

Industry standard

# Safe concrete cutting and drilling

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This guidance has been reviewed and updated for the sole purpose of amending year and regulation references relating to the Occupational Health and Safety Regulations, in line with amendments which came into effect on 18 June 2017.

# 1. Introduction

## 1.1 Purpose

Under the *Occupational Health and Safety Act 2004* (the OHS Act) employers have a general duty to ensure the health and safety of employees at work. Employers involved in construction work also have specific duties under the Part 5.1 of the Occupational Health and Safety Regulations 2017 (the Regulations) to control any risk associated with construction work as far as reasonably practicable.

This Industry Standard provides practical guidance for concrete cutting and drilling, to eliminate or reduce the risk to the health and safety of employees, contractors, self-employed people and the public.

## 1.2 Scope

This Industry Standard applies to concrete cutting and drilling, and the specialised equipment used to carry out this work.

It covers:

- chasing
- core drilling
- concrete slab cutting
- concrete wall cutting
- concrete pipe cutting
- asphalt cutting
- safety grooving and texturing.

The Industry Standard does not cover:

- angle grinding
- brick cutting
- discs or cutting equipment designed to be used dry.

## 1.3 What is the status of this Industry Standard?

The guidance in this Industry Standard should be followed. An alternative method may be followed if it achieves an equivalent or better level of health and safety.

Where this Industry Standard reflects the OHS Act or the Regulations, the word 'must' is used. In such cases, the guidance is prescriptive and must be followed.

All work should be consistent with the following Australian Standards:

- AS/NZS 1269.3, *Occupational noise management – Hearing protector program*
- AS /NZS 1715, *Selection, use and maintenance of respiratory protective devices*
- AS /NZS 3012, *Electrical Installations – Construction and demolition sites*

These documents, and other relevant Australian Standards, provide detailed technical guidance.

Where conflict arises between a provision of this Industry Standard and a technical provision of the Australian Standard, the Australian Standard provision should be followed. However, where the guidance in this Industry Standard reflects a legal requirement in Victoria, this Industry Standard must be followed.

See References for a list of relevant Australian Standards and other guidance information.

# 2. Planning and preparation

## 2.1 General duties

The Regulations place duties on employers to control any risks associated with construction work, including concrete cutting and drilling.

Certain concrete cutting and drilling may involve high-risk construction work, so a safe work method statement must be prepared and followed (see Section 2.2).

All risk controls must be reviewed regularly and be adapted to take account of any changes at the workplace.

Self-employed people must comply with the Regulations in the same way as employers and must make sure their work does not expose people to health and safety risks.

For further information see the WorkSafe publication, *Controlling OHS hazards and risks – A handbook for workplaces*.

## 2.2 Developing safe procedures

Before any concrete cutting or drilling starts on site, appropriate planning and preparation are necessary to ensure the work can be done safely. Planning and coordination must involve consultation with those engaged in the work and any health and safety representatives (HSRs)<sup>1</sup>.

A safe work method statement (SWMS) should be prepared. It sets out how the work should be done safely at a particular site. If high-risk work is being done, an SWMS must be prepared before work can start.

High-risk work is construction work involving (but not limited to):

- a risk of a person falling more than two metres
- demolition
- the removal or likely disturbance of asbestos
- structural alterations where some sort of temporary support will be used to prevent the structure from collapsing
- tilt-up or precast concrete
- confined spaces
- tunnels
- a trench or shaft deeper than 1.5 metres

- work on or near pressurised gas distribution mains or piping
- work on or near chemical, fuel or refrigerant lines
- work on or near electrical installations or services
- areas that may have a contaminated or flammable atmosphere
- work on or next to roads or railways that are in use
- workplaces where there is any movement of powered mobile plant
- areas where there are artificial extremes of temperature
- work in, over or near water or other liquids if there is a risk that someone may drown.

As well as covering the risks involved in cutting and drilling, an SWMS should also take account of issues such as weather conditions, access to the work site, barricades and warning signs, and the safe removal of any cut pieces or cores.

All concrete cutting or coring should be done in accordance with the principal contractor's permits and procedures where applicable.

WorkSafe's publication, *Working safely in the general construction industry* provides specific advice about how to comply with the Regulations.

See Appendix 1 for a sample SWMS.

<sup>1</sup> For further information, see the WorkSafe Victoria publication *Employee representation*.

## 2. Planning and preparation

### 2.3 How to control risks

Work through the following list, in order, to control any risks<sup>2</sup>.

1. Wherever it is reasonably practicable, the employer must eliminate any risks to health and safety arising from construction work.
2. If it is not reasonably practicable to eliminate a risk, the risk must be reduced so far as is reasonably practicable by using one of the following control measures (or two or three of them in combination):
  - substituting the hazard with a safer activity, procedure, plant, process or substance
  - using engineering controls, such as mechanical or electrical devices
  - isolating the hazard from people, such as barricading, fencing or guardrailing.
3. If there is still any risk, administrative controls must be used to reduce the risk so far as is reasonably practicable.
4. If there is still any risk, suitable personal protective equipment (PPE), such as safety helmets, protective clothing and sunscreen, must be used to control the risk.

### 2.4 Personal protective equipment

Personal protective equipment (PPE) should be provided for all workers who are cutting and drilling concrete. All PPE should be consistent with the relevant Australian Standards. Workers should also be instructed in how to use the PPE correctly.

Using PPE should, however, be the last step in controlling risks involved in concrete cutting and drilling. Employers must ensure they have taken action to reduce the risks so far as is reasonably practicable before using PPE (see WorkSafe's publication, *Controlling OHS hazards and risks – A handbook for workplaces* for more information).

The following PPE should be provided, where necessary:

- safety helmets
- hearing protection
- safety goggles
- face shields
- safety clothing, including safety boots, aprons, gloves and reflective vests
- respirators.

Operators working outside should also be provided with sunscreen and should wear hats, eye protection, long sleeve shirts and trousers.

Employers must ensure all PPE is maintained in good condition, regularly inspected and replaced when necessary.

### 2.5 Training and instruction

Employers have a duty to ensure all workers receive the instruction, training and supervision they need to do their work safely.

Employers must also ensure their employees have completed:

- construction induction training (such as a construction induction card or equivalent)
- a site-specific induction
- training on the safe use of plant, including concrete cutting and drilling equipment
- training on how to work in accordance with any SWMS developed for a task
- training on how to eliminate or control specific hazards and risks involved in the work that are not covered by an SWMS (eg manual handling and UV-protection).

### 2.6 Supplying hire equipment

Anyone who supplies concrete cutting and drilling equipment for hire or lease must regularly inspect and maintain it to ensure it can be used safely. Records of all inspections and maintenance work must be kept.

Suppliers must also provide information about the equipment to enable it to be used safely (eg operator's manual) and should help the person hiring the equipment to understand any risks involved in using it. For example, the supplier should provide a quick safety demonstration covering start-up, operation and shut-down procedures.

<sup>2</sup> This process should be used to control any risks that are not covered by specific duties in other parts of the Regulations (eg traffic management and sun exposure). For how to control risks arising from hazards such as manual handling, noise, falls, confined spaces, plant and machinery, hazardous substances, asbestos and lead, see those sections of the Regulations.

# 3. Specific hazards

## 3.1 Inverted cutting

Inverted cutting involves cutting the underside of a slab, floor or overhang. In most cases, it should be possible to make the cut from on top of the slab, without the need for inverted cutting.

If this type of work has to be done, it should only be performed by appropriately trained people. A hand-held saw should never be used for inverted cutting because the operator has little control of a cutting machine held above shoulder height.

### Control the risk

- Attach a track-mounted wall saw to guide tracks bolted to the slab.
- Never use electric powered water-cooled saws for inverted cutting unless it is specifically designed for the purpose. If the saw is turned upside down, water can flood into the motor and cause the electricity to earth through the operator.

## 3.2 Dust and gases

Concrete cutting and drilling can generate large amounts of dust, including respirable silica dust that can cause silicosis (a serious respiratory illness) if inhaled. Dry cutting and drilling is also unsafe as it can cause the blade to heat up and crack becoming a potential projectile.

Toxic exhaust fumes from equipment powered by internal combustion engines, including hydraulic power packs, can quickly reach dangerous levels when operated in enclosed or poorly ventilated areas. These engines can also rapidly consume the oxygen in the air. The Regulations place specific duties on employers to identify and control any risks associated with work in confined spaces. See WorkSafe's publication, *Confined spaces Compliance Code* for more information.

### Control the risk

- Where possible, use concrete and drilling equipment that is fitted with extraction devices to eliminate dust production at the source.
- Use wet methods to minimise dust production and ensure enough water or coolant is supplied.
- Remove slurry before it dries to prevent the dried material from generating dust that can be spread to other areas of the site.
- If it isn't practicable to use water suppression or dust extraction equipment, liquid nitrogen (eg in furnaces) or dry ice (eg in cool rooms) may be appropriate.
- Consider using slower cutting and drilling equipment which produces less dust.
- Provide extractor fans in confined spaces or poorly ventilated areas.
- Use respiratory protection in accordance with AS/NZS 1715, *Selection, use and maintenance of respiratory protective devices* to prevent inhalation of dust and toxic substances. Appropriate respirators should be selected taking into account the work to be carried out. Additional ventilation should also be provided.
- Use hydraulic, pneumatic or electric powered saws and drills, rather than petrol-driven equipment in confined spaces.
- If chemicals or other hazardous substances are used as aids in cutting or drilling operations, make sure they are used in accordance with information supplied by the manufacturer on the material safety data sheet (MSDS).
- If possible, workers should change out of their work clothes at the site to prevent the spread of silica dust.

## 3.3 Noise

Excessive noise from concrete cutting and drilling can damage an operator's hearing and the hearing of other people in the vicinity. Hearing damage can result from very loud noise over a relatively short period or by exposure to a lower level of noise over a longer period. During normal use, concrete cutting and drilling equipment create excessive noise levels for the operator and others nearby.

The Regulations require employers to ensure workers are not exposed to noise that exceeds the exposure standard. See WorkSafe's *Guide for assessing and fixing noise problems at work* for more information.

## 3. Specific hazards

### Control the risk

- Obtain information on the noise output of different models from manufacturers and suppliers before purchasing or hiring equipment.
- Assess the suitability of using noise-reduced saw blades for a particular job.
- Select the quietest suitable model and blade available.
- Keep people not directly involved in cutting or drilling away from excessive noise areas.
- Where practicable, erect temporary acoustic barriers around cutting and drilling areas to further reduce the spread of noise.
- Provide training and instruction about the effects of excessive noise on hearing, noise control measures and the proper use and maintenance of hearing protectors.
- Provide operators and nearby workers who need to be in excessive noise areas with hearing protectors selected in accordance with AS/NZS 1269,3, *Occupational noise management – Hearing protector program* and ensure the hearing protectors comply with AS/NZS 1270, *Acoustics – Hearing protectors*.

### 3.4 Vibration

Vibration transmitted from cutting and drilling equipment can cause damage to the spine and the peripheral nervous and vascular systems. Operators may also suffer from fatigue, headaches and gastrointestinal problems.

Hand and arm vibration can lead to Raynaud's Disease (or white finger), resulting in the loss of the sense of touch, heat, numbness and loss of grip strength. Other effects can include damage to tendons, bones and joints in the hands, wrists, arms, elbows and shoulders, and carpal tunnel syndrome.

### Control the risk

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

- Provide gloves that allow equipment to be gripped more effectively (note that some industrial gloves are unsuitable and can actually make gripping more difficult). Gloves also help to keep the hands warm, increasing blood flow to the fingers. Gloves, however, have a minimal effect on vibration exposure.
- Where practicable, use concrete cutting or drilling equipment rather than hand-held jackhammers.
- If hand-held jack hammers need to be used, make sure they are used as little as possible and for no more than 30 minutes a day.

### 3.5 Hazardous manual handling

Concrete cutting and drilling involves a range of hazardous manual handling tasks that can cause injury. Lifting and operating equipment that typically weighs up to 30kg can result in sprains and strains, including back injuries. Operators are also at risk if they are required to hold a saw in the same awkward position for an extended period. Slips and trips while handling equipment or materials are common causes of injury. Serious injuries can also be caused by sudden violent reactions by a saw (kick-back, pushback or pull-in) when the blade strikes a hidden obstruction or resistance or is pinched or jams in the cut.

The Regulations place specific duties on employers to identify and control any risks associated with hazardous manual handling.

### Control the risk

- Suspend or support cutting and drilling equipment in a frame to reduce the forces and to avoid the need for awkward and static working positions.
- Select lighter equipment, such as smaller diameter blades, where possible.
- Reduce the range of movement of the equipment to minimise the effect or forces needed to guide or control it.
- Ensure operators receive appropriate training in safe systems of work for handling the equipment and materials involved.
- Avoid kick-back, push-back and pull-in situations by pre-checking blades and other saw components for wear and tear, assessing materials to be cut, locating hidden steel reinforcing and other obstructions, and avoiding hazardous cutting situations.
- Provide gloves that allow equipment to be gripped more effectively.

## 3. Specific hazards

### 3.6 Working at heights

Using concrete cutting and drilling equipment at height is dangerous. Heavy equipment cannot be used safely on an unstable platform and portable equipment should never be used while standing on a ladder.

The Regulations place specific duties on employers for any work where there is a risk of falling from a height of over two metres. See WorkSafe's Compliance Code *Prevention of falls in general construction* for more information.

#### Control the risk

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

### 3.7 Electricity

There is a risk of electrocution if extension leads, plugs and electric powered tools are used around water. Electrocution can occur if hand-held equipment is inverted when drilling. Specialist three-phase equipment is available that can be used for wet cutting.

Any damaged equipment that could involve an electrical risk must be replaced or repaired. Employers must also have appropriate work systems to prevent inadvertent energising of equipment that has been isolated but not physically disconnected from the electrical supply (eg lockable covers over safety switches could be installed).

All concrete cutting and drilling operations must comply with AS/NZS 3012, *Electrical installations – construction and demolition sites*.

#### Control the risk

- Never use electrical cutting or drilling equipment for inverted cutting unless it is specifically designed for the purpose.
- Remove pooled water (such as coolant water used in concrete or masonry cutting and drilling) with a wet and dry vacuum cleaner before any electrical equipment is used in the area.
- Keep extension leads, plugs and electric powered tools away from dry cutting equipment or drilling water or slurry that cannot be easily removed.
- Never use electric equipment for wet cutting unless it is specifically designed for the purpose – use hydraulic, pneumatic or petrol engine powered equipment instead.
- Map out the location of existing electrical or other services (eg gas, water and sewerage) before work begins.
- Use a power supply fitted with residual current devices (RCDs) for portable electrical equipment to protect against earth leakage shock. Test portable RCDs regularly to ensure they are working properly.
- Inspect and tag all electrical equipment used for cutting or drilling operations.
- Suspend cords and extension leads above head height on stands, and use waterproof connectors where there is water.

### 3.8 Damage to structures

Operators and others can be at serious risk if stressed components or components that affect the integrity of a building are damaged during cutting or drilling.

#### Control the risk

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



## 3. Specific hazards

### 3.9 Damage to services

All precautions must be taken to avoid cutting through gas, electricity or water services at the worksite. In addition to the risk of personal injury, the financial and social costs of damaging underground services can be extremely high.

See WorkSafe's *Guide for undertaking work near underground assets* for more information.

#### Control the risk

- Locate and mark all services during initial safety planning using the 'Dial 1100 before you dig' service or by contacting the local government authority.
- Consult the original drawings of the services and conduct a search for any 'as constructed' drawings in case there has been a change of location of services during installation (eg services located in floors, walls and cavities).
- If the services have been moved, use specialist equipment (eg a cable locator) to accurately determine where the services are now located prior to any cuts being made.
- Disconnect any services that need to be cut through.
- Ensure disconnections are confirmed and tagged by the relevant service personnel before the work begins.
- After the work has finished the service personnel should reconnect the service and, if safe, remove the tags.

### 3.10 Loss of vacuum pressure

Operators using a vacuum assembly to anchor a core drill stand to a surface risk being injured if the vacuum pump fills with slurry. This can cause loss of vacuum and can result in the drill stand breaking free and rotating round the drill.

#### Control the risk

- Use bolt down stands where practicable.
- If a vacuum attachment must be used, ensure the surface to be cut is able to maintain an adequate vacuum.
- Monitor the equipment to ensure the vacuum pressure is maintained.
- When a vacuum system is used to secure a drill stand to concrete, the compressor should have a receiver tank to ensure the operator has time to take action (if power is cut to the compressor) before the drill loses its hold.

### 3.11 Working alone

There is a greater risk of injury when an operator is working alone because of difficulties in setting up and relocating equipment on site, the nature of the work and the absence of a back-up person in case of an emergency. If possible, work plans should be arranged so there is no need for employees to work alone.

A worker is considered alone when they cannot be seen or heard by another person and cannot expect a visit from a supervisor, another worker or a member of the public for some time.

See WorkSafe's *Working alone – identifying and assessing the risks* for more information.

#### Control the risk

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

### 3.12 Entanglement

Workers can receive horrific injuries if machinery is fitted with effective guarding. An operator's hair, beard or loose clothing can get caught in moving saw blades, drill bits and other moving parts if precautions aren't taken.

#### Control the risk

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

# 4. Working safely

Before any cutting begins, make sure you have considered:

- the specific hazards covered in Section 3
- wet concrete cutting
- refuelling
- the use of appropriate PPE (see section 2.4).

## 4.1 Sawing techniques

### Hand-held sawing

Hand-held saws are more prone to potentially fatal kick-back, push-back and pull-in movements.

Petrol-driven saws are more likely to cause a build up of hazardous fumes in enclosed spaces (eg in cold stores or low lying areas such as pits). Electrical, compressed air or hydraulically-driven saws should be used in these situations.

**Note:** Never use hand-held saws for inverted cutting (see section 3.1).

#### Preparation

- Make sure all drill areas have been scanned for electric cables.
- Check all electrical equipment has current safety tags.
- Suspend all electric cables safely above floor or ground level.
- Check all mechanical parts for loose components.
- Ensure there is a hand-hold for the operator's non-trigger hand and there are suitable grips for both right and left handed operators.
- Use a saw that is light and practicable for the type of work, to reduce the risk of strain injury.
- Ensure the blade is appropriately guarded.
- Use balanced equipment with anti-vibration hand-grips that are comfortable to use and provide sufficient support so the operator's hands aren't placed in dangerous positions near the blade or vibrate unnecessarily.
- Use correct diamond cutting blade or abrasive disc for the material being cut, as recommended by the manufacturer, so the operator does not have to force the cut (some concrete cutting blades are not designed to cut steel).

- For horizontal cutting, use a saw that is capable of cutting right-to-left as well as left-to-right without having to reposition the blade or guard.
- Ensure an automatic cut-off switch is fitted and no modifications have been made from the saw's original manufactured form.
- If pipes are to be cut, ensure that they are properly supported and chocked to prevent the pipe from moving and the saw cut from closing in on the blade.
- Set the work piece at a suitable height for cutting (approximately waist height).
- Inform others at the workplace that cutting is about to begin.
- Barricade the area with appropriate signs warning of noise and drilling.
- Ensure any person assisting the operator is positioned so they are not in any danger from sudden saw movements or ejecting material.
- Carry out fuelling with the saw turned off and well away from ignition sources such as hot exhausts.
- Check the cutting area has a clear and level working surface.
- Ensure the cutting area is well ventilated.
- Collect all slurry with a wet and dry vacuum cleaner and dispose of it safely.
- Suspend all electric cables safely above the floor or ground level.
- Ensure the operator and others stand away from the path of the blade when starting the machine and the blade is not touching any object.
- Use the handles (rather than the belt guard) to support the equipment.

#### Operation

- Mark the cut line with a waterproof crayon or permanent marker.
- When cutting, stand with one foot firmly in front of the other, with the body balanced and the back close to vertical.
- Maintain an upright posture with both feet flat on the ground.
- Don't cut above shoulder height – use a safe platform or scaffold if required.

## 4. Working safely

- When cutting horizontally across a wall, the operator's hands should be at waist level.
- Operate cutting and drilling equipment away from combustible material, fumes, wet slurry and electrically powered equipment.
- Make the first cut about 25–50mm deep to enable a straight cut.
- Use sufficient water or coolant to suppress dust and cool the blade.
- If cutting a pipe, ensure cutting always takes place in the lower quadrant of the blade.
- Don't force the machine; let the machine do the work.
- Stop work immediately if any fault in the blade or machine is detected.

### Cutting slabs on the ground and road sawing

#### Preparation

- Establish an exclusion zone around the work area.
- Place bunding around the cutting area to contain excess water and slurry.
- Secure the area to be cut.
- Pre-mark the cut line with a waterproof crayon or permanent marker pen.
- Measure the length of cut that needs to be made.
- Select the correct saw blade diameter to suit the requirements of the cut and technical conditions.
- Carry out a pre-start check in accordance with manufacturer's instructions.
- Lift the blade off the ground before starting or stopping the machine.

#### Operation

- Fit all blades with guards before starting the machine – refer to the appropriate training manual or manufacturer's guide.
- Ensure sufficient amounts of water are used while operating.
- Cut in a straight line.
- Saw only as deep as the job specifications and conditions require.
- When using concrete saws, lower the blade into the cut slowly and proceed to cut forward.
- Use consistent pressure that does not force the blade to 'climb' out of the cut.
- To avoid overworking the saw, set engine revolutions to the cutting speed recommended by the manufacturer for the material.

### Road sawing suspended slabs

#### Preparation

- Use a qualified person, such as a structural engineer, to determine the correct load bearing capacities of the slab.
- Shut off, cap or otherwise control all electric, gas, water, sewer, steam and other service lines not required at or outside the building line, before any cutting commences.
- Establish an exclusion zone around the work area.
- Place bunding around the cutting area to contain excess water and slurry.
- Secure the area to be cut.
- Pre-mark the cut line with a waterproof crayon or permanent marker pen.
- Measure the length of cut that needs to be made.
- Select the correct saw blade diameter to suit the requirements of the cut and technical conditions.
- Carry out a pre-start check in accordance with manufacturer's instructions.
- Lift the blade off the ground before starting or stopping the machine.

#### Operation

- Fit all blades with guards before starting the machine – refer to the appropriate training manual or manufacturer's guide.
- Ensure sufficient amounts of water are used while operating.
- Cut in a straight line.
- Saw only as deep as the job specifications and conditions require.
- When using concrete saws, lower the blade into the cut slowly and proceed to cut forward.
- Use consistent pressure that does not force the blade to 'climb' out of the cut.
- To avoid overworking the saw, set engine revolutions to the cutting speed recommended by the manufacturer for the material.

## 4. Working safely

### Wall sawing/track mounting

#### Preparation

- Establish a controlled method for removing waste blocks.
- Establish an exclusion zone around the work area.
- Place bunding around the cutting area to contain excess water and slurry.
- Secure the area to be cut.
- Pre-mark the cut line with a waterproof crayon or permanent marker pen.
- Measure the length of cut that needs to be made, allowing extra track length for the saw head.
- Drill bolt holes to fix tracks to the wall, using suitable drop-in steel anchors.
- Select the correct saw blade diameter to suit the requirements of the cut and technical conditions.
- Carry out a pre-start check in accordance with manufacturer's instructions.
- Check the pressure on the hydraulic gauge.

#### Operation

- Use sufficient water or coolant to suppress dust and cool the blade.
- Stand away from the path of the blade when starting the machine.
- Refer to the manufacturer's manual when determining the maximum saw blade.
- When changing to a second blade, align the blade with the previous cut before cutting again.
- To avoid overworking the saw, set engine revolutions to the cutting speed recommended by the manufacturer for the material.
- In case of an emergency, turn off the main switch on the power unit – this is the quickest way to stop the blade and the power unit.
- Use correct manual handling techniques when lifting the wall saw onto the rails (eg where practicable, use the track to move the saw head (otherwise, use team lifting)).
- Cordon off the area at the back of the wall where the blade comes out when cutting through to avoid injury to other people and damage to materials.
- Use a spotter if necessary.

- Ensure any person assisting the operator is positioned so they will not be exposed to danger from sudden saw movement, ejecting material, a dropped machine or falling off-cuts.
- Turn off the power pack and remove the saw blade before lifting the cutting head from the rails.

### Wire sawing

#### Preparation

- Obtain approval from the site supervisor.
- Mark out the cuts with a waterproof crayon or permanent marker.
- Ensure the crane or lifting device is designed for the load and the weight of the concrete block does not exceed the maximum permitted floor loading.
- Determine the cutting sequence and remove the structural components.
- Secure the danger area.
- Create drill holes for the passage of wire if necessary.

#### Operation

- Position /mount the diamond wire saw.
- Use anchoring elements appropriate for the base material to secure the wire saw and roller supports.
- When mounting the rollers supports and diverting rollers, ensure that the diverting rollers are positioned at the entry and exit points to intercept the diamond wire at the end of cutting.
- Connect the power supply.
- Round off the corners.
- Insert the diamond wire and grind in the wire manually.
- Twist the diamond wire, join the wire together and align the guide rollers.
- Install water supply and water lances.
- Secure the concrete blocks that will be cut out to ensure they cannot overturn or fall out.
- Allow the diamond wire to start up at low tension in order to avoid jamming, then increase the tension and wire speed.
- Switch off and clean the diamond wire saw and roller supports.
- Disconnect the wire and disassemble the diamond wire saw and roller supports.
- Remove the concrete blocks.
- Secure the opening.
- Dispose of the sawing slurry.

## 4. Working safely

### 4.2 Coring techniques

#### Preparation

- Ensure all drill areas have been scanned for electric cables.
- Check all electrical equipment has current safety tags.
- Suspend all electric cables safely above floor or ground level.
- Check all mechanical parts for loose components.
- Ensure the power supply is protected by a residual current device (RCD).
- Erect barricades and clear no-entry signs to areas where drilling or coring is in progress and isolate the area below drill sites on horizontal slabs with either a spotter or danger signs.

#### Operation

- Ensure holes have been marked and centres given with a waterproof crayon or permanent marker.
- Secure the core drill with anchor bolts or in accordance with the manufacturer's specifications.
- Ensure the drill machine is solidly fixed with no movement of the mast.
- Attach the drill to the mast and make sure it is secure.
- Start the drilling of all holes in low gear, stopping the motor before changing to a higher gear and operate the machine in accordance with the manufacturer's instructions.
- Feed tap pressure water into the hole to bring up slurry and keep the hole saw bit cool.
- Where possible, fill holes or fit safety covers over drilled core holes and attach warning signs if necessary.
- Remove slurry and cores to prevent slip and trip hazards.
- Never drill inverted holes using an electric drill unless the equipment is fitted with a specifically designed water collection ring – use hydraulically driven equipment as a safer alternative.

# Appendix 1

**Note:** This is a sample only. The purpose of a legislatively required Safe Work Method Statement (SWMS) is to include what has been described in the document proper regarding hazards and risk controls.

This SWMS is a site-specific statement that must be prepared before any Road Sawing is commenced.

Cutting supervisor responsible for ensuring compliance with this SWMS:		Date:	
High-risk job:	On or adjacent to roadways or railways used by road or rail traffic. On or near energised electrical installations or services. On or near pressurised gas distribution mains or piping.	Location:	
What are the tasks involved?	What are the hazards and risks?	How will hazards and risks be controlled? (describe the control measures and how they will be used)	
<b>Think about the worksite and each stage of the project, including preparation and clean-up.</b>			
1. On arrival at site	<ul style="list-style-type: none"> <li>Workers unfamiliar with site.</li> <li>UV Rays.</li> </ul>	<ul style="list-style-type: none"> <li>Each worker must have a:               <ul style="list-style-type: none"> <li>site induction</li> <li>CI card</li> <li>long sleeved high visibility shirt, safety boots, riggers gloves, safety glasses and ear plugs.</li> </ul> </li> <li>UV protection clothing, sun glasses, broad brimmed hats and 30+ sunscreen to be worn.</li> </ul>	
2. Prepare work area	<ul style="list-style-type: none"> <li>General public in vicinity.</li> <li>Slips, trips, falls.</li> <li>Working near traffic.</li> </ul>	<ul style="list-style-type: none"> <li>Isolate work zone. Erect barricading and signage.</li> <li>Inspect site and clear area of any obstructing material or debris.</li> <li>Ensure that correct signage and traffic control measures are in place in accordance with the Traffic Management Plan.</li> </ul>	
3. Unloading equipment from vans	<ul style="list-style-type: none"> <li>Manual handling.</li> </ul>	<ul style="list-style-type: none"> <li>Use ramps provided to remove saws from van.</li> <li>Use gloves when removing saw blades from vans.</li> </ul>	
3. Cutting stage (on roadway)	<ul style="list-style-type: none"> <li>Equipment poorly maintained.</li> </ul>	Petrol /diesel powered saws to be well maintained and serviceable. Check that: <ul style="list-style-type: none"> <li>Guards are fitted around pulley belts;</li> <li>Petrol /diesel driven saws are tuned and only operated outside.</li> </ul>	
	<ul style="list-style-type: none"> <li>Working near underground electrical and gas lines.</li> </ul>	<ul style="list-style-type: none"> <li>Refer to site plans for the location of underground electrical and gas services.</li> <li>If unavailable, stop work and call office.</li> </ul>	
4. Clean up operations	<ul style="list-style-type: none"> <li>Manual handling.</li> <li>Working near traffic.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that all slurry and debris is removed prior to leaving the site.</li> <li>Leave any traffic management controls in place if cutting operations are not finished.</li> </ul>	

# Definition of terms

## General definitions

AS	Australian Standard (produced by Standards Australia)
AS /NZS	Australian Standard/New Zealand Standard (a joint standard)
High-risk construction work	High-risk construction work is construction work listed in the construction part of the OHS regulations (Part 5.1). Before this work commences, a SWMS must be prepared if anyone's health or safety is at risk because of this work.
HSR	Health and safety representative
The OHS Act	<i>Occupational Health and Safety Act 2004</i>
The Regulations	Occupational Health and Safety Regulations 2017
SWMS	A safe work method statement that: <ul style="list-style-type: none"><li>• lists the type of high risk construction work being done</li><li>• states the health and safety hazards and risks arising from that work</li><li>• describes how the risks will be controlled</li><li>• describes how the risk control measures will be put in place.</li></ul>

# References

## Australian Standards

AS/NZS 1269.3, *Occupational noise management – Hearing protector program*

AS/NZS 1715, *Selection, use and maintenance of respiratory protective devices*

AS/NZS 3012, *Electrical Installations – Construction and demolition sites*

Copies of standards can be obtained from Standards Australia at **1300 654 646** or **standards.com.au**

## Legislation

*Occupational Health and Safety Act 2004*

Occupational Health and Safety Regulations 2017

View the legislation at **legislation.vic.gov.au**

Acts and regulations are available from Information Victoria at **1300 366 356** or **bookshop.vic.gov.au**

## WorkSafe publications

*Industry Standard for Concrete Cutting and Drilling – 1999*

*Confined spaces Compliance Code*

*Controlling OHS hazards and risks – A handbook for workplaces*

*Employee representation*

*Guide for assessing and fixing noise problems at work*

*Guide for undertaking work near underground assets*

*Prevention of falls in general construction compliance code*

*Working alone – Identifying and assessing the risks*

*Working safely in the general construction industry*

## Energy Safe Victoria

Phone: **(03) 9203 9700**

**esv.vic.gov.au**

## Other information

Dial Before you Dig

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**http://www.1100.com.au/**



**Note:** The information presented in the Industry Standard, *Safe concrete cutting and drilling* is intended for general use only. It should not be viewed as a definitive guide to the law and should be read in conjunction with the *Occupational Health and Safety Act 2004*.

Whilst every effort has been made to ensure the accuracy and completeness of the industry standard, the advice contained herein may not apply in every circumstance. Accordingly, WorkSafe cannot be held responsible, and extends no warranties as to the suitability of the information for your specific circumstances; or actions taken by third parties as a result of information contained in the Industry Standard, *Safe concrete cutting and drilling* was developed.

## Developing Industry Standards in partnership

Foundations for Safety Victoria is Victoria's primary forum for dealing with occupational health and safety (OHS) issues in the construction industry.

Foundations for Safety brings together regulatory agencies, construction unions and employer associations representing principle contractors and specialist trade sub-contractors.

Chaired by WorkSafe Victoria, it meets every three months to progress OHS issues relating to the construction industry. One of its initiatives is establishing working parties to develop Industry Standards that provide practical guidance to the industry on particular issues.

At the time of printing, the organisations represented on Foundations for Safety Victoria are:

- Air Conditioning and Mechanical Contractors Association
- Association of Wall and Ceiling Industries
- Australian Industry Group
- Australian Manufacturing Workers Union
- Australian Master Bricklayers Association
- Australian Workers Union
- Building Commission Victoria
- CEPU Electrical Trades Union
- CEPU Plumbing Division
- CFMEU Construction and General Division
- Civil Contractors Federation
- Energy Safe Victoria
- Engineers Australia
- Finishing Trades Association of Australia
- Housing Industry Association
- Master Builders Association of Victoria
- Master Plumbers and Mechanical Services Association of Australia

- National Electrical and Communications Association
- National Federation of Bricklayers and Masonry Employers
- Plumbing Industry Commission
- Royal Australian Institute of Architects
- Victorian Construction Safety Alliance
- Victorian Crane Association
- Victorian Employers Chamber of Commerce and Industry
- Victorian Trades Hall Council
- Victorian Volume Home Builders Safety Alliance
- WorkSafe Victoria

You can help improve health and safety in the construction industry by providing feedback on this Industry Standard or on other health and safety issues to any member organisation of Foundations for Safety Victoria.

## Acknowledgements

This Industry Standard was prepared on behalf of Foundations for Safety Victoria by a working group comprising of industry practitioners, employers, industry employer groups, unions and WorkSafe Victoria.

The working group was chaired by WorkSafe Victoria and included representatives from:

- Advanced Sawing & Drilling
- CEPU Plumbing Division
- CFMEU Construction and General Division
- Concut
- Cut & Core
- Housing Industry Association
- Salta Construction

## WorkSafe Victoria

### WorkSafe Agents

Agent contact details are all available at [worksafe.vic.gov.au/agents](http://worksafe.vic.gov.au/agents)

### Advisory Service

Phone.....(03) 9641 1444  
Toll-free.....1800 136 089  
Email.....[info@worksafe.vic.gov.au](mailto:info@worksafe.vic.gov.au)

### Head Office

222 Exhibition Street, Melbourne 3000  
Phone.....(03) 9641 1555  
Toll-free.....1800 136 089  
Website.....[worksafe.vic.gov.au](http://worksafe.vic.gov.au)

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