VICTORIAN WATER
INDUSTRY ASSOCIATION INC.
"Innovation, Co-operation and Sustainability"

CIVIL CONTRACTORS FEDERATION

Civil Construction Safety Guides

Version 2.1 - January 2011

Civil Construction Safety Guides

These guides are modelled on the *Civil Construction Safety Guides* produced by CivilSAfe and SAFER Industries, supported by the Government of South Australia, and have been adapted to suit Victorian legislative requirements. Version 1 was dated July 2007 to coincide with the introduction of the Victorian OHS Regulations 2007.

Version 1 of these Guides were created for Victorian Water Industry by Tony Smith, Manager Business Risk and Compliance, East Gippsland Water in support of the course in Water Industry Construction Site Supervision (21599VIC), construction induction training, and for general use within the Victorian Water Industry. Thanks to members of the Victorian Water Industry OHS Network, particularly Graeme Broderick from Wannon Water, Gino La Morticella from Southern Rural Water, and Keith Baker from Utility Services for their review and input to the final product.

Version 2 builds on input from other sources as well as partnering with Peter Fisher, Occupational Health and Safety Field Officer and other specialist personnel from the Civil Contractors Federations of Australia, Victorian Branch.

January 2011

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Civil Construction Safety Guide

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AMENITIES

Legal Reference: OHS Act 2004

Other References: National Standard for Construction Work

WorkSafe Guidance note - Amenities required on greenfield developments and minor civil construction and maintenance sites

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Civil construction employers must ensure that their workers (including contractors & sub-contractors) have:

- **adequate first aid facilities (see Guide No 11), and**
- **adequate and hygienic amenities**

The WorkSafe Victorian Industry Standard for Civil Construction due for release in May 2011 will state the following with regard to amenities.

Works of less than 2 days

If the total works are not expected to exceed two days, the minimum standard of amenities are:

- **a supply of fresh drinking water**
- **hand washing facilities**
- **works vehicles for shelter**

Where there is no on-site toilet, access to a maintained public toilet, or a toilet the contractor has permission to use may be used as long as:

- **the toilet is within 2km(urban) or 10 km (non-urban) of the worksite**
- **a works vehicle is available at all times for workers to drive to the toilet**
- **this arrangement is acceptable to the workers**

(Urban - within a town boundary; non-urban - outside of a town boundary.)

Works of 3 to 5 days

In addition to the above, an on-site toilet should be provided.

Works of more than 5 days

Site amenities should follow the WorkSafe Guidance Note listed above.

Mobile Works

Civil construction employers with work crews mostly doing mobile works should consider using portable amenities or have them purpose built on suitable work vehicles.

Provision of services to site facilities

When relocatable site amenities (e.g. huts, sheds and caravans) are connected to electrical power or sewerage services the following requirements apply:

Provision of sewerage services

All connections to water or sewer distribution services must be carried out by a licensed plumber in accordance with the relevant service provider's permit conditions.

Provision of electrical services (refer Guide No 7)

Electricity Safety Legislation requires all electrical installation work, including the connection, alteration, repair or maintenance on the relocatable site buildings to be carried out by a licensed electrician.

This requirement does not apply to the connection of a building via an extension lead to a generator or socket-outlet where the socket-outlet, generator and extension lead comply with the *AS/NZS 3000, AS/NZS 3012* and the *Industry Standard for Electrical Installations on Construction Sites*.

Internal wiring of relocatable site buildings

The internal wiring of all relocatable site buildings, including those supplied with power via an extension lead, must be undertaken by a licensed electrician and comply with the AS/NZS 3000, AS/NZS 3012 and the Industry Standard for Electrical Installations on Construction Sites.

Generator-supplied electricity

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.

Socket-outlet(s) fitted to portable generators used on a construction site must be protected by residual current devices (RCDs), including those supplying power to a relocatable site building via an extension lead. Generators must be capable of providing power to facilitate lighting, heating and boiling water at the same time.

The portable generator must be positioned so that any exhaust gases do not enter the relocatable site building.

Extension leads

All extension leads used to supply power to a relocatable site building must be:

- **the heavy duty type,**
- **the correct current rating for the inlet-socket,**
- **the correct length for the flexible rating of the cord, and**
- **installed so they do not run across the ground.**

ASBESTOS

Legal Reference: **OHS Regulations 2007, Parts 4.3, 6 and Schedules 6, 7 & 8**

Other References: **National Codes of Practice for the Safe Removal of Asbestos and Management and Control of Asbestos in the Workplace**

WorkSafe Compliance Codes for Asbestos

All facilities in which asbestos has been identified should be labelled.

Where any material is discovered that may contain asbestos, report it to your OHS Officer immediately.

If asbestos is being removed, the following must apply:

- **Appropriate notification is to be provided to WorkSafe Victoria.**
- **An approved control plan and removal record must be completed.**
- **An approved asbestos supervisor must be nominated on the removal record.**
- **Only trained, competent personnel of a licensed asbestos removalist may remove asbestos. Refresher training is required 2 yearly.**
- **Warning signs must be displayed and barricades erected (unless exempted).**
- **Unless otherwise approved, use non-powered hand tools and wet down to avoid airborne fibres.**
- **When wetting down the asbestos product, don't use a high pressure water jet.**
- **Wear the proper coveralls, disposable respirator or half face respirator with appropriate cartridges.**
- **There must be a good face seal between the face and respirator – no beards, stubble, long moustaches or long sideburns.**
- **Waste asbestos must double-wrapped and be disposed of according to EPA requirements.**

Most water corporations hold a B Class Specific licence for the repair and removal of asbestos cement pipes and associated fittings. Only direct employees of a licence holder are permitted to operate under an asbestos removal licence.

Note: Small quantities of non-friable asbestos (less than 10m^2) or where the total time over which asbestos removal work is performed in any period of 7 days does not exceed 1hour may be removed by unlicensed personnel as long as certain conditions are met. Refer to your OHS Officer for details.

- **Don't use a respirator / breathing apparatus unless properly trained.**
- **Don't use any damaged equipment or faulty protective clothing or equipment, and report any as soon as possible.**
- **Don't drop asbestos products to the ground, remove with minimal breakage.**
- **Asbestos and debris must be removed and disposed of in accordance with EPA requirements (ie: taken to an approved land fill site, with relevant transit documentation completed).**
- **Don't eat, drink or smoke in the area of asbestos work.**
- **Remove PPC&E after completion of the work and dispose of disposable PPC&E with the asbestos waste.**
- **Maintain a high level of hygiene; wash / shower before eating, drinking or smoking.**
- **Disposable coveralls are preferred, but if wearing non-disposable overalls, these are to be laundered in a separate washing facility from normal clothes – they are not to be taken home for washing. Commercial laundries must be approved to launder asbestos soiled garments.**
- **A clearance inspection by an independent 'competent person' is required after removing asbestos materials in excess of 10m^2.**

CHEMICALS

Legal Reference: OHS Regulations 2007, Part 4.1, Dangerous Goods Act 1985
Dangerous Goods (Storage and Handling) Regulations 2000

Other References: WorkSafe Victoria Codes of Practice for Hazardous Substances and Dangerous Goods (Storage & Handling)
Various Australian/New Zealand Standards

Hazardous Substances are chemicals that have an ***immediate*** (acute) or ***long term*** (chronic) adverse effect on ***human health***.

Dangerous Goods are substances that have an ***immediate*** adverse effect on ***people, property or the environment***.

For chemicals classified as hazardous substances or dangerous goods, the following must apply:

- **Chemicals must be included in a chemical register.**
- **Chemicals must have material safety data sheets (MSDS) produced and distributed by the manufacturer of the chemical, and be within 5 years of the issue date.**
- **If completed, risk assessments for each chemical should be based on its form and that of its prescribed use.**
- **All personnel who do use or are exposed to the chemical/s must be trained in its safe use, handling, storage and effects.**
- **Hazard and Risk control training shall be undertaken before first use or introduction of the chemical.**
- **Chemical containers must be correctly labelled with all DG markings, in good condition and appropriate to chemical. Drink bottles or similar household containers being of plastic glass or other material type shall not be used.**
- **Empty dangerous goods containers will be treated as if they are full containers unless they have been decontaminated safely, made clear of content residue and therefore pose no longer a risk. The labels must have been removed.**
- **Incompatible chemicals must be stored separately with segregation distances in accordance with the MSDS or relevant Australian Standards.**
- **Where practicable hazardous chemicals should be substituted with less hazardous types that will still meet the specific requirements for the job undertaken. (This will be determined via appropriate trials, post the initial Risk Assessment of the chemical substitute.)**

What are Dangerous Goods?

 **Class 1 – explosives** **Eg: dynamite, fuses, detonators, fireworks** **Not common for the water industry**	 **Class 4.3 – dangerous when wet** **Eg: calcium carbide, aluminium phosphide** **Not common for the water industry**
 **Class 2.1 – flammable gas** **Eg: LPG, acetylene, may aerosols** **Common for the water industry**	 **Class 5.1 – oxidising agent** **Eg: calcium hypochlorite (pool chlorine)** **Common for the water industry**
 **Class 2.2 – non-flammable, non-toxic** **Eg: CO_2, nitrogen** **Common for the water industry**	 **Class 5.2 – organic peroxide** **Eg: specific substance – thermally unstable** **Not common for the water industry**
 **Class 2.3 – toxic gas** **Eg: Chlorine gas, anhydrous ammonia** **Common for the water industry**	 **Class 6.1 – toxic** **Eg: poisons, many pesticides and agricultural chemicals** **Common for the water industry**
 **Class 3 – flammable liquid** **Eg: Petrol, paint thinners, kerosene, some paints** **Common for the water industry**	**Class 7 – radioactive** **Not common for the water industry**
 **Class 4.1 – flammable solid** **Eg: magnesium, sulphur** **Not common for the water industry**	 **Class 8 – corrosives** **Eg: sodium hypochlorite, hydrochloric acid** **Common for the water industry**
 **Class 4 – spontaneously combustible** **Eg: white phosphorous** **Not common for the water industry**	 **Class 9 – miscellaneous DG** **Eg: asbestos, dry ice, liquids transported at high temperature (bitumen)** **Not common for the water industry**

Dangerous goods in all but the smallest of quantities require spill protection of some kind (generally bunding) and spill clean up capability regardless of the quantity.

CONFINED SPACES

Legal Reference: OHS Regulations 2007, Parts 3.4 & 5.1

Other References: WorkSafe Victoria Compliance Code for Confined Spaces
AS/NZS 2865-2001 Safe working in a confined space

Confined Spaces are enclosed or partially closed spaces that:

- are not intended as a regular workplace;
- are at atmospheric pressure;
- are liable at any time to have an atmosphere that contains potentially harmful levels of contaminant; have an oxygen deficiency or excess; or cause engulfment; and
- may have a restricted means of entry and exit.

Hazards may include:

- Toxic / flammable gases.
- Lack of oxygen resulting from bacteria or gases that are heavier than air and displace oxygen.
- Electrical hazards; metals that conduct electricity.
- Engulfment by sand or soil.
- Poor lighting.
- Restricted assess and egress (difficulty to escape in the event of an emergency).
- Cramped or awkward working positions; heat stress.
- The work creating a hazard; eg: welding, hammering, exhaust fumes.

Risk controls:

- A safe work method statement (SWMS) must be completed for any confined space entry work.
- Only trained and competent personnel may enter or be involved in a confined space entry task. Check your organisation's requirement for refresher training.
- A Confined Space Entry Permit must be completed and signage displayed.
- There must be adequate emergency and rescue equipment.
- All harnesses and other retrieval systems must be tested and tagged by a competent person/service provider and within 'test date'.

How do you identify if something is a *Confined Space*?

WorkSafe Victoria definition: "a space in any vat, tank, pit, pipe, duct, flue, oven, chimney, silo, reaction vessel, container, receptacle, underground sewer, shaft, well, trench, tunnel or other similar enclosed or partially enclosed structure, if the space:

a. Is, or is intended to be, or is likely to be, entered by any person; and

b. Has a limited or restricted means of entry or exit that makes it physically difficult for a person to enter or exist the space; and

c. Is or is intended to be at normal atmospheric pressure while any person is in the space; and

d. Contains, or is intended to contain, or is likely to contain:

- **An atmosphere that has a harmful level of any contaminant; or**
- **An atmosphere that does not have a safe oxygen level; or**
- **Any stored substance (except liquids) that could cause engulfment."**

How do you apply the definition?

- **Consider the above criteria. If *a* and *b* and *c* and any of *d* apply, then the space is a confined space and the Regulations apply.**
- **There may be some instances where it is not easy to decide. In these cases, the OHS Act 2004 requirement to provide safe systems of work still applies.**

Examples of *confined spaces*.

- **Trenches, shafts, manholes, pits, sewer lines, underground pump stations or similar constructions connected to either an open sewer line, a previously open sewer line, or a line which is to be opened or found to be broken or leaking; or**
- **Any other service line likely to generate a harmful level of contaminant.**

Examples of excavations that need to be assessed on a case by case basis.

- **Excavations where there is no sewer, stormwater, or gas line either exposed or open, or likely to be exposed or open, but where there may be leaking service lines nearby; harmful gases from decomposed material or other sources being released from the ground itself; or where the presence of engine exhaust gases or the use of solvents or other materials in the excavation may create a hazardous atmosphere.**
- **Any pit or tunnel that has not been connected to a live service line, but is sealed from natural ventilation; or where solvents have been used for sealing pipes and a hazardous atmosphere may be built up; or where the curing of fresh concrete may have reduced the oxygen level to below 19.5%.**
- **Shallow open shafts or trenches where there may only be a small quantity of contaminant in the atmosphere, eg, some household connections to live sewer points and where there may be good natural ventilation.**

Examples of excavations that would not be *confined spaces* according to the definition.

- **Open shafts or trenches being excavated in previously undisturbed ground such as new sub-divisions and which are not affected by a contaminated atmosphere from nearly service lines such as sewer, stormwater or gas.**
- **Bulk excavations (ie: where the width and length of the excavation exceed the depth) and there is good natural ventilation that will prevent the build up of atmospheric contaminants.**

DEMOLITION WORK

Legal Reference: **OHS Regulations 2007 Part 5.1**

Other References: **WorkSafe Victoria Code of Practice for Demolition**

- **A safe work method statement (SWMS) must be completed for any demolition work.**
- **Demolition warning signs must be put in place before work commences.**
- **All services – gas, electricity etc – must be disconnected and proof available.**
- **The work area must be fenced or barricaded to prevent unauthorised entry.**

- **Overhead structures must be erected to protect any public place or persons.**
- **Work must not be carried out from a fragile roof unless adequate protection is provided.**
- **Openings in floors must be barricaded.**
- **Access roads, paths etc must be closed off and only used in connection with the work.**
- **Demolition site traffic must be controlled; vehicle movement must be restricted and kept to a minimum.**
- **Stairways and overhead structures must be maintained in a clean condition, free from debris and excess materials.**
- **Keep dust to a minimum by vacuuming, extraction or wetting.**
- **Appropriate fire fighting and emergency plans must be established.**
- **All Personal Protective Equipment must be worn where signs are displayed.**
- **Where electrical equipment is used, the provisions of Guides 5 and 5a are to apply.**

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DRUGS AND ALCOHOL

Legal Reference: **OHS Act 2004**

Other References: **Various WorkSafe guidance material**

Civil construction work involves a number of hazards: operating dangerous plant and equipment, working at heights, confined spaces, excavation work etc.

Drugs and alcohol can impair co-ordination and increase the risk of injury, not only to a plant and equipment operator, but to other persons.

Alcohol or illegal drugs are banned from the workplace. It is an offence under the Occupational Health and Safety Act 2004 to work under the influence of drugs or alcohol.

- **Don't start work whilst affected by any drug or alcohol.**
- **Contractors, subcontractors, visitors etc must not endanger themselves or others by the consumption of drugs or alcohol.**
- **All incidents involving drugs or alcohol are to be reported.**
- **Should there be a drug or alcohol problem and there is a need to do something about it, see the company management for private and confidential assistance.**
- **Prescription drugs may have an affect on work performance. They could make a person drowsy, impair judgement or reactions.**
- **If concerned about any prescription medication being taken, discuss this with the Site Supervisor and a Medical Adviser.**

Under the OHS Act 2004, everyone has an obligation to do what is reasonably practicable to protect their own health and safety and that of others by not being affected by any drug or alcohol at work.

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ELECTRICAL SAFETY (GENERAL)

Legal Reference: OHS Act 2004

Electricity Safety Act 1998

Other References: Various Australian/New Zealand Standards, including

AS/NZS 3012.2003 Electrical installations – construction and demolition sites

AS/NZS 4836.2001 Safe Working on low-voltage electrical installations

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Temporary Switchboards

- Must be designed and constructed according to AS/NZS 3012.
- Must be securely mounted. This can be on a portable stand, provided it is robust and secured to prevent it from being blown or knocked over.
- Must have, at the bottom of the enclosure, free access for flexible cords to prevent mechanical damage: eg; openings in the cabinet shall be insulated to prevent damage to cords from contact with sheet metal edges.
- Must include a way of preventing strain on cables and cords: eg; a tie bar that is insulated and prevented from causing damage.
- Must be readily accessible and protected from mechanical damage and adverse environmental conditions.
- Should have a clearance of one metre maintained in front of the switchboard.
- Should be located to suit maximum extension cord lengths (see table overleaf).

Where a temporary switchboard is fitted with a door or lid, this shall:

- Need a tool to be removed.
- Be fitted with a way to be locked.
- Be fitted with a way to be held in the open position.
- If the switchboard is provided with a socket-outlet, be provided with a clearly visible and legible sign on the external surface that states KEEP CLOSED – RUN ALL LEADS THROUGH BOTTOM.
- Be kept closed at all times, except when access is required.

All electrical work, including disconnect/reconnect, must be performed by an appropriately qualified and competent person.

- **Flexible electrical cords should be run on insulated hangars or stands to provide a safe route through a work area and provide sufficient height clearance for personnel and vehicles. This need not apply within a horizontal distance of 4 metres from the immediate work area where the power is to be used.**
- **Where there is a risk of cabling being damaged, it is to be provided with suitable mechanical protection.**
- **Electrical sockets mounted on generators are to be protected by RCDs not exceeding 30mA. Where generators are supplying fixed switchboards, the RCDs may be mounted on the switchboard.**

Maximum extension cord lengths

Maximum extension cord lengths depend on the conductor (wire) size – the larger the conductor size, the greater the distance can be from a switchboard (source) to an appliance (see table below).

Extension cord rating (amps)	Conductor area ($mm^{2)}$	Maximum extension cord length (m)
10	1.0	25
	1.5	35
	2.5	60
	4.0	100
15	1.5	25
	2.5	40
	4.0	65
20	2.5	30
	4.0	50

ELECTRICAL SAFETY
(Use of Electrical Equipment)

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Legal Reference: OHS Act 2004

Other References: AS/NZS 3760, AS/NZS 3012

WorkSafe Victoria Industry Standard: Electrical Installations Construction Sites

- All power tools and extension cords must be tested and tagged, and within date (see table overleaf).
- All electrical power tool leads and extension cords are to be checked for defects, cuts, loose wires <u>before</u> each use.
- Damaged electrical equipment, exposed wires, loose plugs etc must be tagged out of service and removed.
- Fixed or portable residual current devices (RCD) must be used.
- Portable RCDs must be tested prior to use by using the built-in test button.
- Electrical sockets mounted on generators are to be protected by RCDs not exceeding 30mA.
- Piggy back plugs and double adaptors are <u>not</u> to be used.
- Wherever practical, extension cords and power leads must be kept above head height using cable stands etc.
- Leads, cords and plugs should be off the ground to avoid damage and a tripping hazard.
- Extension cords are not to be attached to scaffolding.
- Electrical equipment should not be used in poor light.
- Extension leads are not to be joined together.
- Only qualified electricians are to make alterations or repairs to leads or cords.
- Electrical equipment is not to be placed on, or near wet areas unless the equipment is designed for the specific purpose, e.g. pump.
- Report all electrical shocks, and wear eye protection where there is the possibility of an electrical flash.

MINIMUM TESTING AND INSPECTION INTERVALS FOR ELECTRICAL EQUIPMENT

(adapted from AS/NZS 3760, AS/NZS 3012 and the Industry Standard for Electrical Installations on Construction Sites)

Type of Environment and/or Equipment	Interval between inspection and tests						Cord extension sets and EPODS
	Class of Equipment		Residual Current Devices (RCDs)				
	Class I (protectively earthed)	Class II (double insulated)	Push-button test by user		Operating time RCD tester		
			Portable	Fixed	Portable	Fixed	
Construction sites	**Before first use and then 3 monthly**	**Before first use and then 3 monthly**	**Before each use**	**Monthly**	**Monthly**	**Monthly* see blow**	**Before first use and then 3 monthly**
Factories, workshops, places of work or repair, manufacturing, assembly, maintenance or fabrication	6 months	12 months	Daily, or before every use, whichever is the longer	6 months	12 months	12 months	6 months
Laboratories, health care and educational establishments, tea rooms and office kitchens	12 months	12 months	3 months, or before every use, whichever is the longer	6 months	2 years	2 years	12 months
Office environment: where the equipment or supply flexible cord is subject to flexing in normal use, or is open to abuse, or is in a hostile environment	12 months	12 months	3 months	6 months	2 years	2 years	12 months
Office environment: where the equipment or supply flexible cord is not subject to flexing in normal use, or is not open to abuse, or is not in a hostile environment	5 years	5 years	3 months	6 months	2 years	2 years	5 years
Hire equipment	Inspect before each hire. Test monthly.	Inspect before each hire. Test monthly.	Prior to each hire. Test monthly.	N/A	Prior to each hire. Test monthly.	N/A	Prior to each hire. Test monthly.
Repaired/serviced/second hand equipment	After repair or service which could affect electrical safety, or on re-introduction to service						

* Operating time test for fixed RCD is monthly except if complying with part 4.5 of the Industry Standard for Electrical Installations on Construction Sites (Ed 3 - January 2011), then can be up to 3 months based on risk assessment [see part 4.5 pages 18 &19 and table 2 page 20 of the IS

Recommended colour coding for electrical test tags:

December to February – Red

March to May – Green

June to August – Blue

September to November - Yellow

ELECTRICAL SAFETY
(Working Near Overhead & Underground Services)

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Civil Construction Safety Guide

Legal Reference:	**OHS Regulations 2007, Part 3.5**
	Electrical Safety Act 1998, Gas Safety Act 1997
Other References:	**WorkSafe Victoria handbook for Using earthmoving equipment near overhead electrical assets**
	WorkSafe Victoria Framework for Working near Overhead and Underground Assets

- **Safe work method statements (SWMS) must be completed for any work on or near gas, electricity or other service, and identify the presence of overhead or underground services where applicable.**
- **Where identified as a hazard, the height of the overhead power line must be determined, as well as knowing the "design envelope" i.e. the 'reach' of the equipment being used.**
- **Before digging, all services must be identified and clearly marked (see Guide 9).**
- **A qualified spotter may be required when working in the 'no go' or 'spotter' zones – see WorkSafe Victoria handbook, *Using earthmoving equipment near overhead electrical assets*. Spotter 'ticket' is valid for maximum of 3 years – check currency. A permit may also be required from the Power Company concerned.**
- **Spotter must be qualified (card will be issued by EnergySafe) to spot for the equipment being used – spotter's card will be endorsed accordingly.**
- **For underground services a competent person is required to observe**
- **There must be an effective communications system between the plant operator and the spotter.**
- **Earthing chain is to be provided for mobile crane type plant with chain of at least 10mm diameter, link material bolted or welded to the carrier chassis and with at least 1m in contact with the ground.**
- **Emergency procedures should be documented and known by workers in case of contact with live lines. These procedures are to include:**
  - **Isolation of the power supply**
  - **When it is safe to rescue**
  - **First Aid including CPR**
- **All employees working near overhead or underground services should have completed an approved electrical awareness course.**

In the event of plant making contact with overhead wires:

- **Stay on the machine**
- **If the machine is operating – move it away**
- **If on fire, etc, jump well clear and hop to safety**
- **Don't make contact with the machine and the ground at the same time.**

The material in this document is intended as guidance only for staff involved in civil construction and/or site supervisor tasks – see Disclaimer inside front cover. For further information, consult the reference material listed in each Guide, or contact your organisation's OHS Officer.

Clearances and Spotter Zones

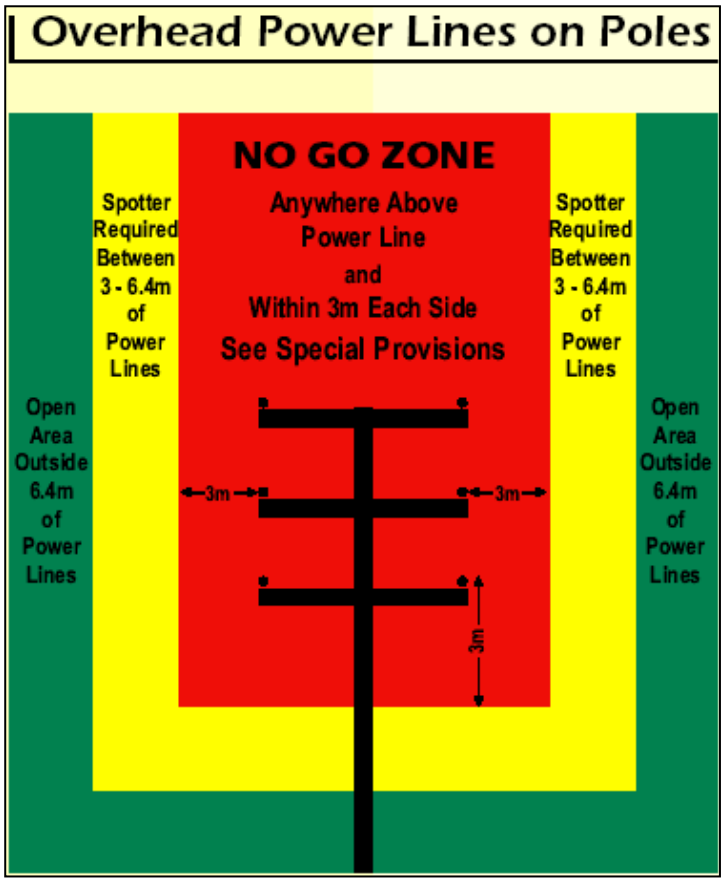


Table A: Limits of approach

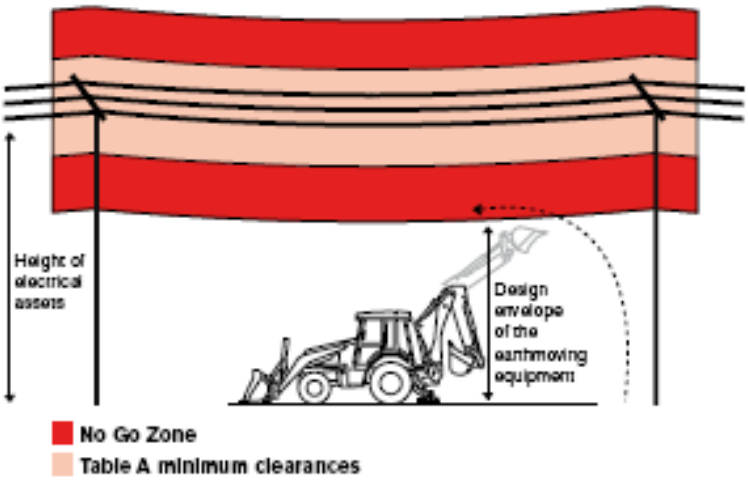
Types of overhead assets	Minimum clearance from asset
High voltage electricity conductors up to and including 66 kV	2000 mm
Un-insulated low voltage electricity conductors	1000 mm
Insulated low voltage electricity conductors, greater than 50 V but less than 1000 V	500 mm
Communications cabling – broadband and telephony	300 mm

Table B: Safe work requirements

Limit of approach of equipment design envelope		
OUTSIDE NO GO ZONE	NO GO ZONE	
Safe systems of work (spotter may not be required)	Outside Table A Clearances * Safe systems of work (including use of spotter)	Inside Table A Clearances * Written permit and safe systems of work (including use of spotter)

* See Diagram 2: Design envelope and limits of approach (below) for Table A clearances.

Clearances and Spotter Zones



When a spotter is not required

Where the works to be undertaken are more than 6.4m from the electrical assets, but the design envelope of the earthmoving equipment may still reach into the 3m No Go Zone, the use of a spotter may be omitted where all of the following apply:

1. the works are designed and set up so that no part of the earthmoving equipment or its load is required to come within 6.4m of the electrical assets
2. the control measures to ensure the above requirements are documented in a SWMS
3. a person is authorised and assigned the responsibility of ensuring compliance with the SWMS.

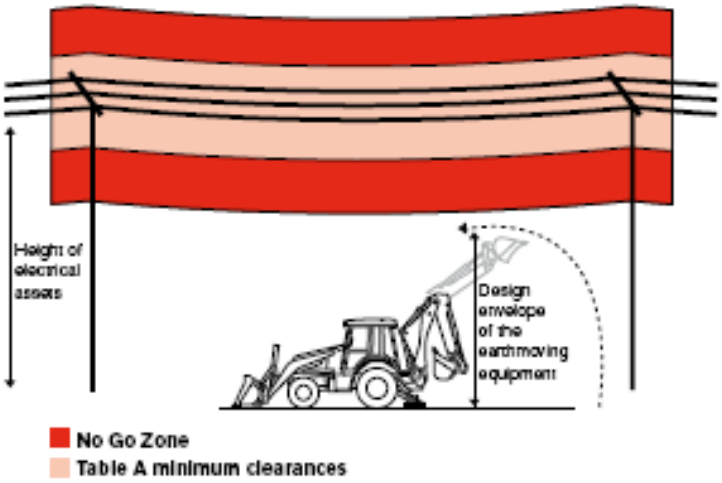
SWMS, but Spotter not required

Scenario 1: Design envelope outside the No Go Zone

Where the design envelope of the earthmoving equipment will not reach into the No Go Zone but is within the spotter zone, work may start in accordance with a site-specific SWMS. In this situation it is not mandatory to use a spotter solely for observing the proximity of the equipment to the overhead electrical assets.

Diagram 3: Outside the No Go Zone

SWMS required but Spotter not mandatory

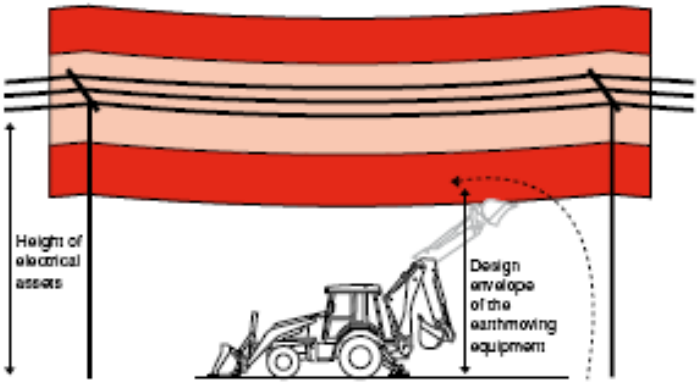


Scenario 2: Design envelope inside the No Go Zone

Where the design envelope of the equipment will reach into the No Go Zone but not encroach on the limits of approach (as stated in Table A) work may proceed as outlined in the section 'Managing No Go Zone safety' providing:

- a SWMS has been developed and implemented
- the SWMS includes:
  - documented heights and voltages of overhead electrical assets
  - documented heights of the earthmoving equipment being used
  - a designated spotter

Diagram 4: Inside the No Go Zone



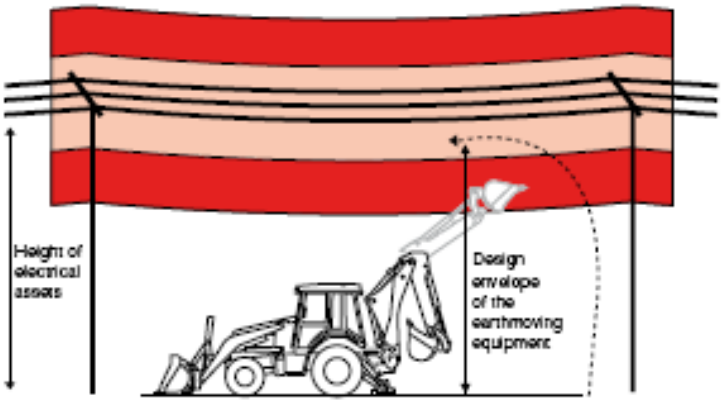
No Go Zone
Table A minimum clearances

SWMS and Spotter required

Scenario 3: Design envelope encroaching on limits of approach

Where the design envelope of the earthmoving equipment will reach into No Go Zone and encroach on the limits of approach (stated in Table A) a higher order control should be implemented where possible (eg have power disconnected). Work should also proceed as outlined in the section 'Managing No Go Zone safety'.

Diagram 5: Encroaching on the limits of approach (Table A)



No Go Zone
Table A minimum clearances

Asset owner permit to work and Spotter required

Permit required

In this situation, **no work may begin** unless the asset owner has granted written permission (Permit to Work) which stipulates the conditions before work can be undertaken.

To obtain a Permit to Work, the contractor will need to contact the relevant asset owner.

Contact Energy Safe Victoria on **(03) 9203 9700** for direction if uncertain of which company to contact.

Any permit issued will include other requirements and conditions of work that must be adhered to at the worksite.

EMERGENCY RESPONSE AND FIRE EXTINGUISHERS

Legal Reference: **OHS Act 2004**

Other References: **Various WorkSafe guidance material**

Emergency Response and Fire Extinguishers

- **An emergency plan should be prepared for the site and known to all persons working on the site.**
- **Fire extinguishers are to be fitted to all mobile plant.**
- **Fire extinguishers must be of the appropriate type and quantity relative to the risk identified.**
- **Fire extinguishers must be secured from tipping over.**
- **Fire extinguishers are to have evidence of 6 monthly inspections and testing by an authorised person.**
- **There is to be adequate signage indicating the type and location of fire extinguishers.**
- **Fire extinguishers should only be used by trained and competent persons.**

Lone Workers

- **An emergency plan should be prepared that caters for lone workers, including communications and the provision of first aid and emergency support.**
- **Any emergency plan needs to take into account issues related to remote locations and communication limitations.**
- **See Guide 11 for first aid guidance.**

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EXCAVATION AND TRENCHING

9

Civil Construction Safety Guide

Legal Reference: OHS Regulations 2007, Part 5.1

Other References: WorkSafe Victoria Code of Practice for Trenching Operations

Framework for Working Near Overhead & Underground Services

Like most civil construction activities, excavation and trenching operations do not take place in isolation; therefore safe work method statements (SWMS) must be prepared and identify the presence of other hazards that require controls.

- **Where proximity to overhead or underground services is identified, the provisions of Guide 7b are also to apply.**
- **Where confined space entry is identified, the provisions of Guide 4 are also to apply.**
- **Where excavations involve the use of mobile plant, the provisions of Guide 23a, b and d are also to apply.**
- **Where excavations take place on a road or road reserve, the provisions of Guide 28 are also to apply.**

Specific controls relating to excavation and trenching are as follows.

- **Before digging, a DIAL BEFORE YOU DIG referral is to be sought (where possible) AND the location of all services proven by appropriate means. All services must be identified and clearly marked.**
- **Trenching in excess of 1.5 metres deep requires notification to WorkSafe at least 3 days prior to commencing the excavation (except emergency works).**
- **Trenching in excess of 1.5 metres deep requires specific risk controls:**
  - **Shored**
  - **Battered (includes angled or step battering) (see overleaf for details)**
  - **Use of approved trench shields**
- **Trenching in excess of 1.5 metres deep must be under the control of a trench supervisor / mine manager.**
- **Any persons working in and around a trench or excavation are to wear an approved safety helmet and high visibility jacket, shirt or vest.**
- **Persons are not to work alone in a trench unless there is another person close by who can render aid if required.**

- **Equipment, plant and spoil must not be placed within 0.5 metres of the edge of a trench. Spoil must not be placed on the 'high side' of a trench that is accessed by people.**

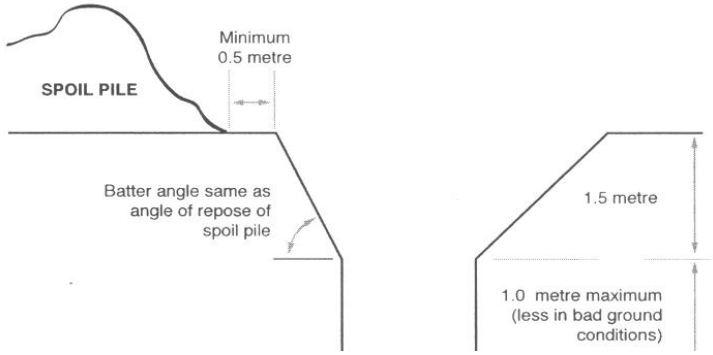
- **Examine surrounding soil for fretting, ground swelling or cracking, especially running parallel to the sides of the trench. If discovered, cease work until support is rectified.**

- **Safe access with ladders must be provided into and out of trenches. Ladders should be secured and positioned no more than 30 metres apart. The top of the ladder should protrude at least 900mm above the top of the trench.**

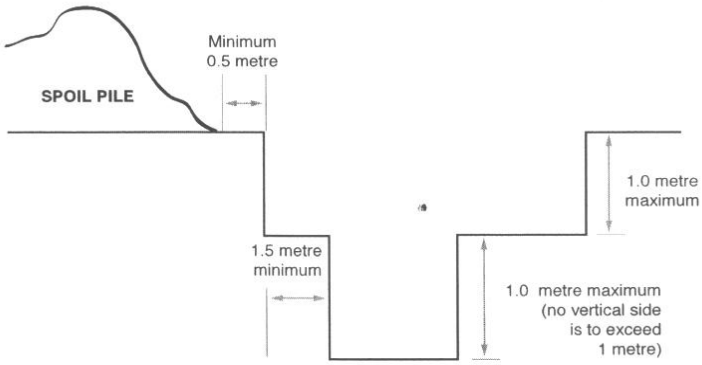
- **Trenching in excess of 2 metres deep requires additional measures to control the risk of persons falling into the trench and to comply with Fall Prevention Regulations. This can include barricades protruding 900mm above the sides of the trench, or a barrier over the top of the trench (see Guide 7 – Fall Prevention).**

Battering:

Battering the sides of the trenches
Example 2.5 metres deep in stiff clay



Steep battering vertical sided trenches
Example 2.0 metres deep in stiff clay



FALL PREVENTION (GENERAL)

10

Civil Construction Safety Guide

Legal Reference: OHS Regulations 2007, Parts 3.3 and 5.1

Other References: WorkSafe Victoria Fall Prevention Compliance Code and Guidance Material

AS/NZS 1657 Fixed platforms, walkways, stairways and ladders - Design, construction and installation

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Fall prevention must be provided when working 'near to' a fall hazard – where the potential to fall exceeds 2 metres: eg; work at height - near open edges, roofs, shafts, pits.

A safe work method statement (SWMS) must be completed for any work where a fall risk exists.

- **Fall prevention should follow a prescribed hierarchy of control (see overleaf).**
- **Handrails complying with AS/NZS 1657 are to be used where possible. Handrails must extend 900 mm in height and have a mid rail at about 450 mm. A kick board of no less than 100 mm should be in place.**
- **Only competent persons are to erect, alter or dismantle scaffold. Where scaffold exceeds 4 m in height, a "High Risk Work Licence" or National Certificate of Competency endorsed SD, SI or SA must be held. (See Guide 7c for further information on scaffolding)**
- **Tools, plant and equipment used at heights must be kept to a minimum, and a means of preventing them from falling onto persons underneath must be employed; eg: use of kick boards, or tools and equipment secured to prevent them from falling.**
- **Persons must be trained in the use of any fall prevention equipment used.**
- **Only approved, tested and tagged ('in date') inertia reels, static lines and harnesses are to be worn where no other suitable (higher level) means of fall prevention is available.**
- **Anchor points must ensure minimum fall and avoid the 'pendulum effect'.**
- **Hard hats are to be worn where there is a possibility of head injury.**
- **Barricades and signs such as "DANGER KEEP CLEAR OVERHEAD WORK" should be displayed.**
- **Look out for:**
  - **Fragile and/or unstable surfaces**
  - **Sloping or slippery surfaces**
  - **Work near the edge of pits, holes, roofs etc**
  - **Working on any plant or structure**
  - **Proximity to the public or traffic**

Fall Prevention (General)

Hierarchy of Control
Elimination: Can a barricade that complies with AS 1657 be erected?
Reg 3.3.4(1): Can the task be completed on ***"solid construction"***; eg: install a fixed grate or use a scaffold?
Reg 3.3.4(2): Can a ***"passive fall prevention device"*** be used; eg: temporary work platform or guard railing?
Reg 3.3.4(3): Can a ***"work positioning system"*** be used; eg: travel restraint system that is worn by a person and is designed to physically restrain a person from reaching an edge or elevated surface from which he/she may fall?
Reg 3.3.4(4): Can a ***"fall injury prevention system"*** be used; eg: industrial safety net, catch platform or safety harness other than a travel restraint system?
Reg 3.3.4(5)(a): Can a ***"fixed or portable ladder"*** be used? If using a ladder as a control measure, it must be appropriate to the task (including duration) and set up in the correct manner (Reg 3.3.5) see Guide 7b.
Reg 3.3.4(5)(b): Can ***"administrative controls"*** be used; eg: systems of work or procedures that eliminate or reduce the risk of a fall, use of manhole cover? If relying on administrative controls, record: a. a description of the administrative control used, and b. a description of the task to which the administrative control relates (Reg 3.3.5).
Emergency Procedures (Reg 3.3.9): If using measures in accordance with Reg 3.3.4 (2), (3), (4) or (5) to control the risk of a fall, then: **Emergency procedures must be detailed, and** **First aid provisions must be detailed.**

FALL PREVENTION

(Use of ladders)

10a

Civil Construction Safety Guide

Legal Reference: **OHS Regulations 2007, Part 3.3.5**

Other References: **WorkSafe Victoria Fall Prevention Compliance Code and Guidance Material**

AS/NZS 1657 Fixed platforms, walkways, stairways and ladders - Design, construction and installation

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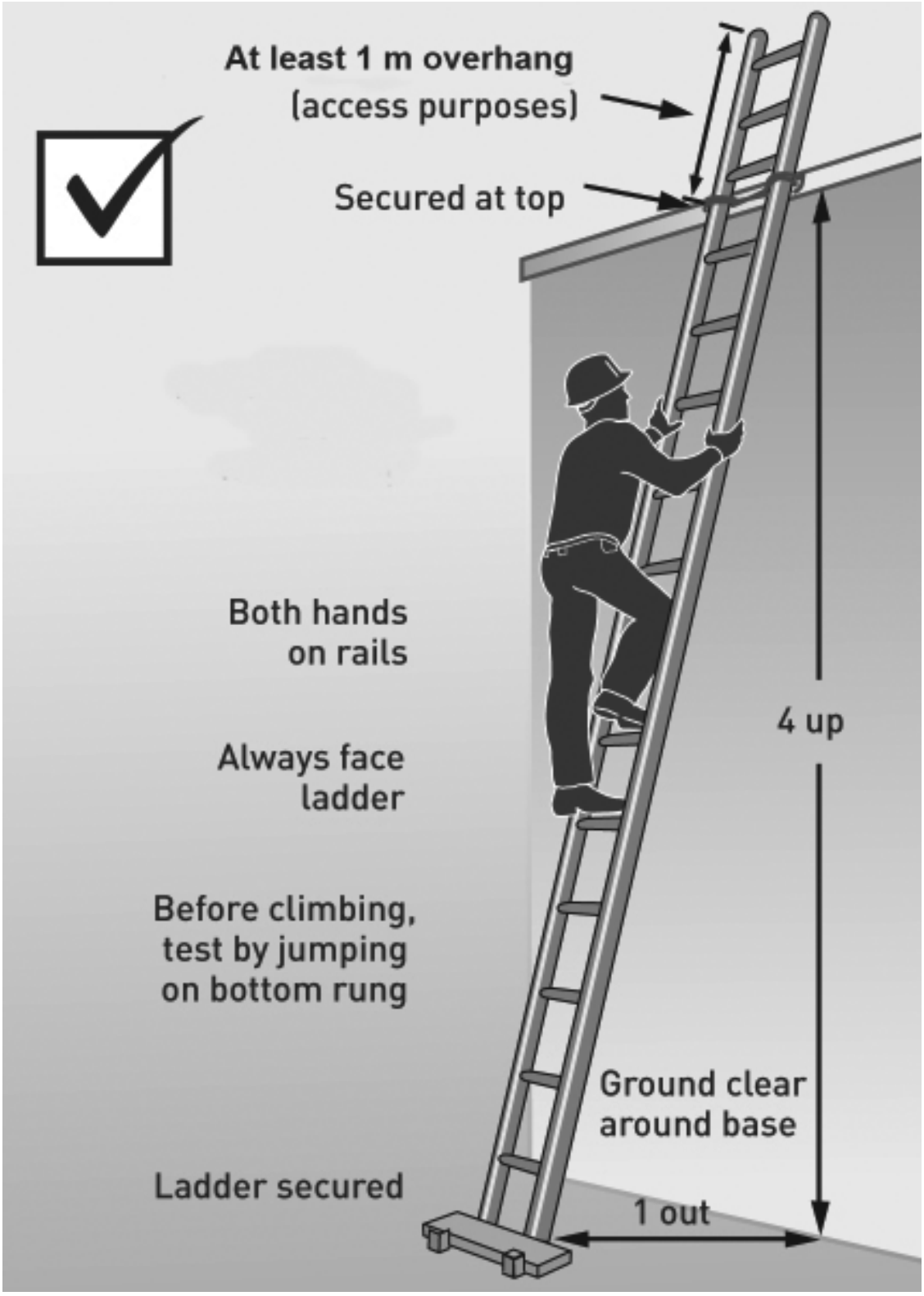
- **Examine all ladders for defects and damage before use.**
- **Ladders used in trenches must be securely fixed and at intervals not exceeding 30 metres.**
- **Portable ladders must be angled one out and four up, but may be less when secured in a shored trench.**
- **Portable ladders used in a workplace must have a 120 kg Safe Work Load.**
- **Ladders must extend at least one metre above the access level.**
- **Ladders must be secured at the top or firmly held while a person uses it.**
- **Ladders must be placed on firm, secure footing and not rested against an unsecured or movable object.**
- **A step ladder must have the spreader fully opened and engaged for stability.**
- **Use the correct ladder for the job. One person on a ladder at a time.**
- **Don't climb long or extension ladders higher than the third rung from the top.**
- **There must not be less than $3^{1/2}$ rungs overlapping sections of an extension ladder.**
- **Metal ladders must not be used where electrical hazards exist.**
- **Before using ladders mud, grease etc must be cleaned off footwear and the ladder rungs.**
- **Ladders must not be used to support planks as a work platform.**
- **Don't lean sideways or over-reach when using ladders - keep belt buckle within the stiles.**
- **Always climb and descend facing the ladder, with the hands gripping each rung.**
- **Don't carry anything when climbing or descending.**
- **Ladders placed in vehicle or pedestrian traffic areas must have adequate barricading for the safety or workers and the public.**

Fall Prevention (Use of ladders)



Prevention of Falls Risk Control Hierarchy to comply with the OHS Regulations 2007, Part 3.3

1.	**Elimination:** Can we erect a barricade that complies with AS 1657?
2.	**Reg 3.3.4(1):** Can we complete the task on ***"solid construction"***; eg: install a fixed grate or use a scaffold?
3.	**Reg 3.3.4(2):** Can we use a ***"passive fall prevention device"***; eg: temporary work platform or guard railing?
4.	**Reg 3.3.4(3):** Can we use a ***"work positioning system"***; eg: travel restraint system that is worn by a person and is designed to physically restrain a person from reaching an edge or elevated surface from which he/she may fall?
5.	**Reg 3.3.4(4):** Can we use a ***"fall injury prevention system"***; eg: industrial safety net, catch platform or safety harness other than a travel restraint system?
6.	**Reg 3.3.4(5)(a):** Can we use a ***"fixed or portable ladder"***? If using a ladder as a control measure, it must be appropriate to the task (including duration) and set up in the correct manner (Reg 3.3.5).
7.	**Reg 3.3.4(5)(b):** Can we use ***"administrative controls"***; eg: systems of work or procedures that eliminate or reduce the risk of a fall, use of manhole cover? If relying on administrative controls, record: a. a description of the administrative control used, and b. a description of the task to which the administrative control relates (Reg 3.3.5).
	Emergency Procedures (Reg 3.3.9): If using measures in accordance with Reg 3.3.4 (2), (3), (4) or (5) to control the risk of a fall, then: **Detail emergency procedures:** (Eg: Two persons to be used where travel restraint system used. Communications with depot or main office to be available.) **Detail first aid provisions:** (Eg: Majority of O&M field staff are First Aid Level 2 qualified; all are EAR/CPR trained & current. Communication with emergency services available & emergency phone numbers displayed in each vehicle.)

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FALL PREVENTION(Scaffolding)

10b

Civil Construction Safety Guide

Legal Reference: OHS Regulations 2007, Parts 3.3, 3.5, (incl 3.5.43) 3.6, 6.1

Other References: WorkSafe Victoria Fall Prevention Compliance Code and Guidance Material

Australian/New Zealand Standards 1576, 1577, and 4576

- **Scaffolds must only be erected by competent persons.**
- **Scaffolds over 4 metres can only be erected, altered and/or dismantled by (or under direct supervision of) a person with the relevant "High Risk Work Licence" or National Certificate of Competency (either SB [scaffolding basic], SI [scaffolding intermediate], or SA [scaffolding advanced]).**
- **Ladders must be secured in position: eg; internal ladders on mobile scaffolding.**
- **Don't climb scaffolding standards or transoms.**
- **Don't use damaged scaffold planks or accessories.**
- **Kickboards and handrails must be installed and secured in place.**
- **All tools and equipment must be removed from scaffolds when not in use.**
- **The number of workers and materials must be kept to a minimum at any one time.**
- **Scaffolding must be regularly inspected for faults, damage and stability. Faulty scaffolds must be tagged out and access prevented.**
- **Mobile scaffolding wheel locks must be engaged when persons are on the scaffold.**
- **Mobile scaffolds must not be moved whilst persons are on the scaffold.**
- **Scaffolding must not be erected close to electrical wires. No part of a metal scaffold should be closer than 4.6 metres horizontally or 5.0 metres vertically from any live powerlines.**
- **Nearby power lines must be de-energized, insulated, earthed or re-routed.**
- **Don't work on scaffolding during poor weather conditions.**
- **Make sure scaffolding can't be struck by mobile plant or equipment.**

Prevention of Falls Risk Control Hierarchy to comply with the OHS Regulations 2007, Part 3.3

1. Elimination: Can we erect a barricade that complies with AS 1657?
2. Reg 3.3.4(1): Can we complete the task on ***"solid construction"***; eg: install a fixed grate or use a scaffold?

Scaffolding represents a high level fall risk control - as long as is it correctly constructed, well maintained and used properly.

FALL PREVENTION - Trenching

Legal Reference: OHS Regulations 2007, Parts 3.3 & 5.1

Other References: WorkSafe Victoria Compliance Code for Prevention of Falls in General Construction

Civil Contractors Federation publication – Falls Regulations in Trenching Operations

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Fall prevention must be provided when working 'near to' a fall hazard – where the potential to fall exceeds 2 metres: eg; work at height - near open edges, roofs, shafts, pits, trenches and from mobile plant.

A safe work method statement (SWMS) must be completed for any work where a fall risk exists.

Recognition of Hazards

There are a number of fall hazards associated with trenching operations and common examples are:

- **Working in or near trenches**
- **Entering and exiting tenches**
- **Placing/ removing ladders and shields in trenches**
- **Public access to trenches**
- **Inspection and pipe laying activities**

The hazards traditionally dealt with are, trench collapse, stockpiling excavated material, trench battering, keeping plant from edges of trenches, and protecting employees and public from collisions with plant.

Some Solutions for Common Situations

Working near Trenches Deeper than 2 metres.

Actions to eliminate or minimise the risk of falling into the trench.

1. **If shields are used, where possible allow the shield to be above the ground to act as a fence or barricade. (300mm is required in the Code of Practice – Safety in Trenching Operations, but up to 900mm is a better barrier)**
2. **When approaching the shield to attach hooks, to enter the trench or to pour or strip a manhole do either or both of the following;**
   - **(a) Backfill between the shield and trench wall to at least 1.0m below ground level.**
   - **(b) Use a ramp walkway with handrail and kick board, from ground level to the shield or manhole. Securely place the ramp on level ground and the edge of the shield.**
   - **(c) Alternatively, trenches can be step battered when working in clay conditions. This allows for a 1.0m wide bench for personnel to work on adjacent to the trench. Trench shields should be protruding a minimum of 600mm above the bench to act as a barrier against people overbalancing.**

Working near Trenches Deeper than 2 metres (continued)

3. **Confine the pipe laying and storage of materials to only one side. Stockpile spoil on the other side of the trench and barricade with safety mesh fencing, between the stockpile and edge of trench to stop access. If we can stay to one side we will eliminate half the hazard.**
4. **Keep the edge of the trench we are working on smooth and clear of tools and material at all times to stop tripping and falling.**
5. **When entering the trench through a shield, place a shield cover with handrail at the ladder and enclosing the entry point.**
6. **Enter and leave trenches deeper than 1.5m by two means only:**
   - **(a) Ladder outside the shield where the trench is backfilled to less than 1.5m**
   - **(b) Ladder inside the shield with safe access of the type specified above**
7. **Barricade the trench if deeper than 1.5m and left open behind the pipe laying. Barricade by fastening safety mesh on steel pickets placed not more than 6m apart for its full length.**
8. **Place warning signs if the risk to others including the public warrants it.**
   The section between the end of pipe and excavator where pipes are being laid need not be barricaded as long as constant supervision is available to ensure only competent pipe laying persons approach the trench.
9. **To eliminate as much risk as possible always backfill as soon as possible to at least 1.5m. Do not leave trenches open and not backfilled over night or during days of no work. If they have to be left open then barricade them accordingly.**

Using ladders for Entry and Exit from trench or for Manhole Construction.

Actions to eliminate or minimise the risk of falling into the trench.

1. **Eliminate the need for a ladder. If possible backfill part of the trench as soon as possible and slope down to enter the shield at a depth less than 1.5m**
2. **Make sure the ladder is commercial quality and is in good condition. Return the ladder to the Foreman, Supervisor or Manager if it is damaged or not suitable for the task.**
3. **The ladder must be tall enough to extend at least 900mm above the level needed to stand or step off.**
4. **The ladder must be securely positioned at the bottom, e.g. push it into bedding or backfilling, or tie it to the shield.**
   Restrain the top so that it cannot slide away, e.g. tied to the top of the shield.
5. **Make sure the ladder is at least 900mm above the work level or where you step off. Use the top 900 mm of the ladder to hold onto; do not stand on the top 900 mm of the ladder.**

   If the trench is deeper than 1.5m position the ladder within the shield with a shield cover always.

   If the trench is less than 1.5m deep the ladder can be outside the shield but preferably against the shield.

Attaching, Lifting and Placing Loads near a Deep Trench

Hazards include:

- **Being too close to the moving trench shield or manhole forms and being knocked into the trench.**
- **Falling into the trench when attaching or removing lifting hooks from the shields in the trench.**
- **Tripping over on the edge of the trench and falling into the trench during pipe laying.**
- **Reaching to guide the pipe being lowered and falling into the trench**

Controlling the Risks

Actions to eliminate or minimise the risk of falling into the trench.

1. **The operator and employee directing the movement of a shield or manhole form / component must work together and carry out the activity safely. The employee directing the load must stand well clear of the trench and the moving load.**

Do not stand or balance on the shield, manhole forms or precast manhole components under any circumstances

2. **The unprotected trench where pipes are being laid is the most dangerous. Only competent pipe layers or helpers from above are allowed in this area. The area should be kept to a minimum. The edge of the trench for a width of at least 2m should be kept smooth and clear of tools and pipes that can be tripped over.**

3. **The pipe laying activity should be planned safely. Consider the method of lifting and lowering the pipes, to eliminate as much as possible getting close to the edge of the trench. Guide pipes with a rope standing away from the edge. Wherever possible lower the pipe through the shield, this allows some protection by the shield if it is above the ground. Ensure that no one is under the load as it is being lowered into the trench.**

The Civil Construction Federation publication Falls Regulations in Trenching Operations provides some useful pictorial guidance for fall prevention associated with trenching.

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FIRST AID

Legal Reference: **OHS Act 2004 specifically sections 21(1) and 21(2)(d)**

Other References: **National Standard for Construction Work**

WorkSafe Victoria Compliance Code for First aid in the workplace

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First Aid obligations can be met via two methods:

1. **Prescribed Approach**
2. **Risk Assessment Approach**

<u>Prescribed Approach:</u>

- **Civil construction sites will generally be deemed to be "high risk workplaces". Compliance is achieved by providing:**
  - **One first aid officer for up to 25 employees**
  - **Two first aid officers for 26 – 50 employees**
  - **An additional first aid officer for every additional 50 employees.**
- **Where employees do not have timely access to appropriate medical and ambulance services (such as remote locations or mobile workplaces), compliance is achieved by providing at least one first aid officer for every 10 employees.**
- **The 'prescribed approach' is a simple method of achieving compliance, but if chosen, must be followed in full.**

Training & Competencies

- **The minimum standard of training for first aid officers is 'senior first aid certificate', often referred to as "Level 2 First Aid', or the equivalent HLTFA301B Apply First Aid.**
- **For higher risk workplaces, a more advanced Level 3 competency may be appropriate. (HLTFA402B Apply Advance First Aid.)**

Signage

- **The employer should provide adequate signage to identify first aid facilities, including the telephone number of emergency services and details of first aid officers.**
- **Signs should comprise a white cross on a green background – see example above.**

First Aid Kits

- **First aid facilities are to be available to all staff and checked regularly for adequate stocks and items within expiry date.**
- **Under the prescribed approach:**
  - **the number of first aid kits are one for up to 50 employees with one additional kit for every 50 employees up to 200.**
  - **Contents**

basic first aid notes	disposable gloves
resuscitation mask	individually wrapped sterile dressings
sterile eye pads (packet)	sterile coverings for serious wounds
triangular bandages	small sterile unmedicated wound dressings
safety pins	medium sterile unmedicated wound dressings
non-allergenic tape	large sterile unmedicated wound dressings
scissors	rubber thread or crepe bandage
tweezers	suitable book for recording details of first aid provided
sterile saline solution	plastic bags for disposal

  - **Additional modules: An assessment should be undertaken to consider the need for additional specific modules for eyes, burns, snake bite etc based on the hazards workers are exposed to.**

Risk Assessment Approach:

- **A first aid assessment should be completed for each site and first aid arrangements, including training & competency of first aid officers and quantity & contents of first aid kits, implemented as a result of the risks identified.**
- **First aid assessments should be recorded – the WorkSafe Compliance Code provides guidance.**
- **The first aid kit contents list above provides relevant guidance for the risk assessment approach.**

Workplaces with Less than 10 Employees

- **The reference in the WorkSafe Compliance Code for workplaces with less than 10 employees is restricted to low risk businesses - not civil construction.**

General

- **Names of first aiders should be prominently displayed and known to all employees on the site.**
- **Refer to the section on Communicable Disease later in this Guide.**

Legal Reference: **OHS Act 2004**

Other References: **National Standard for Construction Work**
Various WorkSafe guidance material

Housekeeping (Access and Egress)

Good Housekeeping is Everyone's Responsibility

- **All work areas must be clear of trip hazards: remove all tools, leads etc when not in use.**
- **Remove all nails from timber and stack in appropriate areas.**
- **Break off hardened nails with correct tools, not by hitting with a hammer.**
- **Clean up spills, oils, chemicals etc as soon as possible. Warning signs must be displayed and/or temporary barricades in place.**
- **Use absorbent material to clean up spills and dispose of in accordance with Material Safety Data Sheets.**
- **Dispose of or keep rags in appropriate containers. Oily rags can result in spontaneous combustion.**
- **Access and egress must take into account the use of tools, plant and equipment.**
- **Walkways must be free of obstructions and sharp objects.**
- **People or equipment must be prevented from falling into openings, trenches and from scaffolding, etc.**
- **There must be adequate lighting for night work or when there is poor light.**
- **There must be clear access to emergency equipment, fire extinguishers, fire hoses, emergency exits, switchboards, amenities.**
- **Scrap and waste material must be removed as soon as possible from work areas.**
- **Warning lights or signs must clearly identify worksite access and egress.**

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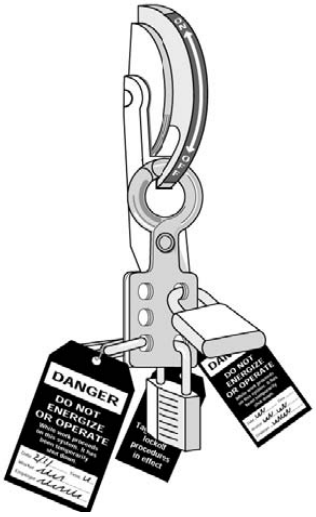
ISOLATION PROCEDURES

Legal Reference: **OHS Regulations 2007, Part 3.5**

Other References: **Australian Standard 1318**

- **Don't start any repairs, alterations or maintenance unless the energy source is disconnected.**
- **Any faulty, damaged or malfunctioning plant or equipment must be fitted with a danger tag and removed from service.**
- **Switch off, isolate, attach danger tags or lockouts - always test to ensure isolation has worked.**
- **The person to remove a danger tag or lockout is the person who put it in place.**
- **Don't remove any lockout or tag unless authorised to do so and always test first.**
- **Plant or equipment must be isolated and tagged where guarding has been removed.**
- **Out of service tags or lockouts must be fixed to operating controls.**
- **All tags must remain in place until all repairs, maintenance and or alterations have been completed.**
- **All danger tags and or out of service tags must be clearly visible.**
- **If there are two or more persons working on the same equipment or machinery, at the same time each person must use a separate DANGER TAG.**



BE AWARE THAT MORE THAN ONE HAZARD MAY NEED TO BE ISOLATED, ENSURE THE CORRECT ONE IS ISOLATED

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LASER SURVEY EQUIPMENT

14

Civil Construction Safety Guide

Legal Reference: **OHS Regulations 2007, Part 3.5**

Other References: **Australian/New Zealand Standard 2211 series**

- **All lasers must be labelled, eg class 1, 2, 3A.**
- **Don't operate unless properly trained.**
- **Lasers must be used and maintained in accordance with manufacturer's instructions.**
- **Laser warning signs must be displayed.**
- **A laser beam must not be directed at any person.**
- **The path of the laser beam must be well below or well above eye level.**
- **Wear appropriate eye protection and don't look directly into a laser beam.**
- **Turn off and secure the laser when not in use, no unauthorised operation.**
- **Laser beams must not be directed at reflective surfaces.**

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LIFTING AND SLINGING LOADS

15

Civil Construction Safety Guide

Legal Reference: OHS Regulations 2007, Parts 3.5, (incl 3.5.40), 3.6, 6.1

Other References: Australian Standards 1418 and 2550

- **Slinging and lifting must be carried out by properly trained and certified persons (see Guide 16a).**
- **A person slinging the load or directing the operator must hold a certificate of competency for Dogging or Rigging if:**
  - **that person is required to exercise judgement in relation to the weight of the load, the centre of gravity of the load, the selection of slings or sling attachment points, or**
  - **the load or person directing the operator are partially or completely obscured from the operator's view.**

General Procedures

- **Plan the lift, don't overload equipment.**
- **Slings must be positioned correctly, not over sharp edges or corners.**
- **Use lifting lugs, no multiple slings on the same hook.**
- **Chains, slings and other attachments must be tested and tagged. If tags are missing from the chains, slings or other attachment then they MUST not be used.**
- **No person is to ride a sling or hook.**
- **Don't stand under a suspended load - loads are not be suspended over people unless absolutely necessary, and only with a specific JSA/SWMS for the task. (See Guide 27)**
- **Always stand well clear of the load to avoid injury if the load swings, slips or spills.**
- **Always keep slings away from chemicals.**
- **Never combine slings, eg nylon and chains.**
- **Shackles must be used where slings are attached to eye bolts or lifting lugs.**
- **Slings must be regularly checked by a competent person and kept in good condition.**
- **Lifting equipment should be examined for damage before each use. If damage is identified, tag out and remove from service.**

Lifting and Slinging Loads

- **Worn or damaged slings must be discarded or repaired by the manufacturer.**
- **All hooks must be supplied with devices to prevent load movement.**
- **Multiple slings must be shackled together and placed on the hook.**
- **The lifting area must be secured to prevent unauthorised entry.**
- **Don't stand between the materials and the load.**
- **Keep hands and feet well clear of pinch points.**
- **Never leave the load suspended without an operator at the controls.**
- **Use guide ropes or tag lines to manoeuvre loads if necessary.**

MANUAL HANDLING

Legal Reference: **OHS Regulations 2007, Part 3.1**

Other References: **WorkSafe Victoria Code of Practice for Manual Handling**

Over 50% of workers compensation claims (and therefore workplace injuries) are sprains, strains or lower back related. Manual handling (pushing, pulling, lifting, carrying, moving, holding or restraining objects) can cause acute injuries like stains, sprains and physical tiredness. It can also cause chronic injuries to the lower back, tendons and other structural systems.

Work design should allow people to maintain a comfortable, natural posture. Lifting is best between waist and shoulder height (when standing). Work should comprise a variety of tasks to allow people to exercise different muscle systems.

Lifting, lowering, carrying, pulling, holding or restraining can cause Manual Handling injuries, often called Musculo-Skeletal Disorders (MSD).

To identify manual handling risk situations, look out for:

- **Persons holding or working in a fixed (sustained) position with the back bent or body twisted**
- **Persons exposed to sustained vibration (whackers, jack hammers etc)**
- **Any repetitive movements over long periods of time (30 minutes in one go, or a total of 2 hours in one day)**
- **Persons carrying large or bulky items without assistance, and not in the method recommended overleaf**
- **Retrieving items stored or stacked below waist and above shoulder heights**
- **Excessively bulky or heavy items without apparent mechanical lifting equipment**
- **Loads that are unstable, unbalanced or difficult to move**
- **Wet, oily, untidy or cluttered workplaces (slip & trip hazards)**

To reduce the risks:

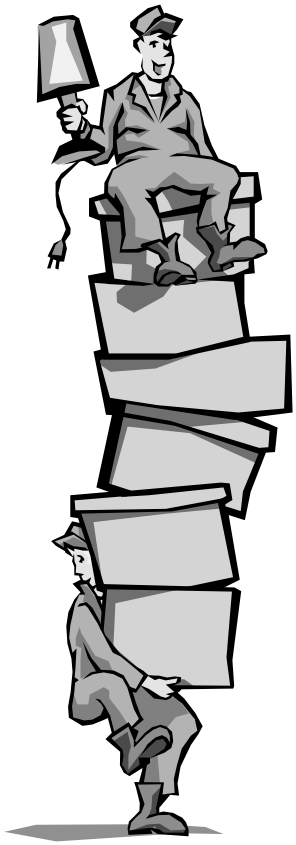
- **Use mechanical devices (cranes, forklifts, trolleys)**
- **Alter the handling qualities of the object (break down into smaller loads)**
- **Alter the work environment (wipe up spills, tidy clutter)**
- **Change the way objects are stored (make them easier to get to)**
- **Alter the systems of work (team lifting, adjust the pace, rotate people through 'heavy' tasks**
- **Ensure workers are trained in manual handling risks and techniques**

Civil Construction Safety Guide

Save Your Back (the most common part of the body subject to manual handling injuries)

PLAN THE LIFT

- Assess load, size, weight, etc
- Examine load for protrusions, staples, sharp edges, etc
- Check path, clear of obstructions, etc
- Ask - can a mechanical lifting device be used?



LIFTING TECHNIQUES

- Keep the feet apart for balance and face the direction of travel.
- Bend the knees
- Keep your back straight
- Diagonal grip on the load
- Keep the load close to the body
- Lift smoothly and slowly without jerking

Vary heavy tasks with lighter work, load share: team lifting, co-ordinate the lift

TEAM LIFT GUIDANCE (where suitable alternatives are not available)

- Appoint a coordinator
- Ensure simple but effective communications
- Consider individual differences (height, strength)
- Practice the lift first
- No room for horseplay!
- Weight Guide – 2 persons: max 40 kg; 3 persons: max 60 kg; 4 persons : max 80kg

Source: *A Guide to Handling Large, Bulky or Awkward Items, 2nd Ed*, WorkSafe 2005

MATERIALS STACKING & STORAGE

17

Civil Construction Safety Guide

Legal Reference: **OHS Act 2004**

Other References: **WorkSafe Victoria Code of Practice for Manual Handling**

- **Materials must be stacked in a neat and orderly manner.**
- **Adequate access and egress must be maintained around material stacks for emergencies, fire fighting etc.**
- **No sharp or rough edges of materials are to protrude into any walkway areas.**
- **Materials must be securely stacked so as not to fall or be easily dislodged.**
- **Materials must be stored in a stable condition, on the base rather than in the upright position eg concrete rings and pipes.**
- **It must be safe to retrieve any material from a stack or storage.**
- **Appropriate protective equipment must be worn when handling any materials: eg; gloves.**
- **Any hazardous or dangerous substances must be stored in accordance with the Material Safety Data Sheet (MSDS).**
- **Housekeeping must be regularly carried out to reduce debris build up and fire hazards.**
- **Incompatible materials must not be stored or stacked together.**
- **Materials must be stacked and stored to reduce double handling.**
- **Bearers must be used to improve stack stability.**
- **Round items may need to be strapped or chocked.**
- **When "A" frames or racks are provided for storage of materials, these must be used.**
- **Material stacks must be secured to prevent access by unauthorised persons.**

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NOISE

Legal Reference: **OHS Regulations 2007, Part 3.2**

Other References: **National Standard and Code of Practice for Noise**
WorkSafe Victoria Guidance Material for Noise Control

- **Noisy plant and equipment can be a sign of damage, wear, etc and indicate that maintenance is required. Noise assessments should be conducted on plant and machinery whenever that item of plant or machinery is risk assessed or at intervals not exceeding 5 years.**
- **Noisy plant or equipment must be enclosed with sound absorbing material where possible.**
- **Schedule noisy work when the least number of persons are present.**
- **Tools and equipment must be kept in good condition: eg; pneumatic tools, air lines, blades sharp etc.**
- **Obey warning signs and keep away from noisy operations.**
- **Use a quieter process, such as pressing or bending instead of hammering.**
- **Wear hearing protection, ear muffs, ear plugs that are comfortable and suitable. Refer Guide 22 - Personal Protective Equipment & Clothing.**
- **Don't share hearing protection to avoid infection or disease.**
- **Take regular breaks when working in noisy environments or when using noisy plant or equipment.**
- **Hearing protection must be the correct type to reduce noise exposure to acceptable levels. Refer AS/NZS 1269.3.**
- **Training must be carried out in regard to safe use, fitting and maintenance of hearing protection.**
- **Report any hearing problems, ringing in the ears, etc, as soon as possible.**
- **Where hearing protection is required as a control measure, audiometric testing is to be performed at least 2 yearly, and within 3 months of commencing employment.**

AS A RULE OF THUMB, IF TWO PEOPLE CAN'T HAVE A CONVERSATION FROM 1 METRE AWAY WITHOUT SHOUTING, THEN THERE IS A NOISE PROBLEM.

WEARING HEARING PROTECTION IS THE LAST OPTION: REDUCE NOISE AT THE SOURCE WHEREVER POSSIBLE.

Typical Noise Sources

Effect on hearing	Sound level in dB(A)	Typical sound source
	140	Jet engine
A lot of damage	130	Rivet hammer
	Threshold of Pain	
	120	Angle grinding
	110	Chainsaw
	100	Sheet metal workshop
	91	Welding
Damaging	**85**	Front end loader **(exposure standard in Victoria for an average 8-hour day)**
	80	Heavy traffic / lathe
	70	Loud conversation
	60	Normal conversation
	50	Low conversation
	40	Quiet radio music
	30	Whispering
	20	Quiet urban room
	10	Rustling leaves
	0	Hearing threshold

Daily Noise Dose Chart (without hearing protection)

dB(A)	Exposure standard – 8 hours x 5 day working week Leq 85 dB(A)
83 dB(A)	12 hours
85 dB(A)	8 hours
88 dB(A)	4 hours
91 dB(A)	2 hours
94 dB(A)	1 hour
97 dB(A)	30 minutes
100 dB(A)	15 minutes
103 dB(A)	7.5 minutes
106 dB(A)	3.75 minutes
109 dB(A)	2 minutes
112 dB(A)	1 minute
115 dB(A)	30 seconds

NOTIFIABLE INCIDENTS

Legal Reference: **OHS Act 2004**

Other References: **Various WorkSafe guidance material**

Section 38 of the Occupational Health and Safety Act 2004 requires that WorkSafe Victoria be immediately notified if the following occurs:

A. Notifiable Occurrence: An incident that results in:

- **the death of a person; or**
- **a person needing immediate medical treatment (by a registered medical practitioner) for:**
  - **amputation of any part of the body; or**
  - **serious head Injury; or**
  - **serious eye Injury; or**
  - **separation of skin from underlying tissue such as de-gloving or scalping; or**
  - **electric shock; or**
  - **spinal injury; or**
  - **loss of a bodily function; or**
  - **serious lacerations; or**
- **immediate hospital treatment (as an in-patient); or**
- **medical treatment within 48 hours of being exposed to a substance (such as chemicals or biological material)**

OR

B. Dangerous Occurrence: A situation that exposes a person in the immediate vicinity to an immediate risk to the person's heath and safety through:

- **the collapse, overturning, failure or malfunction of, or damage to any plant that the regulations prescribe must not be used unless the plant is licensed or registered; or**
- **the collapse or failure of an excavation or of the shoring supporting an excavation; or**
- **the collapse or partial collapse of part of a building or structure; or**
- **an implosion, explosion or fire; or**
- **the escape, spillage or leakage of any substance (including dangerous goods); or**
- **the fall or release from height of any plant, object or substance**

A completed incident notification form (available from the WorkSafe website – www.worksafe.vic.gov.au) must be sent to WorkSafe Victoria within 48 hours of a notifiable incident or dangerous occurrence. Failure to notify WorkSafe of a serious workplace injury or death or dangerous occurrence may result in the individual or company being fined.

Note: if an incident involves Electric Shock, it is also to be reported to EnergySafe Victoria.

<u>Contractors note:</u> If emergency services are called to a worksite and WorkSafe also attend, a contractor still has a responsibility to notify WorkSafe directly as per the requirements.

Note: the requirement to notify WorkSafe of incidents does not apply if the only person injured is the employer or a self employed person.

<u>Preservation of an Incident Site</u>:

For any notifiable incident, the incident scene must be left undisturbed until a WorkSafe inspector arrives at the site, or if an inspector directs otherwise. The only exception is where it is necessary to:

- **protect the health & safety of a person;**
- **aid an injured person involved in the incident; or**
- **take essential action to make the site safe or to prevent a further occurrence of the incident.**

<u>Retention of Records:</u>

Copies of any records must be held for at least 5 years and made available or inspection by:

- **an inspector**
- **a person or a representative of a person injured in the incident, or whose health and safety was exposed to an immediate risk by the incident**
- **a representative of the person whose death was caused by the incident**
- **a health and safety representative (if applicable)**
- **a member of a health & safety committee established by the employer (if applicable)**

OUTDOOR WORK

Legal Reference: OHS Act 2004

Other References: National Standard for Construction Work
WorkSafe Victoria and SunSmart Guidance Material

HEAT STRESS

Heat stress & heat exhaustion may occur when working in excessive heat, high humidity, radiant heat, direct sun and confined spaces.

Ensure:

- Adequate and regular drinking of water
- Heavy work is carried out at cooler times
- Shade and shielding from radiant heat
- Adequate air movement
- Suitable clothing and head protection worn
- Persons are not affected by medication

Where heat stress occurs:

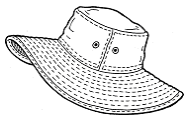
- Assist person to a cooler environment
- Soak clothing or sponge with cool water
- Encourage sipping of cool fluids

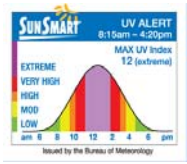
Instances of heat illness (cramps, skin rashes, fatigue, nausea, dizziness and/or weakness, fainting, collapse) should be referred to a doctor.

SUNBURN AND SKIN CANCER

Skin can be damaged by the sun even on cloudy days.

- The best protection is to be covered up by clothing - wear loose fitting, light coloured clothing, sleeves rolled down, long pants.
- Arrange work for cooler parts of the day; ultra violet rays strongest 10 am-2 pm (11am-3pm daylight saving).
- Sunscreen SPF 30 plus should be used - liberally apply sunscreen to exposed parts of the body and regularly re-apply.
- Wear hats that protect the ears and neck - broad brim or legionnaire's style caps offer the best protection.
- Wear sunglasses/safety glasses to reduce ultra violet radiation to the eyes.
- When hard hats are to be worn, a brim should be attached.
- If available, check the SunSmart / UV alert which provides an indication of the expected UV levels for the day.





CHECK FOR SKIN CANCERS

Regular checks should be carried out on parts of the body mostly exposed: eg; face, ears, neck, shoulders, arms and hands. (Refer to a GP)

Melanoma

Very dangerous and can be fatal: a spot, unusual freckle or mole that changes colour, size and thickness over months. Colours range from dark brown, black, red, blue, black or a combination. Can appear on body parts protected from the sun.

Basal Cell Carcinoma (BCC)

Most common type: a small round or flattened lump, red, pale or pearly in colour. May have blood vessels over the surface.

Squamous Cell Carcinoma (SCC)

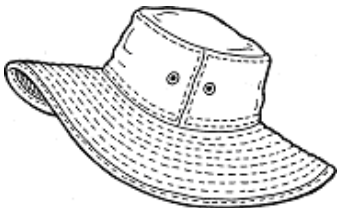
Less common than BCC's but more dangerous: can spread, usually red scaly areas that bleed, turn into ulcers and has the appearance of a sore that does not heal.

Sun Spots

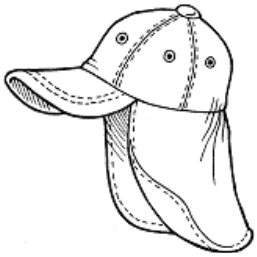
Usually rough dry, firm spots. These are not skin cancers but show the skin has had an overdose of ultra violet light and on rare occasions can turn into cancers.

Hats

These types of hats provide excellent protection from the sun:

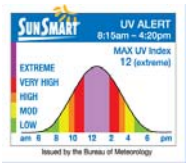


Broad-brimmed hat



Legionnaire hat

- **broad-brimmed hats with a brim of at least 7.5 cm**
- **legionnaire-style hats (the side flap and front peak should meet to provide protection to the side of the face)**



PERSONAL HYGIENE

Legal Reference: **OHS Act 2004**

Other References: **National Standard for Construction Work**
Various WorkSafe guidance material

Personal Hygiene And Communicable Disease

Communicable Disease

- **Avoid direct contact with body fluids, such as blood, urine, faeces, pus.**
- **Wear disposable gloves where contact with body fluids, sewerage, rubbish etc.**
- **Immediately wash hands thoroughly if body fluid contact is made and wear eye protections if chance of splashes in eyes.**
- **Never place hands directly into rubbish.**
- **Needle stick injuries must be thoroughly and immediately washed and reported straight away.**
- **Never pick up syringes with bare hands, use heavy duty gloves or tongs and place in appropriate sharps container.**
- **Persons giving resuscitation must be adequately trained.**
- **Anaesthetic face masks must be used when giving resuscitation.**

Personal Hygiene

- **Wash hands before eating, drinking, smoking, and after going to the toilet.**
- **Never use solvents, petrol etc to clean hands.**
- **Report any skin problems, dermatitis, cuts, scratches, infections, before starting work.**
- **Toilets, lunchrooms, change rooms and showers must be kept clean, tidy and in a hygienic condition.**
- **Put all foods scraps and rubbish in bins.**
- **Gloves must be worn when handling rubbish, toxic or corrosive chemicals. Wash hands afterwards.**
- **Bins must have tight fitting lids and be emptied regularly.**
- **Maintain personal hygiene: wash and shower regularly.**
- **Where working in potentially unhygienic conditions leave overalls/work clothes at work and change before going home. Launder work clothes at work.**

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PERSONAL PROTECTIVE EQUIPMENT and CLOTHING

Legal Reference: **OHS Act 2004**

Other References: **Various Australian/New Zealand Standards**

Safety Helmets

- **Must be worn when working in excavations more than 1.5 metres deep, including trenches, manholes, sewers, pits.**
- **Must be worn when working below steel erection, scaffolding, cranes, hoists, vehicles being loaded and unloaded etc, where there is a possibility of being struck.**
- **Must be worn when safety helmet signs are displayed.**
- **Should be worn with wide brim to protect from UV rays.**

- **Must be replaced when damaged and must be kept in a clean condition Safety helmets can be damaged by substances such as petrol, cleaning agents, paint, and adhesives.**
- **In a general construction workplace setting, safety helmets have a life of 3 years (shell) and 2 years (harness components) from the date of issue, which should be indicated on the label inside the helmet. If not so indicated, take 3 years from the date of manufacture. (Engineers, safety officers and the like who do not regularly wear a helmet may exceed this 'life span' as long as the helmet is in good condition and kept out of sunlight.) AS/NZS 1800 refers.**

High Visibility Clothing (including Vests)

- **Must be maintained in a good and clean condition.**
- **Damaged or faded vests must be replaced as soon as possible.**
- **Vests must be worn over clothing and not hidden by coats, jumpers etc.**
- **When worn, the vest must be done up at all times.**
- **Wear vests that are comfortable, the correct size and fit for unrestricted movement. It is important to be seen when carrying out work near plant, equipment and roads.**
- **Retro-reflective (Class N or D/N) garments must be worn at night or at times of poor visibility.**
- **High visibility outer-wear (jackets, shirts) may be worn in lieu of safety vests during daylight hours. Retro-reflective outer-wear may be worn in lieu of safety vests on all occasions.**
- **Class D garments are suitable for daylight hours only.**
- **Refer to AS/NZS 4602.**

Personal Protective Equipment and Clothing

Safety Footwear

- **Foot protection must be worn where there is a possibility of foot or toe injuries.**
- **Must be worn where signs are displayed.**
- **Must be worn in accordance with any Material Safety Data Sheet.**
- **Safety footwear must be kept in good repair.**
- **Worn or damaged footwear must be replaced.**
- **Must be appropriate footwear for the hazard: eg; wet conditions, falling objects, need for chemical or penetration resistance.**
- **Don't allow footwear soles to become covered in mud, grease etc.**

Hearing Protection

- **Must be worn when exposed to noise, hammer drills, explosive power tools, breakers, high speed cutting machines, etc.**
- **Hearing protection, muffs, ear plugs etc must be adequate to reduce noise exposure. Therefore the noise level must be known or estimated in order to calculate the attenuation required.**
- **Must be maintained in a clean and hygienic condition.**
- **Hearing protection is to be individually issued (and not shared), to avoid infections.**
- **Must be worn where signs are displayed.**

Hand Protection

- **Gloves must be worn to protect against abrasions, hot/cold surfaces, electric shock, infections, disease, contamination and vibration.**
- **Must be worn when handling hazardous substances in accordance with the Material Safety Data Sheets.**
- **Damaged or worn gloves must be replaced as soon as possible.**
- **Rings must not be worn, so as to reduce electrocution and finger injury.**
- **Don't wear gloves when operating equipment where gloves may be caught.**
- **Hand protection must be worn where signs are displayed.**

Personal Protective Equipment and Clothing

Eye Protection

- **Must be worn where there is a possibility of eye injury, flying particles, dust, lasers, chemicals, high pressure water etc.**
- **Must be worn where eye protection signs are displayed.**
- **Appropriate eye protection must be worn when welding.**
- **Must be worn to protect against UV radiation.**
- **Must be maintained and cleaned regularly.**
- **Scratched or damaged eye protection must be disposed of and replaced.**
- **Where there is a possibility of eye protection falling off, a head strap or lanyard must be worn.**
- **Chemical goggles in accordance with and certified against AS/NZS 1337 are to be used where the risk of chemical splash into eyes exists.**

Respirators

- **Must be worn where there are toxic dust, gases, vapours, welding fumes etc.**
- **Respirator cartridges and canisters must be checked for life limit.**
- **Breathing apparatus must be worn where there is a shortage of oxygen or atmospheric contaminants.**
- **Damaged respirators, dust masks or 1/2 face mask respirators must be replaced as soon as possible.**
- **Must be regularly cleaned and maintained.**
- **Respirators, dust masks etc are to be individually issued (and not shared), to avoid infections and disease.**
- **Must be worn where respirator signs are displayed.**
- **Respirators used in asbestos removal operations are to be disposed of with the asbestos waste.**

Personal Protective Equipment and Clothing

Protective Clothing

- **Must be worn where there is a risk, ie handling chemicals, sewage etc.**
- **Must be worn where warning signs are displayed.**
- **Torn, damaged or faded protective clothing must be replaced.**
- **Water proof clothing must be worn in inclement weather conditions, sewage etc.**
- **Water proof clothing must have light reflective features.**
- **Protective clothing must not be tight or loose fitting and allow adequate movement.**
- **Must be suitable for the task eg, non flammable, anti static, chemical proof etc.**

Safety Harness

- **Must be worn when working in confined spaces.**
- **Must be worn when working at heights (where higher order controls are not available).**
- **Must be checked before use for deterioration or damage.**
- **Any damaged or worn harnesses must be replaced or repaired by the manufacturer.**
- **Must be worn when working from elevated work platforms.**
- **Cleaning, maintenance and storage must be in accordance with the manufacturer's recommendations.**
- **Are to be regularly inspected and tagged by competent persons.**

Life Jackets

- **Life jackets must be worn when carrying out work on or near water: eg; water storages, rivers, bridge construction work etc.**
- **Must be worn when there is a possibility of slipping or falling into water.**
- **Must be inspected for any damage or wear and replaced or repaired by the manufacturer as soon as possible.**
- **Must be appropriately stored for easy access in an emergency.**
- **Must be illuminated for night work.**
- **Must be worn where life jacket signs are displayed.**

PLANT (Plant Operations)

23a

Civil Construction Safety Guide

Legal Reference: OHS Regulations 2007, Parts 3.5, 3.6, 6.1 and Schedule 3

Other References: WorkSafe Victoria Code of Practice for Plant

Various Australian Standards and WorkSafe guidance material

A safe work method statement (SWMS) must be completed for any work where there is any movement of powered mobile plant.

All operators must be trained and hold appropriate certification or licence – see overleaf for common construction site plant types and relevant licenses for "high risk work" or certificates of competency for certain plant operations.

- **A log book (or similar) is to be in place to allow recording of daily pre-start (or before use) checks.**
- **Any damage or fault is to be reported immediately.**
- **All warning devices must be checked and operating – warning light and reversing beeper as a minimum.**
- **Faulty or damaged plant must be isolated and Danger Tags used.**
- **A pre-start check should be carried out when taking over from another operator.**
- **Clean mud etc from footwear when climbing into plant.**
- **Always read the manufacturer's operating instructions.**
- **Before operating plant check all underground and overhead services are identified.**
- **Don't drive or operate plant close to the edge of any trench or excavation.**
- **Wear a seat belt if fitted.**
- **Wear appropriate Personal Protective Equipment: eg; hearing protection, safety footwear.**
- **Other persons working in the vicinity of plant are to wear high visibility clothing or PPE.**
- **Be aware of people, plant and equipment in the area.**
- **Don't reverse unless there is a clear view or someone directing.**
- **Keep travel speed slow enough to maintain control at all times.**
- **Never leave plant running and unattended. Remove keys when not in use.**
- **Always leave plant parked in a safe location, easily seen and secured, particularly when left overnight.**
- **Do not move plant unless authorised; always exercise caution when doing so. Identified tracks, roads and access areas must be used.**
- **For mobile plant operations on or near water see Guide 29.**

Licensing – High Risk Work (OHS Regulations 2007 Part 3.6 and Schedule 3)

Dogmen and Riggers
Workers who need to exercise judgement to sling loads or who direct crane movement from outside the crane operator's full view (such as with whistle signals or radio) need a dogging (class **DG**) certificate or rigging certificate. Rigging certificates are now issued in 3 classes:

- **Basic** (class **RB**) covers steel erection, setting up of winches and barrow hoists etc,
- **Intermediate** (class **RI**) covers basic rigging work and rigging of tilt-up panels, demolition rigging, rigging of cranes and the control of multi-crane lifts, and
- **Advanced** (class **RA**) all types of rigging.

Note: Although crane chaser certificates are no longer issued, workers who still hold these certificates can sling loads and direct crane movement while within full view of the operator.

Crane Operators
The cranes listed here are the types generally encountered on construction sites and operators need to have the appropriate certificate of competency:

- Vehicle loading cranes of 10 metre/tonnes capacity or more, (class **CV** or any slewing mobile crane class),
- Non-slewing mobile cranes greater than 3 tonnes capacity (class **CN** or any slewing mobile crane class),
- Slewing mobile cranes
  - ◊ Class C2 - up to 20 tonnes,
  - ◊ Class C6 - up to 60 tonnes,
  - ◊ Class C1 - up to 100 tonnes and
  - ◊ Class C0 - any capacity
- Tower cranes (Class **CT**)

Note: Operators of other types of vehicle loading cranes must be competent and be able to demonstrate they have received instruction or training in the operation and safe use of the crane.

Forklift Operators
The operation of any size of standard forklift requires the operator to hold a certificate of competency class **LF**.

Load-all or Tele-handler Operators
This type of equipment is not classified as a forklift, rather as multi-purpose, non-slewing, telescopic boom crane able to be used with several different types of boom attachments. Operators are required to hold a certificate of competency for a mobile crane (class **CN** or any slewing mobile crane class).

Scaffolders
A scaffolding certificate of the appropriate class is needed to erect, alter or dismantle any scaffold from which a person or object could fall 4 metres from the working platform. Scaffolding certificates are now issued in 3 classes:

- **Basic** (class **SB**) covers prefabricated scaffolds and barrow hoist,
- **Intermediate** (class **SI**) covers basic scaffolding and tube-and-coupler scaffolds,
- **Advanced** (class **SA**) all types of scaffolds.

Note: Uncertificated scaffolders can undertake scaffolding work provided they are directly supervised by a certificated scaffolder of the appropriate class.

Mobile Concrete Placing Boom Operators
The operator of mobile concrete pump fitted with a concrete placing boom is required to have a certificate of competency class **PB**.

Hoist and Elevating Work platform Operators
Operators are required to hold a certificate of competency for:

- Barrow hoists (class **HM** or **HP**),
- Personnel & materials hoists (class **HP**).

Elevating Work Platform Operators
Only operators of boom-type elevating work platforms where the boom length is 11 metres or more are required to hold a certificate of competency (class **WP**)

Note: Operators of all other types of EWPs must be competent and be able to demonstrate they have received instruction or training in operation and safe use of the EWP.

Earthmoving Equipment Operators
WorkSafe no longer issues certificates of competency for earthmoving equipment operation (although NSW and Queensland authorities continue to). A nationally uniform qualification system is now administered in Victoria by WorkSafe-recognised training providers. Operators should have qualification cards for:

- Front-end loader/backhoe (class **LB**),
- Front-end loader (class **LL**),
- Skid steer loader (class **LS**),
- Excavator (class **LE**),
- Dragline (class **LD**)
- Bull dozer (class **LZ**).

Alternatively, employers need to be able to demonstrate how they have deemed an operator to be competent to operate the machine.

PLANT
(Earthmoving Equipment Used as a Crane)

23b

Civil Construction Safety Guide

Legal Reference: OHS Regulations 2007, Parts 3.5, (incl 3.5.40), 3.6, 6.1 and Schedule 3

Other References: WorkSafe Victoria Code of Practice for Plant

Australian Standards 1418.8 and 4722, and WorkSafe Guidance Note - Earthmoving equipment used as a crane: May 2010

Powered earthmoving equipment is often used on construction sites to perform work in a similar manner to a mobile crane.

The following rules apply when determining whether a particular item of earthmoving equipment is suitable for lifting a freely suspended load, and to be in addition to those items contained in Guides 15 and 23a:

- **Loads to be lifted, the weight of the loads and the load radius must be within the rated capacity (WLL) of the plant and consistent with any instructions, information, conditions or restrictions provided by the manufacturer.**
- **The manufacturer's operation and maintenance manual is to be available with the earthmoving equipment.**
- **A single capacity load chart including the following information is to be mounted inside the operator's cabin:**
  - **The manufacturer's name;**
  - **Date of manufacture;**
  - **Plant model identification and serial number;**
  - **The location of lifting points, and their corresponding rated capacity, and**
  - **The rated capacity or working load limit (WLL) of the plant corresponding to the position of each lifting point, and boom configuration.**

    NOTE: Variable lift load charts should not be available within machines unless the machine is fitted with additional limiting and indicating devices i.e. radius indicators, slope indicators, level indicators etc.
- **The working load limit (WLL) must be marked on the boom of the machine. This is important because booms on earthmoving equipment are sometimes interchanged and capacities may vary. (Note: The WLL is equal to the sum of the weight of the lifted load and the lifting attachments. In order to determine the weight of the freely suspended load, the weight of the lifting attachments must be deducted from the WLL).**
- **Each lifting point must form a closed eye. Lifting points may be a lug located on the boom, arm, bucket or linkage, or a quick hitch frame as specified and rated by the manufacturer.**
- **Ensure that lifting slings cannot become detached from the lifting point or load, and that slings will hang clear of the boom, or boom attachment.**
- **Loads are not to be suspended from bucket teeth or adaptors.**

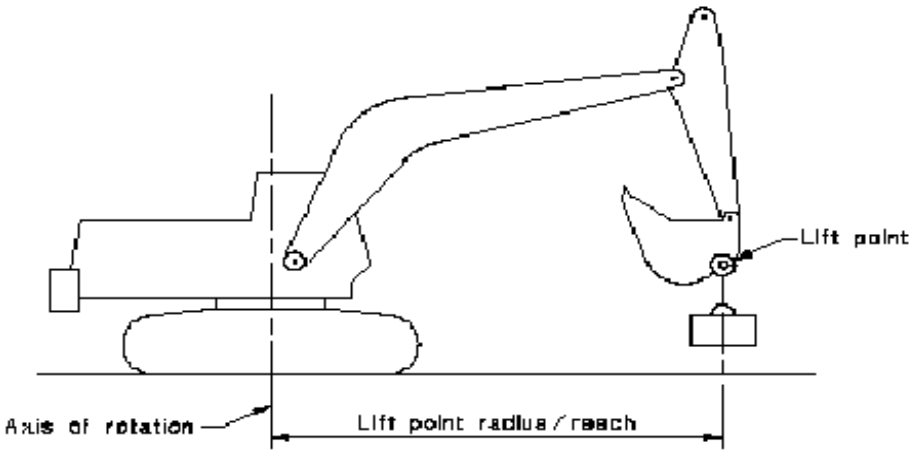
PLANT
(Earthmoving Equipment Used as a Crane)

Hose Burst Protection Valves:

- **For plant with a rated capacity greater than 1 tonne, hydraulic cylinders supporting the booms and lifting attachment are to be fitted with controlled lowering devices (commonly referred to as "hose burst protection valve" or "burst protection") where necessary to ensure that the load will remain supported in the event of hydraulic hose failure. (The rated capacity was reduced from 3 tonne to 1 tonne in 2008.)**
- **Valves are to meet the requirements of AS 1418.8 Sect 5.4.3.**

Quick Hitches:

- **Quick hitches must have independent latching devices that are:**
  - **positively and mechanically locked in an engaged position, and**
  - **must be intentionally disengaged for the attachment to be uncoupled.**
- **Quick hitches should only be used to support attachments for which they have been specifically designed and must be maintained in proper working order. They should be marked with the model and serial number, manufacturer's name, quick hitch weight, and maximum rated capacity, as well as the capacity of each lifting point.**



Example of an excavator operating in a crane configuration

- **As a general rule, earthmoving equipment is less suitable than most common types of cranes for precision lifting and placement applications. Precision lifting and placement requires the plant to operate at creep speed (inching), and to support the load without drift while connections are being made.**
- **The inherent 'hydraulic drift' characteristics, and the absence of an integral winch and hoisting rope, rules out the use of earthmoving equipment for precision lifting and placement.**

PLANT (Maintenance)

23c

Civil Construction Safety Guide

Legal Reference: OHS Regulations 2007, Part 3.5

Other References: WorkSafe Victoria Code of Practice for Plant

Various Australian Standards and WorkSafe guidance material

- **Maintenance details should be recorded for all items of plant.**
- **Don't repair or service any plant unless properly trained.**
- **Don't carry out temporary, patch up repairs.**
- **Check that regular maintenance has been carried out before operating.**
- **Before maintenance, isolate, release the hydraulic pressure, lock out and chock.**
- **Tag out and report any faults or problems.**
- **When leaving plant, isolate controls and remove keys.**
- **Watch out for hot lubricants, components and parts when carrying out maintenance.**
- **If an oil or hydraulic fluid spill etc immediate action must be taken to control and dispose of the waste.**

PLANT (Working Near)

- **High visibility jackets, shirts or vests must be worn at all times.**
- **Retro-reflective outer wear must be worn at night or in poor light conditions.**
- **Hard hats must be worn where plant is used for lifting.**
- **Stand well clear of revolving, reversing, swinging or turning plant.**
- **Be aware of sounds, plant, warning devices of reversing vehicles, buzzers etc.**
- **Know the work operations, the direction plant and vehicles will be coming and going.**
- **Watch the operator when moving into an area, make and maintain eye contact.**
- **Follow all operator instructions.**
- **If working in an enclosed area, there must be adequate ventilation - exhaust fumes can kill.**

PLANT (Powered Small Plant)

23e

Civil Construction Safety Guide

Legal Reference: OHS Act 2004

Other References: Various Australian Standards and WorkSafe guidance material

Be aware of hazards such as nip/shear points, vibration, noise, electrical, manual handling and overuse injury.

- **Check for any defects thoroughly before use - faulty guarding etc.**
- **All guarding must be in place, secured and cut off/braking systems operating.**
- **Don't repair or service any plant unless properly trained.**
- **Don't carry out temporary, patch up repairs.**
- **All controls must be operating properly and easily accessible.**
- **Emergency controls must be properly maintained, easily accessible and clearly marked.**
- **Tag out and report any faults or problems.**
- **When leaving plant, isolate controls.**
- **Before starting, clear the area of all hazards.**

- **Check all electrical connections and that plant is filled with oil, fuel etc before starting.**
- **If an oil or hydraulic fluid spill etc immediate action must be taken to control and dispose of the waste.**
- **The public, other workers and animals must be protected by barricades, screens etc.**
- **Don't lift or try to move heavy plant - get help or use a lifting device.**
- **Wear all appropriate PPE (see Guide 22).**
- **Cables, hoses etc must be placed to avoid damage or becoming a tripping hazard.**
- **Stand out of the line of any blade, chain, pulley etc when in use.**
- **When refuelling, turn the engine off, ensure there are no flammable materials nearby, no naked flames, smoking, sparking etc, and that adequate ventilation exists.**

Planning the work must include:

- **The method of pumping concrete and the capacity of equipment used**
- **Placing the pump as close as possible to the work, but allowing for safe access and egress**

- **Don't locate pumping operations on or near unstable ground, trenches or excavations.**
- **Use outriggers and place on solid surfaces, clear of trenches etc.**
- **Be aware of the location of power lines - windy conditions can cause power lines to swing.**
- **Screens must be used to protect the public from splashing etc.**
- **Fumes and exhaust gases must be controlled so as to not constitute a hazard.**
- **Traffic must be controlled and adequate street access/egress allowed for emergencies.**
- **Pedestrian access (unauthorised persons) must be controlled.**
- **Vehicle log books should be on site (with the vehicle).**
- **Appropriate personal protective equipment and clothing should be worn (see Guide No 22).**
- **Weather conditions may require special consideration.**

Other hazards to be considered and controlled include:

- **Manual handling (see Guide No 16)**
- **Tripping and slipping hazards**
- **UV radiation and other outdoor work (see Guide No 20)**
- **Noise (see Guide No 18)**

PUBLIC SAFETY

Legal Reference:	**OHS Act 2004**
	Road Management Act 2004
	Common Law
Other References:	**National Standard for Construction Work**
	Various WorkSafe guidance material and Australian/New Zealand Standards

The safety of the public is paramount on all construction sites. The OHS Act 2004 (Sections 2 and 23) provide for the safety of persons other than employees, particularly visitors and the public in general. The Road Management Act provides for safety of road users and pedestrians, as well as those who work on roads or in road reserves.

Methods of ensuring public safety are:

- **Adequate fencing around major construction sites**
- **A requirement for visitors to report to the site office before entering a hazard zone, and provisions to avoid unauthorised entry**
- **Appropriate signage**
- **Ensuring adequate staff are available on the site and trained in the need for public safety and appropriate methods of dealing with the public**
- **Barricades around fall and other hazards**
- **Minimising the time that excavations are left before backfilling**

When securing sites, particular attention must be given to the proximity of and likely access by children, location of bus stops, footpaths, and shopping precincts. In such cases, simple barrier mesh may not be acceptable.

Where works impinge on normal pedestrian walkways, alternate safe passage must be provided for pedestrians. This may result in the use of traffic controllers to allow pedestrians to safely access pathways on the opposite side of the road.

Safety of cyclists must also be considered.

Under common law, contractors and principal employers will be held liable for any injury to the public and loss or damage to public property.

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TOOLS & EQUIPMENT (Use of Hand Tools)

25a

Civil Construction Safety Guide

Legal Reference: OHS Act 2004

Other References: Various Australian Standards and WorkSafe guidance material

Hand Tools

- Use the correct tool, the right size and type for the job – don't improvise.
- Tools must be kept in good condition and used correctly.
- Never use attachments for extra leverage unless they are designed for that purpose.
- Cutting tools must be kept sharp and out of the way when not in use.
- Direct the sharp edge away from the body.
- Regular checks must be made for wear of jaws and pivot points.
- Never throw tools as injuries and damage can occur.
- Sharp edges or points must be stored away from areas where persons may reach into.
- Tag out any defective tools.

TOOLS & EQUIPMENT (Use of Power Tools)

Power Tools

- **Must be earthed except where double insulated – use with a Residual Current Device (RCD).**
- **Must be checked, maintained, tested and tagged by a competent person (refer Guide 7a) – do not use if out of test date.**
- **Must be used for the purpose they were designed – don't improvise.**
- **Must not be located where they can be damaged or create a hazard.**

- **Check for damage before use – switches, connections, power cables, guards, etc.**
- **Power leads must be long enough to reach the job without straining.**
- **Keep power tools dry – don't use in wet or damp conditions unless they are designed for such use.**
- **Don't leave power tools unsecured in overhead locations.**
- **Power must be disconnected before making adjustments or changing attachments.**
- **Don't repair or service any plant unless properly trained.**
- **Tag out and report any faults or problems.**

TOOLS & EQUIPMENT (Compressed Air Tools)

25c

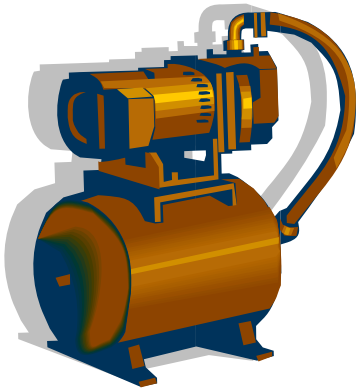
Civil Construction Safety Guide

Legal Reference: OHS Act 2004

Other References: Various Australian Standards and WorkSafe guidance material

Compressed air is capable of penetrating eyes, rupturing eardrums and entering the blood stream causing severe pain and even death.

- **Appropriate eye and hearing protection must be worn while using compressed air.**
- **Turn off the air supply – don't crimp the hose when connecting or disconnecting equipment.**
- **Check air lines and tools before use and tighten hose connections.**
- **Air hoses must be suspended above traffic height.**
- **Air hoses in traffic or pedestrian areas must be protected from damage.**
- **Check all quick release couplings to prevent separating under pressure.**
- **Safety chains must be used as provided for in manufacturers' instructions.**
- **Don't use compressed air to blow dust from clothing, skin or hair.**
- **After the job, turn off the main supply and bleed air from the system.**



TOOLS & EQUIPMENT (Explosive Power Tools)

Only trained, qualified and competent operators are to use explosive power tools.

- **Appropriate eye and hearing protection must be worn.**
- **Warning signs "EXPLOSIVE TOOLS IN USE" must be used.**
- **Loaded explosive power tools must not be left unattended and must be maintained in good condition.**
- **Explosive power tools must be examined for defects and overhauled by a competent person.**
- **When not in use, lock away with all explosive charges.**
- **Power must be disconnected before making adjustments or changing attachments.**

REMOTE AND ISOLATED WORK

Legal Reference: **OHS Act 2004**

Other References:

Remote and isolated work includes working alone without direct supervision or support: eg; working 'after hours', alone with the public, in remote areas, water treatment plants, depots etc.

- **There must be a reliable and adequate communication system to enable timely response in the event of an emergency.**
- **Regular communication must be provided and maintained.**
- **First Aid appropriate to the risk / hazards and relevant Personal Protective Equipment must be provided.**
- **Appropriate vehicle and accessories must be provided for remote and isolated worksites.**
- **Non perishable food and drinking water should be provided for remote worksites.**
- **Orientation of plant, equipment, area and hazardous substances must be carried out.**
- **Weather conditions must be monitored.**

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Civil Construction Safety Guide

Legal Reference: OHS Act 2004

Other References: National Standard for Construction Work
Various WorkSafe guidance material

Safe Work Method Statements (SWMS) and Job Safety Analyses (JSAs)

JSAs break down a task into sequential steps in order to consider hazards associated with each step, and the measures to be implemented to control the risk associated with those hazards.

SWMS are prescribed in OHS Regulation 5.1.5 and are to be completed for high risk construction work (as defined in OHS Reg 5.1.3) and are to:

a. **Identify work that is "high risk construction work"**
b. **State the hazards and risk to health & safety of that work;**
c. **Sufficiently describe measures to controls those hazards and risks; and**
d. **Describe the manner in which risk controls are to be implemented.**

- **JSAs/SWMS must be completed for all complex or high risk tasks.**
- **JSAs/SWMS are to be completed by competent persons, and should have the input of all staff on the job.**
- **JSAs/SWMS must be communicated to all staff, and should be 'signed off' by all staff involved in the job.**
- **Generic JSAs/SWMS are acceptable, as long as they consider (and then address) all hazards associated with the particular job.**
- **JSAs/SWMS must be reviewed regularly and revised if circumstances change.**

High Risk Construction Work – construction work on or involving:

- **a risk of falling more than 2 metres**
- **demolition**
- **confined space work**
- **tunnel work**
- **on or near pressurised gas distribution mains or piping**
- **on or near chemical, fuel or refrigerant lines**
- **on or adjacent to roadways or railways used by road or rail traffic**
- **an area where there are artificial extremes of temperature**
- **tilt-up or pre-cast concrete**
- **structural alterations that require temporary support to prevent collapse**
- **telecommunications towers**
- **removal or disturbance of asbestos**
- **trenching greater than 1.5 metres deep**
- **use of explosives**
- **on or near energised electrical installations or services**
- **in an area that may have a contaminated or flammable atmosphere**
- **at workplaces where there is any movement of powered mobile plant**
- **in, over, or adjacent to water or other liquids where there is a risk of drowning**
- **diving**

TRAFFIC MANAGEMENT

Legal Reference:	**OHS Regulations 2007, Parts 5.1.3 and 5.1.5**
	Road Management Act 2004, Road Safety Act 1986
	Road Safety (Traffic Management) Regulations 2009
Other References:	**Road Management Act 2004 Worksite Safety – Traffic Management Code of Practice 2010**
	Australian Standard 1742.3-2009

A safe work method statement (SWMS) must be completed for any work on or next to roads that are in use.

Persons undertaking work must have:

- **Consent to Work from the Coordinating Road Authority, obtained prior to works commencing. (Utilities and contractors performing works for utilities have exemptions for minor, low impact and emergency works.)**
- **A Traffic Management Plan (TMP) in operation and a copy on-site while workers are present.**
- **Relevant authorisation for regulatory devices (eg portable traffic lights etc)**

All traffic control devices must be erected prior to commencement of work under the supervision of competent person(s) who has/have completed VicRoads approved Traffic Management Training within the last three years.

- **The TMP (developed by a competent person) must identify hazards, assess risks, implement control measures and have provision to review the controls.**
- **Signs, bollards, lights, witches hats must be erected by a competent person and accord with the Worksite Safety – Traffic Management Code of Practice.**
- **Only trained and competent persons are to implement traffic control devices, including the use of stop/slow bats.**
- **High visibility clothing must be worn and maintained in good condition: retro-reflective vests must be worn for night work or in poor light or limited visibility.**
- **Drive or walk through the area to ensure correct distances and use of control devices.**
- **There must be adequate lighting for the work area during low light or at night to illuminate signs, traffic controllers etc.**
- **Approach signs and devices furthest from the worksite must be erected first and removed in reverse order.**
- **Signs, barricades, lights, witches hats etc must be secured at the end of the work shift.**

- **Pedestrians and vehicles must be prevented from entering trenches and excavations.**
- **Only minimal amounts of roadways and footpaths are to be closed off.**
- **Traffic delays should be kept to a minimum.**
- **Park vehicles in advance of workers.**
- **Yellow rotating warning lights should be fitted and used on all vehicles working on roads and footpaths.**

Report all incidents, damage, incorrect traffic controls, unauthorised personnel etc to site management.

Notification of completion of the works is to be provided to the Coordinating Road Authority (unless exemptions apply).

Working Near Traffic

- **All persons working near traffic should have completed approved VicRoads approved Traffic Management Training and be aware of the contents of the traffic management plan.**
- **High visibility clothing is to be worn at all times: retro-reflective vests are to be worn at night or in poor light conditions. Vests are to be 'done up'.**
- **Know the work site and traffic flow layout.**
- **Be aware of traffic noise, warning devices, beepers, buzzers etc.**
- **Don't anticipate drivers slowing down or sighting work operations.**
- **Stand well back out of the line of travel where possible.**
- **Wear appropriate PPE and sunscreen.**
- **Don't work alone – signs and traffic controls must be in place before starting work.**
- **Only trained and competent persons are to use traffic control devices, including stop/slow bats.**

WORKING ON OR NEAR WATER

Legal Reference: **OHS Regulations 2007, Part 5.1**

Other References: **National Standard for Construction Work [NOHSC:1016(2005)]**

In accordance with OHS Regulations 5.1.3 and 5.1.5, working on or near water constitutes high risk construction work and a safe work method statement must be completed. (See Guide 27.)

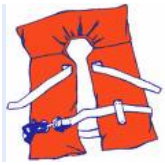
General

Before starting work over or near water, the risks must be identified and emergency plans established.

- **Don't work alone where there is a risk of an injury or drowning.**
- **Fall protection must be in place, such as harnesses, nets etc (refer Guide 10).**
- **Tool belts must be the quick release type.**
- **Rescue equipment must be provided, maintained and easily accessible.**
- **There must be prompt rescue of persons in danger of injury or drowning.**
- **Approved buoyancy vest or life jackets must be worn, depending on the risk.**
- **Training must be carried out in emergency rescue procedures and the use of rescue equipment.**
- **In poor visibility, there must be adequate lighting of the worksite.**
- **Life rings or rescue equipment must be the illuminated type and must have sufficient line to reach the water level below.**
- **Communication or appropriate provisions must be made for access to medical assistance.**
- **First aiders should have Cardio-Pulmonary Resuscitation (CPR) training.**
- **Don't play practical jokes when working over or near water.**

Work Involving Boats

- **All boats used by contractors shall be registered and equipped with appropriate levels of safety equipment (for EGW refer WI 014 checklists).**
- **All persons aboard a boat shall be appropriately trained or instructed in the duties they are required to perform.**
- **Boats must not be loaded beyond their design loading either with materials or people.**
- **Personal Floatation Devices shall be worn at all times whilst in the boat.**



All activity involving the use of boats on water requires two people to be involved. The second person can either be on the boat or an on-shore observer.

Work Involving Mobile Plant

Before starting work with powered mobile plant in or adjacent to bodies of water, the employer/operator is to:

- **Assess the stability of the work surface (creek bed, river bank or dam wall)**
- **Determine the depth of the water along the expected work area, and if it is affected by tidal flow**
- **Determine if it is safe to work from level areas, including temporary pads**
- **Devise and implement emergency procedures based on site conditions**
- **Select the most appropriate plant for the task**
- **Ensure all safety features and emergency exits on mobile plant are in working order**
- **Ensure all operators are instructed in and understand the safe system of work and emergency procedures**
- **Ensure that the safe system of work is implemented and adhered to on site**

All of the above should be recorded on the safe work method statement.

WELDING AND CUTTING

30

Civil Construction Safety Guide

Legal Reference: OHS Act 2004, Dangerous Goods (Storage and Handling) Regulations 2000

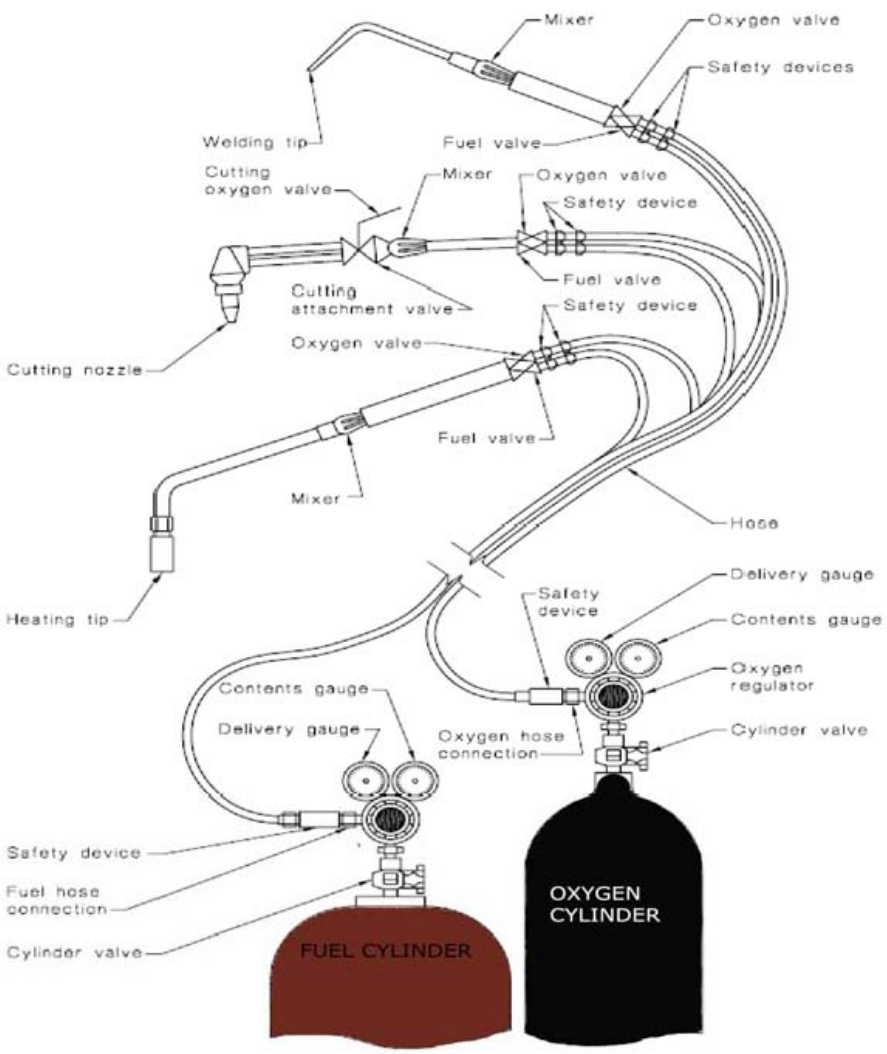
Other References: Australian/New Zealand Standards 2030, 2865, 2745

- Gas cylinders must not be used as supports, as rollers etc.
- Cylinders must be on trolleys or cradles and secured.
- Care must be taken to protect cylinders from falls, heat and from being struck.
- Personal Protective Equipment and protective clothing must be worn.
- Hearing protection must be worn if required.
- Purge hoses before igniting to make sure no gas mixture is still inside the hose.
- Check hoses and joins for leaks and deterioration regularly and thoroughly before starting the job. Use soapy water: NOT A NAKED FLAME.

- Protect others, use screens or welding curtains, particularly at heights.
- Ventilate or wear a respirator that fits inside the welding helmet.
- Regulators, valves and cylinders threads must be kept clean. Don't handle with dirty, greasy or oily hands or rags.
- Dangerous fume signs must be displayed.
- Flash arresters should be fitted to the cylinder ends of both oxygen and acetylene hoses to prevent flash back. For longer hoses (3m or longer), flash arresters should be fit at both ends.
- Maintain safe working distances from flammables.
- A suitable fire extinguisher (DCP or CO_2) must readily accessible. In certain applications, fire hose reels, fire blankets and garden hoses may also be used to extinguish fires.
- Don't store oxygen cylinders with gas cylinders, near combustibles, flammable materials, oil or grease.
- Mark completed work 'hot' with white chalk.
- Cylinders must be turned off when not in use and the hoses removed.
- Drums that once contained Dangerous Goods must not be welded or cut unless <u>ALL RISK</u> of residual vapour has been eliminated.

- **Empty cylinders must be marked 'empty' and the caps replaced.**
- **All cylinders not in use on welding trolleys are to be kept upright and secured from falling over. This also applies to empty cylinders.**

Typical oxy-fuel gas equipment



(Diagram courtesy of WorkSafe Victoria - Frequently Asked Questions About Portable Oxy-Fuel Gas Equipment)