

CUTTING AND DRILLING **CONCRETE** AND OTHER MASONRY PRODUCTS

CODE OF PRACTICE 1997

Disclaimer

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CODE OF PRACTICE

Cutting and Drilling Concrete and other Masonry Products

gazetted 29 November 1996, commenced 1 March 1997

Foreword

This Industry Code of Practice has been produced by the WorkCover Authority of NSW to provide employers, self-employed persons and employees with practical advice on the use of saws and drills and associated equipment used in the cutting and drilling of concrete and other building structural materials during construction work.

This code has been developed by a tri-partite industry working party and has involved extensive consultation with industry and other special interest groups.

General Manager, WorkCover Authority of NSW

1. Introduction

1.1 Title

This code of practice is the *Code of practice: Cutting and drilling concrete and other masonry products*.

1.2 Purpose

This code sets out guidelines for the use of saws and drills and associated equipment used in the cutting and drilling of concrete and other building structural materials during *construction work*.

1.3 Scope

- (a) This code applies to all concrete and masonry cutting and drilling equipment and operations.
- (b) This code does not apply to work carried out in a mine within the meaning of the *Coal Mines Regulation Act 1982* or the *Mines Inspection Act 1901*.

1.4 Commencement date

This code commences on (date to be determined).

1.5 Authority

This code of practice is approved as an industry Code of Practice pursuant to *Section 44A* of the *Occupational Health and Safety Act 1983*, by the Minister for Industrial Relations on the recommendation of the WorkCover Authority of NSW.

2. Consultation

The principal contractor, the cutting and drilling contractor, self-employed persons, employers, employees and their representatives should consult with each other when observing the recommendations of the code and determining the provision of safeguards.

The consultation process should be used to determine safe systems of work based on the assessment of the risk. The designer should be involved in the consultation process when appropriate.

The consultation process should consider the following:

- type of materials
- condition of material
- nature of work

- interaction with other trades
- workplace access
- management of surrounding vehicular traffic
- public safety.

3. Planning and preparation

The first essential step in ensuring that work is done safely is to carefully plan and prepare to ensure that work is done safely. Planning and preparation should involve consultation with all those engaged in the work and include the risk assessment and control process.

3.1 Planning by *principal contractor*

The principal contractor, whether as an employer or as the person in control of the workplace, has a statutory duty imposed by the *Occupational Health and Safety Act 1983* (OHS Act). This duty is to provide and maintain, in relation to those matters over which he or she has control, a workplace that is safe and without risks to health for their employees and other persons present at the workplace or affected by the work. To fulfil these obligations the principal contractor should plan for the work to be done safely.

When planning the site layout and sequence of work the principal contractor should prepare a health and safety management plan which is based on consultation with the contractors and their employees or representatives. It should include a work method statement provided by the principal contractor describing how the work is to be done safely.

Before concrete/masonry cutting or drilling operations start, the principal contractor in consultation with the contractor doing the work should at least consider:

- (a) an assessment of the risks involved in carrying out the work (see 3.3 & 3.4).
- (b) the most appropriate methods to control any risk of injury (see section 4).
- (c) instructions for the saw/drill operator regarding any site safety requirements to be observed.
- (d) providing suitable safe access to and from the work place including the work area.
- (e) that the area of the cutting and drilling operations is clearly defined by barricades and warning signs.
- (f) that the exact location of the cut or penetration of the structure is clearly marked.
- (g) that any services such as electricity, gas, water are identified and clearly marked.
- (h) the cutting or drilling operations do not affect the structural adequacy of the building or structure.
- (i) electrical safety, including the location electrical service cables and providing systems of work which comply with the recommendations in the *Code of practice: Electrical practices for construction work*.
- (j) that all persons carrying out the work have received appropriate training and instruction. (see Section 7.)

3.2 Planning by the *contractor*

The contractor doing the work has an obligation under OHS Act to provide and maintain a workplace that is safe and without risks to health for their employees in relation to those matters over which he or she has control.

In addition to consultation with the principal contractor or builder in the overall job planning, the contractor using the cutting or drilling equipment should at least consider:

- (a) an assessment of the risk in carrying out the work.
- (b) the most appropriate methods of controlling any risk of injury.
- (c) providing a work method statement, where appropriate, describing how the work is to be done safely. This work method statement should take into account an assessment of the risk involved in carrying out the work.
- (d) providing suitable and safe access to and from the work area.
- (e) an assessment of manual handling tasks which could cause back strains and other injuries and providing systems of work which comply with the provisions of the *Occupational Health and Safety (Manual Handling) Regulation 1991*.
- (f) electrical safety, including the location electrical service cables and providing systems of work which comply with the recommendations in the *Code of practice: Electrical practices for construction work*.
- (g) the use of PPE such as safety footwear, eye protection and hearing protection (see section 6).

- (h) preventing persons entering the area where cutting or drilling operations are being carried out where there is a risk of injury.
- (I) that all persons carrying out the work are provided with the appropriate training and instruction (see Section 7.)

3.3 Risk assessment and control

A hazard identification and risk assessment process should be carried out at the planning and preparation stage by the contractor doing the work in consultation with the principal contractor to determine if persons are at risk. Safe systems should then be put in place to control the risk.

The process of risk assessment and control is made up of the following steps:

1. Identify the hazards.
2. Assess the risk(s) from the hazards.
3. Use appropriate control measures to eliminate or reduce the risk.
4. Control measures should be reviewed from time to time, as appropriate to the control measures used.

3.4 Hierarchy of control measures

Use the following hierarchy of control in order to develop each control measure:

1. Eliminate the risk. (eg discontinue the activity or not use the plant)
2. Minimise the risk by:
 - substituting the system of work or plant (with something safer)
 - modifying the system of work or plant (to make it safer)
 - isolating the hazard (eg introduce a restrictive work area)
 - introducing engineering controls (eg guarding, fencing).
3. Other controls:
 - using personal protective equipment (eg eye, respiratory and hearing protection).
 - adopting administrative controls such as hazard warning signs and specific training and work instructions.

The control measures at Level 1 give the best results and should be adopted. The measures at the lower levels are less effective and they require more frequent reviews of the hazards and systems of work. In some situations a combination of control measures may need to be used.

The control measures recommended by the contractor doing the work should be considered by the principal contractor as part of the health and safety management plan. Any new control measures should be evaluated to ensure that they are effective and safe and that no new hazards are created by them

3.5 Preparation

When preparing for the commencement of work the principal contractor and the cutting or drilling contractor should ensure that the workplace is safe based on the health and safety management plan. They should also check to ensure that all controls identified by the risk assessment have been put in place and that no new hazards exist. Preparation should also at least include:

- (a) an assessment of climatic/environmental conditions.
- (b) access to and from the workplace.
- (c) barricades and warning signs.
- (d) PPE (see section 6).
- (e) specific instructions for employees.
- (f) the cutting and drilling equipment is suitable for use and properly maintained (see section 5).

- (g) *earth leakage devices* (safety switches) protecting the user of portable electric powered tools.

4. Work systems and control measures

Control measures to prevent injury during cutting and drilling operations should be established as a part of a safe system of work.

The systems of work and control measures selected are generally determined by individual job factors discussed in consultation and other factors identified by the risk management process.

4.1 Setting-up

When setting-up a cutting or drilling operation the principal contractor and the contractor doing the work should check and ensure that:

- (a) the work area and/or work platform is safe and adequate for the proposed operation.
- (b) the exact location of the cut or penetration is clearly marked on the work area.
- (c) the blade is in good working condition and is free from cracks and deterioration.
- (d) appropriate barricading and warning signs are erected and in the position.
- (e) the work area is adequately ventilated. If the working area is a confined space, the requirements of the *Occupational Health and Safety Act (Confined Spaces) Regulation 1990* must be complied with. (See *section 4.5*).
- (f) adequate lighting (natural or artificial) is provided at the work area.
- (g) specific hazards have been identified and appropriate safe systems of work are in place. Some examples of specific hazards are asbestos cutting or Raynauds phenomenon (occupational vibration or white finger syndrome).
- (h) a method of collecting residue from the cutting or drilling operations should be put in place in order to prevent surfaces becoming a slip hazard. All necessary precautions should be taken to prevent wash down residue flowing into stormwater drains. Disposal of residue should also be in accordance with the current Environment Protection Authority requirements.

4.2 Road, wall and portable hand held saws

The contractor doing the work should ensure at least the following:

- (a) Before cutting check that:
 - the blade speed matches the drive speed, as specified and recommended by the manufacturer.
 - the shaft and flanges are clean and not damaged.
 - the blade fits securely over the shaft.
 - the shaft nut is securely tightened against the outside flange.
 - the drive belt is at the correct tension.
 - adequate coolant/water is available and used for wet cutting.
 - persons in the area are not at risk from the cutting operation, in particular the area in the path of the blade.
- (b) During cutting operations
 - the blade guard should be in the lowered position.
 - it is essential the operator stand outside the path of the blade when starting the machine.
 - if the machine stalls during cutting operations, raise the blade and check the outside flange and nut for tightness.
 - when resuming, ensure the blade is in alignment with the previous cut.
 - two operators should be used to carry out hydraulic and compressed air wall sawing in situations where the power pack is not easily accessible or the machine is not remotely controlled at the working head.
 - use coolant/water to suppress dust at the point of generation. Failure to use coolant/water could create high levels of airborne dust that contains crystalline silica in concentrations considered to be a significant health hazard. Further information on this matter is contained in the WorkCover publication *How to prevent silicosis*.
 - the appropriate PPE is provided and used.

- when cutting through floors or walls ensure the area behind the cut is barricaded to prevent persons entering that area. Post signs clearly stating “concrete cutting operations in progress”.
- electrical power to be sourced from a power outlet that is protected by an *earth leakage device* (safety switch).
- safe operation procedures should be in place when hand held saws are operated in confined areas. (see section 4.5)
- use work practices that minimise “kick backs” when using portable hand held saws.
- ensure that portable hand held saws:
 - are only used at or below shoulder height
 - are only used with blade rotating in the opposite direction to the cut
 - are not recommended for inverted sawing.

4.3 Core drilling

The contractor doing the work should ensure at least the following;

- (a) close fitting clothing should be worn when operating a core drilling machine.
- (b) the drill is securely fastened to the work surface.
- (c) the area below or behind the drilling operations is barricaded to prevent persons gaining access during drilling. Post signs clearly stating “drilling operations in progress”.
- (d) electrical power is sourced from a power outlet that is protected by an *earth leakage device* (safety switch).
- (e) the appropriate PPE is provided and used.
- (f) a supply of clean water is always available.
- (g) that a drill stand is used to do inverted drilling.
- (h) that hydraulic air or flexible drive units are used for inverted drilling.
- (i) that drills used for hand held drilling are fitted with a clutch.
- (j) coolant/water is used to suppress dust at the point of generation.

4.4 Public safety

If cutting or drilling operations are to be carried out on a roadway or public place where the public may be at risk the contractor doing the work should ensure at least following:

- (a) compliance with relevant local government requirements such as road or footpath closure.
- (b) barricades or screens are positioned and maintained at a distance from the work to avoid injury to pedestrians and collision by vehicles.
- (c) warning signs are displayed including the lighting of signs where necessary.
- (d) provide adequate lighting (natural or artificial) to ensure the work areas and access ways are well lit. If artificial lighting is used, ensure it does not create excessive glare or shadows.
- (e) that wheelchair access past the operations is available at all times. (The slope of an access ramp should not exceed 1 in 8, where the ramp is less than 3m in length or 1 in 14 for longer ramps).

4.5 Fumes

Where internal combustion engines are used for any purpose in an enclosed or confined area, the contractor doing the work should ensure that adequate ventilation is used to prevent the build up of gases.

The *Occupational Health and Safety Act (Confined Spaces) Regulation 1990* prohibits the use of internal combustion engines in confined spaces. The exhaust fumes from the engine are very poisonous, and rapidly reach dangerous levels. The engine can also very quickly eat up the oxygen in the air.

Although the build-up of gases can be reduced by fitting a catalytic converter or scrubber to the exhaust system of each internal combustion engine, this is not a solution to the use of internal combustion engines in unventilated areas. Please note that catalytic converters only operate when the engine is under load and not when idling.

Extractor fans or appropriate respiratory protective equipment should be provided and used when cutting or drilling in any confined or poorly ventilated areas. The only respirators suitable to confined spaces are airline respirators or self contained breathing apparatus. For further information refer to the current *AS 2865 Safe working in a confined space*. Hydraulic, electric or air driven machines are recommended for use in confined or poorly ventilated areas.

4.6 Noise

Noise management provisions and noise level measurements should be carried out by the contractor doing the work to ensure compliance with the *Occupational Health and Safety Act (Noise) Regulation 1996* so that noise levels from machinery or equipment during cutting or drilling operations do not become a risk to hearing or health.

The noise management provisions in the *Code of practice for noise management and protection of hearing at work* should be implemented to control noise levels. Where the noise level is in excess of the noise exposure limits, engineering control measures should be implemented. Where this can not be achieved, appropriate hearing protection equipment should be provided to all persons in the vicinity of the cutting or drilling operations.

The risk of causing permanent hearing damage is related to both loudness of the noise and the length of exposure. For example two minutes working in noise levels of 114 decibels dB(A) may cause the same amount of damage as eight hours working in 85 dB(A).

4.7 Dust and airborne substances

Where there is a risk of inhalation of silica dust, other harmful particulates or airborne hazardous substances, the contractor doing the work should ensure compliance with the provisions of the *Occupational Health and Safety Act (Hazardous Substances) Regulation 1996*.

5. Inspection and maintenance of plant

Regular planned inspection and routine maintenance should be carried out to ensure safe and efficient operation of saws and drills and associated plant. The contractor using the plant should implement the following requirements.

5.1 Daily

General condition and maintenance of the plant should be checked daily by the person doing the cutting or drilling.

5.2 Monthly

The plant should be inspected and maintained by an appropriately qualified person at least every month or after 50 hours of running time.

5.3 Repairs

Repairs should be carried out by a competent person. Competent person means a person who has acquired through training, qualification, or experience, the knowledge and skills to perform the specified tasks.

5.4 Reporting defects

Any defects to equipment should be reported immediately to the person responsible for maintaining such plant.

Staff are a good source of information about defects in plant because of their day to day experience and they should be encouraged to be involved in reporting such defects.

5.5 Log books and inspection check sheets

Owners of plant and associated equipment should keep log books and inspection check sheets containing a full service and repairs history of their equipment.

These records should be maintained to include any hazards relating to the plant in its normal use. These records should be kept current and retained for the life of the plant. If the plant is sold, the records should form part of the sale. See section 4 for examples of hazards.

6. Personal protective equipment (PPE)

6.1 Provision of PPE

Before commencing any sawing, cutting or drilling work, the principal contractor or contractor doing the work should assess any conditions likely to affect the health and safety of the employees or themselves, as identified during the risk assessment procedure, and arrange for the provision and use of appropriate PPE.

The following PPE should be provided where necessary:

- (a) Safety helmets complying with *AS1800 Selection, care and use of industrial safety helmets*, and *AS1801 Industrial safety helmets* should be provided and used.
- (b) Hearing protection complying with *AS1270 Acoustics - hearing protectors* should be provided and used.
- (c) To reduce the risk of eye injury, eye protection complying with *AS1337 Eye protectors for industrial applications* should be provided and used.
- (d) Safety clothing such as safety boots, waterproof clothing, gloves, and reflective safety vest. All clothing should be comfortable and suitable for the work and the weather conditions. Loose clothing which may snag or create a trip hazard should be avoided and long hair should be contained.
- (e) Respiratory protective equipment complying with *AS1716 Respiratory protective devices* and *AS1715 Selection, use and maintenance of respiratory protective devices* should be used to reduce the risk of inhalation of silica dust and other harmful particulates.
- (f) Workers should be protected from sunlight/UV radiation by using a sunscreen with an SPF(sun protection factor) rating of at least 15+ and wearing hats, long sleeves and long trousers. Even with protection workers should avoid overlong exposure to strong sunlight, including any reflected light.

6.2 Maintenance of PPE

All PPE used by persons doing cutting or drilling work should be regularly inspected and replaced as necessary.

7. Training and instruction

Under Section 15(1) of the *OHS Act* employers must provide training and instruction, including information and supervision to ensure the health and safety at work of their employees.

All persons involved in any cutting and drilling of concrete and other masonry products should be trained to follow systems of work and work practices that enable them to perform their work in a manner that is safe and without risks to health. Only those persons who have received training and instruction should carry out the work.

The employer should monitor the systems of work and provide refresher training to ensure that safe systems and work practices are being followed, including the use of PPE.

The training provided and the instruction given should include:

- (a) the work method to be used for the cutting and drilling operations and the manual handling of equipment by operators, including control measures based on the risk assessment to prevent injury.
- (b) the correct use, care and storage in accordance with the manufacturers' recommendations or Australian Standards of PPE, tools and equipment to be used and individual fall arrest equipment.
- (c) the use of plant and associated equipment including electrical safety and hazardous substances.
- (d) procedures to be adopted in the event of accident, injury or other emergency.

8. Legal requirements

8.1 Occupational health and safety

Every person at the place of work has a duty under the *Occupational Health and Safety Act 1983*, whether as an employer, an employee, a self-employed person or a person in control of the workplace. While the obligation for each person is different, all persons must ensure that the way they carry out their work does not interfere with the health and safety of other persons who are present at the place of work.

8.2 Employers' responsibilities

Employers have an obligation to ensure the health, safety and welfare of employees and other persons at the place of work and to comply with the *OHS Act* and Regulations. This includes the provision or maintenance of adequate amenities at work.

8.3 Employees' responsibilities

Employees have an obligation to take reasonable care for the health and safety of other persons in the place of work and to cooperate with their employer in the interests of health, safety and welfare.

8.4 Self employed persons' responsibilities

Self employed persons have an *obligation* to ensure that persons not in their employment are not exposed to risks to their health and safety arising from their conduct while they are at a place of work.

8.5 Person in control

Any person who has, to any extent, control of a place of work, the means of access or egress or plant or substances used has an *obligation* to ensure the health and safety regarding the place of work, the means of access or egress and plant or substances used at the place of work.

8.6 Manufacturers'/suppliers' responsibilities

Manufacturers and suppliers have an obligation to ensure health and safety regarding plant or substances used at places of work. They are required to carry out all necessary research, testing and examination.

They are also required to make available adequate information about the safe use of the plant or substances, and any conditions necessary to ensure that the plant or substances will be safe and without risks to health when properly used.

8.7 Statutory provisions

The following Acts and Regulations apply to the cutting and drilling operations:

Occupational Health and Safety Act 1983 and Regulations

Construction Safety Act and Regulations

OHS (Manual Handling) Regulation 1991

OHS (Confined Spaces) Regulation 1990

OHS (Noise) Regulation 1996

OHS (Hazardous Substances) Regulation 1996

Definitions

The following definitions are for the purposes of this code.

“**Construction work**” includes:

- (a) building, including excavation, and the construction, alteration, renovation, repair, maintenance and demolition of all types of buildings or structures.
- (b) civil engineering, including excavation, and the construction, structural alteration, repair, maintenance and demolition of for example, airports, docks, harbours, inland waterways, dams, river and avalanche and sea defence works, roads and highways, railways, bridges, tunnels, viaducts and works related to the provisions of services such as communications, drainage, sewerage, water and energy supplies.
- (c) the erection and dismantling of prefabricated buildings and structures as well as the manufacturing of prefabricated elements at the construction site.

“**Contractor**” means the person responsible for the concrete and masonry cutting and drilling equipment and associated operations. Depending on the contractual arrangements which are in place, the cutting or drilling contractor may be an employer, self-employed person or a person in control within the terms of the OHS Act.

“**Employee**” means an individual who works under a contract of employment or apprenticeship.

“**Employer**” means a corporation which, or an individual who, employs persons under contracts of employment or apprenticeship.

“Principal contractor” means the person with overall responsibility for the construction work and includes an owner builder. Depending on the contractual arrangements which are in place, the principal contractor may be an employer, self-employed person or a person in control within the terms of the OHS Act.

“Self-employed person” means an individual who works for gain or reward otherwise than under a contract of employment or apprenticeship, whether or not they employ others.

More information

For more guidance refer to the following codes and standards:

WorkCover NSW publications

Code of practice Electrical Practices for Construction Work.

Code of practice Noise management and protection of hearing at work.

Skin cancer and outdoor workers - a guide for workers

Skin cancer and outdoor workers - a guide for employers

How to prevent silicosis

Standards Australia publications

AS1270 Acoustics - Hearing protectors

AS1337 Eye protectors for Industrial Applications

AS1715 Selection, use and maintenance of respiratory protective devices

AS1716 Respiratory protective devices

AS1800 Selection, care and use of industrial safety helmets

AS1801 Industrial safety helmets

AS2865 Safe working in a confined space

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