installed from a safe work platform
- a perimeter guardrail system
- scaffold tower for access.

In relation to the installation of roof safety mesh, ensure the following:

- Mesh should be of 2 mm diameter with a NATA certificate (attached).
- A competent person should inspect safety mesh at the completion of installation to ensure correct method of fixing has been applied.
- The mesh should be fixed to the purlins by drilling a hole in the top of the purlin and tying off with at least four full turns around the wire. Where mesh is to be fixed to timber purlins 40 mm x 3.5 staples should be used.
- The runs of mesh should be side lapped by 150 mm (one opening width). Where purlin spacing exceeds 1.7 metres, intermediate stapling of the mesh should be carried out from underneath.

- To make longitudinal joins, the knot and tie should be the full length of the tail wire, which should be 300 mm in length. The tail wire should be tied at least three times around the knot. The other tail wire is placed under the longitudinal wire and tied around the traverse wire. The 300 mm tail wire can be achieved by cutting the longitudinal wire close to the join. The join should be the full width of the mesh with every longitudinal wire joined.
- The 2 mm wire mesh should be comprehensively installed across the entire skeletal frame of the roof prior to cutting the mesh for air conditioning penetrations.
- The entire area of the roof frame needs to be meshed and the mesh then formally inspected to confirm that it has been installed in accordance with the manufacturers' instructions, before the roof is loaded with any bundles of sheeting.

In the renewal or replacement of existing roofs, the following safety measures to control fall hazards at the leading edge (before the wire mesh is installed) should be considered:

- Catch platforms and/or individual fall arrest systems (subject to risk assessment).
- Special safety control measures for work on fragile roofs. There should be no work or movement across a fragile roof (or a roof containing unprotected skylights) unless a comprehensive fall protection system is in place (e.g. guard rail protected walkways).
- Where trades other than roofing workers need to enter a roofing area under completion, perimeter protection in the form of guardrails or a warning line system should be provided.
- If an old roof is to be replaced, make sure that it does not contain asbestos. Note that some metal roof and cladding materials are coated with a thick coating of asbestos paint.



Floor penetrations

Reference:

- WorkSafe Victoria Compliance Code Prevention of falls in general construction

Ensure floor openings, penetrations, pipe risers, voids and similar openings are protected against persons falling and falling objects at all times.

Mesh cast in at the concrete pour can provide protection for small penetrations. Otherwise a timber cover, properly secured and splayed should be installed over the penetration.

Ensure large penetrations and voids have adequate protection to make sure plant, equipment or personnel cannot fall through. This protection may include fully meshed out guardrail panels, or guard rails with a top rail, mid rail and kickboard.

Where guardrails and penetration covers are removed temporarily for work purposes, make sure adequate barricading and warning signs are in place at a safe distance from openings.

Shafts

All shafts should be protected by a full-length screen.

Ensure lift shafts are fitted with a steel mesh or solid timber cage, which has a lockable gate.

Where there is a danger of falling during the fitting of screens and cages, ensure workers are protected by an IFPS (Individual Fall Protection System).

For all work in shafts a safe work method statement (SWMS) should be developed which includes fall protection, emergency lighting and emergency evacuation.

Entry into the shafts should be subject to a tag or permit system signed by the responsible company representative. A copy of the SWMS should be attached to the permit or tag.

Fall protection while working in shafts should consist of a safe working platform complete with guardrails (if the platform does not fully span the shaft).

Where total fall protection cannot be provided by a work platform, an IFAS should be used.

Ensure the shaft remains guarded to protect other employees whilst work is being performed in the shaft.

Falling objects

There is always the potential for falling objects to injure or kill persons when overhead work is carried out.

Where guardrails are protecting edges and voids make sure kickboards are in place to stop materials from falling over the edge.

In developing a Safe Work Method Statement for particular tasks, supervisors and their employees should consider falling object hazards.

Where protective platforms and screens cannot guarantee that falling objects will not present a threat, the following safety measures should apply:

- A NO GO area should be established below overhead work.
- A NO GO area or overhead protection should be provided in proximity of hoist (e.g. Alimak) access/egress points to prevent falling hoist components injuring persons.
- The NO GO area should have secure barriers in place and adequate signage to prevent access into the area.
- All employees should be made aware of the NO GO area.
- In certain circumstances a spotter may be necessary.

Workers should be instructed to remember that there may be a danger to themselves from other trades working overhead and that their work may be a danger to those working below.

Workers can avoid being injured or injuring others by the following measures:

1. Always wearing a hard hat in work areas.
2. Providing kickboards to scaffold working decks.
3. Not leaving materials on scaffold working decks.
4. Staying away from 'No Access' and 'No Go' areas.
5. Keeping away from loads being lifted and slung loads.
6. Securing loose material such as ply-board, iron-sheets and off-cuts against the wind.
7. Not stacking materials close to unmeshed guardrails and perimeter edges.
8. Alerting the supervisor and/or Health and Safety Representative of any falling object problem areas around the site.

Exterior sign erection/installation

Reference:

- WorkSafe Victoria Exterior sign erection / installation checklist https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-01/Exterior_sign_erection_and_installation_checklist.pdf

This work is often performed by workers without adequate planning and safety controls put in place for their protection.

The four main hazards are:

- proximity to live powerlines
- falls from height
- preventing falling objects
- undertaking electrical work.

The checklist on the following page provides the means to establish and maintain a safe system of work.

Exterior sign erection / installation checklist

WorkSafe

How to use

This checklist is for employers to help control risks associated with working at heights, working near overhead electrical services, undertaking electrical work and preventing falling objects when installing signage.

As an employer, if you answer 'no' to any of the following questions you should review how work is being undertaken. Employers must ensure compliance with the relevant Occupational Health and Safety Regulations 2007 (Vic) (OHS Regulations) and ensure hazards are identified and health and safety risks are controlled, so far as is reasonably practicable.

Note: not all items listed may necessarily be relevant for each site – if this is the case, leave the section blank.

Reviewer's name	Sign installation company
Principal contractor (if different from above)	**Job location**

Indicate type of sign installation (can tick multiple boxes)

☐ Banner ☐ Blade ☐ Illuminated ☐ Pylon ☐ Other

	Licensing and certification	
1	Is the **electrical installation work** being undertaken by licensed electrical workers?	☐
2	Is the work or sign within, or could come within, 6.4 metres of powerlines or pole-mounted electrical equipment? If so, no work is to occur unless the **no go zone** requirements are followed (see diagram on page 3).	☐
3	Is the rigging work associated with the cranage of the sign, supporting poles, and erection of steel work being undertaken by a high risk work licence holder? Depending on the task: • A licensed dogman is required where slinging techniques are being applied, including the selection of lifting gear and the directing of the crane operator in the movement of the load, including when the load is out of view of the operator. • A licensed rigger is required for those sign erection tasks that involve the movement of plant and equipment and steel erection. Note: a licensed rigger can also perform dogman work.	☐
4	If **traffic management** is required, has a trained person designed / set-out the traffic control and is a trained person on site to use the stop slow bat if required?	☐
5	Is a **scaffold** being erected? • If a person or object could fall more than four metres from the structure, the scaffolder must hold an appropriate high risk work licence to erect, modify or dismantle the scaffold. Note: workers must be competent to erect and dismantle the particular type of scaffold being used to the manufacturer's specifications irrelevant of the potential fall height.	☐

FOR850/02/12IG

VICTORIA State Government



Solar panel installation

Safe installation of solar PV system

Reference:

- WorkSafe Victoria Technical Solution sheet 1 Working safely at height during solar installations https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2023-07/Working-safely-height-during-solar-installations-2023-07.pdf

Ensure the solar PV system installation is carried out by a licenced electrician experienced in the specific work.

While installing the solar panels:

- Use the identified control measures for eliminating or minimising the risk of falls from heights, and other hazards like asbestos.
- Ensure manufacturer requirements are followed when installing mounting points for the solar panels framing, considering the highest wind speeds for the region (refer to AS/NZS1170.2:2002 Structural design actions – Wind actions).
- Ensure that external wiring is protected from UV rays.

- Ensure that mechanical protection of cables is provided in accordance with AS/NZS 3000 Australian/New Zealand Wiring Rules and AS/NZS 3008.1.1:2017 Electrical installations – Selection of cables.
- It is the electrician's responsibility to ensure a copy of the Certificate of Compliance – Electrical Work (CCEW) is provided.

Site setup

Where using a vehicle loading crane or elevated work platform, loading areas should be clear from overhead power and service lines.

Establish an exclusion zone to prevent unauthorised persons from accessing the work area. Erect barrier tape attached to bollards and signage.

Accessing the roof

For large installations, temporary scaffold stairways or a mobile scaffold are a safe option as a means of access.

An elevating work platform (EWP) may also be a suitable means of access. You must ensure systems of work are in place to allow safe access from the EWP basket onto the roof surface.

For smaller works when using a ladder, it can only be used for access/egress to the roof, not for transferring equipment or material such as panels and mounting equipment onto the roof.

The carrying of tools must be in a tool belt to enable the worker to keep both hands free when climbing or descending.



Base of ladder secured on lower-level roof



Preventing falls through brittle/fragile roof material

Consideration needs to be given to the following:

- The location of polycarbonate or plastic commonly used in skylights.
- Fibre cement sheets.
- Significant deformation of the roof.

If there is a risk of falling through a roof surface, additional protection must be provided. This may include:

- An elevating work platform so workers can avoid standing on the roof itself.
- Physical barriers such as guard rails.
- Covers that are secured and labelled with a warning, e.g. form ply with a warning sign or fixed steel mesh.

Work Positioning Systems (WPS)

If it is not reasonably practicable to provide physical edge protection, a work positioning (harness) system may be used.

WPS physically prevents a fall hazard from being reached.



Work positioning system for solar panel installation

Electrical risks

Before starting any solar installation work, you must ensure that you turn off and isolate all electricity being supplied to the property at the main switch board. You should also take steps to prevent the electricity from being turned back on while work is in progress – lock-out/tag-out (LOTO).

Before entering any ceiling space:

- Identify and confirm all sources of electricity to the property. There may be more than one source or multiple properties powered from the same meter box.
- Switch OFF all power at the electricity meter box and place a lock on the MAIN SWITCH or on the meter box itself. This will prevent inadvertent re-energisation.
- For workers entering the ceiling space, always "test for 'dead' before you touch" – before undertaking any electrical work.



Example of main electrical switch with lock

Safety in construction of onshore windfarms

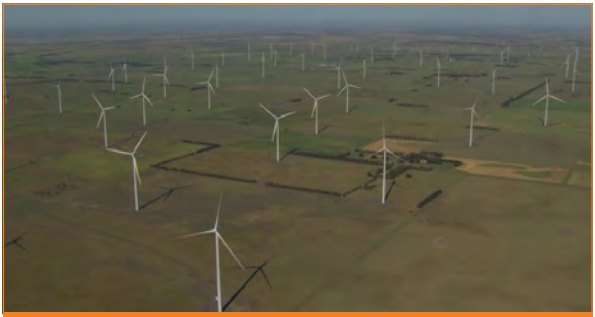
In the context of climate change, there is an imperative to establish renewable sources of Green Energy.

Alongside Solar Power, the generation of electricity through Wind Energy – derived from Wind Farms – has become a major development in the strategy to replace fossil fuels.

As of September 2024, there were 90 operational onshore wind farms in Australia. In addition, there are many wind farm projects that are proposed, or under construction.

Golden Plains Wind Farm

This wind farm is 60kms northwest of Geelong in Victoria. The site has been under construction since mid 2023 and is set to become the largest windfarm in the southern hemisphere, providing approximately 9% of the state's energy needs. The farm is comprised of electrical infrastructure and 122 turbines with a total output of 756MW at the East Site, and 93 turbines with a total output of 574KW at the West Site, with planning approval for a further 13 turbines.



Golden Plains Wind Farm

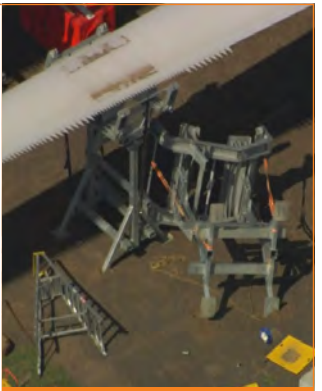
Fatality

WorkSafe Victoria is investigating an incident involving the death of a worker at the Golden Plains Wind Farm in Rokewood at 8am on 11 November, 2024.

The employee was preparing a 79-metre-long wind turbine blade to be placed into position by a crane. The blade was stored horizontally in a bracket at ground level. The bracket was made up of two parts – an upper clamp and a lower clamp. The two parts were linked together by two bolts and two pins. As the upper clamp was removed by a crane, one pin remained in place. The bracket and blade toppled over and struck the 36-year-old man just after 8am in the morning.



Three wind turbine blades stored in brackets



A blade and scaffolding on the ground near where the worker died

Previous incident at same site

A blade strike incident occurred on October 26 during the lifting of a turbine blade. The company responsible for constructing the project said a sub-contractor was involved in the October incident.

A blade made contact with the crane boom; nobody was injured.

WorkSafe Victoria has conducted 117 site visits to the project since March last year and issued 22 compliance notices to a number of duty holders.

List of safety incidents at windfarms across Australia:

- Turbine blades falling to the ground during operations (three incidents in Victoria, one in NSW and one in WA).
- An operating turbine tower collapsing at the mid-tower height level, with the top half of tower essentially 'bent over' itself, reaching the ground (WA).
- A blade fire that destroyed the blade, burning the blade down to the hub (NSW).
- A construction worker's hand being severed while cleaning a concrete pump at a wind farm site (NSW).
- Rollover of blade transportation vehicles on public roads (Tasmania and Victoria).
- Blade transportation vehicles colliding with power lines or other infrastructure (Victoria).
- Blade transportation vehicles colliding with other moving vehicles (NSW).
- Rollover of onsite cranes (three incidents in Victoria).
- Workers falling from significant heights inside wind turbine towers (NSW and Tasmania).
- Inability for emergency responders to quickly locate injured worker on site (Tasmania).
- Workers involved in vehicle accidents to or from the project site (Tasmania).
- Fires allegedly caused by private power lines installed to connect renewable generation assets to the grid (NSW).
- Fires allegedly caused by solar farm control equipment (Victoria).

Reference:

- Commissioner's Observations and Recommendations (updated) Health and Safety Matters https://www.aeic.gov.au/observations-and-recommendations/health-matters

High-risk construction work

Working on the construction of wind farms involves a range of high-risk work activities. This is exemplified in the typical installation of 200 metre towers and 80 metre blades.

In addition to working at heights, High-Risk Construction Work occurs in the following contexts listed in the Victorian OHS Regulations 2017:

- At workplaces where there is any movement of powered mobile plant.
- Where there are structural alterations that require temporary support to prevent collapse.
- On or near energised electrical installations or services.
- Involving a trench or shaft more than 1.5 m deep.
- Involving a confined space.
- Involving tilt-up or precast concrete.
- On telecommunications towers.



Ability of an oversized loads mounted on 170 tonne trucks to safely navigate the existing road network in order access the windfarm site



Accessing the site roads

Key safety issues

There are many safety considerations involved in the construction of windfarms. For example:

- Civil aviation flight path.
- Oversized equipment transport to site – road conditions, routes and road closures.
- Establishment of crane hardstands and equipment pads.
- Support structures for wind blade storage on site.
- Selection of cranes.
- Exclusion zones for cranes and other plant.
- Unloading equipment onto site.
- Pouring footings and slabs.
- Specialised rigging and lifting of tower, turbine, nacelle and blades.
- Monitoring weather-lightning wind.
- Fall protection for in-air installation of equipment.
- EWPs wind turbine access platforms.
- Falling objects.
- Internal access of towers – elevator, ladders.
- Confined spaces – within the tower.
- Maintenance work within wind turbine.
- Electrical safety.
- Machine guarding.
- Emergency evacuation.

Controlling hazards - Safe Work Method Statements

Multiple Safe Work Method Statements (SWMS) should be developed for all high-risk work activities.

For example, a SWMS for Support Structures Retaining Wind Turbine Blades would of necessity address the following:

- A geo technical report providing assurance that the ground conditions can support the standing platform for the bracket structures retaining under load, the wind turbine blades.
- An engineers report confirming that:
  - The ground platforms for the bracket structures at each end of the wind turbine blades, are uniformly level and solid – equally supporting the weight of the blades.
  - The bracket structures and their counterweights have an additional load margin capacity to allow for any ground subsidence.
- The mechanism for retaining the blades on the brackets has a fail-safe device which will not allow inadvertent dislodgment, before lifting takes place.
- A crane retains the full load of the wind turbine blade while preparatory work is taking place on the blades and/or the bracket fastenings.
- A checklist is developed which covers all steps of the work, which is signed-off by the site supervisor, the crane driver and the rigger/doggers before work commences.

References:

- Planning Guidelines for Development of Wind Energy Facilities Victorian State Government https://www.planning.vic.gov.au/guides-and-resources/guides/all-guides/renewable-energy-facilities/wind-energy-facilities/planning-guidelines-for-development-of-wind-energy-facilities
- Geogrid-reinforced access routes and Crane platforms in wind farm construction https://www.huesker.com.au/geosynthetics/applications/earthworks-foundations/windfarm-construction/
- QTLC Review of Oversize Overmass Wind Farm Arrangements Report 2023 https://www.qtlc.com.au/wp-content/uploads/2024/01/Pastin-Final-Report-OSOM-Windfarm.pdf
- Energy Safe Victoria Wind turbines Regulatory requirements for installation Guideline https://www.energysafe.vic.gov.au/sites/default/files/2022-12/Guideline-Installation-requirements-for-wind-turbines.pdf
- Planning Guidelines for Development of Wind Energy Facilities Department of Transport and Planning Vic State Government https://www.planning.vic.gov.au/__data/assets/pdf_file/0021/570630/Development-of-wind-energy-facilities.pdf

Demolition

Reference:

- WorkSafe Victoria Compliance Code Demolition 2018 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-02/ISBN-Compliance-code-demolition-2019-12.pdf

Prior to demolition, the structure and the site should be investigated by a structural engineer and a work plan should be developed in consultation with workers and their elected Health and Safety Representatives. Ensure the work plan calls for a Safe Work Method Statement and induction of employees into their SWMS.

The work plan – which should identify hazards and propose appropriate control measures – should consider the following:

- Hazardous materials present such as asbestos, SMF, PCBs, lead.
- Existing services (e.g. electricity, gas) and their disconnection.
- Location of all underground tanks, vaults, wells, voids and structures and certify that all chemicals, volatile fuels and gases have been de-activated.
- Floor loadings and potential for structural collapse.
- Fire protection.
- Where work cannot be done safely from the ground or from solid construction, safe work platforms such as scaffolding and EWPs should be used.
- Brittle roofing materials such as AC sheeting and skylights.
- If plant is to be used, ensure a qualified engineer verifies the adequacy of floors and supporting structures to bear loads imposed by the plant. This also include the tying of scaffolding, and mast climbing platforms to the structure.
- The demolition process needs to be undertaken in a way that does not affect the structural integrity of any other building or structure.

- If individual fall arrest systems (IFAS) are used, the specific application of such equipment should be subject to a risk assessment and the development of a SWMS.
- Open sides of floors, roofs, stairwells, and lift shafts should be securely covered with rigid material or provided with guardrails and toe boards. In the installation of these guardrails and coverings, make sure workers are protected from falling by Individual Fall Protection Systems – IFPS (which may include fall arrest systems or travel restraint systems).
- Cranes should not be used to pull upon fixed structural members or to lift unknown loads.
- Ensure all rigging work involved in demolition is controlled by a person holding at least the Intermediate Rigging High Risk Work Licence (RI).
- Jobs undertaken within ceilings require the provision of a solid and secure work platform.

When undertaking the demolition of roofs ensure adequate fall protection is provided (catch platforms, IFPS, guardrails, purpose built roofing ladders).

Working on suspended floors

If a powered mobile plant will be operated on a suspended floor, the principal contractor or demolition contractor, will ensure a structural engineer, verifies and documents:

- The type, size, weight and usage of specified plant.
- The floor is capable of sustaining the static and live loads of the plant, including attachments and demolished materials, without excessive deformation or collapse, either:
  - without additional support from below; or
  - with specified propping to be applied from below so the loads carried do not exceed their manufacturer's specified rating.

Demolition of walls

When a mobile plant – for example an excavator with a hydraulic rock breaker – is used to demolish walls, at least 900 mm of the wall being demolished should be left intact above the floor level to provide a protective barrier at the perimeter of the building and around lift wells, stairwells, light wells and other places where persons or objects could fall. The remaining wall can later be safely demolished from the floor below.

Remaining sections of walls should be identified and highlighted as buffers for edge protection.

Guarding, hoarding and/or exclusion zones should be used to protect workers and/or the public against the risk of being struck by falling debris and materials.

Walls should not be laterally loaded by accumulated rubble or debris to the extent they are in danger of collapse.

Work must not be performed above other employees where there is a danger of materials, tools or equipment falling.

References:

- WorkSafe Victoria Compliance Code: Demolition 2019 https://www.worksafe.vic.gov.au/resources/compliance-code-demolition
- Model Safe Work Australia Code of Practice - Demolition Work 2018 https://www.safeworkaustralia.gov.au/doc/model-code-practice-demolition-work
- NSW Government Code of Practice Demolition Work 2019 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0015/52161/Demolition-work-COP.pdf

Concrete cutting and drilling

Reference:

- WorkSafe Victoria Industry Standard Safe Concrete Cutting and Drilling 2017

This document provides detailed advice about the hazards and the control measures necessary to perform this work safely.

Specific advice is provided on the following types of concrete cutting and drilling:

- hand-held sawing
- cutting slabs on the ground and road sawing
- road sawing suspended slabs
- wall sawing/track mounting
- wire sawing
- coring techniques
- operators using a vacuum assembly to anchor a core drill.

The key hazards involved in concrete cutting and drillings are as follows:

- inverted cutting
- respirable silica dust
- toxic fumes
- serious lacerations (kickback, blades breaking)
- electrical shock in the use of electrical cutting saws
- electrical shock in the contact with in-slab electrical services
- damage to other services – gas and water
- entanglement
- falls from heights
- damage to structures
- working alone
- excessive noise
- vibration
- hazardous manual handling.

Safe work method statement

- Because concrete cutting and drilling is likely to fall into the category of High-Risk Construction Work, ensure a SWMS is prepared before work can start.

PPE

- Appropriate Personal Protective Equipment (PPE) should be provided. This includes:
  - safety helmets
  - hearing protection
  - safety goggles
  - face shields
  - safety clothing, including safety boots, aprons, gloves and reflective vests
  - respirators.

Inverted cutting

- A hand-held saw should never be used for inverted cutting because the operator has no control of a cutting machine held above shoulder height.
- Attach a track-mounted wall saw to guide tracks bolted to the slab.
- Never use electric powered water-cooled saws for inverted cutting. If the saw is turned upside down, water can flood into the motor and cause the electricity to earth through the operator.

Locating services

- Locate and mark all services during initial safety planning using the 'Dial 1100 before you dig' service or by contacting the local government authority.
- Consult the original drawings of the services and conduct a search for any 'as constructed' drawings in case there has been a change of location of services during installation (e.g. services located in floors, walls and cavities).

- If the services have been moved, use specialist equipment (e.g. a cable locator) to accurately determine where the services are now located prior to any cuts being made.
- Disconnect any services that need to be cut through.
- Ensure disconnections are confirmed and tagged by the relevant service personnel before the work begins.
- After the work has finished the service personnel should reconnect the service and, if safe, remove the tags.

Preventing damage to structures

- Confirm the location of any structural components or services within the slab or wall.
- Seek advice from a structural engineer for all alterations to structural components.
- Ensure a competent person supervises the work.
- Carry out a risk assessment if components such as stressing tendons must be cut.
- Locate and mark all components that will affect the strength of a structure if cut.
- Seek advice and supervision from a structural engineer for all cuts to structural components.

Electrical hazards in the operation of equipment

- Ensure all concrete cutting and drilling operations complies with AS/NZS 3012, Electrical installations – construction and demolition sites.
- Never use electric powered water-cooled saws for inverted cutting unless it is specifically designed for the purpose. If the saw is turned upside down, water can flood into the motor and cause the electricity to earth through the operator.
- Remove pooled water (such as coolant water used in concrete or masonry cutting and drilling) with a wet and dry vacuum cleaner before any electrical equipment is used in the area.
- Never use electric equipment for wet cutting unless it is specifically designed for the purpose – use hydraulic, pneumatic or petrol engine powered equipment instead.

- Keep extension leads, plugs and electric powered tools away from dry cutting equipment or drilling water or slurry that cannot be easily removed.
- Map out the location of existing electrical or other services (e.g. gas, water and sewerage) before work begins.
- Use a power supply fitted with residual current devices (RCDs) for portable electrical equipment to protect against earth leakage shock. Test portable RCDs regularly to ensure they are working properly.
- Inspect and tag all electrical equipment used for cutting or drilling operations.
- Suspend cords and extension leads above head height on stands, and use waterproof connectors where there is water.

Dust and gases

- Where possible, use concrete and drilling equipment that is fitted with extraction devices to eliminate dust production at the source.
- Use wet methods to minimise dust production and ensure enough water or coolant is supplied.
- Remove slurry before it dries to prevent the dried material from generating dust that can be spread to other areas of the site.
- Provide extractor fans in confined spaces or poorly ventilated areas.
- Consider using slower cutting and drilling equipment which produces less dust.
- Use respiratory protection in accordance with AS/NZS 1715, Selection, use and maintenance of respiratory protective devices to prevent inhalation of dust and toxic substances. Additional ventilation should also be provided.
- Use hydraulic, pneumatic or electric powered saws and drills, rather than petrol-driven equipment in confined or restricted spaces (carbon monoxide risk).

- If chemicals or other hazardous substances are used as aids in cutting or drilling operations, make sure they are used in accordance with the safety data sheet (SDS).
- Workers should change out of their work clothes at the site to prevent the spread of silica dust.

Working at heights

- Carry out work at height from a safe working platform, preferably scaffolding.
- Use appropriate mobile scaffold, taking into account stability and loading issues.
- Use elevating work platforms where scaffolding is not practicable.
- Never operate concrete cutting and drilling equipment while standing on a ladder.
- Access to and egress from working platforms should be by a walkway or stairway, or a temporary work platform such as an elevating work platform, scaffold or personnel cage on a forklift.

Noise

- Obtain information on the noise output of different models from manufacturers and suppliers before purchasing or hiring equipment.
- Select the quietest suitable model and blade available.
- Assess the suitability of using noise-reduced saw blades for a particular job.
- Keep people not directly involved in cutting or drilling away from excessive noise areas.
- Where practicable, erect temporary acoustic barriers around cutting and drilling areas to further reduce the spread of noise.
- Provide operators with appropriate hearing protectors.

Hazardous manual handling

- Suspend or support cutting and drilling equipment in a frame to reduce the forces and to avoid the need for awkward and static working positions.

- Select lighter equipment, such as smaller diameter blades, where possible.
- Avoid kick-back, push-back and pull-in situations by pre-checking blades and other saw components for wear and tear, assessing materials to be cut, locating hidden steel reinforcing and other obstructions, and avoiding hazardous cutting situations.
- Provide gloves that allow equipment to be gripped more effectively.

Vibration

- Purchase or hire equipment that does not have to be held or manually supported or vibrates less.
- Equipment should be well-balanced, as light as possible and capable of being held in either hand (and in different sized hands).
- Ensure the equipment has vibration-absorbing handles or an even surface on the handles to distribute gripping force.
- Consider wrapping metal handles with soft resilient rubber lagging to effectively reduce vibration exposure.
- Provide gloves that allow equipment to be gripped more effectively.

Entanglement

- Ensure all machinery is fitted with appropriate guarding.
- Fit blades saw correctly.
- Workers tie back long hair and don't operate machinery while wearing loose fitting clothing, including reflective safety vests.

Loss of vacuum pressure

- Use bolt down stands where practicable.
- If a vacuum attachment is required ensure the surface to be cut is able to maintain an adequate vacuum.
- Monitor the equipment to ensure the vacuum pressure is maintained.

- When a vacuum system is used to secure a drill stand to concrete, the compressor should have a receiver tank to ensure the operator has time to take action (if power is cut to the compressor) before the drill loses it hold.

Working alone

- Avoid situations where operators need to work alone.
- Carry out a risk assessment and consider supervision and emergency response procedures when developing safe systems of work.
- Provide communication systems to enable an operator to call for assistance if anything goes wrong.

References:

- WorkSafe Victoria Industry Standard on Safe Concrete Cutting and Drilling 2017 https://www.worksafe.vic.gov.au/resources/safe-concrete-cutting-and-drilling-industry-standard
- WorkSafe Victoria Construction: Preventing exposure to crystalline silica dust 2024 https://www.worksafe.vic.gov.au/preventing-exposure-crystalline-silica-dust



Concrete cutting and clean-up using on-tool water suppression, dust extraction, and vacuuming.

Trenching and excavations

Reference:

- WorkSafe Victoria Compliance Code Excavation (2018)

In the new Excavation Compliance Code, the depth of 1.5 metres is no longer the benchmark for providing support for a trench. The Compliance Code states the following:

- Where it is determined that there is a risk of ground collapse, or where there is a possibility of the sides of the excavation becoming unstable, the excavation needs to be supported irrespective of the depth.
- The depth of 1.5 metres is only applicable for notification to WorkSafe of excavation work (including work on a shaft or trench) at least three clear days before commencement of this work. This notification does not apply if the excavation or trenching is part of building work for which a permit has been issued.

Site Investigation

It is crucial that prior to excavation taking place, a site investigation is carried out to determine:

- Nature of the ground (soil type, rock, water table).
- Possibility of flooding from any water source.
- The existence of underground services (gas, electricity, pipelines, sewer).
- Proximity of other excavations and other point sources of instability.
- The possibility of natural or artificial hazards (e.g. ground contamination).
- Static/dynamic loads (e.g. buildings/traffic) and ground vibration.

In addition, the following should be in place prior to excavation work:

- A SWMS has been developed for all trenching/excavation tasks.
- The SWMS includes control measures for the safe use of excavation plant.
- The SWMS includes emergency procedures.
- The SWMS covers control measures to prevent falls into trenches or excavations.
- Employees have been inducted into the SWMS relevant to their trenching or excavation work.

Employers should assess the competency of persons engaged in trenching and shoring work to determine the need for refresher training.

Trenching/excavation checklist

All trenching and excavation operations should be subject to a daily checklist system to make sure that specific SWMS safety controls and the following safety requirements are observed:

- No person ever enters an unsupported section.
- Trenching supports are appropriate to the conditions (i.e. the need or otherwise for trench shields, close sheeting or benching).
- Spoil heaps are properly positioned at least 0.5 metres from the edges of the trench.
- Safe ladder access, with side guarding is provided into the trench.
- All workers wear safety helmets and high visibility vests (excepting persons performing hot works who should have non-flammable high visibility vests).
- No person is working alone in an excavation.
- Emergency procedures are in place (e.g. rescue in the event of trench collapse).
- Persons do not remain in close proximity to where an excavator is operating.

- The excavation is protected by parawebbing barricades.
- Workers in excavations are not exposed to an accumulation of hazardous fumes including fumes from petrol or diesel vehicles.
- Ensure workers not involved with the work and the public cannot access the trench and works area.
- Where there is a risk of children or other members of the public accessing the works area ensure secure site fencing is provided to prevent access.

A person should never enter an unshored or unbenched trench.

References:

- WorkSafe Victoria Compliance Code: Excavation 2019 https://www.worksafe.vic.gov.au/resources/compliance-code-excavation
- NSW Government Code of Practice Excavation Work 2020 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0019/52147/Excavation-work-COP.pdf
- Safe work Australia Excavation work Code of Practice 2018n https://www.safeworkaustralia.gov.au/doc/model-code-practice-excavation-work
- WorkSafe Victoria Industry Standard Piling work and foundation engineering sites 2014 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Piling-work-and-foundation-engineering-sites-a-guide-to-managing-safety-2014-01.pdf



Excavator too close to trench



Trench shield with guard rails attached and safe access ladder tied off

Tunnelling

Primary Reference:

- Safework Australia Guide for Tunnelling Work November 2013 https://www.safeworkaustralia.gov.au/doc/guide-tunnelling-work

Tunnelling work includes constructing a tunnel and supporting systems and associated temporary work. A supporting system means a system necessary to construct the tunnel, for example a ventilation system.

A tunnel can be defined as an underground passage or opening that is approximately horizontal and starts at the surface of the ground or at an excavation.

Excavation associated with tunnelling includes vertical and inclined shafts providing access to tunnels, portals where tunnels emerge at the surface or at a shaft, underground chambers and caverns.

Construction work carried out in or near a tunnel or associated excavation is High-Risk Construction Work under the Victorian Occupational Health and Safety Regulations 2017 and WHS regulation.

There are two main methods of tunnel excavation:

1. Tunnel Boring Machines (TBM) - Safer method
2. Drill and Blast - Less safe method

Tunnel Boring Machines (TBM) - Safer method

With the advances in technology, Tunnel Boring Machines (TBM) have now become the most common method, especially for the major infrastructure projects undertaken in Australian metropolitan centres. The use of this technology can be seen in the construction of the North East Link tunnel in Melbourne.

TBMs are large machines used to excavate dirt and rock. The cutting head on the front of the TBM rotates and hydraulic

cylinders push it forward from behind. Cutter discs on the cutting head break through the dirt and rock.

Key points about the North East Link TBMs:

- **Cutting head** – the primary working part is the large rotating cutterhead at the front, with discs that break up the earth and rock.
- **Hydraulic thrust** – hydraulic cylinders push the machine forward, allowing the cutterhead to dig into the ground.
- **Concrete segment installation** – as the TBM excavates, it simultaneously places concrete segments behind it to create the tunnel lining.
- **Material removal** – excavated material is transported out of the machine via conveyor belts and pipes to the surface.
- **Deep tunnelling** – the North East Link TBMs are designed to dig deep underground, reaching depths of up to 45 meters.

Advantages of TBM

Safety: TBM tunnelling offers a safer working environment for tunnel construction workers since most of the excavation takes place within the TBM itself. This minimises the risks associated with drilling, blasting, and rock fragmentation.



Tunnel Boring machine – North East Link

Drill and Blast - Less safe method

The Drill and Blast had been the traditional method of tunnel construction in Australia. The many kilometres of tunnels constructed during the Snowy Mountain Hydro-Electric Scheme (Snowy 1.0) exclusively involved the Drill and Blast method.

Snowy 2.0 however, is using a combination of both Tunnel Boring Machines BM and Drill and Blast – with the primary deployment of TBM.

Drill and Blast is widely used technique in tunnel construction, especially in hard rock environments.

The typical cycle of excavation by blasting is performed in the following steps:

- Drilling blast holes and loading them with explosives.
- Detonating the blast, followed by ventilation to remove blast fumes.
- Removal of the blasted rock (mucking).
- Scaling crown and walls to remove loosened pieces of rock.
- Installing initial ground support.
- Advancing rail, ventilation, and utilities.

Advantages of Drill and Blast

- **Versatility:** The Drill and Blast method can adapt to varying geological conditions, making it suitable for tunnels in different types of hard rock formations.
- **Cost-effectiveness:** For shorter tunnel lengths and smaller projects, the Drill and Blast method can be more cost-effective than using large TBMs.

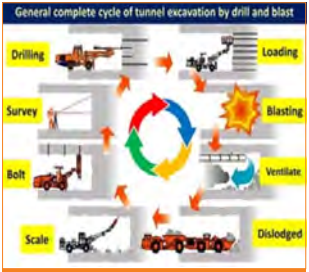


Diagram of tasks involved in Drill and Blast

Tunnel planning – Geotechnical and other investigations

The following assessment should be carried out for all proposed tunnelling operations:

- rock mass geology
- planes of weakness
- mechanical properties of rock including the influence of planes on the rock mass
- in-situ rock stress field magnitude and orientation
- induced rock stress field due to excavation
- potential rock failure mechanisms
- blast damage effects to the rock mass if blasting is being considered)
- likely scale and nature of the ground behaviour (e.g. movement)
- possible effects on other workplaces or installations
- groundwater presence and quantity
- underground services – 'Dial Before You Dig'; asset location devices (including GPR), pot holing
- possible contaminated environments, including groundwater, hazardous gases like methane, liquids like industrial waste and solids like naturally occurring or dumped asbestos.

Hazards and risks controls for Drill and Blast

Hazards	Risk Controls
▪ Uncontrolled storage, transport and use of explosives ▪ Face instability ▪ Injury from drilling and charging faces ▪ Firing times and preventing entry to firing areas ▪ Blasting fumes and dust ▪ Misfires ▪ Ground vibrations and overpressures from blasting ▪ Fly rock ▪ Rock falls – face instability ▪ Working in unprotected ground ▪ Plant hitting people, plant or structures, like muck out loaders	▪ Licensed storage, use and handling of explosives ▪ Only a competent certificated shotfirer should be allowed to handle and use explosives ▪ Only enough explosives for immediate use should be transported to working face ▪ Blasting plan should be drawn up before blasting is carried out ▪ Explosive management systems including computer control electronic blasting ▪ Drilling of lifter holes first ▪ Charging should not start until drilling is completed and electric plant like water pumps are switched off and removed from the area ▪ In the threat of a thunderstorm/lightning, charging with electric detonators should be stopped immediately and the working face evacuated ▪ Engineered ventilation ▪ Protection exclusion zones and safe places from blasting face ▪ Re-entry procedures ▪ Geotech inspection and mapping ▪ Scaling with mechanised protected equipment to minimise risk of rock fall ▪ Coating of shotcrete, known as a 'flash coat', for immediate ground support ▪ Vibration monitoring ▪ Gas monitoring ▪ Muck out using operators and spotters with traffic management plans ▪ Dust suppression sprays



Blasting refuge



Partial tunnel collapse at Snowy 2.0 site



Scaling machine



Shotcrete application

Hazard/Risks and control measures for Tunnel Boring Machines

Hazards/risks	Control measures
Access restrictions	▪ designing TBMs so there is safe access to maintainable parts including access for screw conveyor wear repair ▪ ensuring emergency plans are in place for recovery of injured people ▪ planning exit routes
TBM safe operation	▪ isolating TBM access during maintenance using: - lock out systems to prevent accidental starting - auto cut-offs for TBM roll and friction pads on grippers ▪ deeming TBM operators competent by an independent party or the TBM supplier ▪ developing and practising contingency plans
Crush areas, around grippers, walking feet or shields	▪ using: - visual lock out devices - cameras and alarms to increase the visual field ▪ ensuring operators can clearly see when grippers and pads are deployed and if there are obstructions
Cutter head transport and access including heat exposure	▪ using: - an isolation process for cutter head access - rear loading cutters and protecting cutter rings ▪ restricting other maintenance when work on the cutter head or cutter head entry is in progress
Face collapse including risks from changing ground conditions, mixed face and preferential excavation of soft ground leading to risk of settlement	▪ selecting plant through geotechnical modelling ▪ ongoing assessment of ground conditions with geologists and designers during excavation ▪ pre-treating and consolidating ground ▪ assessing settlement and potential damage

Hazards/risks	Control measures
Ground support installation including access, ring build, segment handling with cranes, annulus void filling and vibration	▪ using remote control rock bolting ▪ correctly operating segment feeder and handling devices ▪ ensuring: - workers are competent in the use of segment handlers and follow manufacturer's instructions - the ring builder can visually see rams when moving them - use of exclusion zones so no work is done under unsupported ground - limbs are kept well clear of plant ▪ inspecting installed ground support
Tunnel collapse including ground and rock fall near shields and fingers; lining failure leading to potential ground and rock falls and degradation of excavated ground through drying, flaking and support failure	▪ using geotechnical assessment during TBM design ▪ ongoing assessment of ground conditions and ground support with geologists and designers during excavation ▪ using finger shields including hoods ▪ mapping ground conditions immediately behind shields ▪ designing tunnel lining using geotechnical data and assessment including faults (shearing) and seismic activity including liquefaction ▪ having quality assurance programs for lining and annulus void filling
Pressurised hydraulic systems including pressure release through screw conveyor discharge gate	▪ using tunnel brackets designed to ensure the service pipes and cables are correctly supported ▪ marking cut off valves clearly ▪ inspecting hoses regularly for wear and replacing them if necessary ▪ establishing communication protocols when pigging the slurry lines ▪ having a sealable spoil screw conveyor tube ▪ inspecting pipes, seals and packing before commencing operations ▪ maintaining separation between workers and hose joints ▪ using eye protection for operators

Hazards/risks	Control measures
Water inrush including flooding	▪ using: - flood doors, tunnel portals and shafts designed to prevent inundation - water spray barriers - bulkheads between face and workers with sealable doors - sealable spoil screw conveyor tube - automated or remote operated pumping systems ▪ designing dewatering systems through geotechnical modelling ▪ implementing emergency exit plan ▪ monitoring groundwater inflow ▪ probing under sea or river ▪ estimated hydrostatic pressure input into tunnel lining design ▪ alignment design incorporates known geotechnical data ▪ having quality assurance programs for lining and annulus void filling ▪ designing the tunnel to prevent flotation ▪ calculating pressure for groundwater control
Electricity	▪ using cut-off switches and lock out systems ▪ implementing procedures for power failure
Gas accumulation	▪ using gas detection and lock out devices
Irrespirable atmosphere, including toxic fumes	▪ providing self-rescuers and checking their operation regularly ▪ using emergency seals
Fire	▪ providing fire suppression ▪ having individual electrical cabinet fire detection and suppression systems ▪ installing aqueous film forming foam systems at locations where grease, oil and fuel lines and tanks are present ▪ designing tunnel lining for fire durability ▪ using: - fire resistant hydraulic fluid and fire resistant power cables for high voltage supply - fire retardant tail shield grease

Hazards/risks	Control measures
Dust	▪ dust suppression, air filtration and scrubbers units ▪ water sprays and dust suppression on conveyor belts
Slip and trips including risks from greasy walls and spillage from polymer use	▪ ensuring housekeeping procedures are followed ▪ using grated walkways ▪ having spill kits available

Comprehensive coverage of tunnelling work

As the table below indicates, *Safework Australia Guide for Tunnelling Work November 2013* document provides detailed advice on safety in Tunnelling work.

https://www.safeworkaustralia.gov.au/doc/guide-tunnelling-work

Section # and description	
2.5	Emergency planning
4.3	Tunnel boring machines
4.4	Drill and blast
4.5	Portal protection
4.6	Inspections and scaling
4.7	Ground support
4.8	Sprayed concrete
4.9	Shafts
4.10	Shaft sinking
4.11	Raise boring
4.12	Raised shafts
4.13	Caissons
4.14	Ground freezing
4.15	Pipe jacking
4.16	Compressed air tunnelling
4.17	Pressure grouting

Section # and description	
4.18	New Austrian Tunnelling Method (NATM) or “Observation Method”
4.19	Personal protective equipment
5	Air quality and ventilation systems
6	Plant
7.	Other tunnelling risks
7.1	Fire and explosion
7.2	Hazardous chemicals
7.3	Health monitoring for hazardous chemicals
7.4	Visibility and lighting
7.5	Working with compressed air
7.6	Electrical safety
7.7	Falls from heights
7.8	Falling objects
7.9	Vibration
7.10	Eye injury
7.11	Radiation

References:

- Safework Australia Guide for Tunnelling Work November 2013 https://www.safeworkaustralia.gov.au/system/files/documents/1702/guide-tunnelling.pdf
- BS EN 16191:2014 Tunnelling machinery. Safety requirements https://www.intertekinform.com/en-au/standards/bs-en-16191-2014-281608_saig_bsi_bsi_650528/
- Identec Tunnel Construction Safety: Overcoming challenges https://www.identecsolutions.com/news/tunnel-construction-safety-overcoming-challenges
- Victoria’s Big Build Tunnel Boring Machines
- Guide to Road Tunnels Part 2: Planning, Design and Commissioning Australian Roads https://austroads.gov.au/publications/tunnels/agrt02

Deep bulk excavations

Reference:

- WorkSafe Victoria Compliance Code Excavation 2019 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-02/ISBN-Compliance-code-excavation-2019-12.pdf

Bulk excavations are often undertaken when construction projects are required to make provision for large spaces (e.g. underground parking, basements).

Common hazards in deep bulk excavations

- Being buried from ground collapse.
- Undermining the structural integrity of neighbouring structures, buildings footpaths/roadways.
- Damage to buried essential services (for example, gas and sewerage pipes).
- Falling into the excavation or piling holes, both people and plant.
- Drowning if the excavation floods from rain or damaged water or sewer pipes.

Controls

A geotechnical engineer or civil engineer) should determine:

- Ground conditions.
- Appropriate ground support or retention system for the site.
- Suitable systems of work for the installation of the ground support system.

Controls when excavating

- Competent person supervises the work.
- SWMS are developed and followed for the excavation and ground support works.
- Workers never work ahead of the support or remove it prematurely.
- Public is prevented from accessing the edge of the excavation or the site.

Drilling and piling

Reference:

- WorkSafe Victoria Industry Standard Piling work and foundation engineering sites 2014 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Piling-work-and-foundation-engineering-sites-a-guide-to-managing-safety-2014-01.pdf

Piles and deep foundation engineering (PF work) includes a number of piles, ground improvement and retaining wall techniques.

Hazards

- Falls, including when inspecting or maintaining piling rigs and falls into pile holes or excavations.
- Being struck by powered mobile plant, including working in close proximately to PF rigs and delivery vehicles.
- Contact with utilities services (e.g. overhead powerlines and underground cables or pipes).
- Entanglement in the rotating parts of the PF rigs.
- Crushing when moving materials, including when unloading piles from trucks and stacking them onsite.
- Collapse of partially assembled PF rigs.
- Falling loads due to use of inappropriate lifting gear.

Cast in lift points

Wherever possible, include a cast in lift point in the design of the precast piles, instead of relying on a choke hitch to lift the pile.

- Ensure the lift point has been designed by a suitably competent engineer.
- Ensure the lift point is adequately rated to lift the entire weight of the pile, while taking into consideration the dynamic forces.
- Ensure the lifting equipment has been verified as compatible with the cast in lift point.

Recommended ways to control risks

Rigging arrangements

If using a choke hitch:

- Where it has been determined that it is not reasonably practicable to have cast in lift points, then a choke hitch may be used to lift and pitch the pile.

If using a choke hitch to lift and pitch the pile:

- Ensure a detailed rigging plan has been developed that clearly identifies the capacity of the lifting equipment (including any derations) and the tension in the lifting equipment.
- Use an endless chain rather than a single leg chain, wherever possible. The endless chain will distribute the load more evenly between the chain links, avoiding repeated stressing of the individual chain links during lifting cycles.
- Before each lifting cycle, inspect the chain for any linkage damage and ensure that the inspection is documented.
- Attach a secondary choked hitch as a safety precaution. This secondary chain provides added protection in the event that the primary lifting chain fails. The secondary chain should only come under tension in the case of a failure of the primary chain.

The following safety documentation must be in place:

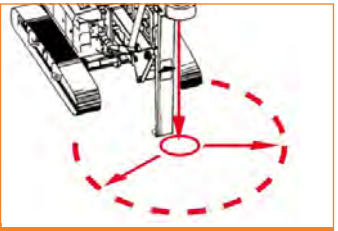
- Working Platform Certificate
- evidence of Rig Annual and Major Inspection
- non-destructive testing - DT) should be carried out by a competent person and should take place within a 12 month period and concentrate on structurally critical elements of the rig
- operators' log book
- pre-operational daily inspection
- Safe Work Method Statement (SWMS).

Onsite safety control

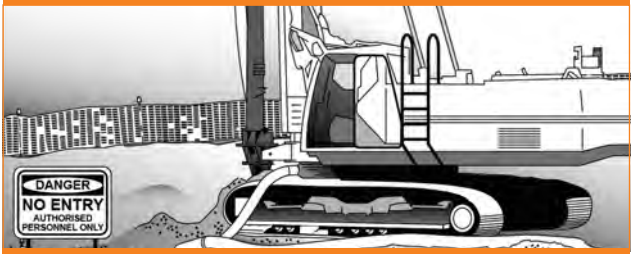
- Slopes are within the operating capacity of the equipment.
- Bored pile excavations guarding.
- Surface is able to support the weight of the operating PF equipment and any delivery trucks.
- Area is clear from obstructions and excavations.
- Excess water should be prevented from filling up the hole.
- Equipment operated without encroaching the no-go zone' areas near overhead powerlines.
- Underground services or buried structures are identified.
- Operational safety zone can be established.
- Spoil should be neatly positioned as far away from the edge of the pile excavation as practicable.
- Public protection needs to be implemented.



Pile hole guard with footplate



Example of an exclusion zone



Rig enclosed in operational safety zone

Concrete pumping

Reference:

- WorkSafe Victoria Industry Standard – Concrete Pumping 2004 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Concrete-pumping-industry-standard-2004-04.pdf

Hazards associated with concrete pumping include the following:

- traffic/public safety hazard
- concrete placing boom structural failure – boom falling to ground
- electrical – power line hazard
- reversing concrete delivery truck pedestrian hazard
- delivery hose hazard equipment/placing boom operation hazard
- equipment under pressure hazard
- entanglement/entrapment hazard – being crushed in the hopper.

In the planning for concrete pumping activities, the following issues should be considered:

- site limitations and local street access
- concrete pumping unit positioning
- concrete truck delivery access and delivery sequence
- barricading and No Go Zones for concrete delivery operation
- overhead power lines and other obstructions.

Before the commencement of the concrete pumping operations, the concrete contractor, in cooperation with the concrete pumping contractor, should provide the principal contractor with the following OHS documentation:

- Safe Work Method Statements for the general operation of the concrete pump and the overall activity of the concrete pour.

- Site specific Safe Work Method Statements (SWMSs) for the actual work to be performed on site:
  - the set up of the concrete pumping unit
  - the concrete pumping operation
  - clean up procedures
  - preparation for road travel on completion of work
- Plant safety hazard identification/risk assessments for the concrete pumping unit.
- Current equipment maintenance log books.
- Manufacturer's manual and operator's instructions.
- An annual inspection report signed by a qualified engineer verifying that the concrete pumping unit is in sound mechanical condition and the placing boom does not exhibit critical areas of wear and stress.
- A copy of the WorkSafe registration of the concrete placing boom and most industrial pressure vessels, including those used in spraying concrete.
- Certificates of competency or equivalent High Risk Work Licences for operation of Truck Mounted Concrete Placing Boom.
- If required a SWMS for the operation near overhead power lines of a concrete placing boom.
- If required the nomination and qualifications of the designated spotter for power line NO GO ZONES.

All Periodic Inspections shall be conducted as per AS 2550.15 2019: Concrete Placing Equipment (see below):

- Equipment up to five (5) years old shall be inspected once every 1000 operating hours, but not less than once a year.
- Equipment from five (5) years old up to ten (10) years old shall be inspected once every 500 operating hours, but not less than once a year.
- Equipment more than ten (10) years old shall be inspected once every 250 operating hours, but not less than once a year.

- A concrete placing boom which has been re-mounted onto another vehicle (carrier) shall have a stability test performed and recorded in accordance with the manufacturer's requirements prior to use.

The Concrete Pump operator must never be allowed to carry out the task of the line hand – located at the end of the concrete delivery line.

The concrete pump operator and the principal contractor must ensure that no persons are directly under the slewing radius of the concrete placing boom operation. A spotter and or barricades will be provided for that purpose.

Bunting and barricades and suitable signage should be installed around the perimeter of the work zone to exclude persons (other than the concrete contractor's employees and the concrete pump operator) from the area in which the concrete pour activity is taking place.

The concrete pumping contractor should ensure the following controls are in place before commencing pumping operations:

- The earth safety chain has been deployed.
- The concrete pump unit's outriggers have been securely and properly positioned.
- An inspection of the pipelines fittings and couplings has taken place.
- The emergency shut down systems are in order.
- Contingency planning for any break down of pump and need for replacement.
- The receiving hopper is suitably protected by a safety grille.
- Correct clean up procedures are in place.

All persons involved in the concrete pumping operation and the concrete pour will be required to participate in an induction into their respective SWMS conducted by the contractor supervisor (s) concerned.

Reference:

- NZ Concrete Pumping Association and WorkSafe Victoria Concrete Pumping Health and Safety Guidelines 2013 https://www.worksafe.govt.nz/assets/dmsassets/zero/440WKS-4-building-and-construction-pumping-concrete.pdf

Formwork

The main hazards when working with formwork are the following:

- Falling from unprotected edges, from bearers, through holes in the formwork deck, and over the perimeter edge of the deck itself.
- Collapse of the formwork during the concrete pour.
- Falling formwork components during stripping of the formwork.

Formwork failures can be caused by:

- Formwork not being designed by a competent person.
- Formwork not constructed in accordance with the formwork design or specifications.
- On-site changes to formwork due to site conditions not addressed in the design.
- Damaged or sub-standard formwork components being used.
- Removal of formwork before concrete achieves adequate strength.
- Overloading of the formwork during concrete pouring operations.

A Safe Work Method Statement should be developed before any formwork installation. The SWMS should include:

- Reference to the proper design and approval of the formwork by the formwork engineer.
- The installation of bunting or parawebbing and suitable signage around the perimeter of the formwork erection zone to exclude persons – other than the concrete/formwork contractor employees – from entering the area in which the formwork assembly is taking place.
- Base, supports and ground conditions adequate for the load.

- Props that are plumb, level, securely tied and fitted with the correct pins.
- Safe platform access for installing bearers on H frame U heads from underneath.
- Safe work platforms with guard rails on edges and similar protection of all openings.
- A formwork deck laying method that does not permit walking on bearers.
- Secured ladder access to the formwork deck.
- Scaffold access for forming columns and walls.
- The use of Individual Fall Protection Systems where other forms of fall protection are not practicable.
- Inspection by the formwork engineer before allowing concrete pours.
- Ensure certified advice is obtained from the formwork engineer before dismantling the formwork assembly can commence. This advice should include any back-propping arrangements and/or re-shoring.
- Drop stripping of the formwork will not be permitted.

Formwork should not be erected unless it has been properly designed by a formwork design engineer.

No person is permitted to be under the formwork during a concrete pour.

Preventing injuries from lifting reinforcing mesh

When workers lift reinforcing mesh to position 'bar chairs', they are at risk of injuring their back and arms from the repetitive and high force usually required to lift the mesh.

Workers may also have their fingers trapped under the mesh or potentially squashed by other workers walking on the mesh.

Workers should use a mesh lifter, which reduces the force required to lift the mesh and frees their hands for other work.

References:

- SafeWork NSW Code of Practice – Formwork 2021 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0004/845887/Formwork-code-of-practice.pdf
- Safe Work Australia Formwork and Falsework Guidance Material Package 2014 https://www.safeworkaustralia.gov.au/system/files/documents/1702/formwork-falsework-general-guide.pdf
- Safe Work Australia Falsework Guide 2014 https://www.safeworkaustralia.gov.au/system/files/documents/1703/guide-falsework.pdf
- Safe Work Australia Guide to Formwork 2014 https://www.safeworkaustralia.gov.au/system/files/documents/1703/guide-formwork.pdf
- Workplace Health and Safety QLD Formwork Code of Practice 2016 https://www.worksafe.qld.gov.au/__data/assets/pdf_file/0019/15823/formwork-cop-2016.pdf

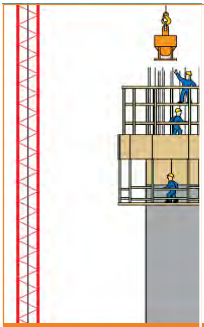
Safe slip, jump and travelling formwork systems

For more comprehensive advice, consult:

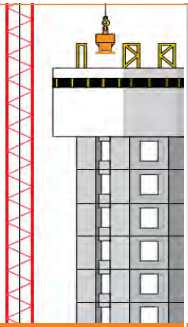
- Safework australia Guide to slip, jump and travelling formwork systems 2014 https://www.safeworkaustralia.gov.au/system/files/documents/1703/guide-slip-jump-travelling-forms.pdf
- WorkSafe Victoria Guidance Note Jump forms and slip forms - Developing a safe system of work 2017 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Jump-forms-and-slip-forms-developing-safe-work-system-2017-06.pdf

Slip forms and jump forms are self-climbing formwork systems designed to construct lift and stair cores in high rise buildings and other concrete structures like silos, stacks and chimneys. The term ‘climb form’ is sometimes used to describe both slip and jump forms. The power for the climbing operation can be provided by hydraulic rams or electric motors connected to climbing feet or screw feet or screw shafts. Slip forms and jump forms usually consist of a number of platforms or decks for workers and may also be fitted with trailing screens suspended from the form.

Travelling formwork moves horizontally allowing the repeated construction of structural elements, for example in-situ concrete bridge spans. The formwork is generally supported by the permanent structure as it is progressively completed so has the advantage that no falsework is required over the length of the bridge the formwork designer should be a competent person, for example an engineer with experience in structural design.



Slip form chimney constructions



Jump form construction



Travelling formwork for bridge construction

Designer's Safety Controls

The Designer should ensure:

- Safe entry to all areas and work platforms including emergency entry and stair access.
- A trailing stair system suspended from the slip form or jump form.
- Allowance for loads, including dynamic and wind loads, which may be applied to the form.
- Minimum concrete strength required before climbing.
- Cranes to lift shutters – and provide safe access and working areas for people slinging and unslinging loads.

- Temporary electric power connections.
- Sufficient working space and head room.
- Fire protection throughout the system.
- Refuge points to protect workers from extreme heat.
- Rescue procedure requirements that may affect the design of the form.
- Emergency access for the retrieval of an injured or incapacitated person from a work area located within the structure.

Other requirements

- Penetrations should be covered by form ply secured in position, clearly visible and identified, or have leading or perimeter edge protection.
- Guardrail or trap door protection should be provided for all penetrations. Access should be maintained and kept clear at all times.
- Suitable controls to prevent the risk of being impaled, including edge protection on the internal side of the working platform.
- Platforms that may be affected by uplift should be positively secured so uplift cannot occur. Uplift can occur from wind loading or when a platform is cantilevered and unsecured.
- Signage for design loading for platforms on the trailing system.
- People on the platform should hold at least a dogger or rigger licence or a person with such a licence should be located on the platform as it is lifted.
- Use a clear method of communication between the crane operator and the dogger or rigger responsible for directing the lift, for example a whistle or two-way radios.
- A competent person, such as a structural engineer, should "sign off" that the structure has been correctly assembled.
- Before the form is climbed a 'Sign-off' procedure is to be completed for the removal of obstructions on the form.

Precast concrete panel erection

Reference:

- WorkSafe Victoria Industry Standard – Pre-cast and Tilt-up Concrete for Buildings (2001) https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Precast-and-tiltup-concrete-for-buildings-2001-04.pdf

Unsafe work practices or inadequate planning in the erection of precast concrete panels has caused a number of fatalities and major incidents in the building and construction industry.

The builder or principal contractor should ensure that precast concrete elements are appropriately designed to resist all forces they will likely be exposed to.

A suitably qualified person, such as a structural engineer experienced in erection design, should be engaged to develop a safe system of work for the handling, transport, lifting, rotation and erection of precast concrete elements. This person is referred to as the erection design engineer (EDE).

The EDE should review the precast concrete element designs and specify any additional reinforcing or strong-backs required to ensure the element is safe for transport, lifting, rotation and erection into its final position.

The EDE may not always be directly engaged by the builder or principal contractor. However, both the builder or principal contractor and precast erector should ensure that a suitably qualified person has been engaged and has undertaken the functions of the EDE before erection works begin.

A comprehensive safety checklist should be developed and completed prior to the commencement of precast concrete panel erection work. This checklist should be addressed well before the actual day the work is scheduled.

The safety checklist should address the following issues:

1. Site precast documentation:

- Building permit.
- Manufacturer's certificate of compliance (birthing certificate).
- Panel shop drawings.
- Erection design and certificate of compliance.
- Verification from Builder that the concrete slab for brace footings and panels is at least 20MPa.
- Precast and tilt-up concrete for buildings.
- Verification from an engineer that any proposed crane standing area (i.e. floor slab, suspended slab, or surrounding area) can safely carry the construction and erection loads.

Prior to element manufacture

The PSE and builder should consult with the EDE and precast element manufacturer to ensure that the precast element 'break up' design achieves element shapes that are robust and can be handled safely, where possible without the need for strong-backs and additional reinforcement.

The EDE should carefully consider all forces that the element will be exposed to during lifting, rotation and placement and:

- Review the design of the element to determine whether additional reinforcement or strong-backs are required to ensure that it can be handled safely, especially where the element has cut-outs or penetrations.
- Provide the precast manufacturer with marked up structural or shop drawings that accurately and clearly show the necessary lifting and bracing insert locations and any additional reinforcement or strong-backs required.
- Where strong-backs are required, the strong-back type and associated fixings should be accurately and clearly specified.
- Produce rigging designs for the various lifting stages required (demoulding, pre-transport, rotation, installation).

- Review and approve the updated shop drawings (prior to them being issued for construction), to ensure that the lifting and brace inserts and any additional reinforcement and strong-backs are correctly detailed on the drawings.
- Following completion of the above steps, issue the EDE's certificate of compliance.

During element manufacture

The precast manufacturer should ensure:

- The shop drawing for the element has been reviewed and approved by the project design engineer (PDE) and EDE prior to commencing manufacture.
- A suitably competent person, who was not involved in the original set-up, has ensured all reinforcement and components comply with the approved shop drawings before casting.
- Minimum specified concrete strength is achieved before initial lift of the casting bed.
- All strong-backs are installed as per the EDE's specification prior to lifting or transport.
- Non-specified and non-structural strong-back components and fixings are not used.
- Minimum specified concrete strength has been achieved prior to transporting the element to site.
- They have completed and issued the manufacturer's certificate of compliance (birth certificate) to the builder or principal contractor.
- Any variations to the original design (including changes to strong-back or component specifications) are approved in writing by the EDE.

2. Site preparation/planning

- If applicable, power line hazard identified and appropriate controls put in place (including power supply company permit if required).
- Site access suitable for crane arrival and entry/exit of precast panel delivery trucks.
- Traffic management controls determined and personnel allocated.
- Consider public and workforce safety in crane lifting of panels.
- Proximity of public facilities and/or site amenities should be considered in relation to erected precast panels under conditions of temporary bracing.
- Correct selection of crane in terms of working radius and ability to rotate panels.
- Before erection commences the builder should supply the erector with written verification from an engineer that any proposed crane standing area (i.e. floor slab, suspended slab, or surrounding area) can safely carry the construction and erection loads.
- Sufficient space is available for mobile crane/outriggers and panel delivery trucks.
- If applicable, hazards associated with erecting panels in excavations have been appropriately controlled.
- Precast panel delivery based on lifting sequence plan with correct orientation of panels on trucks.

Prior to lifting the element on-site

When the precast concrete element arrives at site, but prior to lifting, an appropriately licenced rigger should:

- Inspect the element to ensure it aligns with the shop drawing (dimensions, cast-in plates, inserts and ferrule locations all match the drawing) and that the element and components are free from damage.
- Confirm the lifting inserts match the shop drawing specification and are free from damage.

- Confirm the concrete adjacent to the lifting inserts is in good condition and free from significant cracking, honeycombing or damage (if in doubt seek advice from the EDE).
- Ensure strong-backs are all in place and as per the shop drawing specification (type, size, location, orientation, fixings).
- Review the birth certificate for the element to confirm the casting date.
- Confirm the lifting clutches are compatible with the lifting inserts, and inspect all rigging gear prior to use.
- Ensure the element is rigged in accordance with the relevant rigging design, being sure to use the correct lifting inserts where there are multiple inserts present.
- Stop the lift and seek advice from the EDE if any of the above safety critical information is missing or if there are any issues identified during inspection of the element.

3. Braces verification

- Brace anchor bolts supplied by erector are the same as specified in shop drawings. (High Performance High Load Slip Controlled Anchors Bolts must be specified).
- The bracing capacities (WLL) are as recommended by erection design engineer.
- The panel braces have permanent WLL markings on them as above.
- The correct number of braces provided for each panel as per shop drawings (minimum of two per panel).
- Brace pins are of type that are secured/locked and can only be removed by using a tool.
- Confirm braces are not to be removed under any circumstances, prior to written instruction from the erection engineer or project design engineer.

4. Crane/rigging

- rigging system verification
- crane maintenance records
- crane operator's certification or equivalent High Risk Work Licences
- riggers certification or equivalent High Risk Work Licences
- rigger equipment service records.

5. Content of precast erector's SWMS

To include the following:

- correct site details on SWMS
- confirmation of birthing certificate for concrete precast panels
- reference Builder's verification that concrete slab for brace footings and panels is at least 20MPa
- correct selection of crane
- certification or equivalent High Risk Work Licences of precast erection crew
- inspection of rigging gear assured
- barricading of mobile crane
- control of power line hazard – if applicable
- overhead path of the craned-in panels to avoid other trades or public
- erection crew outside of drop zone
- safe accessing of panels on the semi- trailer by dogman
- retaining firm control of panel by crane prior to completed installation of braces
- brace retaining pins are of a secured/locked type
- traffic management controls
- pre-planning of erection sequence
- PPE compliance of crew
- assessment of windy conditions.

6. SWMS induction

Prior to the commencement of work, the precast panel erection crew should receive a site induction which includes its SWMS. The site Health and Safety Representative should be present at this SWMS induction session.

7. Storage of precast concrete panels on site

Approval and written instruction should be obtained from the engineer before a concrete precast panel is stored horizontally.

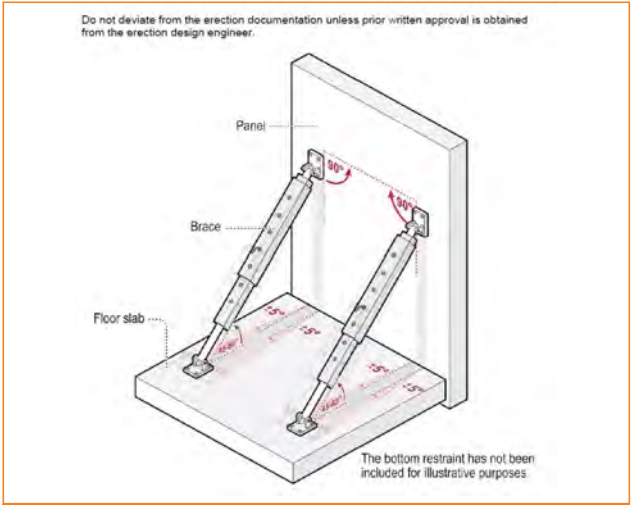
8. Avoidance of operating mobile plant near braces and concrete panels

The use of mobile plant such as cranes, backhoes, excavators and elevating work platforms (EWPs) close to concrete element braces can be extremely hazardous due to the risk of the elements and /or braces being struck resulting in a subsequent collapse. Where it is necessary and unavoidable to operate mobile plant in close proximity to braces and concrete panels, dedicated spotters and barricading should be deployed and implemented.

Any excavation work carried out in the vicinity of brace footings should be approved by an engineer to ensure footings are not undermined.

9. Safe removal of braces

When removing braces, the bottom bolts of the braces should be removed first. The weight of the brace is to be supported with a crane or other suitable means prior to the removal of the top bolts. The braces should then be lowered in a controlled manner. Compliance with an engineer or their nominated agent's written instruction is required prior to the brace removal.



Drawing of correctly braced pre-cast panel

References:

- National Code of Practice for Precast, Tilt-Up and Concrete Elements In Building Construction 2008 https://www.safeworkaustralia.gov.au/system/files/documents/1702/codeofpractice_precasttiltupandconcreteelementsbuildingconstruction_2008_pdf.pdf
- WorkSafe Victoria Construction Safety Focus Precast Panels and Mobile Cranes 2017 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-cranes-and-precast-2017-09.pdf
- WorkSafe Victoria Information about Precast and Tilt-up Concrete Construction 2017 https://www.worksafe.vic.gov.au/resources/precast-and-tilt-concrete-construction
- WorkSafe Victoria Erection of Concrete Panels on Early Age Low Strength Concrete 2017 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Erection-concrete-panels-early-age-low-strength-concrete-2017-08.pdf
- WorkSafe Victoria Safety Alert Precast Concrete Panel Falls from Truck 2019 (2023) https://www.worksafe.vic.gov.au/safety-alerts/precast-concrete-panel-falls-truck



PART 6:

Electrical safety

Electrical safety on construction sites

Reference:

- WorkSafe Victoria Industry Standard-Electrical Installations on Construction Sites 2011 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Electrical-installations-on-construction-sites-industry-standard-2011-01.pdf

Residual current devices

RCD is a residual current device.

- Ensure the power supply to all electrical equipment on building and construction sites is protected by a residual current device (RCD) with a maximum rated tripping current of 30mA.
- Ensure all portable RCDs are tested daily before use by operation of the test button.
- Ensure all RCDs, while being used on site, are tested by a licensed electrician for tripping current and time each calendar month.
- These requirements also apply to RCDs on portable generators.

Portable generators

Portable generators not requiring an earth electrode should be used wherever reasonably practicable. Where a generator supplies portable tools and equipment, it should be fitted with a decal and displayed in a prominent position which clearly indicates whether the generator requires an earth stake.

Where portable generators are used on site, ensure the following:

- Is fully serviceable and has been properly maintained where supplying a fixed installation.
- Is installed by a licensed electrician.
- Is inspected by a licensed electrical inspector before use.
- A Certificate of Electrical Safety is provided.
- Is fitted with a 30mA RCD – where supplying portable tools and equipment.

Ensure socket-outlet(s) fitted to portable generators used on a construction site are protected by residual current devices (RCDs), including those supplying power to a re-locatable site building via an extension lead.

Generators supplying power to re-locatable site buildings

- Ensure the extension lead is protected by a residual current device (RCD).
- Ensure the generator is capable of providing power to facilitate lighting, heating and boiling water at the same time.
- Ensure the generator is positioned so that any exhaust gases do not enter the re-locatable site building.

Construction switchboards

Ensure all construction wiring, including switchboards and wiring within transportable structures, is inspected, tested and certified by a licensed electrician (A class) before connection to the mains supply.

Construction switchboards fitted with residual current device (RCD) protection should be used to supply all power on building and construction sites. Temporary switchboards should have:

- A door and a locking facility for circuit breakers and RCDs – which are tested on a monthly cycle.
- A clear sign on the door stating "Keep Closed – leads through bottom".
- An insulated recess in the bottom for connecting extension leads.
- Protection from the weather if used outdoors.
- Protection against mechanical damage (electrical supply wiring should also be protected).
- A tie bar.

- Suitable stands or are attached to a wall. Post mounted boards must be securely fastened by coach screws or bolts.
- A clearance of at least 1 m maintained in front of the board.

Never use an electrical power source which is not protected by a RCD. Never reset a RCD which has tripped, it should be checked and reset by an electrician.

Extension leads

- All electrical extension leads should be of a heavy-duty type.
- Ensure the sheath of electrical extension leads does not contain the colour green.
- Leads should not be longer than specified in the Industry Standard according to their amp rating. For example, at 10 amp electrical lead cannot exceed 35 metres and 20 amp leads cannot exceed 50 metres.
- No extension lead should run from one floor to another on multi level sites.
- Leads should always be insulated against contact with metal structures.
- Leads should be raised on insulated stands or hooks to protect them from damage and to provide clear access for personnel and vehicles.
- Ensure multi-plug portable outlet devices include over current and RCD protection.
- Make sure that the power tools and electrical leads in use have been properly checked and tagged.
- Make sure that electrical leads are not lying in water or in contact with metal components.
- Make sure leads never run through water or be on the ground in potential contact with trafficable plant and machinery.
- Ensure all 3 pin flat pin plugs and sockets used on extension leads are of the transparent or non-removable type moulded on to the cord.
- Ensure double adaptors and 3 pins plug adaptors (piggy-back) are not to be used.

Inspection and tagging

- Ensure all plant including portable electrical equipment and electrical leads are inspected and tagged in accordance with AS/NZS 3760 by a licensed electrician or electrician supervised (ES or L) prior to first use and at three calendar monthly intervals.
- New purchased equipment should be inspected and tagged prior to use (as a safeguard against the shoddy manufacturing of electrical products).
- Residual current devices (RCDs) should be tested every month.
- All items tested should carry a test tag colour coded to indicate whether it is 'current'. Colour coding as per AS/NZS 3012 is preferable, as it avoids any confusion.
  - Red = December to February
  - Green = March to May
  - Blue = June to August
  - Yellow = September to November
- Tags should have a valid test date (that is within the period) and the electrician's registration number. Colour coding alone is not determination of currency; make sure the tag can be read for the valid test date.

Isolation and danger tagging

Ensure before working on any electrical equipment, it is isolated from power and the correct locking out and danger tagging procedure followed.

Demolition and major refurbishment work

For all demolition and major refurbishment work, the management of electrical safety should be the subject of a site-specific Safe Work Method Statement.

The SWMS should address the following issues:

- The isolation of the pre-existing power source from the area under refurbishment and/or demolition.
- An inspection of the work zone for the existence of energised wiring prior to the commencement of each stage of work. Any electrical wiring which cannot be isolated should be tagged or marked using appropriate warning tape and should be appropriately mechanically protected against damage.
- The establishment of an RCD protected switchboard for power and lighting.

References:

- WorkSafe Victoria Industry Standard-Electrical Installations on Construction Sites 2011 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Electrical-installations-on-construction-sites-industry-standard-2011-01.pdf
- Safe Work Australia Model Code of Practice- Managing Electrical Risks at the Workplace 2018 https://www.safeworkaustralia.gov.au/system/files/documents/1810/model-cop-managing-electrical-risks-in-the-workplace.pdf
- WorkSafe Victoria Preventing Electric Shocks to Electricians 2017 https://www.worksafe.vic.gov.au/preventing-electric-shocks-electricians
- WorkSafe Victoria Information about Preventing Electric Shocks When Working in Ceiling Spaces 2017 (2024) https://www.worksafe.vic.gov.au/preventing-electric-shocks-when-working-ceiling-spaces
- WorkSafe Victoria Preventing Electric Shocks to Electricians 2017 https://www.worksafe.vic.gov.au/preventing-electric-shocks-electricians
- WorkSafe Victoria Information about Preventing Electric Shocks When Working in Ceiling Spaces 2017 (2024) https://www.worksafe.vic.gov.au/preventing-electric-shocks-when-working-ceiling-spaces

Gas and water supply electrical precautions

Reference:

- PPTEU Electrical hazards working with metallic and plastic pipework https://www.ppteu.asn.au/occupational-health-safety/hazard-alerts/elecrical-hazards-working-with-metallic-and-plastic-pipework

It is possible for the gas installation pipes to act as an earth return path for stray currents when faults exist or occur on appliances. Ensure a temporary continuity bond is used whenever a gas pipe, pipe fitting or meter is disconnected, replaced or removed.

The temporary bond will carry 70 amps or more with insulated screw clamps to be used. The cable should be fitted with an insulated clip and clamp each end. (Refer to AS/NZS 3500 Plumbing and Gas Set: 2011 Plumbing and Gas Installations Set).

Ensure a bonding strap is attached whenever any of the following work is performed – and if there is a possibility of breaking an unsuspected electrical path:

- Cutting or disconnecting gas service pipes and fitting lines (AS5601).
- Disconnecting appliances or changing gas controls.
- Cutting or disconnecting water service lines.
- Connecting or disconnecting gas or water meters.

The procedure for using the temporary continuity bond is as follows:

- The main switch or switches on the premises will be switched off and a tag reading 'DANGER DO NOT SWITCH ON' attached over the switch.
- Fit the continuity bond before disconnecting any pipe or fitting.
- Fit the first clip to the upstream side (the service pipe side) of the work.
- Ensure that the clips make good electrical contact; if necessary, clean the pipe and remove paint, rust, dirt or pipe wrapping.
- Fit the second clip to the downstream side (the appliance side) of the work.
- Carry out the disconnection and replacement of the meter or pipe work taking care not to disturb the temporary bond.
- When the work has been complete, remove the clip on the downstream side first.

Note: Always keep a watch for sparking when fitting the second clip or disconnecting the gas supply. A spark will only occur if there is an electrical fault. If it happens contact an electrical contractor to find the fault before continuing.

Plastic pipework

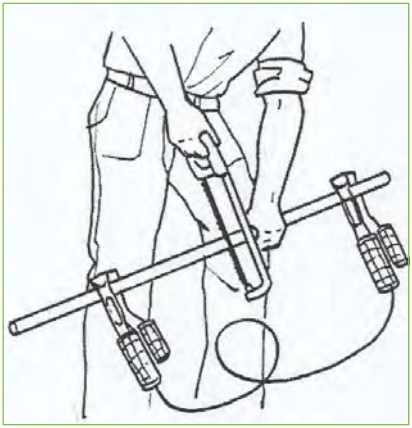
Method of discharging the static electricity related to plastic pipework:

- Wet the ground and dampen the pipe at the work area with a wet cloth.
- Then drape the cloth from the pipe to the ground to provide a path to earth. Under these conditions any static electricity should now have been discharged safely (AS5601).

Incorporating these requirements in a Safe Work Method Statement will reduce the risk of electrical incidents when working on metallic and plastic plumbing systems.

Reference:

- PPTEU Electrical hazards working with metallic and plastic pipework https://www.ppteu.asn.au/occupational-health-safety/hazard-alerts/elecrical-hazards-working-with-metallic-and-plastic-pipework



Hydrogen generators

A hydrogen generator uses pure hydrogen to create an on-demand power source. Hydrogen and oxygen interact with one another to convert chemical energy into electricity – there's no emission output, no pollution and zero waste.

Increasingly hydrogen generators can be seen on building and constructions, including in their deployment to power tower cranes.

Although hydrogen is a flammable fuel, it is much safer than gasoline or natural gas. If there is a leak, it dissipates quickly into the air at 40m per second. In the event of a fire, the hydrogen burns very quickly rather than pooling and causing an explosion like gasoline.



Hydrogen is also the lightest element on the periodic table, so it won't seep into lower areas like LPG or petrol vapours.

Hydrogen safety, much like all flammable gas safety, relies on five key considerations:

1. Recognise hazards and define mitigation measures.
2. Ensure system integrity.
3. Provide proper ventilation to prevent accumulation (manage discharges).
4. Ensure that leaks are detected and isolated.
5. Train personnel.

A risk assessment should be undertaken before a decision is made to replace diesel generators with hydrogen generators.

At a minimum, the risk assessments should address the following:

- Potential hazard scenarios during the operation, transport, refilling, and storage of the unit.
- Previous incidents and near misses involving similar systems and components.
- Engineering and administrative controls applicable to the hazards and their interrelationships (e.g. the use of hydrogen detectors and emergency shutdown capability).
- Mechanisms and consequences of component failures and failure modes of engineering and administrative controls.
- A qualitative evaluation of a range of the possible safety and health effects resulting from failure of controls.

SWMS

In accordance with the 2017 Victorian OHS Regulations – High Risk Construction Work, a Safe Work Method Statement (SWMS) must be developed for the use of a hydrogen generator.

Reference:

- Australian Hydrogen Council Regulations and Standards https://h2council.com.au/regulations-and-standards/

Daily start up and shut down procedure

Completed by: _____
Start Up: _____
Shut Down: _____
Date: _____

#	Action	Done	Comment
1	Staff to ensure in appropriate PPE		
2	Staff to equip personal H2 sensor (ensure unit is charged and has been bumped)		
3	Manual inspection of 10 manpacks – manpack frame, bottles and outlet to EODev		
4	Manual inspection of EODev unit for damage/interference		
5	Manual inspection of EODev hoses/cables & connections for damage/interference		
6	Manual inspection of electrical connection to/from EODev and activation (i.e., to distribution boards/outlets etc)		
7	Toolbox meeting with staff (review of RA and SWMS) – required daily and particularly in case of new staff onsite		
8	Manual inspection of safety equipment: - Fire Extinguishers - First Aid Kits - Security Fencing - Public Access exclusion zone barrier		
9	Upon satisfaction of manual inspection of equipment/ infrastructure and testing via H2 sensor, EODev unit/s can be activated. Where unit has already been activated and gas is left pressurised overnight. 1. Turn EODev key to 'I' - allow ~120 seconds for start-up. Should faults occur refer to EODev User Manual		
10	Supervision of EODev unit always when in operation or restricted access where suitable while GenSet is in normal operation		
11	Shut down of units should occur once confirmation load (end of job) is removed or redirected to alternate power. Ensure all site sheds/walkways etc are cleared. Lights etc. will turn off once unit powered down to prevent trip hazards due to low lighting. 1. Turn EODev key to 'O' - unit will go into shut down mode and vent off H2 per standard process 2. Close H2 blue manpack valves 3. Close V2 (or V4 depending on which side is being used) 4. Open V1 or V3 (depending on which side is used) 5. Secure unit/area before departing.		

List of Required Extinguishers

Note: Fire extinguishers should be deployed only when safe to do so.

Type	Location	Total	Fire Type
Carbon Dioxide	EODev GenSet	2	Liquid & Electrical
Dry Chemical ABE	Outside Hazardous Area	2	Grass, material (fencing) & liquids
Water	Outside Hazardous Area	2	Used to cool cylinders in event of a H2 fire

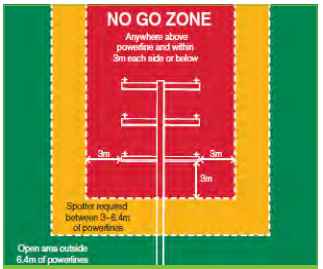
Overhead powerlines (No Go Zones)

Ensure when operating plant near powerlines that the designated NO GO ZONE rules declared by Energy Safe Victoria (9203 9700) are not breached.

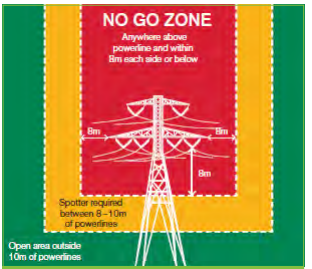
All types of overhead powerlines are dangerous because of the ability of the line to move in the wind and the difficulties operators sometimes experience seeing the line in fading or difficult light.

Working in proximity to powerlines - No Go Zones and Spotter Zones

Type of equipment and powerline type	No Go Zone Horizontal Distance	No Go Zone Vertical Distance	Spotter Zone
Scaffolding			
Powerlines on poles	4.6m either side	5m below; 5m above	N/A
Elevating Work Platforms, Cranes, Concrete Placing Booms, Excavating Equipment			
Powerlines on poles	3m either side	3m below; anywhere above	3m - 6.4m either side; 3m below
Powerlines on towers	8m either side	anywhere above; 8m below	8m - 10m either side; 8m below



Overhead powerlines on poles – No Go Zones



Overhead powerlines on towers – No Go Zones

Electrical Safety Spotter

A trained Electrical Safety Spotter is required for each item of plant or equipment operating in the vicinity of overhead electrical conductor on any worksite.

Obtaining a permit and working safely

Unless special written permission is obtained from the relevant power supply company, make sure plant is never be operated within the above NO GO ZONE distances. Obtaining special written permission involves the following steps:

- Notify the power supply company when planning the work.
- Obtain written permission.
- Develop a safe work method statement with associated risk assessment.
- Complete pre-start site job meeting.

Note:

1. Special permission from the power supply company may involve permit conditions which typically could include the following:
   - Bundling and relocating the overhead cables.
   - Isolating power to the overhead powerlines for the duration of the work.
2. Tiger battens on powerlines serve the purpose of a visual warning only. They do not provide insulation to the live conductors. Other control measures which eliminate or substantially control and reduce the risk must be undertaken.

Ensure when working with long materials and equipment that their operation is kept well clear of overhead powerlines. Examples are:

- Tipping trucks and trailers.
- Erecting exterior display signs or similar advertising structures.
- Handling long materials near powerlines (e.g. ladders, metal purlins, roof sheets, painters' extension poles).
- Moving vehicles with high loads or long aerials.
- Erecting TV/radio antennae, flagpoles, etc.

Reference

- Energysafe and WorkSafe Victoria Guidebook Using powered mobile plant near overhead assets (May 2018) https://www.worksafe.vic.gov.au/resources/using-powered-mobile-plant-near-overhead-assets-guidebook

It must be remembered that overhead powerlines are almost always in close proximity to building and construction sites and their presence must be assessed at all stages of work which involve the use of cranes, telehandlers, earthmoving equipment, tip-up trucks, concrete placing booms, EWPs and scaffolding.

Work on or near overhead powerlines

Workers performing work in relation to overhead powerlines have specific safety requirements determined and governed by the VESI (Victorian Electricity Supply Industry).

The rules and guidance for this work are contained in the five documents listed below.

1. Electricity Safety (General) Regulations 2019 (Regulations)

With respect to safety, these regulations:

- Prescribe the methods to be followed in carrying out electrical installation work.
- Provide for the protection of persons from risk, and property from damage, associated with the generation, transmission, distribution and use of electricity.

Reference:

- https://www.legislation.vic.gov.au/in-force/statutory-rules/electricity-safety-general-regulations-2019/001

2. The Blue Book

The Blue Book – 'Code of Practice on Electrical Safety for Work on or Near High Voltage Electrical Apparatus' provide practical guidance in maintaining safe work systems in relation to the control of risks associated with work on or near, or in the vicinity of, HV electrical apparatus in Victoria.

Reference:

- https://www.energysafe.vic.gov.au/industry-guidance/electrical/electrical-network-infrastructure/blue-book

3. The Green Book

The Green Book is the Electrical Safety Rules (the Rules) for the VESI Distribution Networks. The Green Book, provides the means by which the Major Electricity Companies (MEC's) comply with the published technical standards.

Reference:

- https://www.scribd.com/document/692707308/Green-Book-2023-book-2023-10



4. VESI Fieldworkers Handbook (2008)

This is a book containing work practices for VESI Field based personnel.

Reference:

- https://vesi.com.au/work-practices

5. VESI Skills and Training Guideline

The Victorian Electricity Supply Industry (VESI) Skills and Training Guideline provides the minimum standards for Qualifications and competency assessment/refresher training for field workers working in the VESI.

This Guideline details the training and competency requirements for Network Operators, Contractors and their sub-contractors working on the Distribution and Transmission Networks in Victoria.

Reference:

- https://vesi.com.au/files/SkillsandTraining/VESI_Skills_and_Training_Guideline_V11_July_2024.pdf





PART 7:

Cranes, hoists and earthmoving equipment

Hazard identification/risk assessment

The advice in this section includes requirements from the Plant Part of the OHS Regulations 2017.

Safety is critical in the operation of plant and equipment, such as cranes, forklifts, elevating work platforms, excavators, backhoes, etc.

Full compliance with the manufacturers' specifications for the operation and servicing of all pieces of plant is required – especially cranes, hoists, concrete pumps, other mobile plant.

The Plant Part of the OHS Regulations 2017 applies to major items of equipment, including mobile plant used on building construction sites. All other hand operated (mechanical and manual plant) is covered currently by the provisions of the Victorian OHS Act 2004.

The Regulations require employers to carry out hazard identification on all major and mobile plant used on site.

A SWMS – which can incorporate plant hazard identification and risk assessment – should be developed for all tasks involving major and mobile plant, taking into consideration the following:

- The systems of work associated with the use of the plant.
- The layout and conditions in the workplace where the plant is used.
- The capability, skill and experience of the operator.
- Any reasonable foreseeable abnormal operating conditions.
- Safety of the plant when out of service or when not in use.

The Regulations state that the Risk Control Hierarchy must be applied when determining how plant hazards are to be controlled.

Safety documentation for use of all major and mobile plant on site

The person responsible for managing major and mobile plant on building and construction sites should ensure the following documentation is received from contractors:

- Up to date records and schedules of plant maintenance.
- Plant hazard identifications (which may be included in a SWMS document).
- Plant Daily Operators' Checklists.
- High risk work licences for plant operators.

A visual inspection of plant by a responsible person – in accordance with the Plant Daily Operators' Checklists – should be conducted prior to first use.

This information above, alongside the plant or equipment manufacturer's number and type, should be entered into the Plant Register.

The rules for operating mobile plant near overhead powerlines (see Electrical Safety – Overhead Powerlines) must be strictly obeyed.

References:

- Safe work Australia Managing the risks of plant in the workplace Code of Practice 2024 https://www.safeworkaustralia.gov.au/sites/default/files/2024-11/model_code_of_practice-managing_the_risks_of_plant_in_the_workplace-nov24.pdf
- WorkSafe Victoria Compliance Code Plant 2019 -2020 https://www.worksafe.vic.gov.au/resources/compliance-code-plant

High risk work licences and certificates of competency for operating plant

A high risk work licence is required for the operation of the following major and mobile plant equipment listed below. An up to date register of certificate or high risk work licence holders should be on site.

- Tower crane operation licence CT
- Self-erecting tower crane operation licence CS
- Derrick crane operation licence CD
- Portal boom crane operation licence CP
- Bridge and gantry crane operation licence CB
- Vehicle loading crane operation licence CV
- Non-slewing mobile crane operation licence CN
- Slewing mobile crane operation licence (up to 20 tonnes) C2
- Slewing mobile crane operation licence (up to 60 tonnes) C6
- Slewing mobile crane operation licence (up to 100 tonnes) C1
- Slewing mobile crane operation licence (open/over 100 tonnes) C0
- Reach stacker operation licence 1 RS
- Boom-type elevating work platform operation licence WP
- Materials hoist (cantilever platform) operation licence HM
- Hoist (personnel and materials) operation licence HP
- Concrete-placing boom operation licence PB
- Forklift truck operation licence LF
- Order-picking forklift truck operation licence LO
- Non-slewing telehandler operation licence (over 3 tonnes) TV
- New licence – operate a non-slewing telehandler with a rated capacity greater than 3 tonnes
- Course code is 11249NATor a current mobile crane high risk work licence
- Telehandler-work platform, boom length 11 metres or greater, an EWP boom type WP

- Telehandler-slewing type (with a slewing limit greater than five degrees) CN
- Telehandler-slewing type (slewing mobile crane) up to 20 tonnes C2
- Telehandler-slewing type (Slewing mobile crane) up to 60 tonnes C6
- Telehandler-slewing type (Slewing mobile crane) up to 100 tonnes C1
- Telehandler-slewing type Slewing mobile crane) open/over 100 tonnes C0

A high risk work licences for skilled construction tasks

A high risk work licence is also required for scaffolding work, rigging work (including erection of steel and precast concrete panels) and dogging work.

The high risk work licences are:

- Basic scaffolding licence SB
- Intermediate scaffolding licence SI
- Advanced scaffolding licence SA
- Dogging licence DG
- Basic rigging licence RB
- Intermediate rigging licence RI
- Advanced rigging licence RA

An up to date register of high risk work licence holders should be on site.

Ensure that a person in training for a high risk work licence is under the direct supervision of a high risk work licence holder nominated by the employer.

Certificates of Competency for operation of earthmoving equipment

Earth moving equipment should only be operated by persons who are trained and competent in its use and have Certificates of Competency issued by a RTO (Registered Training Organisation) for the types of plant detailed below:

- Dozers (Qualification Code LZ)
- Draglines (Qualification Code LD)
- Excavators (Qualification Code LE)
- Front End Loaders (Qualification Code LL)
- Front End Loaders/Backhoes (Qualification Code LB)
- Skid Steer Loaders (Qualification Code LS)

Items of major plant mobile plant should never be operated unless the intended operator has been fully trained and is competent in its use.

Reference:

- WorkSafe Victoria high risk work licence 2025 https://www.worksafe.vic.gov.au/high-risk-work-licence

Crane safety

Reference:

- Safe work Australia General Guide for Cranes 2015 https://www.safeworkaustralia.gov.au/sites/default/files/2024-01/general-guide-for-cranes.pdf

Ensure exclusion zones are set up for all types of crane operations.

Ensure that Personnel who are not directly involved in the lifting process, are not in those exclusion zones.

Ensure that the crane operations cease immediately if there are any personnel in the exclusion zones who are not directly involved in the lifting/landing process.

Loading and unloading bays/zones – whether on ground level or on cantilevered crane loading platforms – should only be occupied by the riggers/doggers who are undertaking the crane operations. No other personnel need to be in there.

Truck drivers

- Truck drivers should be shown and guided to a safe area prior to their trucks being loaded or unloaded.
- They are not permitted to stay in the cabins of their vehicles whilst the loading or unloading process is occurring, because if there is a failure – the load could land on the cabin of the truck; further, it eliminates any chance that the truck may move during the loading and/or unloading process.
- If it is determined that the truck needs to be moved from underneath the suspended load, a full and comprehensive risk assessment will be undertaken. Make sure all workers involved are given clear instructions and the accompanying SWMS accurately reflect both the task and these instructions.

The safe operation of cranes involves the following requirements:

- Proof of registration with WorkSafe for mobile cranes with a safe working load greater than 10 tonnes and truck mounted concrete placing booms (where applicable).
- Only persons with a high risk work licence of the right class can operate cranes.
- Only persons with a high risk work licence in dogging or rigging can sling and direct loads.
- Dogging cannot be done by the crane operator, even if qualified.
- All cranes should be subject to a daily checklist/ logbook completed by the operator.
- Development of a Lift Plan.

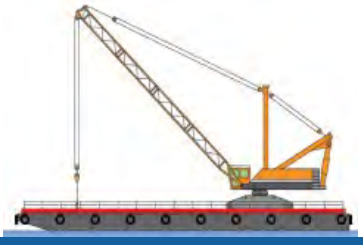
- Ensure that the crane set up area has been inspected for potential hazards and the surface is capable of sustaining the weight of the crane and the outriggers. This inspection should be documented.
- Ensure that the counterweight slewing area is clear of obstacles and is barricaded.
- Ensure sure that no load passes over workers or members of the public.

Working with cranes on floating vessels

References:

- Safe Work Australia Vessel-Mounted Cranes Information Sheet 2015 https://www.safeworkaustralia.gov.au/system/files/documents/1703/vessel-mounted-cranes-information-sheet.pdf
- Working with Land-based Mobile Cranes on Floating Vessels ICSA N005 https://icsa-crane.org/wp-content/uploads/2024/11/ICSA-N005-Guide-Working-with-Land-based-Mobile-Cranes-122024.pdf

Land-based mobile cranes are sometimes used on floating vessels, such as barges and pontoons. This type of use has unique hazards. Extra considerations are needed before starting operations to make sure the crane and vessel are used as intended. It is recommended to get approval from the manufacturer and an engineer for this type of work.



Mobile crawler crane mounted on a barge

Pre-use checks

A competent person should complete a pre-use check including confirmation of the:

- Crane manufacturer's or a competent persons recommended rated capacity when operating on a barge, pontoon or vessel.
- Maximum loads and vessel maximum heel or list.
- Vessel freeboard allowed (distance between the vessel's deck and the water).
- Amount and position of any ballast.
- Minimum depth of water for safe operation.
- Weather conditions e.g. the likelihood of high winds or waves, that limit the use of the crane and vessel combination.
- Adequacy of ties, anchorages and supports at minimum and maximum heel or list.

A rated capacity limiter or indicator should be adjusted to reflect crane de-rating where suitable for vessel operations.

Controls should be put in place to ensure the crane is operating within the specified limits.

Operator competency and licensing

Ensure vessel-mounted crane operators are trained and competent in operating the crane.

Training should cover the crane, controls, instruments, working load limits, load charts, safe working procedures and any operating limitations of each type of crane they operate.

A person must hold a relevant high risk work licence if they operate any of the following mobile cranes on a vessel:

- A vehicle loading crane with a capacity of 10 metre tonnes or more.
- A slewing mobile crane.
- A non-slewing mobile crane with a capacity exceeding 3 tonnes.

Maintenance of personnel hoists (Alimaks)

- Ensure hoists are installed using manufacturers specifications.
- Ensure hoists are checked daily.
- Ensure hoist hirers and suppliers complete maintenance work on hoists for every 40 hours of use, and major inspections after 10 years of service.
- Ensure hoist hirers and suppliers keep a record of hoist inspections and maintenance.
- Both hoists of a dual car personnel and material hoist should be removed from service during the activities of servicing, maintenance or jumping.
- The maintenance crew should be in control of the operation of both cars until works are complete.

Reference:

- WorkSafe Victoria Safety Alert Personnel and Materials Hoist Inspections 2011 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-07/ISDN-Personnel-materials-hoist-inspections-2020-07.pdf
- CPCCLHS3001 Licence to operate a personnel and materials hoist https://training.gov.au/Training/Details/CPCCLHS3001/unitdetails

Safe use of vehicle loading cranes

Vehicle loading cranes (VLCs) are mounted on a truck or trailer and used to shift heavy loads.

VLCs with a capacity of 10-metre tonnes or more are only operated by a person holding a current licence to perform high risk work, either a class CV licence (vehicle loading cranes) or any slewing mobile crane class licence (e.g. C2, C6, C1 or C0).

Ensure load estimation or slinging to move a load with a vehicle loading crane is performed by a person with a High Risk dogging or rigging licence.

Ensure that a person slinging or directing the load – who does not hold a dogging or rigging high risk work licence or equivalent – is directly supervised by an appropriately licensed person under the following conditions:

- When expert opinion is required on the suitability of the lifting gear, including the method of slinging.
- If the load is out of the direct view of the operator.

Employers or operators should ensure:

- Ground surfaces are sufficiently stable and compacted to support the VLC outriggers.
- Outriggers can withstand the load and forces applied during different lifting and slewing activities.
- Site is assessed for underground services or recently backfilled excavations that may affect the stability of the crane.

Note: An engineer may also be required to assess the supporting surface, particularly if it is a suspended floor such as a multi-level car park.

- Outriggers are fully extended before operation and positioned in accordance with the manufacturer's specifications.

- Boom and outriggers are interlocked to prevent boom operation if the outriggers are not fully extended.
- Alternative machinery or equipment is used if obstacles or lack of space make it impossible to fully extend outriggers.
- Operators are trained and instructed not to operate the VLC outside its safe operating limits.

Note: Only when a VLC is fitted with a slew limiting/slew sector controls system that prevents the VLC swinging a load into a sector outside of its rated capacity, can it be operated without fully extended outriggers (in a set-up known as short blocking).

- The rated capacity of the VLC is known before starting work. Operating a VLC outside its rated capacity can cause the truck to overturn. The rated capacity is determined by the manufacturer and should be verified by a competent person.
- The working radius and mass of the load is calculated for all positions. If the rating is not displayed on the rated capacity chart for a particular working zone, lifting should not be attempted in that zone.
- Suitable risk controls should be implemented to prevent operators being crushed between the VLC boom and the operator's control panel:
  - relocating the controls
  - using remote controls
  - installing slew limiters (to prevent the VLC boom contacting the operator)
  - installing physical barriers
  - ensuring operator controls are only operated from a position where the boom or load is not lifted over the operator
  - using controls that are self-centering so operation of the VLC stops when the operator releases the control
  - using emergency stop buttons that are easy to access, simple to use and capable of immediately shutting down crane movements. They should be manually reset after being activated

    - using an emergency stop system to ensure the boom cannot drop under its own weight or the weight of a load.
- A warning system should also be installed to alert the operator if the crane has not been fully stowed before driving. This will prevent VLCs damaging overhead wires or property as they exit sites.
- Employers or operators should ensure operators complete a site-specific Safe Work Method Statement (SWMS) before they start any job.
- Employers or operators should ensure VLC operator manuals are carried in the vehicle at all times.
- Daily Operator Checklist log books are completed by the operator as recommended by the manufacturer.
- Maintenance records of the VLC servicing and repairs are kept in an approved maintenance record log book in the vehicle.
- Servicing is done according to manufacturer specifications and a clearly visible 'next service due' sticker is stuck to the top of the vehicle windscreen.

Special note: In understanding the limitations for the use of vehicle loading cranes, the following should be noted:

Precision load placement refers to the precise placement of a load by a mobile crane undertaking activities that potentially expose workers to pinch points when guiding loads such as structural steel erection, concrete panel placement, or any accurate load positioning or work.

References:

- WorkSafe Victoria Using a vehicle loading crane for deliveries on construction sites 2020 https://www.worksafe.vic.gov.au/safety-alerts/using-vehicle-loading-crane-deliveries-construction-sites
- CFMEU Safe Use of Crane Trucks in The Building and Construction Industry 2023
- QLD Workplace Health and Safety Managing risks of vehicle loading cranes https://www.worksafe.qld.gov.au/__data/assets/pdf_file/0012/22251/managing-risks-of-vehicle-loading-cranes.pdf

- Safe work Australia Information Sheet: High risk work licensing for vehicle loading cranes 2015 https://www.safeworkaustralia.gov.au/system/files/documents/1703/vehicle-loading-crane-hrwl-information-sheet.pdf

Lifting gear

All lifting gear (shackles, slings, wire rope) should be inspected regularly by a qualified and competent person. The inspection details should be recorded and the item tagged.

Load hooks should be fitted with a safety catch, particularly where there is a chance of the slings being displaced.

Safe use of soft slings

A 2012 Work Safe Victoria Safety Alert highlights the dangers associated with using synthetic fibre slings, often known as soft slings, in construction. The alert addresses an incident in which a 950 kg steel beam fell five metres when a round soft sling failed. The beam was being lifted for placement by a mobile crane and struck the boom of an occupied elevating work platform, and landed on the crane's outrigger.

Common causes of soft sling failure:

- sharp edges on loads cutting slings
- slings being cut when contacting obstructions while under load
- mechanical damage from exposure to chemicals or UV light
- dirt or grit in the fibres, or poor storage or handling practices
- working load limit (WLL) being exceeded.

Selection of slings

Soft slings should not be the default choice for lifting loads as they are more susceptible to damage than other sling types.

Sling selection should be based on risk management principles with the safest sling type used for each specific lift. There are a range of safer and suitable/alternative options when the use of "soft-slings" are being considered. All reasonable and

practicable alternatives/options need to be fully sourced and explored, prior to any final decision being made about the most appropriate and safest methods of lifting/transporting/placement of any loads/materials.

Soft slings should only be selected under the following conditions:

- After a comprehensive risk assessment has been completed in full consultation with all the relevant players (including site manager/s, health and safety representatives, high risk licence holder/s).
- Protection of surface finish or paintwork of loads should not be factors in sling selection.
- Where soft slings are deemed to be the most appropriate and safest method to do the lift, ensure soft sling selection is made by a person with a high risk work licence for dogging or rigging.

A range of sling sizes and types should be available to ensure the safest sling is selected.

Control measures for the use of soft slings

- Where the edges of a load are not rounded, ensure the sling is protected from the sharp edges with suitable packing material. If any corner has a radius of less than three times the compressed thickness of the soft sling, packing will be required. The packing should be secured to prevent release when tension is taken off the sling.
- Lifting operations on construction sites are high risk construction work and require a Safe Work Method Statement (SWMS) to be prepared and followed for the work. When soft slings are used to perform this work, the risk of sling failure should be considered and the measures to control the associated risks detailed in the SWMS.

Sling inspection

Regular inspections should identify damaged or defective slings and ensure they are removed from service before failure occurs:

- Ensure soft slings are checked by the person using the sling before each use.
- Ensure they are inspected by a competent person at least every three months.
- Where soft slings are exposed to harsh operating or storage conditions, more frequent inspection by a competent person is required.
- A competent person is trained to inspect the slings to the requirements of the relevant Standard, including specific rejection and acceptance criteria (e.g. an inspection service of a specialist chain and sling supplier).

Reference:

- WorkSafe Victoria Safety Alert Soft sling failures due to incorrect use 2021 https://www.worksafe.vic.gov.au/safety-alerts/soft-sling-failures-due-incorrect-use

Safe operation of earthmoving equipment

The safe operation of earthmoving equipment involves the following requirements:

- Areas where earth moving equipment is operating should be cordoned off by safety bunting off to prevent unauthorised entry.
- Earthmoving equipment should be fitted with: a) overhead protective devices to stop objects falling onto the operator; and b) roll over protection.
- Earthmoving equipment should be fitted with reversing lights and beepers, etc.

- Employees who operate plant must be provided with necessary training and supervision to enable them to perform their work in a way that is safe and without risks to health. Operators may have a certificate/card issued by an RTO, verifying competency in the particular type of earthmoving equipment to be operated.
- Ensure that pre-operation daily checks and maintenance checks have been done prior to using earthmoving equipment.
- Make sure passengers are not carried unless there is a passenger seat fitted.
- Ensure seatbelts are fitted. The fastening of seat belts by operators should be enforced.
- When machines are left unattended the plant should be shut down and the ignition keys removed.
- Buckets (blades) and booms should be grounded before the operators vacate their machines.
- Operators should know their machines' rollover limits and stay well within them.
- Safe distances should be maintained from the edge of embankments. These edges should be clearly marked, provided with earth buffers or protected by spotters.
- When descending grades, operators should use the same gear as they would if ascending the same grades.
- Ensure speed limit restrictions are always observed.
- The rule that loaded earthmoving equipment has right of way always applies.
- Ensure that all spotters and others working nearby wear safety helmets and high visibility vests.

References:

- WorkSafe Victoria Compliance Code: Excavation 2019 https://www.worksafe.vic.gov.au/resources/compliance-code-excavation
- NSW Government Code of Practice Excavation Work 2020 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0019/52147/Excavation-work-COP.pdf
- Safe work Australia Excavation work Code of Practice 2018 https://www.safeworkaustralia.gov.au/doc/model-code-practice-excavation-work
- Civil Construction: A Guide to Managing Safety: Industry Standard 2017 https://www.worksafe.vic.gov.au/resources/civil-construction-guide-managing-safety-industry-standard
- WorkSafe Victoria Construction Safety Focus: Powered Mobile Plant 2017 https://www.worksafe.vic.gov.au/resources/construction-safety-focus-powered-mobile-plant
- WorkSafe Victoria Using Earthmoving Equipment Near Overhead Electrical Assets 2018 https://www.worksafe.vic.gov.au/resources/using-earthmoving-equipment-near-overhead-electrical-assets
- WorkSafe Victoria Guidance Note Earthmoving Equipment Used as a Crane 2017 https://www.worksafe.vic.gov.au/excavators-used-lift-and-suspend-loads

Horizontal directional drilling operations

Horizontal Directional Drilling (HDD) is a trenchless technology that uses surface-launched equipment to drill underground horizontally and install pipes, conduits, and cables. HDD may be used where traditional vertical excavations are too hazardous, at sites with limited space, like dense, urban areas, and in industrial and residential areas.

Horizontal directional drilling projects always vary depending on the bore's diameter, the installation length, and individual worksite complexities such as physical features, weather, and industry type.

Potential hazards associated with HDD operations include:

- struck-by and caught-in hazards from mechanical moving parts
- electrocution
- fire and explosions from damaging electric and gas lines.

Safety controls

- Verify placement of existing underground utility lines before drilling. Contractors must use their state's utility location system. "Call Before You Dig" number in your area, to establish the location of underground utility lines.
- Visually inspect the entire planned digging path for structures that indicate potential underground utilities, like gas meters and manhole covers.
- Review drawings, whenever possible, to verify underground utility locations.
- Compare findings with surface markings to identify any missed utility.
- Pothole, to verify the depth of utility lines near the planned drill. It is important that potholes go to the planned drill path's depth, even if this is beyond the deepest known utility line.

Workers should be able to identify a potential natural gas leak. Handheld natural gas detectors are most effective, but other indicators include:

- Dirt, water, or debris blowing from the ground into the air.
- An unusual sound, such as hissing, whistling, or roaring, near a natural gas line.
- Smelling a distinctive sulphur-like odour, which is typically added to natural gas.

HDD machine operator safety controls:

- Follow the directions and guidance provided in the operator's manual.
- Wear appropriate PPE as required by the task.
- Conduct a walk around inspection checking all fluids and noting any items needing maintenance and repair.
- Remove debris and clutter in the cab that would prevent safe operation.
- Verify operation and accuracy of tracking equipment.

- Use 3 points of contact to enter the machine. Do not use any controls, as handholds when entering or exiting the operator compartment.
- Check that controls are in proper settings before starting the machine.
- Only use approved methods and equipment to connect or disconnect components from the drilling system.

Reference:

- Government of Western Australia Department of Commerce Guidance note Horizontal underground directional drilling 2016 https://www.worksafe.wa.gov.au/system/files/migrated/sites/default/files/atoms/files/uhdd_guidance.pdf

Safe operation of forklifts

The safe operation of forklifts involves the following requirements:

- Ensure operators hold a High Risk Work Licence (class LF).
- Ensure Forklifts operate within their Safe Working Load (SWL) limits.
- Ensure the operation of forklifts is separated from pedestrians either by safety barricades/cordoning or by traffic management Stop/Go bat.
- Forklifts should be fitted with: a) overhead protective devices to stop objects falling on the operator; b) and roll over protection.
- Forklifts should be fitted with reversing lights and beepers, etc.
- Ensure that pre-operation daily checks and maintenance checks have been done prior to using forklifts.
- The employer should assess the need for refresher training especially in regard to new models and types of forklifts which may be unfamiliar to the operator.
- Ensure passengers are not carried on forklift trucks.
- It is recommended that seatbelts should be fitted. The fastening of seat belts by operators should be enforced.
- Ensure persons are never elevated or lifted unless approved lifting boxes are used.

- Avoid hard braking on a laden forklift as it can cause a forklift to lose stability.
- Limit the speed at which a forklift may be driven.
- Forklift loads should be lowered before travelling off and turning off the motor.
- When travelling, forklift tines should be lowered as close to the ground as is practicable because driving with raised loads can make the forklift unstable.
- Forklifts should never be used over terrain for which they have not been designed. Note that uneven flooring and inclines can seriously impact on a forklift's stability.
- When forklifts are left unattended tines should be lowered, gas bottles turned off, and the ignition keys removed.

Reference:

- WorkSafe Victoria Guide book Forklift Safety 2024 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2024-05/Forklift-safety-guidebook-edition-2-2024-05.pdf





PART 8:

Traffic management

The safe management of traffic in the building and construction industry has two distinct parts – both of equal importance:

1. Managing mobile plant hazards in relation to the public

This involves:

- The safe management of vehicles, mobile plant and equipment entering/exiting sites.
- The safe operation or positioning of plant on footpaths or roads on the external boundaries of sites.

2. Managing mobile plant operating within construction sites

This involves:

- Ensuring that there is a safe separation between pedestrian workers and mobile plant operating on sites.

Managing truck/plant hazards in relation to the public

Refer to the Road Management ACT 2004 and Worksite Safety Management Code of Practice for guidance.

WorkSafe requires Traffic Management Plans to be developed in the following scenarios where construction activities are likely to adversely affect public pedestrians and external traffic:

- Where entry into, or exit from, sites by construction vehicles will dangerously impede and compromise the flow of traffic on highways, arterial roads and busy streets.
- Where it is necessary for heavy vehicles and major items of plant to reverse into construction sites from any public street or road. This also applies to the reversing out of sites onto any public street or road.
- Where access for heavy delivery trucks and major items of plant is via a public car park. For example at a shopping centre complex.

- In situations such as hospitals, schools or universities, where construction heavy vehicles and major items of plant share the internal access roads of these populated facilities.
- Where the closure of footpaths and lanes of traffic adjacent to sites is required for construction purposes. I.e. the positioning of cranes, concrete placing booms, or the operation of mobile plant.

The preparation of Traffic Management Plans should address the following:

- The development of a detailed risk assessment.
- An assessment as to whether the site in question has sufficient resources to manage the traffic problem itself, or requires outside professional assistance.
- Where dual carriageways are involved in built up areas, correct assessment and allocation of personnel resources to manage multiple interfaces with pedestrians and traffic.
- Ensuring that personnel allocated to traffic management tasks have been formally trained at accredited courses.
- Obtaining of all necessary council permits for footpath or partial road closures.
- Provision of traffic controllers with Stop Go signage.
- Need to install advance warning signage to alert of truck entry/exit movements.
- Need to provide temporary barriers to re-route pedestrians, or to protect major plant and construction personnel from traffic incursion.
- Physical barriers that are able to absorb errant vehicle impact, as the first choice/preference when work and or workers are required to be conducted on roads.
- Physical barriers are deployed when outriggers of any plant (e.g. cranes, concrete pumps, EWP's) are on the road or at risk of being hit by an errant vehicle.
- Where traffic management controls are in place, requirement for all construction personnel to wear high visibility clothing.

Competencies for Temporary Traffic Management

Successful completion of the following four units of competency inclusive of at least 20 hours practical experience applying the relevant skills and knowledge in a temporary traffic management workplace:

- RIISS00058 - Traffic Controller Skill Set for Urban Streets and Low Volume Rural Roads
- RIICOM201E - Communicate in the workplace
- RIIWHS205E - Control traffic with stop-slow bat
- RIIWHS206 - Control traffic with portable traffic control devices and temporary traffic signs.

References:

- Victorian Government Code of Practice Worksite Safety – Traffic Management 2023 https://www.gazette.vic.gov.au/gazette/Gazettes2023/GG2023S280.pdf
- SAA HB81- Field guide for traffic control at works on roads https://www.saiglobal.com/PDFTemp/Previews/OSH/as/misc/handbook/HB811.pdf



Managing truck/mobile plant operating within construction sites

Commercial construction sites

The following control measures should be considered:

- Minimisation of vehicles needing to access the site.
- Clear access routes through site. One way traffic where practicable.
- Provision of dedicated delivery areas and material storage areas.
- Provision of crane loading bays (where applicable).
- For earth works activity, the provision of flagging or barricading to separate machinery from pedestrians.
- The provision of spotters/Stop/Go traffic controllers where there are hazardous interfaces between trucks/plant and pedestrians.
- Where practicable, barricading, or flagging to separate EWPs from pedestrians, particularly in thoroughfares.
- High visibility reflective vests to be worn by those required to work near mobile plant.
- Reversing lights/beepers on mobile plant, vehicles and trucks.

Housing development

- Delivery vehicles not fitted with reversing alarms to be escorted whilst moving around the site.
- Skid steer loaders to be fitted with isolation switches when unattended.
- Site housekeeping maintained to allow orderly access/areas to subcontractor vehicles.

Reference:

- Safe work Australia Traffic management: Guide for construction work Guidance material https://www.safeworkaustralia.gov.au/sites/default/files/2021-04/Traffic%20management%20guide%20for%20construction.PDF



PART 9:

Welding and hot work

Welding, soldering, cutting and similar hot work should only be performed by competent, qualified operators.

Fire extinguishers should always be available next to welding or cutting kits. These should be preferably attached to each welding and oxy acetylene kit.

A Safe Work Method Statement should be developed for all welding and hot work tasks. The SWMS should include provisions for:

- the work to be done under a hot work permit system
- controls of risks from fire and explosions
- electrical precautions when using arc welders
- the operator to wear non-flammable clothing
- the selection and wearing of the correct Personal Protective Equipment (PPE)
- adequate ventilation of the work area
- material Safety Data Sheets (SDS) for welding fluxes.

Ensure special precautions for working in confined spaces must also be considered. (Additional SWMS and permits are needed for work in confined spaces).

Oxy acetylene or LPG for brazing and cutting

General advice for use

- Only gas equipment from a reputable supplier should be used. The supplier should be able to provide details of servicing and maintenance requirements of all equipment.
- Before use all equipment should be visually checked daily. Any equipment found to be damaged, leaking or suspected should be immediately removed from the work area to a well-ventilated space and an “Unsafe – Do Not Operate” tag should be attached to the equipment, until it is repaired or removed from the site.

- Material Safety Data Sheets for the gases are available to workers.
- Optimum protection is provided when at the blowpipe end a flame (flashback) arrestor and a non-return valve for each gas line is fitted, and at the regulator end a flame (flashback) arrestor, a non-return valve and a temperature activated cut-off valve for each line is fitted. (AS 4839-2001).
- The crimping of "O" rings should only be done with the correct crimping tool.
- Trolleys should be designed to be stable; to hold only one cylinder of each oxygen and fuel; have a strap or chain to secure the cylinders.
- A fire extinguisher should be on hand for all oxy acetylene/ LPG applications.
- Gas equipment - hoses, nozzles, etc. should be removed immediately or gases shut off at the cylinder when work has finished or when work has ceased for more than a few minutes.
- All purging of fuel gas or oxygen hoses should be done in a well-ventilated area remote from any confined or restricted space.
- Gas cylinders in the baskets of boom-type EWPs are only permissible if there is at least a 1 metre clearance between the controls and the cylinders and the sides and floor of the basket are not "enclosed" so as to allow gases to accumulate.
- Gas cylinders should not to be taken into a confined space.
- Cutting and brazing work should not be performed from a ladder.
- Flammable clothing, including types of high visibility vests, should not be worn by workers involved in gas cutting or welding.

Transporting of gas cylinders (vehicle)

- Cylinders should always be transported in an upright position, and secured appropriately to prevent them tipping or falling over.
- Where possible cylinders should be transported on open vehicles. Cylinders should not be covered with a tarpaulin.
- Cylinder valves must be closed (where possible valve protection guards or caps should be fitted).
- All cylinders should be checked for leaks (e.g. with soapy water).
- Regulators, hoses etc should be removed from cylinders before transporting.
- Cylinders should not be used while in an enclosed vehicle. Cylinders should be taken to the open air before use.
- When lifting cylinders by crane, slings must not be used. An approved cylinder cradle is the appropriate lifting device.
- Cylinders should never be rolled along the ground, as this can open or damage the valve.

Storage of gas cylinders

- Cylinders should be stored in an upright position and secured in a well-ventilated area, preferably outdoors.
- Cylinders should be stored away from direct sunlight.
- Cylinders containing different gases should be separated in the storage area.
- Full and empty cylinders should never be stored together.
- Appropriate Dangerous Goods and 'No Smoking' signage should be displayed in the cylinder storage area.
- Do not store cylinders in lunchrooms/amenities areas.
- Cylinders must be kept away from ignition or artificial heat sources.

Storage of gas cylinders in vehicles

Workers have died or sustained serious injuries resulting from the explosion of gas cylinders stored in work vehicles. These incidents have the potential to kill or seriously injure workers, as well as the general public.

Risk

Gas leaking from inappropriately stored cylinders can potentially be ignited from any ignition source, i.e. static electricity, naked flame, people smoking, electronic devices such as mobile phones and keyless remote entry devices. Any ignition source may create a life-threatening explosion.

Control measures

When transporting and storing gas cylinders in work vehicles, ensure:

- Hoses and regulators are removed.
- Cylinder valves are closed, (check for leaks with soapy water).
- Cylinders are stored in an upright position and secured.
- Fire-fighting equipment is fitted to the vehicle.

When stored in open type vehicle

If the vehicle's cargo area is not open to the passenger compartment (e.g. ute, tray truck or trailer):

- Cylinders are not to be covered by tonneau cover or tarpaulin.
- Cylinders are not to be stored in an enclosed service body, tool box or enclosed canopy.

When stored in enclosed type vehicle

If the vehicle's cargo area is open to a passenger compartment and/or an engine compartment (as in most types of vans), ensure the vehicle has a separate compartment (cabinet) that is airtight from the rest of the cargo area. Such cabinet must be:

- Large enough to store all cylinders carried.
- Permanently vented to the outside atmosphere.
- Affixed on it's outside a flammable gas label indicating the storage of flammable gas cylinders.
- Remain closed and sealed when not loading or unloading cylinders from the vehicle.

Cylinders should always be removed from the cabinet prior to use. Empty cylinders are to be treated the same as if full and must also be stored in the cabinet.

Regular maintenance and inspection of the cabinet and seals is to be conducted in accordance with the manufacturer's specifications.

Acetylene safety notes

Acetylene in its pure state is very unstable and will rapidly decompose. To make it safe to handle and store it is filled into compressed gas cylinders containing a porous filler material saturated with acetone. The acetylene gas is then dissolved into the acetone making it stable and preventing the possible decomposition of the gas.

It takes around seven (7) hours to fill a common "G" sized acetylene cylinder of 7.0 cubic metres (m3) as the acetone will only absorb the acetylene gas at one (1) cubic metre per hour or seventeen (17) litres per minute.

This is why the maximum withdrawal rate from an acetylene cylinder is limited to approximately 1/7 of the cylinder contents per hour. If you exceed this rate you could draw the acetone out of the cylinder. This is one of the major causes of flashbacks with oxygen/acetylene equipment.

For cylinders smaller than a "G" sized cylinder the withdrawal rate is even less. The following table gives the maximum withdrawal rate for the most common sized acetylene cylinders on the Australian market.

Size	Volume m3	Volume litres	Max withdraw litres/min
"G"	8.4 m^3	8,400	20.0 l/m
"G"	7.0 m^3	7,000	17.0 l/m
"E"	4.1 m^3	4,100	10.0 l/m
"E"	3.2 m^3	3,200	8.0 l/m
"D"	1.0 m^3	1,000	2.4 l/m

Note: For applications exceeding these withdrawal rates cylinders need to be manifolded together.

Care must be taken before using any acetylene equipment to make sure that it does not exceed the flow rates for the acetylene cylinder being used.

Most manufacturers or suppliers of tips and nozzles have published information available on the flow rates and pressures needed for their particular tips and nozzles. The following table is for the "Comet 3" type of equipment, as it is by far the most common type of equipment found on the Australian market.

Type 41 cutting tips

Tip size	Fuel flow and pressure l/min @ (kPa)	Oxygen flow and pressure l/min @ (kPa)
6	2.0 (100)	11 (200)
8	3.5 (100)	20 (200)
12	4.0 (100)	38 (200)
15	7.0 (100)	75 (350)
20	9.0 (100)	134 (400)
24	12.5 (100)	232 (500)
32	20.0 (100)	420 (600)

Welding tips

Tip size	Fuel flow and pressure l/min @ (kPa)	Oxygen flow and pressure l/min @ (kPa)
4	1.5 (50)	1.5 (50)
6	1.5 (50)	1.5 (50)
8	2.0 (50)	2.0 (50)
10	3.0 (50)	3.0 (50)
12	4.0 (50)	4.0 (50)
15	6.5 (50)	6.5 (50)
20	12.0 (50)	12.0 (50)
26	22.0 (50)	22.0 (50)
32	38.0 (50)	38.0 (100)

Heating tips

Tip size	Fuel flow and pressure l/min @ (kPa)	Oxygen flow and pressure l/min @ (kPa)
10 x 12 HT	22 (100)	23 (350)
8 x 12 HT	41–55 (100)	45–58 (150)
8 x 12 SHA1	41–55 (100)	45–58 (150)
12 x 12 SHA2	65 (100)	74 (200)
4 x 24 HT	95 (100)	100 (200)

Note: Make sure that you have flashback arrestors fitted at both torch and regulator end before using any of the equipment listed above, and ensure they have a suitable flow rate for the tip or nozzle you are using.

Table 1 AS 4839-2001		Maintenance	
Equipment	**Weekly (if in constant use) or before every use (to be performed by the operator)**	**As nominated (to be carried out by a technically competent person)**	**Refurbishment or replacement intervals (Equipment condition determines whether refurbishment or replacement is required)**
1. Regulators (including their integral protective devices)	According to the manufacturer's instructions including-visual examination to determine suitability for service (e.g. gas, pressure rating, damage); condition of threads and sealing surfaces; and oil or grease contamination. Leak test all joints at working pressure.	Six monthly: Functional tests to ensure the correct operation of internal components.	Manufacturer or supplier recommendation, but not exceeding five years.*
2. Flash back arrestors and other external devices (including non-return valves)	Visual examination to determine suitability for service (e.g. gas, pressure rating, damage); condition of threads and sealing surfaces; and oil or grease contamination. Leak test all joints at working pressure.	Yearly as detailed in AS 4603: or following a flashback: Proper functioning of the non return valve and flashback arrestors. For pressure–activated valves, check there is no flow in the normal direction with the valve tripped.	Manufacturer or supplier recommendation, but not exceeding five years.*

Table 1 AS 4839-2001		Maintenance	
3. Hose assemblies	Visual examination to determine suitability for service (e.g. gas, pressure rating, damage); condition of cover; and sealing surfaces of the end fittings. Leak test all joints at working pressure.	Six monthly: Check for absence of cuts and excessive wear by bending the hose in a tight radius, to ensure reinforcement is not visible.	Determined by the hose assembly condition.
4. Blow pipes, mixers and attachments.	Visual examination for damage of threads and sealing surfaces of the hose connections and the attachment connections. Leak test all joints at working pressure.	Six monthly: Test control valve function. Blank the attachment connection and leak test for internal malfunction.	Manufacturer or supplier recommendation, but not exceeding five years.*

* Regulator elastomers and seals will wear and deteriorate in service and deteriorate out of service. Items stored for one year or over without use should receive inspection as per the annual maintenance inspection.

Arc welding

The two most common types of arc welding are:

- The electric arc welding of metal using a flux-coated electrode (manual metal arc welding) MMAW.
- The electric arc welding of metal using a gas-shielded wire electrode (gas metal arc welding) GMAW.

General risk controls

- Ensure a Safe Work Method Statement (SWMS) is in place to address the risk when working in an area that may have a contaminated or flammable atmosphere – and make sure it outlines the control measures necessary to remove or control the risk.
- Only competent persons should perform arc-welding work.
- Ensure a welding helmet, embodying auto-darkening lenses with positive air pressure is selected.
- Ensure welders wear the appropriate protective clothing – eye protection, welding jackets, gloves, apron, overalls and clothing protecting exposed skin.
- The type of electrodes that are being used should be checked to ensure that there is compliance to the safety recommendations of the manufacturer or supplier.
- Ensure screens are used to protect the eyes of other persons from flash burns.
- Ensure Welding is not carried out in an environment where flammable materials or potentially explosive gases are present.
- Safety data sheets (SDS) for welding fluxes should be obtained and the information in the SDS should be assessed as part of the risk assessment for the proposed welding activity.
- If welding activity in poorly ventilated areas is unavoidable, ensure that appropriate fume extracting systems is used. This includes specially coated, electroplated steel.

- In order to reduce the amount of exposure from welding fumes workers should spend an equal amount of time on non - welding tasks.
- Hazardous welding dust should be cleaned from the work areas on a regular basis. The floors and work areas should be cleaned by wetting the dust and applying detergent after sweeping.
- Where sparks or slag may affect persons working at a lower level, either fire blankets or an appropriate barricade with signs restricting access should be used.
- Suitable fire fighting equipment should be kept as close as possible to the work area.
- 'Danger Welding in Progress' signs should be displayed in the area where welding is being carried out.
- Welding should not be performed from ladders.

Employers are required under the OHS Regulations 2017 to monitor the health of their workers performing arc welding tasks.

Welding fumes

Some substances found in welding fumes and vapours are Lead, Cadmium, Manganese, Zinc, Iron, Chromium and Nickel.

Workers who are exposed to welding fumes can suffer a number of short and long-term health effects:

- eye and respiratory irritation
- asthma
- metal fume fever
- nervous system damage
- lung and kidney cancer.

Evidence has shown that brain disorders such has Alzheimer and Parkinson's disease are associated with the occupational exposure of welders to these fumes and vapours.

Since 2019, three Victorian workers have died due to disease caused by welding fumes.

Under the Occupational Health and Safety Regulations, employers are required to control the risk of hazardous substances, including airborne contaminants such as welding fumes, and ensure that workers and others in a workplace are not exposed to levels above any relevant exposure standard.

In changes taking effect on January 2024, the workplace exposure standard for welding fumes (not otherwise classified) is 1 mg/m3 as an eight-hour time weighted average, a reduction from 5 mg/m3.

The exposure standard reflects the airborne concentration of a particular substance or mixture that must not be exceeded and is the highest level that a person can usually be exposed to without adverse health effects occurring.

Depending on the processes and components used, welding fumes may contain specific substances which have their own exposure standards that could be less than 1 mg/m3.

Employers should minimise exposure to welding fumes firstly by eliminating, substituting or modifying the welding process, followed by using ventilation controls such as on torch extraction or local exhaust ventilation and lastly respiratory protection if exposure is still likely to be above the exposure standard.

Ensure atmospheric monitoring is carried out when employers are unsure if a relevant exposure standard is being exceeded, or where there may be a risk to health.

Health monitoring may also be required if workers are exposed to certain substances specified by the OHS Regulations that are likely to cause them harm.

UV radiation damage to eyes

Welding can be hazardous to the health and safety of welders and those in close proximity to where the welding is taking place. During the electric arc welding process, the electric welding arc produces UV radiation, exposing the welder to direct UV radiation or UV radiation that is reflected off hard smooth surfaces in close proximity to the welder.

The International Agency for Research on Cancer (IARC) has classified UV radiation emitted from electric welding arc as a Group 1 carcinogen (IARC Monograph 118). This follows evidence identifying the carcinogenicity of ultraviolet radiation produced during electric arc welding potentially causing ocular melanoma in humans.

Exposure to UV radiation may cause:

- ocular melanoma (also referred to as eye melanoma)
- conjunctivitis (also known as welder's flash or arc eye)
- conjunctivitis is an inflammation of the mucus membrane at the front of the eye. Symptoms for conjunctivitis include:
- inflammation, ranging from mild tenderness to intense pain
- tearing and reddening of the eye and surrounding area
- sensation of sand or grit in the eyes
- abnormal sensitivity to light
- inability to look at light sources.

These symptoms may not be felt until several hours after exposure to the electric welding arc, and may remain for one or two days.

UV radiation may burn skin

UV radiation produced by electric arc welding and/or reflected from metal surfaces may burn unprotected skin. Continuous or repeated exposure to UV radiation over a long period of time (years) may also cause skin cancer.

Identifying the risks of exposure to UV radiation

When assessing the risk to employees, the following factors should be considered by employers:

- Type of welding.
- Gas Metal Arc Welding (GMAW) emits the most radiation of all the welding processes.
- Aluminium increases radiation exposure compared to other metals, such as stainless steel or iron.
- Argon, as a shielding gas, increases radiation exposure when compared with helium or 100% carbon dioxide used as a shielding gas.
- Intensity of the welding currents used – more radiation is emitted at higher welding currents than at lower welding currents.
- Distance between the welder and other persons, including employees or visitors to the site, who are not involved in the welding processes – even maintaining a distance of 5m from the welding process could still expose a person to a radiation hazard.
- Duration and frequency of exposure to the welding task – prolonged exposure increases the risk of health effects from exposure to radiation.
- Proximity of reflective surfaces.
- Operator's welding posture or position.

Hierarchy of risk controls

Elimination

Use alternative methods for joining metals, such as mechanical fasteners (bolts, rivets etc).

Substitution

- Use automated robotic welding.
- Use an alternative welding method instead of an electric arc welding process, such as:
  - oxyacetylene
  - laser
  - electron-beam welding
- Substitute argon for helium or carbon dioxide as a shielding gas for electric arc welding.
- Reduce the welding electrical current.
- Use metals that emit less radiation, such as stainless steel or iron.

Isolation

- Install fixed (or portable) non-flammable welding curtains or screens to prevent exposure to passers-by.

Administrative

- Paint reflective surfaces in dark colours, such as black, to reduce UV reflection.
- Use signs to indicate when welding is in progress to caution people nearby.
- Provide information, instruction and training to all employees on the health risks of exposure to UV radiation from the electric welding arc and how this can be controlled.

Personal Protective Equipment (PPE)

- A welding helmet with air respirator provides both eye and respiratory protection and is recommended for employees where welding is the primary activity.
- Powered Air Purifying Respirator (PAPR), which has auto-darkening lens features with extra darkening where high electrical currents are used during the welding process. The powered air provides the wearer with a continuous air flow. Protection is also provided to the ears, head and neck.
- A welding helmet with an auto darkening lens can be worn when welding is not the predominant workplace activity.
- Protective clothing should be provided by an employer and be suitable for the welding process. This may include fire retardant clothing, welder's jackets and pants. Neck protection and welding gloves are also recommended to protect areas of the skin not protected by other clothing.

References:

- WorkSafe Victoria Controlling exposure to ultraviolet (UV) radiation when welding https://www.worksafe.vic.gov.au/controlling-exposure-ultraviolet-uv-radiation-when-welding
- WorkSafe Victoria Welding 2024 https://www.worksafe.vic.gov.au/welding
- WorkSafe Victoria New standard for welding fume safety 2024 https://www.worksafe.vic.gov.au/news/2024-01/new-standard-welding-fume-safety
- WorkSafe Victoria Controlling exposure to welding fumes 2024 https://www.worksafe.vic.gov.au/controlling-exposure-welding-fumes
- WorkSafe Victoria Metal welding safety: Practical advice for employers on controlling hazards when welding 2018 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Metal-welding-safety-2011-06.pdf
- WorkSafe Victoria Risk controls for on-site structural welding 2022 https://www.worksafe.vic.gov.au/risk-controls-site-structural-welding
- Safe Work Australia Model Code of Practice-Welding Processes 2018 https://www.safeworkaustralia.gov.au/sites/default/files/2020-07/model_code_of_practice_welding_processes.pdf
- WorkSafe Victoria Safety Alert Storing gas cylinders in vehicles 2002 (2022) https://www.worksafe.vic.gov.au/safety-alerts/storing-gas-cylinders-vehicles

Electrofusing polyethylene pipes and fittings

There is a risk of a fire causing property damage and injuring to workers involved in this activity because of the application of excessive heat over a short period of time. A draft effect may occur during the process, overheating the polyethylene causing the material to catch alight.

The following controls should apply:

- Adequate training should be provided to ensure the equipment is used as per the manufacturer's recommendations.
- The equipment should also be calibrated to ensure the correct current is applied to the polyethylene at all times.
- The draft effect can be reduced by placing a blank at the opening of pipe work prior to heating.
- A fire watch should also be carried out for the duration of the material manufacture's cooling time (half hour for 40mm-100mm and one hour for 150mm plus) before leaving the material unattended.
- The requirement for hot work permits, fire extinguishers, clearance zones, restricted and / or confined spaces and spotters, should also be addressed.
- The equipment has been appropriately tested and tagged as is required for the use of electrical equipment on construction sites.
- Conduct a visual inspection of the equipment to ensure that it is safe for use.
- The location is suitable to perform the task (no water underfoot or near any of the equipment).
- Suitable barricading and signage in place that ensures that the works are isolated from the other workers and the public.

References:

- PPTEU OHandS Hazard Alert HDPE Electrofusion - Fire Hazard 2016 https://www.ppteu.asn.au/occupational-health-safety/hazard-alerts/hdpe-electrofusion-fire-hazard
- PPTEU OHandS Hazard Alert Polyfusion and Electrofusion of pipes-Electrical Hazard https://www.ppteu.asn.au/occupational-health-safety/hazard-alerts/polyfusion-and-electrofusion-of-pipes-electrical-hazard



PART 10:

Confined spaces



The advice in this section includes requirements from the Confined Spaces Part of the OHS Regulations 2017 and the WorkSafe Victoria Compliance Code Confined Spaces 2018.

A Confined Space is a place with a restricted means for entry or exit, where harmful gases, substances, lack of oxygen and other hazards increase the risk of injury to those entering the space.

In the construction industry Confined Spaces may be air conditioning ducts, crawl spaces, pits, trenches, pipes, sewers or box beams.

Confined Spaces may also involve entry into an environment where postural movement is severely restricted.

Under the Confined Spaces Part of the OHS Regulations 2017 your employer is required to identify all hazards associated with work in a Confined Space. This must be done in consultation with workers and their elected Health and Safety Representatives.

All employees required to work in a Confined Space should receive full information, instruction and training in relation to hazards and risks and be inducted into the relevant SWMS for the Confined Space work.

Employers should assess the need for refresher training for their employees routinely engaged in Confined Spaces work.

Under the Confined Spaces Part of the OHS Regulations 2017 the employer must undertake the following in relation to work in a Confined Space:

- Eliminate or reduce hazardous substances or emissions from plant or services connected to the Confined Space.
- Isolate or de-energise plant or live services connected to the Confined Space.
- Ensure the Confined Space is purged of any contaminant.
- Ensure that pure oxygen or gas mixtures with oxygen in a concentration greater than 21% by volume are not used for purging or ventilation of any contaminant in the Confined Space.
- Ensure that the atmosphere of the space has a safe oxygen level or if that is not reasonably practicable the employee must be provided with air-supplied respiratory protective equipment.
- Ensure that an employee is not exposed to an atmospheric concentration of a contaminant in the Confined Space above the exposure standard for that contaminant, or if that it is not reasonably practicable the employee must be provided with air-supplied respiratory protective equipment or other appropriate respiratory protective equipment.
- If there is a likelihood of fire or explosion in a Confined Space, the employer to ensure that no source of ignition is introduced to the space.
- The employer to ensure that workers are not exposed to dangerous levels and concentrations of any flammable gas or vapour. (Refer to the Regulations for specific requirements).
- An employer to ensure that signs are erected in the immediate vicinity of a Confined Space (for the period for which work is performed) which identify the Confined Space and notify employees that they must not enter the confined space unless they have a Confined Space Entry Permit.

- An employer must ensure that Confined Space control measures and risks in relation to work in a Confined Space are reviewed and revised:
  a. After any incident occurs involving work in a confined space.
  b. The risk control measures do not adequately control the risks.
  c. After receiving a request from a Health and Safety Representative.

Confined Spaces Entry Permits

In accordance with the Confined Spaces Part of the OHS Regulations work, in a confined space must include the implementation of a Confined Spaces Entry Permit containing the following control measures and requirements:

- Applies to one Confined Space only.
- Provide details of the Confined Space.
- Measures to control the Confined Spaces risks.
- Name (s) of employees permitted to enter the Confined Space
- Period of time that the permit is in operation.
- Employer to retain each Confined Space Entry Permit 30 days from the date on which the permit ceases to be in operation.
- A calibrated gas detector is used to monitor the flammable gas or vapour concentration and oxygen levels. Testing needs to be done before an entry permit is issue, immediately prior to entry and continuously, while the employee is in the Confined Space.
- Continuous communication from outside the Confined Space between a stand-by person assigned by the employer, and the employee (s) in the Confined Space.
- Ensure the stand-by person must be fully trained and accredited in all confined spaces procedures including operation of confined spaces hoist and rescue lines.
- Procedures in place to know when any employee is in the Confined Space.

- Procedures to ensure that all employees have exited a Confined Space on completion of work covered by the Confined Space Entry Permit.
- A written record of exit from Confined Space.
- Emergency procedures which include:
  - Ensure emergency procedures can be initiated from outside the Confined Space.
  - The rescue of any employee from the Confined Space.
  - First aid provided to any employee in the Confined Space and after rescue from the Confined Space.
  - Emergency procedures are rehearsed by the relevant employees.
  - Quick and effective execution of emergency procedures after an emergency arises in a Confined Space.
  - Risks associated with the carrying out of the emergency procedures are eliminated or reduced so far as is reasonably practicable.
  - Confined spaces hoist and rescue lines.
  - Provision of air-supplied respiratory protective equipment if employee (s) carries out emergency procedures in a Confined Space which has an atmosphere that does not have a safe oxygen level or has a harmful level of any contaminant.
  - Provision of all other necessary personal protective equipment used by employee (s) carrying out emergency procedures in a Confined Space. Employers to ensure compliance.
  - Openings for the entry to and exit from a Confined Space are of adequate size to permit rescue operations and are not obstructed by fittings or plant. If that is not reasonably practicable an alternative safe means of entry to and exit from the space for rescue purposes to be provided.
  - Plant provided for use in the emergency procedures to be maintained in a safe condition.

- Relevant employees to be provided with information, instruction and training in all aspects of the Confined Space work including the permit requirements and emergency procedures.

Confined Spaces should not be entered unless personnel have been fully trained, inducted into a SWMS and work in accordance with a Confined Spaces Entry Permit.

References:

- WorkSafe Victoria Compliance Code for Confined Spaces 2019 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2019-12/ISBN-Compliance-code-confined-spaces-2019-12.pdf
- WorkSafe Victoria Confined spaces: Your health and safety guide 2017 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Confined-spaces-guide-2017-06.pdf
- Safe Work Australia Model Code of Practice - Confined Spaces 2018 https://www.safeworkaustralia.gov.au/system/files/documents/1905/model-cop-confined-spaces.pdf



PART 11:

Diving in construction work

The underwater environment presents a vast range of risks including attack by marine life, drowning, entanglement or impact by marine vessels and the underwater environment.

Ensure the employer considers the surface conditions at the dive site, including the state of the water (rough seas, unusual tides or currents), weather, visibility, tide, currents, air and water temperature, other vessels or watercraft and any other local conditions to ensure worker's safety.

Ensure the employer considers the visibility, any contaminants, obstructions, dangerous marine life, thermoclines (rapid temperature changes with depth), pressure differentials and currents in the water.

Ensure workers hold a current certificate of medical fitness (valid for 12 months) to be able to do diving work, which you can get from a doctor who has been trained in underwater medicine. The medical assessment must be in accordance with AS/NZS 2299.1 2015 Occupational diving operations – Standard operational practice.

Recommended risk control measures

- Create a diving operations manual and document safe operational procedures in it – see AS/NZS 2299.1:2015 Occupational diving operations Part 1: Standard operational practice.
- Ensure all employees have access to the diving operations manual.
- Develop a dive plan or safe work method statement (SWMS) that incorporates a dive plan and review it if conditions and/or circumstances change during the planned diving operation.
- Test breathing gas quality according to the relevant standard.
- Ensure compression (recompression) chamber support is available.
- Develop and implement diver emergency procedures.

- Ensure specific requirements for scuba diving operations or Surface Supplied Breathing Apparatus (SSBA) diving operations are in place.
- Ensure specific requirements for Enriched Air Nitrox (EAN) diving operations are in place.
- Report and record all accidents, incidents and near misses.
- Review and revise risk controls following accidents, incidents and near misses.
- Ensure divers are medically assessed as fit to dive.
- Use an adequate number of personnel in each diving operation.
- Ensure divers have the relevant training and qualifications before carry out their work – see AS 2815, Training and certification of occupational divers.

Ensure workers hold a current certificate of medical fitness (valid for 12 months) to be able to do diving work, which you can get from a doctor who has been trained in underwater medicine. Ensure the medical assessment is in accordance with AS/NZS 2299.1 2015 Occupational diving operations – Standard operational practice.

Ensure diver reports illness or injury to the dive supervisor

If the diver is feeling unwell or has any current or recent injuries or illness (e.g. respiratory conditions such as COVID-19) they should immediately report these to the dive supervisor to assess whether the diver is fit to dive and complete the work.

Ensure diver is trained properly

It is your job to make sure your workers are properly trained for diving work. As well as a medical certificate, ensure workers hold a certificate for general diving work; that includes the competencies specified in AS/NZS 2815:2013. Training and certification of occupational divers, series relevant to the type of general diving work being conducted.

Ensure workers have the following competencies:

- NAT11006001 - Work safely in hyperbaric operations.
- ADADIV405A - Work safely as a member of a dive team undertaking diving operations under controlled conditions.
- ADAHYP401A – Work safely in hyperbaric operations.
- BSBWHS211 – Contribute to health and safety of self and others (BSBWHS201 for some RTO providers).

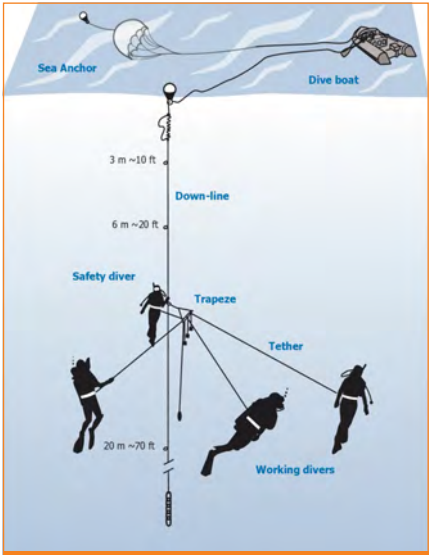
Dive plan

The person supervising the dive needs to prepare a dive plan before the work takes place and give workers instructions about it. Ensure the dive plan is followed and contains the following:

- the method of conducting the diving work
- the tasks and duties of each person who is diving
- the diving equipment being used
- the breathing gases required
- the maximum depth of the dive
- the dive procedures
- the dive times, bottom times and decompression profiles
- any hazards relating to the dive and the steps taken to control the risks
- a dive safety log must be kept for each dive a worker conducts.



Life support equipment



Maintaining contact and control of divers

References:

- Safe work Australia Diving https://www.safeworkaustralia.gov.au/safety-topic/industry-and-business/diving
- WorkSafe Australia Occupational Diving Safety Alert 2022 https://www.worksafe.vic.gov.au/safety-alerts/occupational-diving
- SafeWork NSW Diving https://www.safework.nsw.gov.au/hazards-a-z/diving-work
- NOPSEMA Diving Operations 2024 https://www.nopsema.gov.au/offshore-industry/safety/diving-operations
- NOPSEMA Guidelines for complying with the Diving Safety Regulations 3rd edition 2018
- AS/NZS 2299.1 Occupational diving operations Standard operational practice https://www.intertekinform.com/en-au/standards/as-nzs-2299-1-2015-101071_saig_as_as_212351/



PART 12:

Explosive powered tools, nail guns, compressed air and lasers

Explosive powered tools

Explosive powered tools (EPTs) can be as dangerous as a loaded gun and should be treated with the same care. Ensure operators are specially trained in the correct use of EPTs, their adjustment, dismantling, dangers and safety procedures.

Ensure Safe work method statements are in place prior to use of EPTs.

EPTs should only be loaded immediately before use and all explosive charges should be kept locked when not in use.

Eye and hearing protection should be worn by all persons involved in EPTs tasks, including persons assisting.

EPTs should not be used:

- On hard surfaces such as high tensile steel and cast iron.
- In the presence of an explosive or flammable gas, dust, vapour or in compressed air or in any place where explosive charges may explode unintentionally.
- Close to an edge or hole where there is a risk that the substance might crack or break:
  - for steel – within 15 mm of the edge
  - concrete – within 75 mm of the edge
- On a roof, unless the area below the operators is kept clear of all persons for a distance of at least 6 metres in every direction from the point of operation.
- Where persons, other than the operator and assistant, are in the immediate vicinity of the firing charge.
- Without a WARNING EXPLOSIVE POWERED TOOL IN USE sign posted in the operational area.

The SWMS for the use of EPTs should state that the used explosive strips or charges are to be collected immediately after use and then secured so that they can be taken off-site for disposal. They should not be left lying around or disposed of in rubbish skips on site where children might look for and find them.

Nail guns

Preventing injuries from nail guns

When operators carry the nail gun with the trigger depressed, the contact tip can accidentally be bumped and the nail can be discharged from the gun.

This can lead to serious injuries as nails can be discharged into the operator's – or nearby workers' – legs, hands and other body parts. Nails can also ricochet around the work area, possibly striking workers.

To eliminate or reduce the risk of injuries observe the following:

- Replace bump fire nail guns with sequential (only) firing nail guns wherever possible. In sequential mode, make sure the contact tip is first be held against a workpiece and the trigger is pressed before a nail is discharged. If the trigger is pressed first and the contact tip is bumped or held against the workpiece, the gun will not fire.
- Do not use bump fire nail guns (including those that have a switchable trigger mechanism) if workers are required to climb ladders or other elevated areas with a loaded nail gun.
- Do not use bump fire nail guns in areas where other workers are in close proximity to the operator.
- Do not use bump fire nail guns in restricted spaces.
- Regularly inspect and maintain nail guns and associated equipment to ensure they are in good working order and safe to use.
- Follow manufacturer specifications and operating instructions for each nail gun. Do not assume all nail guns are the same.
- Only use fasteners recommended by the manufacturer.
- Ensure workers are trained in the safe use and operation of nail guns.
- Ensure inexperienced operators (e.g. apprentices and trainees) are supervised by a competent person when using nail guns.

Reference:

- WorkSafe QLD Nail guns 2018 https://www.worksafe.qld.gov.au/safety-and-prevention/hazards/workplace-hazards/construction/nail-guns

Compressed air

Compressed air used irresponsibly can cause severe injury or death.

Only trained, competent persons should operate compressed air tools, making sure that the following safety rules are always observed:

- All valves, hoses and the tools are in good condition.
- Hose couplings have safety clips.
- The end of the hose is secured to prevent it from 'whipping'.
- The tool and the main valve is switched off before replacing tools.
- When turning air on, the air is introduced slowly into the system, ensuring that all controls are in the off position.
- Ensure goggles, face shield or safety glasses are always worn when working with compressed air.
- When using a nail gun all parts of the body are kept clear of the firing line. The trigger should not be squeezed until the nail gun is in position on the timber.
- When the job is completed, the main isolator is turned 'off' and the air is bled from the system.

Compressed air should never be used as follows:

- to cool off or to blow dust off clothes, skin or hair
- directed at persons
- for practical jokes
- if the air tool has a faulty operating valve or governor
- if the hose is kinked, thus cutting off the air supply.

References:

- Compressed Air OHS Reps https://www.ohsrep.org.au/compressed_air
- WorkSafe Victoria Air receiver pressure vessels https://www.worksafe.vic.gov.au/air-receiver-pressure-vessels
- Safe work Australia Compressed Air and Air Receiver Information Sheet 2015 https://www.safeworkaustralia.gov.au/sites/default/files/2020-12/Compressed%20Air%20and%20Air%20Receiver.pdf

Pressure testing of pipe-work

Background

There have been several incidents where fittings have failed on rolled groove pipe when placed under a pressure test:

- A worker not involved in testing was hospitalised when a rolled groove fitting failed under test after being struck by high-pressure water.
- A Plumber received severe facial injuries when he cut the capped end off a 50 mm copper line under test.
- A worker was killed, and his mate seriously injured when a metal cap exploded from a 300 mm diameter pipe when it failed whilst under test.
- Failures have occurred when testing with water or air.

Hazards

- Failure of pipe and/or fittings under excessive pressure.
- Failure to identify if the installation is under a pressure test.

Risk

Serious injury or death resulting from catastrophic failure when under pressure, or when pressure is released in an uncontrolled manner. For example, a blast of compressed air at 40 psi at 100 mm has the potential to rupture an eardrum or cause brain damage.

Control measures

- When testing with compressed air, never exceed a maximum pressure above 50 kPa. Ensure any testing above this maximum is under direction of a qualified engineer.
- Provision for a pressure gauge, stop valve and bleed valve is compulsory.
- Appropriate training and instruction in procedures for workers involved in the test.
- Designated test/exclusion zones. This may require testing conducted outside of normal working hours.
- Adequate pipe end support.
- Lock-out/tag system to prevent persons other than those involved in the test from accidentally releasing pressure.
- Consideration of the effects of hydro-static head pressure on the system in test.
- For pipework left under pressure after the test:
  - Adequate signage/information for persons other than those involved in the test.
  - Protection of pipe-work and fittings with the potential to be damaged.

References:

- PPTEU OHandS Hazard alerts, Pressure testing of pipe-work https://www.ppteu.asn.au/occupational-health-safety/hazard-alerts/pressure-testing-of-pipe-work
- PPTEU OHandS Hazard alerts Hydrostatic testing of fire sprinkler suppression systems https://www.ppteu.asn.au/occupational-health-safety/hazard-alerts/hydrostatic-testing-of-fire-supression-systems
- WorkSafe Victoria Safe pressure testing of pipes 2022 https://www.worksafe.vic.gov.au/safe-pressure-testing-pipes

Laser safety

Lasers should not be used unless they have a label indicating the classification of the laser. All lasers shall be used and maintained in accordance with the manufacturer's instructions.

According to the requirements of AS 2397: Safe use of lasers in the building and construction industry – Class 3B and higher lasers should not be used for construction activities except that Class 3B (Restricted) may be used, provided all applicable safety controls are enforced.

For Class 2, 3A and 3B (Restricted) lasers the following requirements are mandatory:

- All operators shall have appropriate training in the use and safe operation of the laser.
- Warning signs of the correct type to be displayed at entry points and areas where the laser is used.

Signs and training of personal operating Class 1 lasers are not required. However, it is recommended that such persons at least be familiar with the manufacturer's instructions for the proper use and care of the laser.

Reference:

- Safe work Australia Laser classifications and potential hazards Information Sheet 2012 https://www.safeworkaustralia.gov.au/system/files/documents/1702/laser_classification_and_potential_hazards.pdf



PART 13:

Hazardous substances and dangerous goods

Hazardous substances

The advice in this section includes requirements from the Hazardous Substances Part of the OHS Regulations 2017 and the WorkSafe Victoria Compliance Code Hazardous Substances 2018.

Hazardous substances can include the following:

- Paints, solvents, glues, sealants.
- Particle fibreboard, MDF, insulation material.
- Concrete, cements, cement finishes, concrete sealants, and some plasters.
- Grease, oils, fuels, asphalt/bitumen.
- Welding fumes produced or generated from a non-hazardous substance.
- Other hazardous substances such as wood dust, silica and lead produced from grinding, cutting, or sanding.

Hazardous substances in soils

The PFAS group of chemicals – perfluorooctane sulfonate (PFOS), perfluoro-octanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS) – are man-made compounds.

They are in hundreds of products. Some examples are carpets (to make them stain-proof) and non-stick cookware. The chemicals also have industrial uses, including in substances like firefighting foams.

These chemicals may cause:

- low infant birth weights
- effects on the immune system
- cancer (for PFOA)
- thyroid hormone disruption (for PFOS).

The risk for workers is in contaminated soil on building and construction sites.

Workers who may potentially be exposed to PFAS must follow safe work procedures and recommendations given in the Safety Data Sheets (SDS).

Personal Protective Equipment (PPE) is a low level of control and should not be applied as a primary control without consideration of other risk control options.

Safety data sheets

Ensure the employer finds out if a substance is classed as hazardous by obtaining a Safety Data Sheet (SDS) for the substance from the manufacturer or importer.

- Ensure the manufacturer's SDS is obtained.
- Do not alter the SDS in any way.
- If the SDS is older than 5 years obtain the latest SDS from the manufacturer.
- SDS should be readily accessible to employees.
- An SDS register should be accessible to First Aiders.

If the SDS fails to provide sufficient technical information (e.g. does not identify the specific chemical entities) seek clarification from the manufacturer or expert advice from a qualified hygienist. This may include a reputable chemical data base.

Remember a SDS does not tell you whether a product is safe for use. Ensure chemical products, which have been classified as hazardous, are properly assessed as to their suitability for application on site.

Risk control

The Hazardous Substances Part of the OHS Regulations obliges employers/contractors to control the risks associated with hazardous substances at the employer's workplace by applying the Risk Control Hierarchy approach based on the criteria of reasonable practicability.

The controls below are in priority order for selection:

1. Eliminate the hazard.
2. Substitute the substance with a substance that is less hazardous or a less hazardous form of the substance.
3. Isolate employees from the source of exposure to the hazardous substance.
4. Use engineering controls.
5. Use administrative controls.
6. Provide appropriate personal protective equipment to employees.

Ensure when assessing whether elimination or substitution should apply, employers consider the following:

- Some substances are prohibited and cannot be used (e.g. benzene, asbestos).
- There are also special requirements for some scheduled and/or carcinogenic substances (e.g. health surveillance, licence to use).
- Some chemical products may be deemed as unacceptable because under normal conditions of use these products release highly toxic vapours, fumes or dust which exceed the Exposure Standard nominated in the SDS.

In order to document the required control measures, it is good practice for employers, in consultation with workers and their elected Health and Safety Representatives, to develop safe work method statements for hazardous chemical products which have been assessed as suitable for use.

Review of risk control measures

Employers need to ensure that measures implemented to control hazardous substances risks are reviewed and, if necessary, revised in the following circumstances:

a. Before any change is made to systems of work that is likely to result in changes to hazardous substances risks.
b. If an employer receives advice from a registered medical practitioner that adverse health effects have been identified by the health surveillance.
c. After any incident occurs that involves a hazardous substance in the workplace.
d. For any other reason, the risk control measures do not adequately control the risks.
e. After receiving a request from a Health and Safety Representative.

Atmospheric monitoring and exposure standard

Employers to ensure that atmospheric monitoring is carried out if there is uncertainty (based on reasonable grounds) as to whether the Exposure Standard is, or may be, exceeded; or atmospheric monitoring is necessary to determine whether there is a risk to health.

Employers to ensure that an employee is not exposed to an atmospheric concentration of a hazardous substance supplied to, or generated at the workplace above the exposure standard for the substance or any of its ingredients.

Register of hazardous substances

A Register of Hazardous Substances must be kept at the workplace in accordance with following requirements:

- A list of the product names of the hazardous substances supplied to workplace.
- A copy of the SDS for each of the hazardous substances supplied to the workplace.
- The register is readily accessible to any employee who may be exposed to a hazardous substance.

It is good OHS practice to document all chemical products used in the workplace in the following tabulated form:

- date of entry
- name of subcontractor
- name of product
- type of application or use
- quantity involved
- locations of chemical product on site
- availability of SDS (Yes/No)
- hazardous substance (Yes/No)
- dangerous good (Yes/No)
- safe work method statement necessary for use (Yes/No).

Before any chemical product is used employees have the right to ask their employer for all relevant information.

References:

- WorkSafe Victoria Compliance Code: Hazardous Substances 2022 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2022-11/ISBN-Compliance-code-hazardous-substances-2022-11.pdf
- WorkSafe Victoria Health Monitoring How to Conduct Health Monitoring for Employees Exposed to Certain Hazardous Substances 2017 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-08/ISBN-Health-monitoring-2017-06.pdf
- Safe Work Australia Model Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace 2023 https://www.safeworkaustralia.gov.au/sites/default/files/2023-06/model_code_of_practice_managing_the_risks_of_hazardous_chemicals_in_the_workplace.pdf

- Safe Work Australia Model Code of Practice- Labelling of Workplace Hazardous Chemicals 2023 https://www.safeworkaustralia.gov.au/sites/default/files/2023-06/model_code_of_practice_labelling_of_workplace_hazardous_chemicals.pdf
- Safe Work Australia Model Code of Practice- Preparation of Safety Data Sheets for Hazardous Chemicals 2023 https://www.safeworkaustralia.gov.au/sites/default/files/2023-06/model_code_of_practice_preparation_safety_data_sheets_for_hazardous_chemicals.pdf
- WorkSafe Victoria Industry Standard Contaminated Construction Sites Construction and Utilities 2017 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Contaminated-construction-sites-industry-standard-2017-06.pdf

Dangerous goods

Dangerous goods are classified on the basis of immediate physical or chemical effects, such as fire, explosion, corrosion and poisoning affecting people, the environment or property. Dangerous goods used at the site may include:

- explosives
- flammable liquids, such as unleaded petrol, kerosene, turpentine and flammable paints
- corrosives, such as hydrochloric acid
- oxy acetylene welding sets
- LPG.

Ensure there is a Safety Data Sheet for each Dangerous Good. A SDS should provide the following relevant information:

- The Dangerous Good class if applicable.
- The required correct Personal Protective Equipment when either handling or using the goods.
- First Aid provisions.
- Safe storage requirements.
- Emergency procedures in case of spills or fire.

Examples of control measures for dangerous goods commonly used on sites are as follows:

1. Flammable and combustible liquids:
   - Ensure flammable liquids are stored away from any ignition sources or sources of heat.
   - Containers should be kept closed when not in use and secured when the site is unattended.
   - All combustible materials should be removed from areas where flammable liquids are stored, used or decanted.
   - Ensure Flammable liquids are transferred in a safe manner with a dry chemical fire extinguisher available as the extinguishing agent.
   - Ensure no personnel smokes cigarettes near flammable or combustible substances and display NO SMOKING signs where these are stored.
   - Oily rags which can spontaneously combust in hot weather should not be left in piles.
2. Liquid Petroleum Gas (LPG):
   - LPG cylinders must be kept in an upright position at all times and restrained from falling.
   - Cylinder valves should be kept closed when not in use.
   - Ensure LPG is not stored near ignition sources.
   - Provide a dry chemical fire extinguisher as the extinguishing agent.
   - LPG cylinders should never be turned upside down to freeze pipes.
   - LPG cylinders should be stored in a well ventilated area away from combustible materials.
   - Security should be provided for cylinders when the site is unattended.
3. Oxy acetylene welding sets:
   - (See Oxy acetylene or LPG for Brazing and Cutting).

4. Explosives:
   - Ensure explosives are kept in a locked receptacle.
   - Ensure discarded detonator boxes are not left on the site.
   - Ensure excess explosives are not left on an unattended site.
   - Ensure an explosives licence is obtained from WorkSafe to buy and discharge explosives.

Filling portable generators

Filling portable generators with petrol creates vapours that can be easily ignited by static electricity or other ignition sources. Workers can be seriously injured if petrol ignites.

Where it is not practicable to use mains power or a diesel generator, a petrol generator may be used.

When filling a portable generator observe the following measures:

- Use approved fuel containers and funnels to reduce the risk of generating static electricity while decanting petrol.
- Ensure suitable fire extinguishers are immediately accessible.
- Ensure portable generators are always placed on firm ground, in well-ventilated areas, away from heat and possible ignition sources.
- Do not fill generators inside a vehicle, trailer or plastic surface that prevents the discharge of static electricity.
- Ensure the container cap is replaced tightly on the filled generator before moving the generator.
- Allow the motor to cool and ensure the generator is in an upright position in a well-ventilated space before transporting.

Reference:

- WorkSafe Safety Alert Victoria Petrol powered portable generators 2011 https://www.worksafe.vic.gov.au/safety-alerts/petrol-powered-portable-generators

Further information and advice:

Acts and Regulations:

- Dangerous Goods Act 1985
- Dangerous Goods (Storing and Handling) Regulations 2012
- Dangerous Goods Storage and Handling Code of Practice 2013
- Dangerous Goods (Explosives) Regulations 2011

Acts and Regulations are available at www.legislation.vic.gov.au



References:

- WorkSafe Victoria Code of Practice: The Storage and Handling of Dangerous Goods 2022 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2022-11/ISBN-Code-of-practice-for-the-storage-handling-dangerous-goods-2022-11.pdf
- WorkSafe Victoria Transporting Small Quantities of Dangerous Goods: Tools of Trade 2020 https://www.worksafe.vic.gov.au/transporting-dangerous-goods-tools-trade
- WorkSafe Victoria Commonly Used Dangerous Goods 2023 https://www.worksafe.vic.gov.au/commonly-used-dangerous-goods



PART 14:

Control of hazardous dusts and fibres

Silica dust

Under the Hazardous Substances Part of the OHS Regulations 2017, silica dust is considered to be a hazardous substance that is produced or generated from a non-hazardous substance.

Silica dust is created when concrete is cut, sawn or scabbled.

Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans IARC (Group 1).

Safe Work Australia recommends 0.02 mg/m3 as the workplace exposure standard for Silica and Crystalline.

Respirable dusts containing crystalline silica can cause lung cancer, fibrosis, and silicosis. Such dusts may be generated from bricks, mortar, aggregate, sandstone and concrete, particularly when dry cutting, chasing, sawing, grinding or scabbling.

Alternative methods that avoid creating silica dust should always be considered and implemented as far as practicable.

A SWMS must be developed for all tasks where silica dust may be created. The SWMS should include the following controls:

- Use of wet working methods as far as practicable.
- Isolation and restriction of entry to affected areas.
- Use of tools fitted with dust extraction.
- Use of protective cartridge respirator masks.
- Use of eye protection, hearing protection and protective clothing.
- Removal of dry dust using a vacuum cleaner fitted with a HEPA filter.
- Removal of wet slurry using a wet vacuum or squeegee.
- Decontamination of work clothing and personal hygiene.

Engineered stone ban

From 1 July 2024, the manufacture, supply, processing or installation of engineered stone benchtops, panels or slabs is banned in Victoria. The engineered stone ban applies to engineered stone benchtops, panels and slabs.

Engineered stone is defined as an artificial product that:

- Contains 1 per cent or more crystalline silica, determined as a weight/weight (w/w) concentration.
- Created by combining natural stone materials with other chemical constituents such as water, resins or pigments, and becomes hardened.

The ban applies to engineered stone in the form of:

- Benchtops, such as those installed in kitchens and bathrooms and outdoor surfaces.
- Panels, such as kitchen splash backs or floor or wall tiles.
- Slabs, that might need to be cut to fit a variety of different installation settings.

Former engineered stone licence holders must continue to ensure the health monitoring is conducted under the supervision of specialists if they have an employee who:

- Is required to have health monitoring under regulation 169.
- Was employed by them immediately before 1 July 2024.
- Was previously required to have health monitoring under the supervision of a specialist occupational and environmental physician, or specialist respiratory and sleep medicine physician.

References:

- WorkSafe Victoria Construction: Preventing exposure to crystalline silica dust 2024 https://www.worksafe.vic.gov.au/preventing-exposure-crystalline-silica-dust
- WorkSafe Victoria Frequently asked questions - Engineered stone ban 2024 https://www.worksafe.vic.gov.au/frequently-asked-questions-engineered-stone-ban
- WorkSafe Victoria Crystalline Silica: Safety Basics 2024 https://www.worksafe.vic.gov.au/crystalline-silica-safety-basics
- WorkSafe Victoria Crystalline Silica Health Assessments 2024 https://www.worksafe.vic.gov.au/crystalline-silica-health-assessments
- WorkSafe Victoria Stonemasons - Preventing Crystalline Silica Exposure 2024 https://www.worksafe.vic.gov.au/stonemasons-preventing-crystalline-silica-exposure





Asbestos

The advice in this section includes requirements from the Asbestos Part of the OHS Regulations 2017 and the WorkSafe Victoria Compliance Codes:

- **Managing asbestos in workplaces 2018**
- **Removing asbestos in workplaces 2018**

The Safe Work Australia Model Code of Practice: How to safely remove asbestos, is another useful source of advice.

The dangers of asbestos in the causation of lung cancer, asbestosis and mesothelioma are widely known and well documented. In relation to mesothelioma, it should be noted that there is no known safe level of exposure.

The prescribed use of Phase Contrast Microscopy (PCM), to provide an exposure level of 0.01 f/ml as a clearance standard, cannot provide an absolute assurance of safety.

However, If the technique of Transmission Electron Microscopy (TEM) is used, levels of asbestos below 0.01 f/ml will be revealed. In the United States, TEM is now the standard for most airborne investigations, including clearance testing as well as environmental monitoring activities.

Before demolition or refurbishment work commences at a workplace, the person who manages or controls the workplace needs to:

a. Review the Asbestos Register.
b. Revise the Asbestos Register if it is inadequate in identifying all the possible sources of asbestos – taking into account the proposed demolition or refurbishment work.

This formal review is normally commissioned when plans are developed for demolition and refurbishment activities. The examination of the building or structure is undertaken by an approved Hygienist who produces a detailed report listing all the identified and possible sources of asbestos. The report will note that it has been undertaken in accordance with Division 6 Asbestos Part of the OHS Regulations 2017.

Ensure that a person who manages or controls a workplace or plant at a workplace identifies asbestos that is likely to be disturbed by the proposed refurbishment work and makes sure , so far as is reasonably practicable, that the asbestos is removed. (Division 6 Asbestos Part of the OHS Regulations 2017).

In general the Asbestos Part of the OHS Regulations requires asbestos removal work to be performed by licensed asbestos removalists.

Class A licensed asbestos removalists can remove all types of asbestos (whether friable or non-friable). A Class A Licence is now required to remove vinyl floor covering with a friable backing.

Class B licensed removalists can only remove non-friable asbestos-containing material.

If asbestos is found or suspected in the workplace it should not be disturbed in any way.

Procedure if previously unidentified asbestos-containing material is discovered:

- Report the matter to your supervisor and Health and Safety Representative.
- Work should cease in the immediate area where the suspected hazardous building material has been located.
- Site management should contact an accredited Hygienist.
- The Hygienist should provide advice and if required attend site to assess the material and collect a sample for subsequent analysis.
- Where the suspect material has been confirmed to be hazardous the Hygienist should provide advice as to the extent of remedial action required, incorporating the following factors:
  - The extent of removal/clean up required.
  - Precautionary measures to apply during the removal/clean up works.
  - Any requirements of air monitoring during and/or at the completion of the removal /clean up works.
- The necessary removal/clean up works should be performed by an appropriate licensed asbestos removal contractor.
- Refurbishment work should only commence in the affected area once confirmation is obtained from the Hygienist that the area is safe for re-occupation by unprotected personnel.

Control plan

Prior to commencing asbestos removal work, the licensed asbestos removalist is required to prepare a Control Plan which identifies the specific control measures which the removalist will use to ensure employees and other people are not at risk when removal work is being conducted. It is similar to a safe work method statement (SWMS) but it focuses on the specific control measures necessary to reduce the risk from exposure to asbestos throughout that particular removal job.

Para-occupational air monitoring (immediately outside area where asbestos removal is taking place):

- Ensure para-occupational air monitoring takes place for friable asbestos and for non-friable asbestos that becomes friable in the removal process.
- Para-occupational monitoring for non-friable asbestos should be considered where there is a risk that people may be exposed to asbestos dust.

Clearance certificates

Ensure a Clearance Certificate is obtained prior to any person reoccupying a site where: any quantity of friable asbestos has been removed, and non-friable asbestos greater than 10 square metres has been removed.

Ensure the Clearance Certificate states: a) an inspection by an independent person found no visible asbestos residue in the area from which the removal took place; and b) para-occupational air monitoring results in the area from which the removal took place indicate that the airborne asbestos fibre level is less than 0.01 fibres/ml of air as a time weighted average.

References:

- WorkSafe Compliance Code Removing of Asbestos in Workplaces 2019 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-02/ISBN-Compliance-code-removing-asbestos-workplaces-2019-12.pdf
- WorkSafe Victoria Compliance Code for Management of Asbestos in Workplaces 2019 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-02/ISBN-Compliance-code-managing-asbestos-workplaces-2019-12.pdf
- WorkSafe Victoria Removing asbestos – Before Demolition or Refurbishment 2010 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Removing-asbestos-before-demolition-or-refurb-2010-10.pdf
- WorkSafe Victoria Asbestos in Soil 2025 https://www.worksafe.vic.gov.au/asbestos-soil
- WorkSafe Victoria Asbestos-Cement Water Pipe Management 2023 https://www.worksafe.vic.gov.au/asbestos-cement-water-pipe-management
- WorkSafe Victoria Safety Alert Coveralls Used for Asbestos Removal 2010 https://www.worksafe.vic.gov.au/safety-alerts/coveralls-used-asbestos-removal

Synthetic mineral fibres (SMF)

The SafeWork NSW management of synthetic mineral fibres (SMF) — glasswool and rockwool May 2015 — provides the most up to date Health and Safety from a State Regulator on SMFs:
https://www.safework.nsw.gov.au/resource-library/manufacturing/safe-management-of-synthetic-mineral-fibres-smf-glasswool-and-rockwool

The current exposure standard of 0.5 fibres/mL is applicable to 'hazardous' forms of SMF: (Australian Institute of Occupational Hygienists):
https://www.aioh.org.au/product/synthetic-mineral

SMF are fibres made from glass, rock or other materials. Common SMF products are Rockwool, Glasswool, Fibreglass, and Ceramic Fibre.

SMF are used for insulation, usually as batts, ceiling tiles, blankets, and loose wool.

SMF can cause dermatitis and irritation of the nose, eye and throat. They may also cause respiratory illness and ceramic fibres are possibly carcinogenic. (Safework Australia Guide to Handling Refractory Ceramic Fibres July 2020).



SMF fibre glass Insulation of duct work

Although under the Construction Part of the OHS Regulations 2017, a safe work method statement is not required for SMFs, it is good practice to develop a SWMS for the installation and removal of SMFs.

When using SMF products, the following health and safety requirements should be observed.

All those required to work with SMF should receive full information, instruction and training in relation to hazards and risks.

Safe work practices should aim to eliminate the possibility of generating fibres and dust in the first place. However, where this is not practicable the following controls should apply:

- Respiratory protection (class P1 and P2).
- Cordoning off and designation of installation/removal areas with a 3 metre exclusion zone.
- Use of hand tools in preference to power tools or tools fitted with dust extraction.
- Eye protection, gloves and protective coveralls.

- Removal of contamination using an appropriate vacuum cleaner.
- Wetting loose SMF insulation materials prior to removal (where there is no electrical risk).
- Proper disposal measures (plastic sealed bagged material).
- The installation of SMFs in roof spaces of existing buildings, requires the isolation of electrical power for the duration of the task.

Where practicable all products to be delivered on site in a form (encapsulated, wrapped or painted with a PVA sealant) that minimises release of fibres and/or dust) and cutting and handling.

Prior to work with new SMF material ensure that the Safety Data Sheet (SDS) for the product is obtained and read.

Medium density fibreboard (MDF) and wood products

MDF (medium density fibreboard), particle boards and some timbers such as birch, oak, walnut, and others release wood dust, which when cut, may cause nasal cancer and/or respiratory illness. MDF and other particle boards may also release toxic chemicals such as formaldehyde.

Under the Hazardous Substances Part of the OHS Regulations 2017 wood dust is considered to be a hazardous substance that is produced or generated from a non-hazardous substance.

All those required to work with these products should receive full information, instruction and training in relation to hazards and risks and be inducted into the relevant SWMS for the work. The SWMS should include the following controls:

- Prescribes the use of low formaldehyde (LFE) emission MDF.
- Measures to minimise creation and spread of dust.

- Provision of a fully enclosed area where necessary.
- Isolation and restriction of entry to affected areas.
- Use of hand tools in preference to power tools or tools fitted with dust extraction.
- Use of half face protective cartridge respirator masks.
- Removal of dust using an appropriate vacuum cleaner.
- Emptying of vacuum cleaner/dust extraction system bags in a manner that does not release any dust to the atmosphere.
- Decontamination of work clothing and personal hygiene.

Ensure that the SDS for the product is obtained and read prior to work with any of these products.

Ensure MDF and other particle boards are stored in a well-ventilated area.



References:

- SafeWork NSW Wood Dust - Health Hazards and Control: Fact Sheet https://www.safework.nsw.gov.au/resource-library/manufacturing/wood-safety-kit/wood-dust-health-hazards-and-control https://www.safework.nsw.gov.au/__data/assets/pdf_file/0005/101588/SW08419-1117-395343.pdf
- Australian Safety and Compensation Council Benchmarking of exposures to wood dust and formaldehyde in selected industries in Australia 2008 https://www.safeworkaustralia.gov.au/system/files/documents/1702/benchmarkingexposures_wooddust_formaldehydeselectedindustries_australia_2008_pdf.pdf
- Cancer Council Wood products https://www.cancer.org.au/cancer-information/causes-and-prevention/workplace-cancer/wood-products



PART 15:
Noise

The advice in this section includes requirements from the Noise Part of the OHS Regulations 2017 and the WorkSafe Victoria Compliance code March 2018.

High noise levels are almost always present in construction sites but hearing damage may not be felt immediately. Loss of hearing ability is irreversible and may take years to develop.

Exposure standard

In accordance with the Noise Part of the OHS Regulations 2007, employers need to identify if there is a risk to employees from noise levels in the workplace. This means that employers need to determine whether the daily exposure standard for noise of 85 dB (A) and peak hold sound pressure level reading of 140 dB(C) – is likely to be exceeded.

Control measures

Employers need to ensure that no employee at the workplace is exposed to noise that exceeds the exposure standard by implementing the following control measures based on the risk control hierarchy:

- Eliminate the source of the noise.
- Substitute quieter plant or processes.
- Use engineering controls (sound proof the plant in an enclosure).
- Use administrative controls (drastically reduce the time the person is exposed to the noise).
- Provide hearing protective devices as a last resort.

If the employer has determined that noise levels will exceed the exposure standard, and it is not reasonably practicable to control the risk, within six months the employer needs to prepare a written record that describes the actions necessary to implement the control measure and when these actions will be carried out.

Noise areas and machinery and tasks where hearing protection must be worn, are required to be identified by signs, labels or other appropriate means.

Hearing tests

Those required to wear hearing protection need to have:

- Hearing tests (Audiometric Testing) (within 3 months of start and every two years thereafter).
- Reduction in hearing level of 15db or greater over a two-year period, regardless of how many tests are undertaken over that two-year period.
- At any time when reasonably requested to do so by the Health and Safety Representative of the designated work group of which the employee is a member.

Employers should provide training about the effects of exposure to noise; control measures; and selection, fit and maintenance of hearing protective devices.

Indicative noise levels for machinery and plant

The table shows how quickly you can be exposed to the maximum allowed daily noise dose if not wearing hearing protection.

The prevention of hearing loss involves measures to control and reduce noise at its source, in addition to the wearing of hearing protective devices.

Noise level of tools and time taken to reach daily dose of 85dB (A)

Note: Levels for operator position are indicative only.

Tools	Average noise level in decibels	Peak noise	Time required to reach daily dose
Pile hammer	125	N/A	3 sec
Pneumatic rock breaker	120	N/A	10 sec
Angle grinder on metal	120	N/A	10 sec
Chainsaw	115	N/A	28.5 sec
Powder – actuated tool in masonry	109	147	Nil based on peak
Powder – actuated tool in timber	102	143	Nil based on peak
Paslode nail gun	101	138	Nil based on peak
Electric grinder (on aluminium)	100	123	8 minutes
Cut - off saw	100	118	8 minutes
Electric hand planer	98	114	15 minutes
Masonry drill (timber then concrete)	98	111	15 minutes
Bench rip saw	97	116	15 minutes
Circular saw	96	113	15 minutes
Hammering 4 inch nail into timber	95	131	Nil based on peak
Bench grinder	94	113	30 minutes
Jig saw	93	112	30 minutes
Belt sander	93	105	30 minutes
Router	92	108	1 hour
Electric chain saw	91	112	1 hour
Electric drill in timber	89	100	2 hours
Electric sander (1/3 sheet)	81	103	8 hours

References:

- WorkSafe Victoria Compliance Code: Noise 2019 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-02/ISBN-Compliance-code-noise-2019-12.pdf
- WorkSafe Victoria Noise: Safety Basics 2022 https://www.worksafe.vic.gov.au/noise-safety-basics
- WorkSafe Victoria Hearing Protection 2022 https://www.worksafe.vic.gov.au/hearing-protection
- Safe Work Australia Model Code of Practice - Managing Noise and Preventing Hearing Loss at Work 2024 https://www.safeworkaustralia.gov.au/sites/default/files/2024-11/model_code_of_practice-managing_noise_and_preventing_hearing_loss_at_work-nov24.pdf
- WorkSafe Victoria Construction Noise Control Self-Assessment Checklist 2023 https://www.worksafe.vic.gov.au/construction-industry-noise-control-self-assessment-checklist



PART 16:

Hazardous manual handling

The advice in this section includes requirements from the Hazardous Manual Handling Part 3.1 of the OHS Regulations 2017 and the WorkSafe Victoria Compliance Code Hazardous Manual Handling 2018.

Some of the injuries resulting from hazardous manual handling include back injury, muscle sprains and strains, abdominal hernias and chronic pain. Many of these injuries are not felt straight away but develop over some time into more or less continuous pain.

Hazardous movements and postures

Task	Examples
Handling unstable, unbalanced or difficult to grasp loads	Handling steel reinforcement sheets Handling long lengths of timber
Repeated use of force	Using a nail gun
Awkward posture	Working on plaster board ceiling
Repeated single-hand lifting of concentrated load	Brick laying
Application of high force	Lifting heavy load
Exposure to prolonged vibration	Using jackammer

Examples of control measures for hazardous manual handling

Control measure	Examples
Eliminate the task if possible	Not manually lifting or carrying awkward dead weights such as cement blocks and cement bags.
Change the workplace layout or environmental conditions	Placing materials at waist level rather than at floor level so they are easier to pick up. Eliminating the need to push or pull objects up steep ramps. Providing good lighting and work areas free of obstacles with plenty of room to move with.
Change systems of work	Timing and placement of deliveries to reduce the frequency of handling and to avoid double handling. Team handling to reduce forces, postures on one person.

Control measure	Examples
Change the object	Changing the load so it is easier to handle (e.g. 20 kg cement bags). Using tools that are light and have good grips and supports.
Use mechanical aids	Using cranes, forklifts, trolleys, chain blocks, pipe horses, hoists and similar aids to move loads.
Information training and instruction	Ensuring workers understand risks and know how to use proper manual handling techniques and equipment.

Hazardous Manual Handling Part 3.1 of the Regulations

Under the Manual Handling Part 3.1 of the OHS Regulations, an employer needs to – so far as is reasonably practicable – identify any hazardous manual handling undertaken, or to be undertaken, by an employee.

Employers need to ensure that the risk of a musculoskeletal disorder associated with hazardous manual handling is eliminated so far as is reasonably practicable.

If it is not reasonably practicable to eliminate the risk of a musculoskeletal disorder associated with a hazardous manual handling an employer needs to reduce that risk so by:

a. Altering:
   - the workplace layout
   - the workplace environment
   - the systems of work

b. Changing the objects used in the hazardous manual handling

c. Using mechanical aids

Only as a last resort can there be a sole reliance on information, instruction or training to control the risk.

In determining measures to control risk of musculoskeletal injuries, the following factors need to be addressed:

- postures
- movements
- forces
- duration and frequency of the hazardous manual handling
- environmental conditions including heat, cold and vibration.

An employer needs to ensure that manual handling risk control measures are reviewed and, if necessary, revised:

a. Before any alteration is made to objects used in a workplace or to systems of work.
b. Before an object is used for another purpose than that for which it was designed – if that increases the risk.
c. If new or additional information about hazardous manual handling becomes available to the employer.
d. If an occurrence of a musculoskeletal disorder in a workplace is reported.
e. After any manual handling incident in which person required immediate treatment as an in-patient in a hospital.
f. If, for any other reason, the risk control measures do not adequately control the risk.
g. After receiving a request from a Health and Safety Representative.

Simple rules to avoid musculo-skeletal injuries

- Avoid the need to lift heavy weights – use of mechanical aids or two or more trained people.
- Squatting down to the load; not bending the body over to lift.
- Keeping the back upright and straight - using the leg muscles to lift.

- Not lifting objects that are out of comfortable reach.
- Avoid twisting – turn the feet not the hips or shoulders.
- Ensuring that carry paths are clear of all obstacles.
- Avoid working in a crouched or bent over posture in a restricted space.

References:

- WorkSafe Victoria Compliance Code: Hazardous Manual Handling 2019 (2025) https://www.worksafe.vic.gov.au/resources/compliance-code-hazardous-manual-handling
- Safe Work Australia Model Code of Practice - Hazardous Manual Tasks 2020 https://www.safeworkaustralia.gov.au/system/files/documents/1905/model-cop-hazardous-manual-tasks.pdf
- WorkSafe Victoria Loading Bricks, Blocks and Mortar Above Shoulder Height: A Health and Safety Solution 2017-2023 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Loading-bricks-blocks-and-mortar-above-shoulder-height-2017-06.pdf
- WorkSafe Victoria Construction - Preventing Injuries from Lifting Reinforcing Mesh: A Health and Safety Solution 2009 (2022)
- WorkSafe Victoria Reducing the Need to Manually Handle Concrete Blocks: Hazard Solution 2004 (2022) https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Reducing-the-need-to-manually-handle-concrete-blocks-2004-03.pdf
- WorkSafe Victoria Bricklaying Checklist for Builders and Building Trades Contractors 2017 (2022) https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2018-06/ISBN-Bricklaying-checklist-for-builders-and-building-trades-contractors-2017-06.pdf
- WorkSafe Victoria Case study: Hazardous manual handling of construction material 2023 https://www.worksafe.vic.gov.au/case-study-hazardous-manual-handling-construction-material



PART 17:

Personal protective equipment

When risks to health or safety cannot be controlled by other means the employer needs to provide appropriate personal protective equipment (PPE) to all employees exposed to risk.

PPE includes the following:

Hard hats

Ensure hard hats are worn at all times unless it can be clearly established through a documented risk assessment, that there are no risks of head injuries from either falling objects or collision with fixed objects, tools or plant.

Safety footwear

Ensure all personnel on site wear safety footwear conforming to the relevant standard – AS/NZS 2210: Occupational protective footwear – Guide to selection, use and care.

Hearing protection

Ensure ear-plugs/ear-muffs are worn in designated areas and wherever high noise levels are present e.g. jack hammer, grinders, explosive powered tools, pile driving, cutting metal, drilling masonry.

Eye protection

Safety glasses or goggles are compulsory in designated eye protection areas and when using power or machine tools and pressure equipment. Face shields should be worn when handling acids and chemicals.

Ensure suitable welding goggles are worn for gas welding and cutting. Welding helmets need to be worn for electric arc welding. Welding screens should be used to protect the eyes of other persons from welding flashes.

Respiratory protection

Approved face masks or respirators fitted with the appropriate filter should be worn when exposed to hazardous chemical vapours, fumes, dust or fibres. Employers need to provide the correct type of respirator, train employees in fitting the devices and ensure that respirators are properly maintained and replaced as required. The Safety Data Sheets for the hazardous substance(s) involved will provide accurate information on the selection of respirators.

Individual fall protection equipment (IFPE)

IFPE Includes safety harnesses, lanyards, shock absorbers and inertia reels. Correctly connected harnesses need to be used in boom-type elevating work platform (EWPs) and crane-lifted workboxes. In all other cases, they should only be used when safe/protected work platforms are not practicable. This equipment should not be used unless workers have been fully trained.

Skin protection

Appropriate gloves, coveralls, boots and face shields should be worn to prevent skin absorption when handling hazardous liquids such as chemicals, epoxies, solvents, acids and wet concrete. (SDSs will provide accurate information on glove selection). Gloves should be worn when handling objects such as sheet metal, wire cables, etc.

Australian Standards – References:

- AS/NZS 4501.2 Occupational protective clothing - General requirements
- AS/NZS 4501.1 Occupational protective clothing - Guidelines on the selection, use, care and maintenance of protective clothing
- AS/NZS 2161.2 Occupational protective gloves - General requirements
- AS/NZS 2210.1 Occupational protective footwear - Guide to selection, care and use
- AS/NZS 4399 Sun protective clothing - Evaluation and classification

- AS/NZS 4602 High visibility safety garments
- AS/NZS 1067 Sunglasses and fashion spectacles
- AS/NZS 1336 Recommended practices for occupational eye protection
- AS/NZS 1337:1 Eye and face protectors for industrial applications
- AS/NZS 1338.1 Filters for eye protectors - Filters for protection against radiation generated in welding and allied operations
- AS/NZS 1800 Occupational protective helmets - Selection, care and use
- AS/NZS 1269.3 Occupational noise management - Hearing protector program
- AS/NZS 1270 Acoustics - Hearing protectors
- AS/NZS 1715 Selection, use and maintenance of respiratory protective devices
- AS/NZS 1716 Respiratory protective devices
- AS/NZS 1891.1 Personal equipment for work at height – Full body combination and lower body harnesses
- AS/NZS 1891.2: Industrial fall-arrest systems and devices – Horizontal lifeline and rail systems
- AS/NZS 1891.3: Personal equipment for work at height – Fall-arrest devices
- AS/NZS 1891.4: Industrial fall-arrest systems and devices – Selection, Use and Maintenance
- AS 1891.5: Personal equipment for work at height – Lanyard assemblies and pole straps
- AS/NZS 4142.3 Fibre Ropes – man-made fibre rope for static life rescue lines
- AS/NZS ISO 22846.1 Personal Equipment for protection against falls – Rope Access Systems
- AS/NZS ISO 22846.2 Personal Equipment for protection against falls – Rope Access Systems Code of Practice
- AS/NZS 5532 Manufacturing requirements for single-point anchor device used for harness-based work at height

Sun (UV) protection

Australia has the highest rate of skin cancer in the world. Despite being almost preventable, skin cancer continues to affect at least half the Australian population.

In Australia, sunburn can occur in as little as 15 minutes on a fine summer day. All types of sunburn whether serious or mild, can cause permanent and irreversible skin damage and can lay the foundation for skin cancer later in life.

The workplace is a major source of exposure for many adult Australians. It is not surprising that outdoor workers who are required to spend long periods of time working in the sun, year after year, have a higher risk than average of skin cancer.

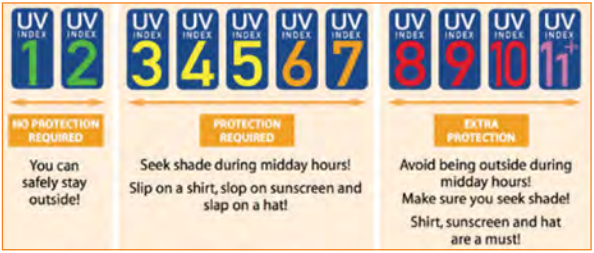
Health risks of over exposure to UV radiation include:

- Sunburn and other skin changes: sunburn ranges from skin reddening to severe and painful blistering of the skin.
- Cataract of the eye lens: opacities in the eye lens lead to decreased vision and eventual blindness.
- Skin carcinoma: several types of malignant skin tumours of the non-melanoma type are caused by UV radiation.
- Malignant melanoma of the skin: this is a very severe cancer that can develop after many years of excessive exposure to the sun.

UV radiation exposure to workers should be assessed and minimised by adopting the following safe work procedures, as far as reasonably practicable:

- Re-organising the work to avoid the UV peak of the day (when the UV index is greater than 3).
- Providing natural or artificial shade.
- Wearing appropriate protective clothing i.e. long sleeve clothing, hats and sunglasses.
- Applying SPF 30 or 50 plus sunscreen to unprotected skin.

The UV index is a measure of UV radiation. The higher the UV index, the higher the risk of skin and eye damage. Use the UV index to plan sun-safe work activities.



Clear, specific rules on the use of personal protective equipment must be in place and enforced.

Where signage is displayed in an area for a type of PPE it should be enforced without exception.

References:

- Safe Work Australia Guide on Exposure to Solar Ultraviolet Radiation (UVR) August 2013 https://www.safeworkaustralia.gov.au/system/files/documents/1702/guide-exposure-solar-ultraviolet-radiation.pdf
- Cancer Council Sunburn Skin Cancer Statistics and Issues Prevention Policy https://www.cancer.org.au/about-us/policy-and-advocacy/prevention/uv-radiation/related-resources/sunburn
- WorkSafe Victoria Skin cancer and outdoor work: A guide for employers 2020 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2022-02/ISBN-Skin-cancer-and-outdoor-work-2020-06a.pdf

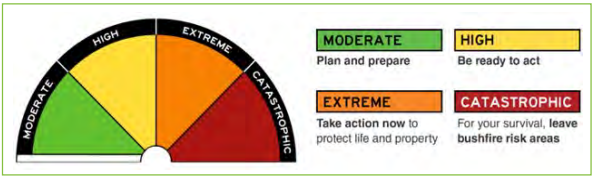


PART 18:

Natural disasters and storms

Bushfires

From 1 September 2022, a new fire rating warning system was introduced across the whole of Australia.



There are four levels of fire danger in the new system:

- **Moderate** – Plan and prepare
- **High** – Be ready to act
- **Extreme** – Take action now to protect your life and property
- **Catastrophic** – For your survival, leave bushfire risk area

The critical ratings which affect construction work are:

- **Extreme**
- **Catastrophic**

Defer work

Construction work should be postponed in bushfire prone rural locations (forested and grassland areas) on days when the fire rating is extreme or catastrophic.

Work involving the use of mobile plant and equipment – such as earth moving equipment, EWPS mobile cranes, PERUs, HDD boring equipment, concrete placement units and trucks delivering building components etc. – poses the greatest risk.

Safety of the workers and members of the public may be compromised in the following hazardous situations and scenarios:

- The need for vehicles loaded with plant to navigate narrow winding roads in hilly areas (e.g. Dandenong Ranges, Warrandyte).
- The need for traffic management and road closures as part of the construction work.
- Community evacuation forced to unsafely negotiate road obstructions caused by construction work.
- Fire rescue assets obstructed by plant.
- Limited escape routes blocked by plant.
- Precious time taken in packing up plant and exiting the area safely.

The only exception to not working in extreme or catastrophic fire rating conditions is emergency works involving the restoration of essential services (utilities). This work should take place under the following conditions:

1. Obtaining a Total Fire Ban permit if the work involved:
   - Welding, cutting and/or grinding
   - heating and spreading of bitumen and like substances
   - blow lamps or gas torches
   - safety fuses in blasting operations

   Total Fire Ban permits issued by CFA, FRV or DEECA can be applied for online through Fire Permits Victoria.
2. Prior consultation and approval from the CFA, Fire Rescue Victoria and Department of Energy, Environment and Climate Action (DEECA).
3. Approval and permit from the relevant utility company.
4. Subject to a documented risk assessment which addresses and considers the following:
   - Information and advice obtained from:
     - VicEmergency Fire and Incident warnings https://emergency.vic.gov.au/respond

  - Australian Government Bureau of Meteorology (BOM) Victoria Weather reports http://www.bom.gov.au/places/vic
  - VicTraffic for road disruptions https://traffic.transport.vic.gov.au
- Duration of work – capable of being achieved in daylight hours.
- Ability to pack up quickly in case of an emergency.
- Nature of the terrain and trafficability of the roads - two lanes; no unstable verges - which could cause rollovers; ability to reverse and pass other vehicles safely.
- Distance and travel time to, and from, major centres.
- Existence of alternative escape routes to prevent being cut off by fire front.
- Predicted level of road traffic in an emergency evacuation situation.
- Location and accessibility of community bush fire shelters.
- Fire extinguishers fully charged on trucks/plant in case of ember attack.

Floods

It is predicted that in the State of Victoria Climate Change will see:

- Heavy rainfall events that last a short time (e.g. less than 1 hour) are expected to increase in intensity.
- Storms in summer are expected to become more intense.
- Rarer heavy rainfall events to become more intense and more frequent.

As with the risk posed by bushfires, a similar degree of diligence should be applied to avoid undertaking construction work in flood conditions.

The Australian Bureau of Meteorology (BoM) issues a Flood Watch when forecast rainfall suggests that local and riverine flooding is possible.

Flood Warnings are more targeted and are issued for specific catchments and locations within catchments. The BOM forecasts how severe the flood is expected to be in each Flood Warning.

Flash floods warning advice comes in the form of a BOM Severe Weather Warning.



Reference:

- https://www.ses.vic.gov.au/plan-and-stay-safe/flood-guides

Vic Emergency Hotline - 1800 226 226

Planning and preparation

First and foremost, you and your employer should consult the BOM Flood watch and Flood Warnings:

- Check if flooding is likely, plan ahead and make alternative arrangements so you are not driving on flooded roads.
- Obey road closure signs.
- When floodwater starts to go down, don't drive over the roads until the road is open again. Sometimes the road damage is not known until the road is completely dry and is being driven on again.
- Drive carefully on roads that have been reopened because they may still be drying out.
- Look out for landslides as many roadsides will have exposed layers of rocks and soil that could slip.
- Listen to your local radio station for further warnings and advice.
- Keep an eye out for any fallen or dangerous trees or powerlines.
- Stay away from electrical signs, streetlights, electrical cables or other conductive material.
- Do not touch switchboards if they have been damaged by water.



Do not travel on roads covered by water

Thunderstorms, lightning and storm conditions

In the state of Victoria, storm conditions commonly result from severe thunderstorms and intense cold fronts associated with south westerly low-pressure systems.

The main risk to constructions workers from these storms consists in the following:

- Damaging or destructive wind gusts (generally wind gusts exceeding 90 km/h accompanying the squall from of a thunderstorm).
- Lightning strikes contacting machinery, building under construction and workers.
- Heavy rainfall which may cause flash flooding.
- Super cell thunderstorms under certain conditions can also form tornadoes.

Storm warnings

The Victoria State Emergency Service (VICSES) and the Bureau of Meteorology work together to warn the community about storms. Severe thunderstorm and severe weather warnings for Victoria can be found on the Bureau of Meteorology website.

Severe Weather Warnings are provided for potentially hazardous or dangerous weather that is not solely related to severe thunderstorms, tropical cyclones or bushfires. They are issued whenever severe weather is occurring in an area or is expected to develop or move into an area.

Severe Weather Warnings are issued for:

- Sustained winds of gale force (63 km/h) or more.
- Wind gusts of 90 km/h or more (100 km/h or more in Tasmania).
- Very heavy rain that may lead to flash flooding.
- Abnormally high tides (or storm tides) expected to exceed the highest astronomical tide.

- Unusually large surf waves expected to cause dangerous conditions on the coast.
- Widespread blizzards in Alpine areas.
- Severe Thunderstorm Warnings are provided to warn communities of the threat of dangerous thunderstorms. They are issued when a severe thunderstorm is occurring or likely to occur.

Reference:

- https://www.emergency.vic.gov.au/respond/

Lightning

A lightning storm is one of the most dangerous weather conditions for all outdoor work.

Steel and metal are highly conductive of electricity, meaning any strike to any steel and/or metal object can potentially seriously injure or kill workers.

Employers need to have systems in place to ensure the safety of workers in the event of an approaching lightning storm. For example, where lighting is detected within a 20 km radius of the crane, operations need to cease and only resume 30 minutes after the last flash of lightning. A lighting tracking system can be used to determine the distance.

Assessing the distance of lightning

Sound travels at approximately 330 m/s. Therefore, the time between the flash and the bang gives an estimate of how close the lightning is. Three seconds represents roughly one kilometre. The risk of being struck by lightning increases when there is less than 30 seconds between the flash and the bang.

As a rule of thumb, when lightning is sighted, count the time until thunder is heard. If that time is 30 seconds or less, the thunderstorm is within 10 km and is DANGEROUS.



If thunder is heard… the lightning is…

- 3 seconds after flash 1 km away
- 6 seconds after flash 2 km away
- 9 seconds after flash 3 km away
- 12 seconds after flash 4 km away
- 15 seconds after flash 5 km away
- 30 seconds after flash 10 km away
- 60 seconds after flash 20 km away

Additional precautions and controls

Employers must always ensure that there are precautionary measures in place to prepare the workplace in the event of a storm, including a plan of what to do when lightning is detected.

The plan should:

- Monitor the latest weather forecast and warnings and take action when required.
- Develop an evacuation plan, detailing actions to be followed when outdoor work is affected by lightning.

- Deploy an adequate tracking system to detect lightning. To improve the accuracy of detection, the employer should adopt a variety of techniques, including a lightning tracking system and training workers to identify the signs of an oncoming storm.
- Direct workers to seek shelter in substantial building or a metal-bodied car when the lightning-thunder gap is less than 30 seconds.
- Include important safety instructions. For example, avoiding touching, handling and proximity to metal objects that may become part of the discharge path, for example towers, mobile plant, power lines, fences and pipes.

References:

- HSR Guidance Outdoor Works During Lightning Storms February 2024
- Australian Government Bureau of Meteorology - Preparation and safety during thunderstorms http://www.bom.gov.au/weather-services/severe-weather-knowledge-centre/safety.shtml
- CCOHS Canadian Centre for Occupational Health and Safety - Weather Lightning https://www.ccohs.ca/oshanswers/safety_haz/weather/lightning.html



PART 19:

Stress from hot and cold working conditions



Working in the heat

In Victoria, on building and constructions sites, the following is industry practice

When they have identified that the heat hazard is significant employers need to monitor work conditions and the health and safety of employee -even though there's no maximum temperature set under the Victorian OHS Act, and OHS Regulations for a worker to stop working.

It is referenced in some union/employer EBA (Enterprise Bargaining Agreements), that when the temperature exceeds 35 degrees Celsius, workers stop work and leave site.

- When the temperature is expected to reach 35° OHS Reps and site management confer on ways to minimise heat risks.
- At temperatures below 35°C, workers are relocated out of direct sunlight when the work environment creates a serious risk to their health and safety.

Rest - Work breaks

The following is a suggested place to start when negotiating a rest-work regime for inclusion in a Heat Policy.

Duration of paid rest breaks within each hour when the temperature reaches and/or exceeds temperatures shown.

Temperature (Degrees Celsius)

- 15 minutes – 30 degrees
- 30 minutes – 32 degrees
- 45 minutes – 34 degrees
- 60 minutes – 36 degrees

Humidity

In other Australian states which extend into tropical and sub-tropical latitudes, the degree of humidity is a crucial factor in determining heat stress.

A trigger point for consultation has become when the temperature reaches 28° and there is a level of 75% humidity.

Risk factors

Risk factors to consider	Adverse conditions
Are ambient conditions hot?	This contributes to incidents such as heat-related illness and burns.
Are days and nights hotter than usual?	A heatwave can make it harder to sleep and workers may become fatigued.
Is it humid?	High humidity makes it harder for the body to cool itself.
When is work done?	Certain times of the day and year will be hotter.
Is the work intense or long?	The harder the body is working the more heat it needs to lose.

Risk factors to consider	Adverse conditions
How often can workers take breaks somewhere cool?	Working in heat for long periods of time is very dangerous.
Are workers physically fit and acclimatised?	Workers who have come from temperate regions will find it difficult to cope with high temperatures and high humidity.
Do workers wear hot clothing (including PPE)?	Some clothing can prevent the evaporation of sweat or prevent air movement.
(If known) do workers have medical conditions?	Some conditions and medications can make workers less able to cope with heat.
Is there cool drinking water or electrolyte drinks on hand?	Dehydration can be dangerous and contributes to heat-related illness.

Signs and symptoms of heat illness

Heat illness occurs when the body can't properly cool itself.

The body normally cools itself by sweating. During hot weather with high humidity, sweating isn't enough.

If symptoms occur, workers need to rest in a cool, well-ventilated area and drink cool fluids. If symptoms do not improve quickly, or skin is very hot and dry to touch, seek urgent medical help.

Symptoms of heat exhaustion

- dizziness
- headache
- sweaty skin
- weakness
- cramps
- nausea/vomiting
- fast and weak pulse rate.

Symptoms of heat stroke

- red, hot, dry skin
- intense thirst
- headache
- nausea or vomiting
- high temperature
- dizziness or confusion
- convulsions
- fainting.



Providing shade in the operation of machinery

Control measures to mitigate heat stress

- Reschedule work so the hot tasks are performed during the cooler part of the day.
- Work from a different location.
- Reduce the time spent doing hot tasks.
- Arrange for more workers to do the job.
- Provide extra rest breaks in a cool area.
- Use mechanical aids to reduce physical exertion.
- Ensure workers have access to cool water and stay hydrated.
- Provide extra rest breaks in a cool area.
- Regularly check if workers/colleagues are showing signs and symptoms of heat illness (see signs and symptoms below).
- Ensure site sheds have air conditioning.
- Ensure air conditioning is functioning in vehicles and plant.
- Use shade cloth when working outdoors.
- Move hot plant away from people.
- Monitor the temperature.

First aid for heat stroke

- Call 000 and evacuate by ambulance immediately.
- Ensure that the ambulance is updated if the worker experiences seizures or becomes unconscious.
- Follow all directions given by the ambulance operator.

- If cardiac arrest occurs, apply CPR (cardiopulmonary resuscitation) if an adult is unconscious and not breathing.

While waiting for the ambulance:

- Move the worker to a cool place with circulating air.
- Remove unnecessary clothing, including PPE.
- Loosen tight clothing.
- If a cold bath is not available cool the worker by splashing cool or cold water on their skin or sponging their skin with a damp cloth.
- If practicable and safe to do, immersion in cold water is the most effective means for cooling a person.
- Continuously observe the worker to ensure an open airway in case of any change in their level of consciousness.
- Where available use a fan to direct gentle airflow over the worker's body.
- Apply cold packs or wrapped ice to the worker's neck, groin and armpits.
- If the worker is fully conscious sit them up to facilitate drinking and provide cool fluid to drink.
- Provide an electrolyte solution with sugar. Do not attempt to give oral fluid if the worker is not fully conscious.
- If the worker starts shivering, stop cooling immediately and cover them until they stop. Once they have stopped shivering recommence first aid treatment.

References:

- WorkSafe Victoria https://www.worksafe.vic.gov.au/resources/compliance-code-workplace-facilities-and-working-environment
- WorkSafe Victoria Working in the heat - prevention and protection from heat illness https://www.worksafe.vic.gov.au/prevention-and-protection-heat-illness
- Safework Australia October 2021 Guide for managing the risks of working in heat https://www.safeworkaustralia.gov.au/doc/guide-managing-risks-working-heat

Working in cold conditions

During winter months and when cold snaps occur in Autumn and Spring, cold conditions can be experienced in the Southern States of Australia and in the Southern Downs Region of Queensland.

The following regions experience temperatures of 0 degrees Celsius and lower:

- **NSW** – Blue Mountains, Southern Tablelands, Central Tablelands the Snowy Mountains and around Bathurst, Goulburn, Bowral and Cooma.
- **VIC** – Central Victoria, Northeast Victoria, the Grampians, the Otway ranges, the Great Dividing Range, the Victorian Alps and Melbourne metropolitan area.
- **ACT** – Canberra and the entire territory.
- **TAS** – Right across the whole state.



Cold Stress

There are a number of factors that contribute to cold stress:

- cold temperatures
- high cold winds
- ice frost or snow
- dampness
- cold water.

Health and safety concerns

Risk of hypothermia

The dangerous overcooling of the body. When your body core temperature drops below 35 degrees Celsius, you are at risk of suffering from mild hypothermia. (One symptom of this is mild shivering). At a core temperature of 33 degrees and below, moderate hypothermia can set in (symptoms may include violent shivering, slurred speech and loss of fine motor coordination). At a core temperature off 30 degrees and below, severe hypothermia can set in (symptoms may include shivering in waves, difficulty in standing and walking, and difficulty in breathing).

Wind chill

Another factor that needs to be considered. Wind chill is a combination of air temperature and wind speed and is a significant risk – even if the air temperature is above freezing point. Wind Chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. Therefore, the wind makes you feel much colder. To calculate the wind chill factor, a temperature reading should be taken on site and the average wind speed for your area, needs to be obtained – The Bureau of Meteorology web site: www.bom.gov.au will assist with this.

Frostbite

A serious effect of extreme cold especially to exposed extremities of the body, such as fingers, toes, nose and ear lobes. Frost bite can occur without hypothermia. Frost bite occurs when the fluids around the body's tissues freeze. Symptoms of frost bite include coldness and tingling in the affected part, followed by numbness and changes in skin colour – often to a lighter or greyish tone.

Increased incidence of arthritis, rheumatism and bronchitis

Muscle/tissue damage. These conditions are commonly associated with the cold. Muscles and soft tissue are susceptible to damage when used in cold conditions.

Decrease in dexterity and sensitivity

Hands and feet become cold, stiff, numb and painful, a worker cannot perform manual tasks with as much dexterity or skill. Shivering also makes it difficult to perform work skilfully or accurately.

Increase in accident rates

Research has found that incident rates increase as the temperature falls below 19°C.

Steps to be taken to mitigate cold stress

- Employers and workers to recognise the nature of the hazard (wind, ice, snow sleet rain, sloping terrain and slippery conditions).
- Wear warm protective clothing in layers to prevent loss of body heat and protect against wind chill.
- Worker to be supplied with beanies and/or balaclavas under hard hats; gloves; thick woollen socks; and insulated work boots.
- Keep dry and don't get wet – wetness greatly increases the chances of cold stress.
- Take frequent breaks in warm dry shelters and/or site sheds.
- Ensure sheds are heated at a constant warm temperature.
- Rotate and share work in cold conditions to limit the exposure of individual workers.
- Never work alone. Work in pairs to look after each other.

References:

- BRRRR…….. Working in the cold
- Cold OHS Reps https://www.ohsrep.org.au/cold



PART 20:

Fatigue

Taking fatigue seriously

Much has been written about fatigue in relation to work activity in general. However, fatigue in the building and construction industry is a particularly serious problem because of the arduous nature of the work and the level of safety risk associated with the work.

- It is crucial, and is a legal requirement, that actions to reduce fatigue are subject to discussions between HandS (Health and Safety) Reps and employers.
- Control measures should be based on reducing the risk of fatigue, rather than working out ways for workers to cope with difficult work regimes that would be intolerable for non-construction workers.
- Fatigue reduces alertness which may lead to errors and can increase the risk of an incidents or injuries for the fatigued worker and others. Particularly when a worker is:
  - operating a fixed or mobile plant
  - working at heights
  - working with flammable or explosive substances
  - doing hazardous work e.g. electrical work
- Being awake for 17 hours impairs performance to the same level as having a 0.05 blood alcohol content. Being awake for 20 hours impairs performance to the same level as having a 0.1 blood alcohol content.
- Your employer has a duty to keep you and your workplace safe from risks associated with fatigue.

What is fatigue?

Fatigue is more than feeling tired and drowsy. In a work context, fatigue is a state of mental and/or physical exhaustion.

It can occur because of prolonged or intense mental or physical activity, sleep loss and/or disruption of the internal body clock.

Signs of fatigue include:

- tiredness even after sleep
- reduced hand-eye coordination or slow reflexes
- short term memory problems and an inability to concentrate
- blurred vision or impaired visual perception
- a need for extended sleep during days off work.

Short-term effects of fatigue

Physical	Mental	Emotional
▪ reduced performance ▪ slower reaction time ▪ impaired hand eye coordina-tion ▪ increased blink rate ▪ heavy eyelids ▪ blurred vision ▪ head drooping ▪ feeling tired after sleep ▪ headache	▪ difficulty concentrating on task ▪ lapses in attention ▪ difficulty remembering what you are doing ▪ failure to communicate im-portant information ▪ risk-taking behaviour ▪ disorganisation ▪ lack of situational aware-ness ▪ accidently doing the wrong thing (error) or not doing the planned thing (omission) ▪ impaired judgement	▪ more quiet than usual ▪ withdrawn ▪ lack of care for others ▪ increased stress levels ▪ reduced motivation ▪ lacking energy ▪ anxiety ▪ decreased tolerance ▪ mood disturbances ▪ emotional outbursts ▪ irritability

Long-term effects of fatigue

Effects	
▪ heart disease ▪ diabetes ▪ high blood pressure ▪ gastrointestinal disorders ▪ burnout ▪ depression ▪ anxiety	▪ negative effects on existing health issues, such as asthma, epilepsy or diabetes ▪ reduction in effectiveness of some medications ▪ potential link with some cancers

Factors for risk assessment

Risk factor	Aspects to consider
Mental and physical demands of work	
Repetitive or monotonous work	▪ Do jobs involve repetitive or monotonous work, eg haul-truck driving?
Sustained physical or mental effort	▪ Is the work physically demanding? ▪ Is there time pressure due to a heavy workload? ▪ Is work fast paced? ▪ Is work intensive? ▪ Can employees/workers vary work pace or work tasks as desired? ▪ Have employees/workers been consulted regarding work tasks or how to carry them out?
Complex physical or mental tasks	▪ Is high vigilance and/or concentration required? ▪ Are there different demands that can be difficult to combine? ▪ Are complex, difficult or strenuous tasks required at the end of shifts or shift cycles?
Work scheduling and planning	
Night shifts, including the number of consecutive night shifts	▪ Are too many consecutive night shifts worked? ▪ Is more than eight hours work required over night shift? ▪ Are more than four consecutive 12-hour night shifts worked? ▪ Are more than five consecutive 10-hour night shifts worked? ▪ Are more than six consecutive 8-hour night shifts worked? ▪ Are tasks requiring sustained physical or mental effort undertaken on night shift? ▪ Are complex physical or mental tasks undertaken on night shift?
Long hours of work in a single shift. This includes travel time, especially for remote sites	▪ Does one shift involve more than 12 hours in a day (including call outs)?

Risk factor	Aspects to consider
Long hours of work across a roster cycle	▪ Do hours of active work (total time spent at work including overtime) exceed 48 hours in any seven days, or 624 hours over a three-month (13 week) period?
Long hours because of on-call duties	▪ Are there irregular and unplanned schedules as a result of call outs? ▪ Is the working day or working week extended beyond 12 hours in a single day, 48 hours in any seven days, or 624 hours over a three-month (13 week) period as a result of call outs?
Adverse working conditions	▪ Do adverse working conditions exist, e.g. exposure to: - Noise? - Heat? - Cold? - Dust? - Hazardous substances?
Excessive commuting times necessary	
	▪ Is significant travel to and from work necessary each day so that time for adequate sleep is reduced? ▪ Are long-distance commutes necessary at the beginning of a work cycle?



Physical exhaustion

Controlling the risks

Shift work

As a guiding principle, employers, HandS Reps and workers should come to an understanding that there should be no difference in rest time duration between the normal day time shifts and afternoon/evening shifts.

If the normal rest time duration on a daytime shift is 16 hours, then this amount of rest time should equally apply to evening and night shifts. If this is not the case, then the unwanted experience of fatigue is an inherent uncontrolled part of shift work.

Employers should seek to eliminate night work. Ensure consultation takes place with their workers and HandS Reps.

Ensure shift work rosters are subject to the following controls:

- To allow employees to plan leisure time and recovery time, set shift rosters ahead of time and avoid sudden changes of shifts.
- Fit shift times in with the availability of public transport and provide alternative transport at end of overtime/long shifts.
- Allocate shift workers consecutive days off, including some weekends.
- Eliminate the need to work extended hours or overtime.

For all shifts

Ensure workers and their HandS Reps have been fully consulted with and by their employers over the following:

- Enabling workers to speak up if they are feeling fatigued and unable to work without risk.
- Ensuring work demands gradually increase towards the middle of the shift and decrease towards the end.
- Avoiding working arrangements that incentivise excessive work hours and overtime.
- Setting start times after 7-30 am, where possible, to enhance sleep opportunity before shifts.
- Environmental controls to reduce fatigue.
- Install adjustable, vibration-free seats in appropriate machinery and vehicles.
- Install heating devices in cold work environments.
- Install cooling devices and/or provide access to cooled areas in hot work environments.

- Install ventilation and mechanical cooling devices in hot, confined work environments such as truck cabins.
- Provide shelter in hot work environments.
- Ensure the workplace and surroundings are well lit, safe and secure to support wakefulness during night shifts.

References:

- Safework Australia: Fatigue management - a workers guide 2013 https://www.safeworkaustralia.gov.au/system/files/documents/1702/fatigue-management-a-workers-guide.pdf
- WorkSafe Victoria Edition 3 Work-related fatigue -a guide for employers 2020 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-10/ISBN-Work-related-fatigue-guide-for-employers-2020-08.pdf
- Occupational Health and Safety Act 2004 https://www.legislation.vic.gov.au/in-force/acts/occupational-health-and-safety-act-2004/044



PART 21:

Safe driving



A bitumen strip road like this would require you to adjust your speed lower than the posted limit

This section deals with the following:

1. Workers driving to regional worksites over longer distances.
2. Drivers transporting plant and equipment to regional work sites.

These two categories involve driving on country roads for extended periods of time.

Work-related driving

In many workplaces, work-related driving is considered secondary to the 'real' work that the employee does. However, a culture of safety recognises that the driving task is often a much higher risk that needs to be managed closely.

Under the Occupational Health and Safety Act 2004, an employer needs to ensure, so far as reasonably practicable, that there is consultation with Health and Safety Representatives (if any) and employees who may be affected by an employer planning for work-related driving.

Safety features of vehicles

Employer should consult with workers in relation to the safety status of their vehicles:

- ANCAP star rating
- anti-lock and automated braking (AEBS) systems
- daytime running lights
- excessive speed alert systems / speed sign recognition
- front, side and curtain airbags
- safety of modifications needed to fit out the vehicle (including weight restrictions)
- electronic stability control
- rear collision warning system
- speed assist / adaptive cruise control
- automatic Headlights
- rain sensing wipers
- lane departure warning/assist
- vehicle colour
- AWD / 4WD for adverse conditions or unsealed roads
- first aid kits / EPIRB (Emergency Position Indication Radion Beacon) for remote areas
- cargo barriers.

Under the Occupational Health and Safety Act 2004, an employer needs to, so far as reasonably practicable, consult with employees who are likely to be or directed affected by an employer selecting a vehicle for work related driving.

Vehicle maintenance

- Employers and employees ensure maintenance and safety checks of vehicles in your fleet are routinely carried out.
- Ensure there is a process in place for workers to report vehicle issues and defects.

- Employee driving their own vehicles ensure scheduled service/ maintenance is undertaken by date indicated.
- Ensure workers are aware of what to do if their vehicle breaks down or needs maintenance during the trip.

What drivers can do

- Before driving on regional journeys workers should also walk around the vehicle and do a quick visual check to ensure it is safe to drive and not damaged.
- Items that should be checked include:
  - Tyres – do they look inflated and have good tread?
  - Brakes – are they working?
  - Headlights – are they both working?
  - Indicators – are they both working, at the front and back?
  - Windscreen – is it clean and not chipped/cracked?
  - Wipers – are they working?

Inform and supervise drivers

Employers– as part of the normal induction training for any new employee doing work-related driving – should cover the organisations' driver and vehicle safety policies and procedures.

A driver induction should include:

- legal requirements, such as road rules
- company requirements such as pre-start checklists and incident reports
- policies to be applied where drivers breach safety rules
- understanding the causes and effects of fatigue
- understanding road conditions and driving precautions
- what to do in the case of a crash of emergency
- record keeping.

Hazards and Risks

Distractions

- Equipment and tools – Having tools or equipment in the vehicle can be distracting, especially if they're not properly secured.
- Fielding work-related communications while driving can divert attention, even with hands-free devices.
- Fatigue – Long work hours can lead to fatigue, impairing driving ability, especially for those with irregular schedules.
- Finding construction sites, or navigating through areas with roadwork, can distract drivers, particularly if heavily reliant on GPS or maps.
- Eating or drinking on-the-go – Consuming snacks or drinks while driving diverts attention from the road.

Steep descents

- Lack of knowledge of the locations of steep descents, prior to a journey.

Speeding

- The problem with speeding is not just travelling above the designated speed limit, but also driving too fast for the conditions.
- Many country roads have not been properly assessed or surveyed for safe speed limits.
- Wildlife such as kangaroos and wombats constitute an accident risk if driving at a speed which does not permit the avoidance of a collision.
- Signage will often wrongly indicate a default speed limit of 100 km/h on a two-way road where clearly it is only safe to travel between 80 km/h - 90 km/h max.



Signage warning of the need to slow down because of wildlife

Falling asleep at the wheel

- More people die and are seriously injured in fatigue crashes than drink driving crashes.
- Being tired can affect your driving by reducing attentiveness and alertness to dangers as well as slowing your reaction times.
- It can also cause a microsleep – where you briefly fall asleep unintentionally. If this happens while driving, it can cost you your life.
- Driving during nighttime hours when your body naturally wants to sleep is the riskiest time, as well as during afternoon hours and early in the morning.

Alcohol and illicit drugs

- Don't drink any alcohol if you plan to drive.
- Remember that you may still have alcohol in your system the morning after drinking.
- It is illegal and dangerous to drive after taking illicit drugs. Many prescription and non-prescription medicines may also affect a person's ability to drive safely.

Mobile phones

- Drivers who hold a full licence in general cannot touch an unmounted portable device, such as a phone, tablet, laptop or any other device while driving.
- Specifically, for all device types (portable, mounted, wearable and inbuilt) you must ensure while driving, you do not:
  - enter text, numbers or symbols
  - scroll (such as on websites, social media, playlists)
  - play videos or games or take video calls
  - display text messages, social media, emails, or photos
  - rest a device on any part of the body or pass a device to a passenger.
- Mobile phone use for those on "P" plates is illegal – this includes using while in a Handsfree device. Including smart watch and other device.
- In relation to portable devices such as unmounted or loose mobile phones, tablets, laptops, media players and game-consoles, ensure – unless parked – you do not touch a portable device, even if it is turned off.
- Allow a portable device to be in your lap or on any part of your body or clothes (unless it is in a pocket, or in a pouch attached to your belt or other part of your body).
- Look at the display of a device being operated by another person in the vehicle.
- Pass a portable device to a passenger.
- If a passenger, pass a portable device to a driver.

References:

- Worksafe Vic – Managing risk Factors on the road https://www.worksafe.vic.gov.au/managing-risk-factors-road
- Vic roads Drivers with full licences

Control measures for safe driving

Planning the journey

- Encourage workers to plan their route and use the major roads as they're safer.
- Require workers to provide a copy of their planned travel route, especially if travelling in rural and remote areas.
- Encourage workers to make contact when they arrive at their destination, especially if they are travelling in rural and remote areas.
- Ensure workers have a mobile phone in case of emergency or provide them with a satellite phone if travelling in remote areas.
- Ensure plenty of travel time, so you don't feel the need to speed.

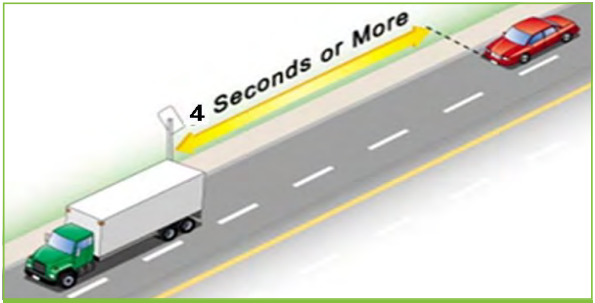
Driving under the speed limit

- Always drive under the posted speed limit.
- Watch for variable speed limits, such as around road works and in school zones.
- Keep a safe distance between you and the vehicle in front.
- Speak up if you are a passenger and you think the driver is going too fast.

Maintaining safe distance behind trucks

Rest breaks

- Pull over for a break at a service station or rest area.
- Pull over for a nap – 15 to 20 minutes works best.
- Stop for a coffee if you're on a short drive.
- Swap drivers if you can.
- Even if you don't feel tired, take regular breaks to avoid becoming tired



Maintaining safe distance behind trucks

Avoid using hands-free phone

- Aim to avoid using a hands-free mobile phone at all when driving.
- Pull over somewhere safe to answer a call, or let it go to voicemail.
- Make sure callers know you're driving.

Take care when driving near trucks

- Avoid cutting in front of heavy vehicles, especially at intersections.
- Don't overtake heavy vehicles when they're turning. Trucks may take up more than one lane when turning or on roundabouts.
- Slow down around heavy vehicles and give them extra space.
- Give way to heavy vehicles – trucks can't stop quickly.
- Avoid driving in trucks' blind spots.

Transporting plant and equipment

The safe transport and delivery of plant, equipment and materials to building and civil construction sites, is governed by Heavy Vehicle National Law (HVNL).

The Master Code (Registered Industry Code of Practice [RICP]) is a practical guide to the achievement of the standards of heavy vehicle safety and compliance required under the HVNL - and the various Heavy Vehicle National Regulations (HVNR).

The HVNL regulates the use of heavy vehicles that have a gross vehicle mass of more than 4.5 tonnes. It applies nationally, except for Western Australia and the Northern Territory.

Reference:

- https://www.nhvr.gov.au/law-policies/heavy-vehicle-national-law-and-regulations

Chain of Responsibility (CoR)

The Chain of Responsibility (CoR) is the part of the Heavy Vehicle National Law (HVNL) that makes parties, other than drivers, responsible for the safety of heavy vehicles on the road.

Parties in the Chain of Responsibility of a heavy vehicle include the following:

- employee vehicle driver
- employer of the driver
- self-employed driver
- scheduler of the vehicle
- consignor of any goods in the vehicle
- packer of any goods in the vehicle
- loading manager for any goods in the vehicle.

Fatigue management in heavy vehicle driving

You must not operate a fatigue-regulated heavy vehicle if you are impaired by fatigue. Even if you comply with work and rest requirements, you may still feel too tired to drive, so it's important to be aware of the signs of fatigue.

The legislation requires that:

- A person must not direct or require the driver of a heavy vehicle (or a party in the chain of responsibility) to do something the person knows, or ought reasonably to know, would have the effect of causing the driver:
  - to drive a fatigue-regulated heavy vehicle while impaired by fatigue; or
  - to drive a fatigue-regulated heavy vehicle while in breach of the driver's work and rest hours.
- Fatigue and Distraction Detection Technologies (FDDT) are shown to play a positive role in reducing driver fatigue and distraction events by better ensuring drivers are behind the wheel when they are most fit for duty and alerting drivers to potential incidents.
- An Electronic Work Diary (EWD) is an electronic device or system approved by the NHVR to monitor and record the work and rest times and can be used by drivers as an alternative to making records in a written work diary.

Load restraint system checklist

- Understand your load. Know your load's characteristics.
- Choose a suitable vehicle for your load type and size.
- Check your vehicle's carrying capacity and allowable overhang height.
- Use a restraint system that is suitable for your load.
- Position your load to maintain vehicle stability. Keep centre of gravity as low as possible; don't exceed legal limits for overhang, height and width, mass and axle mass.
- Check your vehicle structures and restraint equipment are in good working condition and strong enough to restrain your load.
- Loading (and unloading) the vehicle. Make sure your load is stabilised.
- Make sure you understand and use safe work practices when loading and unloading a vehicle.
- Drive according to the load and driving conditions.
- Allow for changes in vehicle stability, steering and braking when driving a loaded vehicle.
- Check the load and its restraint regularly during your journey.

References:

- Load Restraint Guide 2018 National Transport Commission https://www.ntc.gov.au/sites/default/files/assets/files/Load-Restraint-Guide-2018.pdf
- Heavy vehicle National law https://www.nhvr.gov.au/law-policies/heavy-vehicle-national-law-and-regulations
- Heavy vehicle fatigue management
- Heavy vehicle Government safety alerts and bulletins https://www.nhvr.gov.au/safety-accreditation-compliance/safety-alerts-and-bulletins
- Master Code (Registered Industry Code of Practice (RICP) https://www.nhvr.gov.au/files/ricp-master-code.pdf

Transporting plant: Examples from the Load Restraint Guide

Transport small vehicles and mobile equipment on general freight vehicles.



Transport large/tall vehicles and mobile equipment on low loaders to increase vehicle stability.



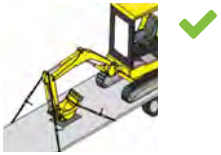
Restrain vehicles and mobile equipment by direct lashings and/or blocking wherever possible. Lashings should be of the same type, same length and equivalent angles to work together.



Alternatively, restrain vehicles and mobile equipment by containing them within the body structure of the carrying vehicle.



Restrain any part of the equipment that can move or rotate.



Road transporting of over-sized loads

Role of the National Heavy Vehicle Regulator (NHVR)

From 20 April 2024, the NHVR is responsible for:

- Providing information and education to industry to promote compliance with the HVNL.
- On-road monitoring of heavy vehicle compliance with mass, dimension, load restraint, vehicle standards, access conditions, driver fatigue and work diaries, requirements for the transportation of dangerous goods and explosives, driver licensing and registration.
- Issuing infringements and undertaking prosecutions for serious offences.
- Issuing defect notices to heavy vehicles that do not comply with safety standards.
- Investigating offences, including Chain of Responsibility (CoR) offences.
- Collecting and analysing data relating to heavy vehicle movements.
- Monitoring and responding to non-compliance with the Intelligent Access Program (IAP).
- Carrying out PVIs and supervised weighs.



Oversize Overmass (OSOM) Vehicles

An Oversize Overmass (OSOM) vehicle is a heavy vehicle that is carrying, or specially designed to carry, a large indivisible item.

A heavy vehicle is a Class 1 heavy vehicle if it, together with its load, does not comply with a prescribed mass requirement or prescribed dimension requirement applying to it – and is a heavy vehicle carrying, or designed for the purpose of carrying, a large indivisible item including, for example, a combination including a low loader.

Examples of OSOM vehicles include a combination of prime movers, low loaders, low loader dollies, platform trailers and jinkers. A Class 1 OSOM vehicle does not require a permit to operate, provided the movement of the vehicle complies with all of the requirements and travel conditions outlined in a transition notice. Operators still need to comply with the operating conditions specified in their relevant transition notice. If a Class 1 OSOM vehicle does not comply with the mass or dimension limits set out in a transition notice, an operator must apply to the National Heavy Vehicle Regulator (NHVR) to obtain a Mass or Dimension Exemption Permit.

References:

- Oversize Overmass (OSOM) Vehicles https://www.nhvr.gov.au/files/201402-0121-oversize-overmass.pdf
- https://www.nhvr.gov.au/road-access/access-management/applications/oversize-overmass

Contacting Third Parties

Where the dimensions of the vehicle are likely to interfere with overhead wires, bridges and other structures on or beside the road, approval to travel the route must be sought from the relevant authorities. These Third-Party approvals will be required prior to the issue of a permit. It is the responsibility of the OSOM vehicle operator to obtain approval from the relevant organisation. For further details regarding third party providers please see the Third-Party utility provider fact sheet.

Examples of Third-Party entities include:

- **Police** – Oversize heavy vehicle movements may require police escorts and/or traffic diversion.
- **Rail infrastructure managers** – The movement of oversize or overmass heavy vehicles across level crossings/rail bridges or restricted access vehicles near rail infrastructure may create risks that need to be managed.
- **Roadwork controllers** – Heavy vehicle movements through worksites may need to be coordinated to ensure the site is free from obstructions.
- **Tunnel operators** – May need to be contacted to coordinate moves and ensure any special requirements are understood and complied with.
- **Utilities** – Restricted access vehicles may have adverse effects on utilities' infrastructure with over-height vehicles and telecommunications/powerlines being a common concern.

Traffic advisory services

Jurisdiction	Service	Website
ACT	Road closures	https://www.cityservices.act.gov.au/roads-and-paths/act_public_road_closures
NSW	Transport for NSW Live Traffic NSW	www.livetraffic.com/desktop.html
Qld	Queensland Traffic and Travel Information	https://qldtraffic.qld.gov.au/
SA	SA Outback Roads Reports	www.dit.sa.gov.au/OutbackRoads
	Traffic - SA	www.traffic.sa.gov.au
Tas	Tasmanian Police Community Alerts	http://www.police.tas.gov.au/community-alerts
	Tasmanian Road Closures and Delays	https://www.transport.tas.gov.au/roadworks/roadworks_map
Vic	VicTraffic	http://traffic.vicroads.vic.gov.au/

Reference:

- NHVR Third party approvals https://www.nhvr.gov.au/road-access/access-management/third-party-approvals

OSOM vehicle warning lights

- A warning light attached to an OSOM vehicle, when switched on, must:
  - emit a yellow-coloured light of rotating and flashing effect
  - clearly visible at a distance of 500 m in all directions; or
  - supplemented by 1 or more additional warning lights so that the light emanating from at least 1 of them is clearly visible at a distance of 500 m in any direction.
- The warning sign on a OSOM vehicle must be at least 1200 mm long and at least 450 mm high. The length of the sign may be split in two parts, in which case the combined length of its parts must be at least 1200 mm.



Oversize signage on OSOM



Escort vehicle for OSOM

Pilot and escort vehicles

The Heavy Vehicle Mass, Dimension and Loading National Regulation (MDL Regulation) has requirements for pilot and escort vehicles, such as warning lights, warning signs, headlights, positioning of vehicles and communication technology.

Reference:

- Pilot and escort recognition and training – Information sheet February 2023

Definitions

Term	Definition	Source
Pilot vehicle	A motor vehicle that accompanies an oversize vehicle to warn other road users of the oversize vehicle's presence.	HVNL
Escort vehicle	An escort vehicle that is driven by a Police officer or another person authorised to direct traffic under an Australian road law.	HVNL

Units of competency

Where a state or territory requires accreditation or licencing to operate as a pilot or Level 2 pilot (or certified pilot or escort), the training varies depending on the state or territory and level. These requirements are outlined in Table 3.

Table 3 Units of competency for pilots (L1 and L2) and escorts (E)

Code	Course name/training required	ACT	NSW	NT	QLD	SA	TAS	VIC	WA
TLIB2004	Carry out vehicle inspection	–	–	L2	–	–	L2	L2	P
TLIF3060	Control traffic as a pilot vehicle operator[1]	–	–	L2	–	–	L2[1]	L2[1]	P
TLIF3013	Coordinate breakdown and emergencies	–	–	L2	–	–	L2	L2	P
TLIF0075	Demonstrate awareness of interacting with other road users	–	–	–	–	–	–	–	–
TLIC3010	Pilot or escort oversized and/or overmass loads	–	–	L2	*L1[2] L2 E		L2	L2	P
TLIH3002	Plan and navigate routes	–	–	E	–	–	–	–	–
TLIE3009	Use pilot and escort communication	–	–	L2	–		L2	L2	P
Bridge supervision		–	–	–	–	–	–	–	P
Knowledge test undertaken at issuing authority		–	–	–	L1[2]	–	–	–	–
Level 2 Load experience required – number of trips		–	–	10 loads greater than 4.5m wide	Minimum of 12 trips	–	Minimum of 40 oversize load movements during the 3 years	Minimum of 40 oversize load movements during the 3 years	–
Escort		–	–	10 loads piloted in a 2-pilot situation and 5 loads involving an NT Accredited Oversize Escort Operator or Authorised Officer (Police)	Minimum of 12 trips	–	–	–	–
Driver's licence: – Provisional or above (PR) – Full licence (F)		PR	PR	F	F	PR	F	F	F

[1] Refresher course every three years.

* In Queensland a pilot of an agricultural vehicle does not need accreditation unless a condition of the notice or permit requires a Level 1 or Level 2 pilot. For more information, refer to the permit or the National Class 1 Agricultural Vehicle and Combination Mass and Dimension Exemption Notice Operator's Guide. The pilot of an agricultural vehicle must hold a provisional or open licence.

[2] In Queensland, a Level 1 pilot must complete either the knowledge test or the TLIC3010. TLIC3010 must be completed before obtaining Level 2 escort accreditation.

Vic Roads Victorian Class 1 Oversize and Overmass (OSOM) Route Access Lists

This Vic Roads document provides lists of:

- Exempted roads
- Prohibited roads
- Prohibited structures



PART 22:

References: Where to get further help and assistance

Regulations, Codes of Practice, Compliance Codes, Guidance Notes, Alerts, Industry Information and Australian Standards relevant to building and construction

Please note: To ensure that the references to Australian Standards retain their currency, they have been listed without dates (the titles remain the same). To obtain the current applicable Standard, please search on the internet for the title of the Standard and click on the reference.

Intertek inform new reference for SAI Global:

www.intertekinform.com/en-au/key-standards/building-and-construction-standards

Link to WorkSafe Victoria:

www.worksafe.vic.gov.au

Link to Safe Work Australia model laws and codes of practice:

www.safeworkaustralia.gov.au

Safety management systems and hazard management OHS organisation on site

- AS/NZS 4804 Occupational health and safety management systems - General guidelines on principles, systems and supporting techniques
- AS/NZS ISO 45001 Requirements with guidance for use Occupational health and safety management systems - Requirements with guidance for use https://saiassurance.com.au/iso-45001
- AS ISO 31000 Guidelines - Risk management – Guidelines
- WorkSafe Victoria Controlling OHS Hazards and Risks: A Handbook for Workplaces 2017
- WorkSafe Victoria A Guide to Risk Control Plans 2017
- Safe Work Australia Construction Work Code of Practice November 2024 https://www.safeworkaustralia.gov.au/sites/default/files/2024-11/model_code_of_practice-construction_work-nov24.pdf

OHS organisation on site and Health and Safety Representatives

- WorkSafe Victoria Right of entry – ARREOs What do authorised representatives of registered employee organisations (ARREOs) do? 2021 https://www.worksafe.vic.gov.au/new-powers-authorised-representatives
- WorkSafe Victoria Sample Checklist for Site Induction 2017
- WorkSafe Victoria Safe-Work-Method-Statements-Information Oct-2018.pdf
- WorkSafe Victoria Employer Representative Competencies 2005
- WorkSafe Victoria Running Effective Health and Safety Committee (HSC) meetings: A Health and Safety Solution 2017
- WorkSafe Victoria Consultation: Safety Basics 2018
- WorkSafe Consultation guide for employers
- WorkSafe Victoria Consultation: A Guide for Victorian Workplaces 2017
- WorkSafe Victoria Checklist for Health and Safety Consultation 2012 https://www.worksafe.vic.gov.au/resources/checklist-health-and-safety-consultation
- Safe Work Australia Work Health and Safety Consultation, Cooperation and Coordination Code of Practice 2023
- WorkSafe Victoria More Information About Designated Work Groups 2012
- WorkSafe Victoria Consultation with Health and Safety Representatives 2012
- WorkSafe Victoria The Importance of Health and Safety Representatives 2019
- WorkSafe Victoria Powers of Health and Safety Representatives 2019 https://www.worksafe.vic.gov.au/information-about-powers-health-and-safety-representatives
- WorkSafe Victoria Health and Safety Representative Training 2019
- Work WorkSafe Victoria Employee Representation: A Comprehensive Guide to Part 7 of the OHS Act 2004 - 2024
- WorkSafe Victoria Support for Health and Safety Representatives (HSRs) - Supporting Health and Safety Representative Access to Health and Safety Information Via the Internet 2017
- How to access support and advice from WorkSafe's Health and Safety Representative Support Officers (HSRSOs).
- WorkSafe Victoria Health and Safety Representatives: Policy Positions 2008
- WorkSafe Victoria Employee representation A handbook for workplaces October 2024

General

- WorkSafe Office health and safety A guide for employers December 2024
- Building Industry Group Drug and Alcohol Management Program (DAMP)
- Edition 1 Communicating occupational health and safety across language Compliance code July 2022
- WorkSafe Victoria Working Alone Information Sheet 2011 https://www.worksafe.vic.gov.au/resources/working-alone-information-sheet

Psychosocial hazards

- WorkSafe Victoria A guide for employers Workplace bullying March 2020
- WorkSafe Victoria A guide for employers Preventing and managing work-related stress 2021 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2021-02/ISBN-Preventing-and-managing-work-related-stress-guide-2021-02.pdf
- Code of Practice Managing Psychosocial Hazards at Work SafeWork NSW May 2021 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0004/983353/Code-of-Practice_Managing-psychosocial-hazards.pdf
- WorkSafe Victoria Psychosocial hazard Workplace bullying fact sheet Edition 1 – August 2021
- Safe work Australia Managing psychosocial hazards at work Code of Practice 2022

Amenities

- Worksafe Victoria Compliance Code - Facilities in Construction 2018 https://www.worksafe.vic.gov.au/resources/compliance-code-facilities-construction
- Safe Work Australia Managing the work environment and facilities Code of Practice November 2024
- AS 1319 Safety signs for the occupational environment
- AS/NZS 1680 Interior lighting Series
- AS/NZS 4020Testing of products for use in contact with drinking water
- WorkSafe Victoria Safety Alert Temporary Site Structures 2015

First aid and emergencies

- WorkSafe Victoria Compliance Code for First Aid in the Workplace 2021 https://www.worksafe.vic.gov.au/resources/compliance-code-first-aid-workplace
- Safe Work Australia Model Code of Practice - First Aid in the Workplace 2019
- WorkSafe Victoria Safety Alert Effective Emergency Response Plans 2011
- AS 3745 Planning for emergencies in facilities
- WorkSafe Victoria Evacuation Lighting on Construction Sites 2012 https://www.worksafe.vic.gov.au/emergency-lighting-construction-sites
- AS 2293.Set Emergency escape lighting and exit signs https://www.intertekinform.com/en-au/standards/as-nzs-2293-1-2018-98876_saig_as_as_207928/

Fire extinguishers

- AS 1670.4 Fire detection, warning, control and intercom systems - System design, installation and commissioning Emergency warning and intercom systems
- AS 2444 Portable Fire Extinguishers and Fire blankets – Selection and Location
- AS/NZS 1841.1 Portable fire extinguishers General requirements
- 1841.2 Part 2: Specific requirements for water type extinguishers
- 1841.3 Part 3: Specific requirements for wet chemical type extinguishers
- 1841.4 Part 4: Specific requirements for foam type extinguishers
- 1841.5 Part 5: Specific requirements for powder type extinguishers
- 1841.6 Part 6: Specific requirements for carbon dioxide type extinguishers
- 1841.7 Part 7: Specific requirements for vaporizing liquid type extinguishers
- 1841.8 Part 8: Specific requirements for non-rechargeable type extinguishers
- AS 4214 Gaseous fire-extinguishing systems
- AS 1851 Routine service of fire protection systems and equipment
- AS ISO 7240.24 Fire detection and alarm systems Fire alarm loudspeakers
- AS/NZS 1221 Fire hose reels
- HB 76 Dangerous goods - Initial emergency response guide https://www.intertekinform.com/en-au/standards/saa-snz-hb-76-2010-129526_saig_as_as_273972/

Qualifications and high-risk work licences

- WorkSafe Victoria Certification, Licensing and Qualifications Checklist 2006 https://www.worksafe.vic.gov.au/resources/certification-licensing-and-qualifications-checklist
- WorkSafe Victoria High risk work licence 2025 https://www.worksafe.vic.gov.au/high-risk-work-licence

Work at heights

- Prevention of Falls Part of the Occupational Health and Safety Regulations 2017
- WorkSafe Victoria Compliance Code for Prevention of Falls in General Construction 2019 https://www.worksafe.vic.gov.au/resources/compliance-code-prevention-falls-general-construction
- WorkSafe Victoria A Guide to Falls Prevention 2017
- Model Safe Work Australia Code of Practice - Managing the Risk of Falls at Workplaces 2018
- Reducing falls from heights in the construction industry - Options Paper 2023 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0018/1144332/Reducing-falls-from-heights-in-the-construction-industry-Options-Paper-June-2023.pdf

- AS/NZS 1891.1 Personal equipment for work at height – Full body combination and lower body harnesses
- AS/NZS 1891.2: Industrial fall-arrest systems and devices – Horizontal lifeline and rail systems
- AS/NZS 1891.3: Personal equipment for work at height – Fall-arrest devices
- AS/NZS 1891.4: Industrial fall-arrest systems and devices – Selection, Use and Maintenance
- AS 1891.5: Personal equipment for work at height – Lanyard assemblies and pole straps
- AS/NZS 4142.3 Fibre Ropes – man-made fibre rope for static life rescue lines
- AS/NZS ISO 22846.1 Personal Equipment for protection against falls – Rope Access Systems
- AS/NZS ISO 22846.2 Personal Equipment for protection against falls – Rope Access Systems Code of Practice
- AS/NZS 5532 Manufacturing requirements for single-point anchor device used for harness-based work at height

Housing construction

- WorkSafe Victoria Victoria Compliance Code Prevention of Falls in Housing Construction Edition 2 2019 https://www.worksafe.vic.gov.au/resources/compliance-code-prevention-falls-housing-construction
- Model Safe Work Australia Code of Practice - Preventing Falls in Housing Construction 2018
- NSW Government Code of Practice Managing the Risks of Falls at Workplaces 2019
- WorkSafe Victoria Safe erection of roof trusses checklist 2023 https://www.worksafe.vic.gov.au/safe-erection-roof-trusses-checklist
- WorkSafe Victoria Preparing to Erect Timber Wall Frames 2022
- AS 3818.10 Timber - Heavy structural products - Visually graded Building poles
- WorkSafe Victoria Using portable ladders in the workplace 2023
- AS 1720.5 Timber structures Nailplated timber roof trusses
- AS/NZS 4361.2 Guide to hazardous paint management Lead paint in residential, public and commercial buildings https://www.intertekinform.com/en-au/standards/as-nzs-4361-2-2017-99188_saig_as_as_208553/
- AS 4349.3 Inspection of buildings Timber pest inspections
- AS 3566.1 Self-drilling screws for the building and construction industries General requirements and mechanical properties

Other fall contexts

- WorkSafe Victoria Exterior Sign Erection and Installation Checklist 2020 https://www.worksafe.vic.gov.au/resources/exterior-sign-erection-and-installation-checklist
- WorkSafe Victoria Guidance Note - Preventing Falls from Earthmoving Equipment 2022
- WorkSafe Victoria Safety Alert Employee Fatally Injured After Fall from Steel Stillage 2019

On-shore wind farms

- Planning Guidelines for Development of Wind Energy Facilities Victorian State Government https://www.planning.vic.gov.au/guides-and-resources/guides/all-guides/renewable-energy-facilities/wind-energy-facilities/planning-guidelines-for-development-of-wind-energy-facilities
- Geogrid-reinforced access routes and Crane platforms in wind farm construction https://www.huesker.com.au/geosynthetics/applications/earthworks-foundations/windfarm-construction/
- QTLC Review of Oversize Overmass Wind Farm Arrangements Report 2023 https://www.qtlc.com.au/wp-content/uploads/2024/01/Pastin-Final-Report-OSOM-Windfarm.pdf
- South Australian Country Fire Service Guidelines for Wind Farms March 2016
- Energy Safe Victoria Wind turbines Regulatory requirements for installation Guideline https://www.energysafe.vic.gov.au/sites/default/files/2022-12/Guideline-Installation-requirements-for-wind-turbines.pdf
- Planning Guidelines for Development of Wind Energy Facilities Department of Transport and Planning Vic State Government https://www.planning.vic.gov.au/__data/assets/pdf_file/0021/570630/Development-of-wind-energy-facilities.pdf
- CSA PLUS 61400 CSA guide to Canadian wind turbine codes and standards
- AS/NZS 1170.2 Structural Design Actions - Wind Actions
- AC 139.E-05v1.1Obstacles (including windfarms) outside the vicinity of a CASA certified aerodrome
- Practical Assessment of Mass Concrete Construction for Wind Farm Projects in Remote Sites
- BS EN 50308 Wind turbines. Protective measures. Requirements for design, operation and maintenance (British Standard)
- AS / NZS 3000 Electrical Installations
- AS / NZS 4509.1Stand-Alone Power Systems - Safety and Installation
- AS / NZS 4777.1 Grid Connection of Energy Systems via Inverters Installation Requirements

- AS / NZS 5139 Electrical Installations - Safety of Battery Systems for use with Power Conversion Equipment
- AS 1768 Lightning Protection
- IEC 61400-1 Ed. 4.0 Wind energy generation systems - Part 1: Design requirements
- IEC 61400-2 Ed. 3.0 Wind turbines Part 2 Small wind turbines
- IEC 61400-13 Ed. 1.0 Wind turbines - Part 13: Measurement of mechanical loads
- IEC 61400-23 Ed. 1.0 Wind turbines - Part 23: Full-scale structural testing of rotor blades
- IEC 61400-24 Ed. 2.0 Wind energy generation systems - Part 24: Lightning protection

Scaffolding

- WorkSafe Victoria Scaffolding industry standard 2024 https://www.worksafe.vic.gov.au/resources/scaffolding-industry-standard
- Safe Work NSW Scaffolding Industry Safety Standard NSW Government 2022 https://www.safework.nsw.gov.au/__data/assets/pdf_file/0006/1057596/scaffolding-industry-safety-standard.pdf
- WorkSafe Victoria Safety Alert Potential for Dangerous Scaffolding Collapse 2019
- WorkSafe Victoria Safety Alert Electrical Power for Swing stages 2010
- WorkSafe Victoria Safety Alert Instability of Building Maintenance Units 2018
- AS 1576.1 Scaffolding – General Requirements https://www.intertekinform.com/en-au/standards/as-nzs-1576-1-2019-117612_saig_as_as_2710601/
- AS/NZS 4576 Guidelines for Scaffolding https://www.intertekinform.com/en-au/standards/as-4576-2020-1195570_saig_as_as_2874065/
- AS 1576.4 Scaffolding - Suspended scaffolding
- AS/NZS 1576.6 Metal tube-and coupler scaffolding
- AS 1576.2 Couplers and accessories
- AS/NZS 1576.5 Scaffolding Part 5 Prefabricated splitheads and trestles
- AS/NZS 1576.3 Scaffolding Prefabricated and tube-and-coupler scaffolding
- AS/NZS 1892.5 Portable ladders - Selection, safe use and care
- AS/NZS 1892.1 Portable ladders – Metal
- Australian Standard AS1657 Fixed platforms, walkways, stairways and ladders – Design, construction and installation https://www.intertekinform.com/en-au/standards/as-1657-2018-99067_saig_as_as_208310/
- AS/NZS 1891.4 Industrial fall-arrest systems and devices - Selection, use and maintenance https://www.intertekinform.com/en-au/standards/as-nzs-1891-4-2009-117449_saig_as_as_274546/

Fall arrest equipment

- AS/NZS 1891.3 Industrial - fall arrest systems and devices – Fall arrest devices https://www.intertekinform.com/en-au/standards/as-nzs-1891-4-2009-117449_saig_as_as_274546/
- AS/NZS 1891.1 Industrial fall-arrest systems and devices - Harnesses and ancillary equipment
- AS/NZS 1891.2 Industrial fall-arrest systems and devices - Horizontal lifeline and rail systems

Roofing

- WorkSafe Victoria Compliance Code for Prevention of Falls in General Construction 2019 https://www.worksafe.vic.gov.au/resources/compliance-code-prevention-falls-general-construction
- Safe work Australia Safe Work on Roofs Information Sheet 2016
- WorkSafe Victoria Safety Alert Preventing Roof Collapses in Housing 2015
- WorkSafe Victoria Removal of Fragile Roofing 2018
- WorkSafe Victoria Construction - Lifting Plant onto Roofs: A Health and Safety Solution 2009
- AS/NZS 4389 Roof safety mesh https://www.intertekinform.com/en-au/standards/as-nzs-4389-2015-111083_saig_as_as_232385/
- Bs 5427(2016) Code of Practice for The Use Of Profiled Sheet for Roof and Wall Cladding on Buildings

Erecting structural steel

- WorkSafe Victoria Industry Standard, Safe Erection of Structural Steel for Buildings 2009 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2020-03/ISBN-Safe-erection-structural-steel-buildings-industry-standard-2009-05a.pdf
- WorkSafe Victoria Significant structural steel collapse during construction Alert 2023
- Worksafe Victoria Compliance Code for Prevention of Falls in General Construction 2019
- Model Safe Work Australia Model Code of Practice- Managing the Risk of Falls at Workplaces 2018
- AS 4100 Steel Structures
- AS/NZS 1554.1 Structural Steel Welding – Welding of steel structures
- BS 5950-8 Structural use of steelwork in building Code of practice for fire resistant design https://www.intertekinform.com/en-au/standards/bs-5950-8-1990-254901_saig_bsi_bsi_591506/

Design of buildings

- ICC 1999 Standard Building Code
- ICC Building Code Essentials 2021
- BS 8670-1 Core criteria. Code of practice Competence frameworks for building safety
- Safe Work Australia Model Code of Practice-Safe Design of Structures 2018 https://www.safeworkaustralia.gov.au/doc/model-code-practice-safe-design-structures
- AS 1530.1 Methods for fire tests in building materials, components
- I.S. EN 13823:2020+A1:2022 Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item
- AS 4072.1 Components for the protection of openings in fire-resistant separating elements Service penetrations and control joints (Reconfirmed 2016)
- ISO 13784-2 Reaction-to-fire tests for sandwich panel building systems Part 2: Test method for large rooms
- AS 3850.2 Prefabricated concrete elements Building construction
- AS1428.1 Design for access and mobility General requirements for access
- AS 1684.4: Residential timber-framed construction Simplified - Non-Cyclonic Areas
- AS 1720.3 Timber structures Design criteria for timber-framed resident..
- ISO 21265 Building and civil engineering sealants Assessment of the fungal growth on sealant surfaces
- ISO 12543-4 Glass in building Laminated glass and laminated safety glass Part 4: Test methods for durability
- ISO 12543-5 Glass in building Laminated glass and laminated safety glass Part 5: Dimensions and edge finishing
- AS 5203 Protection of openable windows/fall prevention - Test sequence and compliance method
- S.R. 50-1:2021+A1:2024 Building services Code of practice Part 1: Water-based heating systems in dwellings
- ISO 16745-1 Sustainability in buildings and civil engineering works — Carbon metric of an existing building during use stage — Part 1: Calculation, reporting and communication
- ISO 18096 Thermal insulating products for building equipment and industrial installations — Determination of maximum service temperature for preformed pipe insulation
- I.S. EN 17635 Glass in building - Shatter properties - Requirements and assessment methods
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  - AS 2550.5 Cranes, hoists and winches - Safe use - Mobile cranes
  - AS 2550.6 Cranes - Safe use - Guided storing and retrieving appliances
  - AS 2550.7 Cranes - Safe use - Builders' hoists and associated equipment
  - AS 2550.10 Cranes - Safe use - Elevating work platforms
  - AS 2550.11 Cranes, hoists and winches - Safe use - Vehicle-loading cranes
  - AS 2550.13 Cranes - Safe use - Building maintenance units
  - AS 2550.15 Cranes - Safe use - Concrete placing equipment
  - AS 2550.16 Cranes - Safe use - Mast climbing work platforms
  - AS 2550.19 Cranes, hoists and winches - Safe use - Telescopic handlers
  - AS 2550.20 Cranes, hoists and winches - Safe use - Self-erecting tower cranes
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- AS 1418.2 Cranes (including hoists and winches) - Serial hoists and winches
- AS 1418.3 Cranes, hoists and winches - Bridge, gantry, portal (including container cranes) and jib cranes
- AS 1418.4 Cranes, hoists and winches – Tower Cranes
- AS 1418.6 Cranes, hoists and winches - Guided storage and retrieving appliances
- AS 1418.7 Cranes (including hoists and winches) - Builders hoists and associated equipment
- AS 1418.8 Cranes, hoists and winches - Special purpose appliances
- AS/NZS 1418.9 Cranes (including hoists and winches) - Vehicle hoists
- AS/NZS 1418.10 Cranes, hoists and winches - Mobile elevating work platforms
- AS 1418.11 Cranes, hoists and winches - Vehicle - loading cranes
- AS 1418.12 Cranes (including hoists and winches) - Crane collector systems
- AS 1418.13 Cranes (including hoists and winches) - Building maintenance units
- AS 1418.16 Cranes (including hoists and winches) - Mast climbing work platforms
- AS 1418.17 Cranes (including hoists and winches) - Design and construction of workboxes

- AS 1418.18 Cranes, hoists and winches - Crane runways and monorails
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- AS 1353.1 Flat synthetic-webbing slings – Product specification
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- AS 3775.1 Chain slings-Grade T- Product specification
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- Unit of competency CPCCCM2007 Use explosive power tools

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- AS 4603 Flashback arresters - Safety devices for use with fuel gases and oxygen or compressed air
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- AS/NZS 2865 Confined spaces
- AS/NZS IEC 60079.10.1AS/NZS 60079.10.1 Explosive atmospheres Classification of areas - Explosive gas atmospheres

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- WorkSafe Victoria Hazardous Substances: A Health and Safety Guide 2024
- WorkSafe Victoria Managing Chemicals in the Workplace: A Step-by-Step Guide 2017
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- WorkSafe Victoria Safety Data Sheets 2022
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- Victorian Health and Human Services A Guide to Developing Risk Management Plans for Cooling Tower System 2024 https://www.health.vic.gov.au/water/guide-to-developing-cooling-tower-risk-management-plans-sections-1-11
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- AS/NZS 3666.1 Air-handling and water systems of buildings–Microbial control –Design, installation and commissioning
- AS/NZS 3666.2 Air-handling and water systems of buildings–Microbial control–Operation and maintenance
- AS/NZS 3666.3 Air-handling and water systems of buildings–Microbial control–Performance-based maintenance of cooling water systems
- HB 32 Control of microbial growth in air-handling and water systems of buildings
- I.S. EN 12236 Ventilation for Buildings - Ductwork Hangers and Supports - Requirements for Strength
- BS EN ISO 16000-32 Indoor air Investigation of buildings for the occurrence of pollutants
- ISO 16000-11 Indoor air – Part 11: Determination of the emission of volatile organic compounds from samples of building products and furnishing – Sampling, storage of samples and preparation of test specimens
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- WorkSafe Victoria Skin cancer and outdoor work: A guide for employers 2020 https://content-v2.api.worksafe.vic.gov.au/sites/default/files/2022-02/ISBN-Skin-cancer-and-outdoor-work-2020-06a.pdf

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- AS/NZS 4501.1 Occupational protective clothing - Guidelines on the selection, use, care and maintenance of protective clothing
- AS/NZS 2161.2 Occupational protective gloves - General requirements
- AS/NZS 2210.1 Occupational protective footwear - Guide to selection, care and use
- AS/NZS 4399 Sun protective clothing - Evaluation and classification
- AS/NZS 4602 High visibility safety garments
- AS/NZS 1067 Sunglasses and fashion spectacles
- AS/NZS 1336 Recommended practices for occupational eye protection
- AS/NZS 1337:1 Eye and face protectors for industrial applications
- AS/NZS 1338.1 Filters for eye protectors - Filters for protection against radiation generated in welding and allied operations
- AS/NZS 1800 Occupational protective helmets - Selection, care and use
- AS/NZS 1269.3 Occupational noise management - Hearing protector program
- AS/NZS 1270 Acoustics - Hearing protectors
- AS/NZS 1715 Selection, use and maintenance of respiratory protective devices
- AS/NZS 1716 Respiratory protective devices
- AS/NZS 1891.1 Personal equipment for work at height – Full body combination and lower body harnesses
- AS/NZS 1891.2: Industrial fall-arrest systems and devices – Horizontal lifeline and rail systems
- AS/NZS 1891.3: Personal equipment for work at height – Fall-arrest devices
- AS/NZS 1891.4: Industrial fall-arrest systems and devices – Selection, Use and Maintenance
- AS 1891.5: Personal equipment for work at height – Lanyard assemblies and pole straps
- AS/NZS 4142.3 Fibre Ropes – man-made fibre rope for static life rescue lines
- AS/NZS ISO 22846.1 Personal Equipment for protection against falls – Rope Access Systems
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Natural disasters, storms, hot and cold conditions

Bushfires

- VicEmergency Fire and Incident warnings https://emergency.vic.gov.au/respond
- Australian Government Bureau of Meteorology (BOM) Victoria Weather reports http://www.bom.gov.au/places/vic
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Transporting plant and equipment

- Load Restraint Guide 2018 National Transport Commission https://www.ntc.gov.au/sites/default/files/assets/files/Load-Restraint-Guide-2018.pdf
- Heavy vehicle National law https://www.nhvr.gov.au/law-policies/heavy-vehicle-national-law-and-regulations
- Heavy vehicle fatigue management
- Heavy vehicle Government safety alerts and bulletins https://www.nhvr.gov.au/safety-accreditation-compliance/safety-alerts-and-bulletins
- Master Code (Registered Industry Code of Practice (RICP) https://www.nhvr.gov.au/files/ricp-master-code.pdf

Oversize overmass (OSOM) Vehicles

- Oversize Overmass (OSOM) Vehicles https://www.nhvr.gov.au/files/201402-0121-oversize-overmass.pdf
- Vic Roads Victorian Class 1 Oversize and Overmass (OSOM) Route Access Lists
- Oversize and/or overmass permit application https://www.nhvr.gov.au/road-access/access-management/applications/oversize-overmass

Incolink
Entitlements Insurance Wellbeing

1 Pelham Street
Carlton VIC 3053

Phone: (03) 9639 3000
Email: support@incolink.org.au

incolink.org.au