



Occupational Health and Safety Code of Practice 2008

I, The Hon Julia Gillard MP, Minister for Employment and Workplace Relations, approve the following Code of Practice under subsection 70(1) of the *Occupational Health and Safety Act 1991*.

Dated: 2 June 2008

[Signed]

The Hon Julia Gillard MP
Minister for Employment and Workplace Relations

1 Name of Code of Practice

This instrument is the *Occupational Health and Safety Code of Practice 2008*

2 Application

Pursuant to paragraph 70(4) (a) of the *Occupational Health and Safety Act 1991*, this Code of Practice is to apply generally.

3 Commencement

This Code of Practice commences the day after it is registered.

4 Revocation

This instrument revokes all current Approved Codes of Practice.

<i>Approved Codes of Practice for Revocation</i>			
item	Notice/Registration No	Description	Gazette/Registration
1	F2006L02336	Approved Code of Practice for the Storage and Handling of Dangerous Goods.	13/7/06
2	F2005L01441	Approved Code of Practice for Noise.	10/6/05
3	1/2004	Approved Code of Practice for Control of Work-related Exposure to Hepatitis and HIV viruses in the Australian Government Employment.	GN 34 25/8/04
4	3/1999	Approved Code of Practice for First Aid in the Commonwealth Workplaces.	GN 45 10/11/99
5	2/1999	Approved Code of Practice on the Control and Safe Use of Inorganic Lead in Commonwealth Employment.	S190 7/5/99
6	1/1999	Approved Code of Practice on the Control of Scheduled Carcinogenic Substances in Commonwealth Employment.	S190 7/5/99
7	1/1995	Approved Code of Practice on Confined Spaces.	GN49 13/12/95
8	1/1995	Approved Code of Practice on Limiting Occupational Exposure to Ionizing Radiation.	GN49 13/12/95
9	1/1995	Approved Code of Practice on the Control of Workplace Hazardous Substances.	GN49 13/12/95
10	1/1994	Approved Code of Practice on Occupational Health and Safety Competency Standards for the Operation of Loadshifting Equipment and Other Types of Specified Equipment	GN2 18/1/95

<i>Approved Codes of Practice for Revocation</i>			
Item	Notice/Registration	Description	Gazette/Registration
11	2/1994	Approved Code of Practice on the Prevention of Occupational Overuse Syndrome.	GN1 11/1/95
12	2/1993	Approved Code of Practice on Workplace Injury and Disease Recording.	GN29 28/7/93
13	2/1993	Approved Code of Practice for the Safe Use of Ethylene Oxide in Sterilisation and Fumigation Processes.	GN29 28/7/93
14	1/1993	Approved Code of Practice on Protection of Workers from Ultraviolet Radiation in Sunlight.	GN3 27/1/93
15	2/1992	Approved Code of Practice on Indoor Air Quality.	GN37 16/9/92
16	2/1992	Approved Code of Practice for the Transport of Dangerous Goods	GN37 16/9/92
17	2/1992	Approved Code of Practice on Non Ionizing Radiation.	GN37 16/9/92
18	2/1992	Approved Code of Practice on Vibration.	GN37 16/9/92
19	2/1992	Approved Code of Practice on Safety in Laboratories.	GN37 16/9/92
20	2/1992	Approved Code of Practice on Interior Lighting. Amended: by Notice 1/1995- GN49- 13/12/95	GN 16/9/92
21	2/1992	Approved Code of practice for Visual Display Units Amended: by Notice 1/1995- GN49- 13/12/95	GN15 15/4/92
22	1/1992	Approved Code of Practice on Asbestos.	GN15 15/4/92
23	1/1992	Approved Code of Practice for the Safe Handling of Timber Preservatives and Treated Timber.	GN15 15/4/92

<i>Approved Codes of Practice for Revocation</i>			
Item	Notice/Registration Number	Description	Gazette/Registration Number
24	1/1992	Approved Code of Practice on Vinyl Chloride.	GN15 15/4/92
25	1/1992	Approved Code of Practice for Synthetic Mineral Fibres.	GN15 15/4/92
26	1/1992	Approved Code of Practice for a Chemical Database for Emergency Services.	GN15 15/4/92
27	1/1992	Approved Code of Practice on Manual Handling. Amended: by Notice 1/1993-GN3-27/1/93 Amended: by Notice 1/1995- GN49-13/12/95	GN 15/4/92

FOREWORD

The Safety, Rehabilitation and Compensation Commission (SRCC) oversee the operation of the Occupational Health and Safety Act 1991 (the Act). The functions of the Commission include:

- develop occupational health and safety policies and strategies and ensure compliance with the Act
- advise the Minister for Employment and Workplace Relations on matters relating to the Act.

Comcare is a statutory body established by the Australian Government to lead and promote efforts to prevent and reduce the incidence of occupational injury and disease as well as promote safety by producing a healthy and safe work environment.

Comcare undertakes a number of functions on behalf of the Commission. Comcare's activities include education, regulation, enforcement, research and the provision of relevant policy advice to both the Commission and persons covered by the Act.

Comcare developed this Code of Practice on behalf of the Commission.

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INTRODUCTION

THE COMMONWEALTH OCCUPATIONAL HEALTH AND SAFETY LEGISLATIVE FRAMEWORK

The Commonwealth Occupational Health and Safety (OHS) legislative framework consists of the Occupational Health and Safety Act 1991 (the Act) and supporting regulations and this Code of Practice.

The Act

The objective of the Act is to secure the health, safety and welfare at work of employees and to protect other persons at or near workplaces from risks to health and safety arising out of the activities of employees at work. The Act defines the general duties and responsibilities of duty holders and provides for specific OHS consultative arrangements and compliance and enforcement matters.

The Regulations

The Occupational Health and Safety (Safety Arrangements) Regulations 1991, (Safety Arrangements Regulations) and the Occupational Health and Safety (Safety Standards) Regulations 1994 (Safety Standards Regulations) set out mandatory obligations on specific matters. These regulations are written in terms of process and/or outcomes that duty holders must follow or achieve to meet their general duties under the Act in relation to these matters.

Code of Practice

The Act and regulations are supported by this Code of Practice. This Code is a source of practical guidance on safe work practices and risk management in relation to specific hazards and/or hazardous activities. This Code provides guidance to duty holders on standards of health and safety that must be achieved in the workplace in relation to those matters, hazards or hazardous activities.

LEGAL STATUS AND APPLICATION OF THIS CODE OF PRACTICE

This Code aims to ensure that adequate health and safety standards are implemented on specific OHS matters whilst allowing flexibility for a duty holder to incorporate new inventions and technological changes that are most appropriate for their workplace, provided they do not reduce health and safety standards.

This Code does not impose mandatory legal obligations. Civil or criminal proceedings cannot be instituted solely on the grounds that a person failed to comply with this Code. However, this Code is admissible in evidence before a court as proof of the standards of health and safety that should be achieved by duty holders to comply with the relevant provisions of the Act and regulations on specific OHS matters.

If this Code is used as evidence in legal proceedings concerning a breach of the Act or regulations, it reverses the burden of proof to the duty holder. This means that if the duty holder has not followed the guidance provided in this Code, it must prove that the related provisions of the Act or regulations were complied with by other equivalent or better means. If the duty holder fails to do so, the breach is proven.

Duty holders must comply with this Code unless they identify another way of achieving the same or better safety standards than those prescribed in this Code. If the duty holder determines that they can meet or better the safety standards prescribed by this Code by alternative means, it is appropriate and lawful for them to do so.

An investigator or a health and safety representative may cite this Code as a means of remedy for an alleged breach of the Act or regulations.

CODE TO BE READ IN CONJUNCTION WITH THE ACT AND REGULATIONS

This Code must be read in conjunction with the Act and the regulations.

The Act, regulations and this Code are complementary documents, which set the legal requirements for occupational health and safety in the Commonwealth OHS jurisdiction. The requirements of this Code are designed to operate in conjunction with the mandatory provisions of the Act and regulations.

This Code does not cover all the responsibilities of the duty holders. There may be additional risks at a workplace that have not been specifically addressed in this Code. Under the Act, duty holders are still required to identify and assess these risks and ensure that control measures are implemented.

Definitions in the Act and regulations apply to this Code. Each Part of this Code includes additional definitions that apply to that particular Part.

CONSULTATION PROVISIONS

One of the objectives of the Act is to foster a cooperative, consultative relationship between employers and employees on the health, safety and welfare of employees at work. This Code should be implemented utilising the consultative framework established under the Act where appropriate. This includes health and safety management arrangements – the contents of which must be consulted upon – as well as consulting with employees and/or their representatives, health and safety representatives and health and safety committees.

PART 1 – RISK MANAGEMENT

INTRODUCTION

- 1.1 Risk management, in the occupational health and safety context, refers to a systematic process by which management policies, procedures and practices are applied to identify the workplace hazards, assess the risks associated with those hazards, determine the appropriate control measures and monitor and review the risk management process for efficacy in providing a safe and healthy workplace.
- 1.2 Workplace injury and disease have a significant impact on the human and financial resources of organisations. An effective risk management strategy can assist employers to meet their statutory obligations and reduce costs, increase productivity, raise staff morale, improve workplace relations and enhance health and safety performance generally.
- 1.3 Employers have general duties under the Act to take all reasonably practicable steps to protect the health and safety of their employees. In addition, Part 1 of the Safety Standards Regulations imposes specific requirements on employers in relation to the matters covered by those regulations. These include the identification of all reasonably foreseeable hazards arising from work that may affect the health and safety of employees or others at work, carry out risk assessments and implement risk control measures.
- 1.4 Manufacturers and suppliers have duties under the Act to take reasonably practicable steps to ensure that plant and/or substances are designed, constructed and supplied in a way that ensures employees' safety and there is no risk to their health.
- 1.5 Erectors and installers also have a duty to ensure the plant is erected or installed safely and that the process of erection or installation is safe and does not create a risk to the health and safety of employees at the workplace.
- 1.6 This part of the Code must be read in conjunction with the introduction to this Code, including in relation to consultation. 1

PURPOSE

- 1.7 The purpose of this Part is to provide practical guidance to employers and other duty holders to assist them to identify hazards, assess the risk and implement risk control measures in the workplace in accordance with the Act and Part 1 of the Safety Standards Regulations.

SCOPE

- 1.8 This Part applies to all employers covered by the Act who have duties to manage risks at work.
- 1.9 The requirements set out in Part 1 of the Safety Standards Regulations do not limit the operation of any other regulation that expressly provides for the control of risks to the health or safety of a person at work. That is, where other parts of the Safety Standards Regulations expressly provide for the control of risks in relation to a particular subject matter, employers must comply with those regulations. The parts of the Safety Standards Regulations that set out specific risk control duties are:

- Part 3: Occupational Noise;
- Part 4: Plant;
- Part 5: Manual Handling;
- Part 6: Hazardous Substances;
- Part 7: Confined Spaces;
- Part 8: Storage and Handling of Dangerous Goods;
- Part 9: Major Hazard Facilities;
- Part 10: Electricity;
- Part 11: Driver Fatigue;
- Part 12: Construction Work; and
- Part 13: Falls from 2 metres or more.

DEFINITIONS

'Consequence' – means outcome or impact of an occurrence.

'Exposure' – occurs when a person is exposed to a hazard.

'Frequency' – means a measure of the number of occurrences per unit time.

'Generic risk assessment' – means a risk assessment, which may be used across areas and job sites because the hazards and risks have been deemed similar.

'Harm' – is death, injury, illness (including psychological illness) or disease that may be suffered by a person because of a hazard or risk.

'Hazard' – means something that can or has the potential to cause injury or illness.

'Likelihood' – describes the probability or frequency of an injury or illness occurring.

'Monitor' – means to check, supervise, observe critically or measure the progress of an activity, action or system on a regular basis in order to identify change from the performance level required or expected.

'Probability' – a measure of the chance of occurrence expressed as a number.

'Residual risk' – means the remaining risk after implementation of the risk control measures.

'Risk' – means the probability or likelihood and consequences of a hazard causing injury or illness.

'Risk assessment' – means the overall process of risk analysis and risk evaluation (AS/NZS 3931). It is the process of evaluating the probability and consequences of injury or illness arising from exposure to an identified hazard or hazards.

'Risk analysis' – mean the analysis of risk by use of a table or other process which may be qualitative, quantitative or a combination of these methods to assist in the evaluation of a hazard according to the probability or likelihood and consequence of injury or illness.

'Risk evaluation' – is the decision making process of the assessed risks to determine which risks require control and control priorities in an organisational context.

'Risk control' – means the process of managing the elimination or minimisation of a risk. This may be an object, work process or system of work.

'Risk management' – means the culture, processes and structures that are directed towards promoting health and safety by the management of hazards and risks within an organisation.

'Risk management framework' – means a set of elements in a system which may include strategic planning, decision making, processes, policies and procedures for dealing with the risks.

'Risk retention' – means the loss or benefit remaining from a particular risk.

RESPONSIBILITIES OF MANUFACTURERS, SUPPLIERS, ERECTORS AND INSTALLERS

1.10 Manufacturers, suppliers, erectors and installers have a general duty to take all reasonably practicable steps to ensure that employees are safe from risks to health and safety arising from the use of plant and machinery at work. In addition to the general duty, manufacturers and suppliers have specific duties in regard to conducting research, testing and examining plant, machinery and substances to assist in the control of identified risks. They must also provide certain information to employers related to the safe use of plant and substances (see sections 18 and 19 of the Act). Manufacturers and suppliers should follow the four (4) step risk management process outlined in paragraphs 1.11 and 1.12 and apply as appropriate.

RESPONSIBILITIES OF EMPLOYERS

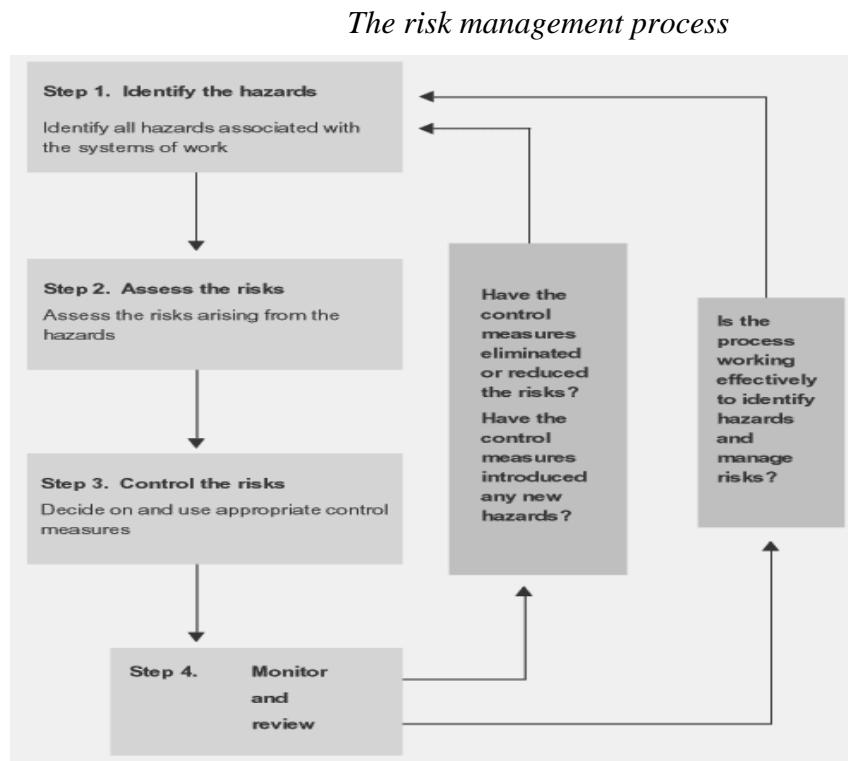
1.11 Risk management involves the establishment of an appropriate framework and culture for health and safety within an organisation. It is an ongoing systematic method of firstly identifying hazards then analysing, evaluating, treating, monitoring and communicating risks associated with any activity, function or process with the objective of minimising the risk of harm or injury from a hazard.

1.12 To ensure that risks are managed in accordance with the duties under the Act and the specific requirements set out in the Safety Standards Regulations, employers should undertake the following four-step risk management process:

- Step 1** identify the hazard;
- Step 2** assess the risk associated with the hazard;
- Step 3** control the risk; and
- Step 4** review the process.

1.13 When undertaking the risk management process, employers should be practical about the ways in which they identify hazards and the potential risks associated with them. They should consider what actually occurs in the workplace as opposed to what may occur in theory.

1.14 Employers should conduct hazard identification and risk assessment from the design and planning phases through to workplace operations where employees use plant, equipment, hazardous substances and dangerous goods.



Responsibility to consult

1.15 Communication and consultation is integral to every step of the risk management process. Employers should consult with employees, and/or their representatives or health and safety representatives and health and safety committees where appropriate. Consultation should occur when:

- identifying hazards;
- assessing the risks;
- determining and implementing control measures;
- developing policy and procedures;
- deciding on the training requirements; and
- supervising and monitoring the risk control measures.

Identify hazards

1.16 Employers should identify all reasonably foreseeable hazards arising from work mindful that some hazards may be obvious and readily identifiable while other hazards, such as exposure to noise, chemicals or psychological injury for example, may be less so.

1.17 Employers may classify hazards in a number of ways. For example, some common workplace hazard types can include:

- gravitational – this includes, but is not limited to, activities where a person can fall or an object can fall on to a person;
- body stressing or impact hazard – activities that cause stress to muscles and/or skeleton including manual handling, occupational overuse and slips, trips or falls on the same level;

- c) mechanical – this includes, but is not limited to, plant, equipment and items that have the potential to cut, tear, rip, abrade, crush, penetrate, produce projectiles or cause sudden impact;
- d) source of energy – this includes, but is not limited to, electricity, heat, cold, noise, radioactive sources and high powered light;
- e) chemical and biological – this includes, but is not limited to, chemical compounds, acids and poisons, powders, dusts, vapours, bacteria, viruses, mould and mildew from various processes which have the potential to impair health, have adverse effects on human reproduction, cause diseases or may have explosive, flammable, toxic or corrosive properties; and
- f) psychosocial environment – this includes workplace stressors, which arise from a variety or combination of sources, and includes, but is not limited to, bullying and harassment.

1.18 In carrying out hazard identification, the employer should consider the following sources of information:

- a) examination of injury and dangerous occurrence data;
- b) technical and scientific evaluation;
- c) visual inspection of the workplace in a direct way with walk-through inspection of plant and equipment;
- d) quantitative hazard analysis;
- e) testing and auditing reports from the workplace;
- f) consultation with employees, health and safety representatives and health and safety committee members; and
- g) discussions with designers, manufacturers, suppliers, importers, or any other relevant party who may assist in the identification of a potential hazard or hazardous situation in the workplace.

Assess the risks

1.19 Where employers have identified a hazard, they should ensure that an assessment is made of the risks associated with that hazard.

1.20 Employers should ensure that, as a minimum, a risk assessment is conducted before:

- a) the introduction of any new plant or substances;
- b) the introduction of a new work practice or procedure; and
- c) any change in a workplace, work practice, activity or process where the change may give rise to a health or safety risk.

1.21 The level of risk increases exponentially with the injury or disease causing potential of a hazard. Therefore, risk is the probability and consequence of a hazard causing injury, ill health or disease. A risk assessment is a process for determining the likelihood and severity of an injury or a disease resulting from exposure to that hazard.

1.22 When the hazard has been identified, employers should consider whether there are specific regulations that deal with that hazard. For example, there are regulations which deal specifically with the risk management of occupational

noise, plant, manual handling, hazardous substances, electricity, driver fatigue, falls from heights, confined spaces, construction and storage and handling of dangerous goods. In circumstances where there are no governing regulations, the employer should conduct a risk assessment as described in this Part.

1.23 When conducting a risk assessment an employer should:

- a) gather information about each identified hazard;
- b) consider the number of people exposed, or likely to be exposed to each hazard;
- c) consider the duration of the exposure; and
- d) use the information obtained to assess the likelihood and consequences of exposure to the hazard.

1.24 A hazard may have the potential to cause a range of consequences from minor discomfort to a serious disabling injury, illness or death. When determining the potential consequences of identified hazards, employers should consider:

- a) the nature of the hazard posing the risk;
- b) any combinations of hazards such as heat and manual handling tasks;
- c) the types of injuries or illnesses foreseeable from exposure;
- d) the duration and level of exposure to the hazard; and
- e) the existing control measures in place.

1.25 Once the consequences of a hazard have been determined, employers should assess the likelihood of that hazard causing harm. Factors which may affect the likelihood of an incident occurring are:

- a) how often the hazard has the potential to harm – when the same hazardous task is repeated the more likely an incident will occur, for example, when an employee continuously or frequently carries a load, pushes a trolley or uses a vibrating hand tool;
- b) the number of people exposed to the hazard – the greater the number of people exposed to a hazard, the more likely an incident will occur;
- c) the duration of exposure – the longer a person is exposed to a hazard, the more likely an incident will occur;
- d) the quantities of materials or multiple exposure points involved;
- e) the position of the hazard relative to employees and to other hazards – for example, employees located next to a noisy machine are more likely to suffer hearing related conditions than those working further away, or some stored chemicals such as methylated spirits may only represent a hazard if located near a heat source;
- f) the skills and experience level of persons exposed – an employee with extensive experience may be less likely to make a mistake which results in an incident than one who is new to the role or conversely, a more experienced employee may become complacent;
- g) the special characteristics of persons exposed – for example colour blindness or hearing impairment;

- h) other elements of the work environment such as distractions – for example, construction employees listening to music on their headphones may increase their chances of being hit by vehicles used on the building site;
- i) environmental conditions – there may be conditions which increase the likelihood of an incident occurring such as water in the vicinity of an electrical hazard;
- j) the work organisation, such as rostering and shift arrangements or the pace at which work should be performed;
- k) the introduction of new work processes; and
- l) the effectiveness of existing control measures.

1.26 The likelihood and consequences may be estimated using statistical analysis and numerical calculations. Where no reliable or relevant past data is available, subjective estimates may be made.

1.27 The identified hazard may require a simple or a complex risk analysis depending on the risk of harm to people in the workplace. The types of risk assessment that may be undertaken will vary with the degree of analysis required. Employers may use, but are not limited to, some of the following:

- a) Qualitative analysis – this type of analysis is descriptive and involves a subjective assessment of the likelihood and consequences of an event occurring. This type of analysis includes:
 - (i) evaluation using multi-disciplinary groups;
 - (ii) specialist and expert judgement; and
 - (iii) structured questionnaires;
- b) Quantitative analysis – this type of analysis uses a numerical value rather than a descriptive scale for both consequences and likelihood. The way in which consequences and likelihood are expressed and the way they combine provide the level of risk. Methods of analysis include:
 - (i) consequence analysis;
 - (ii) statistical analysis of historical data;
 - (iii) fault tree and event tree analysis;
 - (iv) influence diagrams;
 - (v) life cycle cost analysis;
 - (vi) network analysis;
 - (vii) simulation and computer modelling;
 - (viii) statistical and numerical analysis;
 - (ix) test marketing and market research; and
 - (x) probability analysis.

1.28 A simple qualitative form of analysis can be illustrated by means of a risk assessment matrix, see diagram below. Refer to *AS/NZS 4360:2004 – Risk management* and *HB 436:2004 – Risk management guidelines* for detailed information on risk assessment options.

1.29 The level of risk is determined by the relationship between likelihood and consequence.

Simple qualitative risk assessment matrix

		LIKELIHOOD			
		Very likely	Likely	Unlikely	Highly Unlikely
CONSEQUENCES	Fatality	HIGH RISK	HIGH RISK	HIGH RISK	MEDIUM RISK
	Major Injuries	HIGH RISK	HIGH RISK	MEDIUM RISK	MEDIUM RISK
	Minor Injuries	HIGH RISK	MEDIUM RISK	MEDIUM RISK	LOW RISK
	Negligible Injuries	MEDIUM RISK	MEDIUM RISK	LOW RISK	LOW RISK

1.30 Likelihood or the chance of each of the events actually occurring can be determined and rated in the following way:

- very likely (exposed to hazard constantly);
- likely (exposed to hazard occasionally);
- unlikely (could happen but only rarely); or
- highly unlikely (could happen but probably never will).

1.31 Determining consequences involves making a judgement about the level of harm that can occur because of exposure to the hazard. Consequences can be rated in the following way:

- fatality;
- major or serious injury (serious damage to health that may be irreversible, requiring medical attention and ongoing treatment). This is likely to involve significant time off work;
- minor injury (reversible health damage that may require medical attention but limited ongoing treatment). This is less likely to involve significant time off work. A minor injury is unlikely to involve more than 1 day off work; and
- negligible injuries (might sustain slight injury and may require only primary first aid) and no time off work.

1.32 In circumstances where there is uncertainty about the level of risk, inadequate information or uncertainty about the degree of exposure even after having completed a risk assessment, employers should consider the actions listed below:

- e) seek more information – apply good practice to minimise exposure until more information is available;
- f) seek specialist advice if necessary;
- g) conduct surveys, environmental and medical monitoring;
- h) analyse records and data regarding dangerous occurrences, employee complaints, sick leave, unscheduled absences and staff turnover;
- i) examine organisational culture and behaviour as a risk factor; and
- j) assess the competency and training levels.

Implement risk control measures

1.33 Where restrictions on available funds or other resources, or physical practicalities, mean that not all identified controls for hazards can be implemented immediately, employers should determine the most effective control measure for the identified hazard and prioritise the implementation process according to the risk profile of each hazard. Controls for hazards assessed as high risk should be put into operation before those assessed as a medium or low risk.

1.34 Employers should ensure that any risks to the health and safety of employees, arising from the workplace or any work related activity, are:

- a) eliminated; or
- b) if it is not reasonably practicable to eliminate the risks, then minimise the risk.

1.35 Employers should ensure that the control measures selected:

- a) adequately control exposure to the risk;
- b) do not create a new hazard; and
- c) allow employees and contractors to do their work without undue discomfort or distress.

1.36 Employers should use the hierarchy of control pyramid to determine the most appropriate method with respect to risk control. This approach involves designing out or removing hazards at the source and controlling any residual risks by engineering or organisational means. Employers should start at the top of the hierarchy of control pyramid and work their way down. The hierarchy of control pyramid is structured in the following way:

- a) eliminate the hazard. If this is not possible then;
- b) substitute or modify the hazard. If this is not possible then;
- c) isolate the hazard. If this is not possible then;
- d) use engineering controls to control the hazard at its source. If this is not possible then;
- e) use administrative controls. If this is not possible then;
- f) use personal protective equipment (PPE).

1.37 Employers should first ensure, where reasonably practicable, that any hazards identified are eliminated. Elimination of hazards is the most effective control measure. Elimination prevents factors, such as human error, lack of awareness, stress, fatigue, acting reflexively or giving priority to operational or production

demands, from influencing the selection of the most appropriate control measure. Elimination of a hazard might include:

- a) removing trip hazards that clutter corridors;
- b) disposing of unwanted chemicals;
- c) removing hazardous plant or substances;
- d) promptly repairing damaged equipment;
- e) increasing the use of e-mail to reduce excessive photocopying and collation;
- f) ceasing a dangerous work practice; and
- g) ensuring new equipment meets the ergonomic needs of users.

1.38 Elimination of a hazard is best achieved at the design stage of any plant, equipment or process. This is often referred to as 'safe design' and is a concept which can be applied across all industries to eliminate hazards at the source. The implementation of safe design practices has a positive impact on health and safety in the workplace. Where no hazard exists, no risk of injury or illness exists.

Substitution controls

1.39 Where elimination of the hazard is not reasonably practicable, employers should minimise the risk using control measures individually or in combination. The hierarchy of controls next advocates substitution as a means of minimising the risk to employees from an identified hazard.

1.40 Employers should consider substitution of the hazard with something with a lesser risk that still performs the same task in a satisfactory manner. Examples of substitution controls might include:

- a) substitution of a hazardous substance with a less hazardous substance;
- b) substitution of telephone handsets with headsets where there is frequent use of the telephone; and
- c) substitution of a smaller package or container to reduce the risk of manual handling injuries such as back strain.

Isolation controls

1.41 If substitution is not possible, employers should consider isolating the hazard from employees or separating employees from the hazard. This may be achieved by using separate purpose built rooms, barricades or sound barriers. Isolation removes the hazardous process from the main work area. Examples of isolation controls might include:

- a) use of a fume cupboard to isolate and store chemicals; and
- b) use of remote handling equipment for hazardous substances or procedures.

Engineering controls

1.42 Employers should consider engineering controls as the next option on the hierarchy of controls to minimise the risk to an identified hazard. This can include engineering modifications to plant or it may involve a change to systems of work. Examples of engineering controls include the:

- a) modification to plant;
- b) installation of appropriate guarding on machinery; and
- c) use of a ventilation system to remove chemical fumes or dust.

Administrative controls

1.43 If engineering controls do not control the risk or cannot be utilised, employers should apply administrative controls such as safe work practices. Administrative controls should not be the first option to control the risk but can be used if controls higher on the hierarchy of control pyramid cannot be applied or, having been applied, do not adequately control the risk.

1.44 Employers should use administrative controls to back up or supplement other more effective control measures. It may be necessary to use administrative controls while elimination or minimisation control measures are being evaluated and applied. Examples of administrative controls include the use of procedures and instruction and include:

- regular maintenance programs for plant and equipment;
- written work procedures for all hazardous tasks and equipment; and
- a training, education and supervision program for employees/contractors, which includes preventative maintenance and housekeeping procedures.

Provide personal protective equipment (PPE)

1.45 If the application of administrative controls including safe work practices do not minimise the risk, employers should provide appropriate PPE to employees and/or contractors. PPE should only be used when higher order controls are not practicable or adequately effective.

1.46 PPE is often used in combination with other control measures as a final barrier between the employee and the hazard. PPE does not control the hazard at the source and relies on behaviour modification and correct use of the equipment to be successful. Where it is used, employers must make available to employees and/or contractors suitable and correctly fitted PPE free of charge. The PPE must be maintained according to the manufacturer's instructions (Safety Standards Regulations 6.19(4) and (5)).

1.47 Employers should ensure that employees and/or contractors are trained in the correct use and maintenance of the PPE and that supervision is provided to ensure compliance with the training and instruction.

Monitor and review the risk management program

1.48 Employers should ensure that the monitoring and review of the risk management program captures information such as:

- whether control measures are being implemented and used correctly;
- whether solutions to workplace hazards are achieving the desired results;
- whether risk management processes and initiatives are working;
- what has been done to control risks and what remains to be done;
- whether there are any new problems which have resulted from the introduction of risk control measures; and
- whether new risk control measures are required.

1.49 Employers should conduct systematic monitoring and review of the workplace to ensure that no new hazards are introduced. New hazards may arise through:

- the use of new technology, equipment or substances;

- b) the introduction of new work practices or procedures;
- c) a change in work environment (new workplace); or
- d) the introduction of new staff with different skills or knowledge levels.

1.50 Ensuring that hazards and risks are effectively controlled requires ongoing monitoring and review to check that control measures are implemented, are working effectively and are maintained. Factors that affect a risk assessment and change the level of risk include the financial and human resource input involved in implementing and maintaining control measures.

1.51 ‘Residual Risk’ is the risk that remains after risk control measures have been implemented. Employers should be aware of the nature and extent of the residual risk. It should be documented and subject to a monitoring and review process.

1.52 Monitoring and review should be cyclical and form part of the risk management process. This requires forward planning with regular evaluation points over a set period to review the hazards, risks and control measures.

1.53 For hazards covered by the Safety Standards Regulations, employers are required to conduct a risk assessment prior to the introduction of plant or substance, and before introducing work procedure and processes, or changing them where the change may affect health or safety. Employers do this for all other hazards. Prior planning should ensure that a risk assessment is part of the procedure when purchasing equipment and materials and is considered as part of the tender specifications for new equipment and services.

Keep records

1.54 The monitoring and review process is also assisted by effective record keeping. Records help to identify hazards and review the effectiveness of risk control measures. Employers should keep records that show:

- a) details of workplace inspections and audits;
- b) methods used to assess risks;
- c) control measures implemented;
- d) reviews of systems of work;
- e) any action that has been taken to address particular hazards;
- f) instruction, education or training provided;
- g) any atmospheric monitoring and health surveillance results; and
- h) the maintenance schedules for plant and equipment.

RESPONSIBILITIES OF EMPLOYEES

1.55 Under section 21 of the Act, employees must cooperate with the employer in relation to any duty or obligation imposed to ensure the workplace is safe and healthy.

1.56 Employees must use PPE in accordance with their training and consistent with the manufacturers safety requirements.

PART 2 – FIRST AID

INTRODUCTION

2.1 First aid management is an integral part of any workplace as it provides the initial care for those who are injured or become ill whilst performing work activities or tasks. First aid services provide the immediate first aid intervention:

- a) in response to injuries which could result in death or severe disability;
- b) in high-risk locations or when high-risk work is undertaken;
- c) for illnesses due to exposure to environmental conditions, poisons or other harmful substances;
- d) for existing medical conditions which require immediate assistance (for example, an allergic reaction); and
- e) for minor injuries (for example, cuts, scrapes, bruises, sprains and strains).

2.2 The likelihood that first aid will be required for a workplace injury or illness is significant. First aid services prevent the escalation of minor injuries into presentations that are more complex or life threatening events. Examples of injuries, illnesses or events that can occur in the workplace are:

- a) bleeding from wounds or embedded objects;
- b) shock reactions from a crush injury;
- c) head, neck and spinal injuries from falls;
- d) exacerbation of heart related conditions (for example, angina);
- e) fractures, sprains, strains and dislocations from equipment use;
- f) exposure to extremes of hot and cold environments;
- g) burns from hazardous chemicals; and
- h) prior medical conditions that can be symptomatic in the workplace such as epilepsy, asthma and diabetes.

2.3 Employers should provide first aid that is appropriate to the hazards and risks identified within the organisation.

2.4 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

2.5 This Part provides practical guidance to employers on how to meet their duty of care under the Act. Specifically, it deals with the provision of appropriate first aid services to the employer's employees as required under subsection 16(5)(c) of the Act.

SCOPE

2.6 This Part applies to all workplaces covered by the Act and includes all work locations within the control of the employer.

- 2.7 This Part is not intended to replace the need for expert medical assistance. Employees should be advised to seek medical assistance for matters that require a diagnosis or medical treatment outside of the scope and training of the first aid officers.
- 2.8 Where specific hazards have been identified, the employer may deem it necessary to add to or increase first aid services. This can be achieved by using the risk assessment process detailed in Part 1 of this Code of Practice and in consultation with the health and safety representatives, first aid officers and employees.
- 2.9 This Part has been divided into two sections to assist employers. The first section deals with first aid provisions applicable to all workplaces and the second section deals with workplaces where high-risk activities and tasks are performed.

DEFINITIONS

'Automatic External Defibrillator' – refers to a medical device, capable of being used safely by people with minimal first aid experience or training, designed to administer a shock that may restart the heart when there are no detectable signs of life other than a heart rhythm.

'Cross infection' – means the transmission of disease from infected employees to first aid officers or the infection of injured employees during the administration of first aid procedures. Control of infection depends on identifying the mode of spread and interrupting the cycle of infection, replication and spread. Use of disposable, single use equipment in first aid kits and procedures prevents directly inoculating the next injured employee with microbes from the first.

'Designated person' – means a person appointed by the employer as the first aid officer.

'First Aid Officer' – means a person, appointed as a first aid officer by the employer, who holds a current approved first aid qualification from a nationally accredited course that has been delivered by a Registered Training Organisation.

'First aid' – means the initial care of the ill or injured. First aid begins when a first aid officer arrives on the scene of an incident, and continues until the casualty recovers, or medical aid arrives. The first aid officer may be required to remain and assist (*(Australian First Aid handbook (St John's Ambulance 2nd Ed)*).

'First Aid Service' – means a service for the provision of first aid treatment for persons suffering illness or injury at work.

'First Aid Provider' – means a provider of first aid training that is nationally accredited.

'High-risk work' – means any work that involves a high likelihood of injury or illness for which the consequence of injury is severe. The type of injuries can include – contusions or fractures, gunshot wounds, blast or knife injuries, sunburn, sprains and strains and burns or poisoning from a hazardous substance. High-risk workplaces where high-risk activities are undertaken may include working:

- a) at heights;
- b) in high-risk confined spaces;
- c) where people (custodial) or animals are restrained (laboratories);
- d) where there is a high-risk of workplace violence or traumatic injury;
- e) with plant, equipment and instruments that can cause traumatic injury;

- f) with hazardous substances, biological hazards, explosives and dangerous goods; and
- g) with hazards associated with sources of energy including electricity and radiation.

'Medical aid' – means treatment by a doctor, registered nurse or ambulance officer.

'RTO' (*Registered Training Organisation*) – A RTO is a Registered Training Organisation deemed competent by a State or Territory authority to deliver nationally recognised training for a particular industry. Training delivered by a RTO results in a qualification that is part of the Australian Qualifications Framework.

RESPONSIBILITIES OF EMPLOYERS

Identify vaccination needs

2.10 Employers should develop guidelines on vaccinations for employees, specifically first aid officers, who may be at risk of contracting a serious infections disease. Please refer to Part 6 paragraphs 6.19- 6.26 for further guidance on vaccination protocols.

Identify workplace groups

2.11 Workplaces differ in size and work type and the groups categories in this Part will assist employers to determine which group applies to them. There are three (3) groups categorised.

Group A	a) any workplace at which 100 or more employees work; or
	b) any high-risk workplace with 25 or more employees.
Group B	a) any workplace with more than 10, but fewer than 100 employees; or
	b) any high-risk workplace with less than 25 employees.
Group C	a) workplaces with 10 or less employees. This includes mobile workplaces, aircraft, vehicles and small vessels or mobile plant (does not apply to high-risk work).

Provide first aid kits

2.12 Employers should ensure that each workplace has at least one first aid kit that meets the minimum requirements as detailed in paragraph 2.21 unless paragraph 2.17 applies.

2.13 With reference to the three groups detailed in paragraph 2.11 of this Part, employers should provide the following number of first aid kits.

Group A	a) any workplace other than a high risk workplace – at least one kit provided for the first 50 employees; 2 kits for 100 and one additional kit for every 100 employees thereafter; or
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b) **high-risk workplace** – at least one kit provided for the first 25 employees and one (1) additional kit for every 50 employees thereafter.

Groups B, C a) at least one kit is to be provided for employees.

2.14 Employers should ensure that where reasonably practicable, first aid kits are left unlocked.

2.15 Employers should ensure that all first aid kits and the contents purchased for the workplace are included on the Australian Register of Therapeutic Goods (ARTG) as administered by the Therapeutic Goods Administration (TGA).

2.16 Employers should purchase first aid kits that meet, or exceed, the following specifications:

- a) constructed of impervious material that is dustproof and of sufficient size to adequately store the necessary contents;
- b) capable of being sealed and preferably fitted with a carrying handle for ease of movement;
- c) internal storage compartments that will enable items to be easily accessed; and
- d) clearly labelled outside with a white on green sign with the words 'First Aid' and/or a white cross on a green background.

2.17 Employers should consider providing personal protection packs for employees where the work activities and tasks are conducted away from the regular place of work and carrying a first aid kit (refer to paragraph 2.21) is impractical. This can include those employees who perform work duties on foot, bicycles, in open or remote environments and whenever they do not have ready access to a first aid kit.



Note: Vehicles, small vessels, ships and aircraft are considered premises under the Act and are therefore a workplace.

Determine locations for first aid kits

2.18 Employers should locate first aid kits so that:

- a) they are in a prominent and accessible location, with a first aid sign which includes the contact numbers of the first aid officers and emergency services;
- b) they are clearly visible to all employees;
- c) they are close to locations that have been identified as being high risk areas in accordance with any risk assessment;
- d) they are in a place that will take an employee no longer than two minutes to reach (including time required to access secure areas);
- e) there is a minimum of at least one kit on each alternate level in a multi-storey workplace;
- f) they are immediately accessible in remote areas or areas of specific hazards such as:

- (i) dangerous goods (for example, gas, corrosives, poisons, pesticides, explosives or any other hazardous substance or dangerous goods);
- (ii) machinery and/or equipment (for example, on construction sites, in manufacturing and warehousing buildings); and
- (iii) remote areas where professional medical assistance may be delayed or absent.

Supply contents for first aid kits

2.19 The contents of first aid kits should be single use and disposable to avoid the risk of cross infection to the first aid officer or any other person. Cross infection can occur when contaminated equipment (for example, steel scissors or tweezers) is re-used after contact with an infected person via blood, blood borne products and human waste.

2.20 Employers should ensure that first aid kits do not contain analgesics and antiinflammatories. Analgesics and antiinflammatories are a medical treatments that can mask symptoms, influence diagnosis and should not form part of the first aid procedures in accordance with best practice guidelines for first aid officers.

2.21 Employers should adopt the following list as the minimum requirement for any first aid kit. It should be noted that this list does not exclude the addition of other first aid items deemed necessary for high-risk workplaces or remote environments.

Minimum requirements for first aid kits

Description	Group A (Qty / Kit)	Group B (Qty / Kit)	Group C (Qty / Kit)	Personal Kit
Dressing Strips – Plastic (50)	2	1	1	1 (25)
Antiseptic – Swabs	20	10	10	2
Gloves Latex – Large (pair)	3	2	1	1
Dressing tape (hypoallergenic) 25mm	1	1	1	1
Amputation Bag Set in Envelope	1	1	1	NA
Bandage Conforming 5cm	2	1	1	NA
Bandage Crepe 10cm	2	1	1	1
Triangular Bandage	6	2	1	1
Dressing Wound – No. 142P	2	1	1	1
Dressing Wound – No. 13P	2	1	NA	NA
Eye pad – Sterile Single	3	1	1	1
Non Adherent Dressing 7.5 x 7.5cm	2	2	1	1
Emergency Blanket (space)	1	1	1	NA
Scissors – disposable	1	1	1	NA
Splinter probes – disposable sterile	10	5	5	1

Description Continued	Group A (Qty / Kit)	Group B (Qty / Kit)	Group C (Qty / Kit)	Personal Kit
Sodium Chloride 30ml	6	3	3	N/A
First Aid Pamphlet Insert	1	1	1	1
Resuscitation Face Shield / Mask (disposable)	1	1	1	1
First Aid Manual	1	1	NA	NA

Determine the need for additional first aid equipment or supplies

2.22 Additional first aid equipment (for example, Oxygen or an Automatic External Defibrillator (AED)) may be used in any workplace where:

- a) a specific hazard exists that requires the equipment;
- b) a need is identified from a risk assessment because of the location or type of work; or
- c) a requirement for additional first aid equipment is determined in consultation with first aid officers, employees and/or their representatives.

2.23 When employers elect to have an AED in the workplace they should ensure that:

- a) the AED is located in a clearly visible location (for example, a main reception or foyer area);
- b) the AED is accessible to all employees and other persons within the workplace;
- c) there is clear signage in the workplace which identifies the location of the AED; and
- d) regular maintenance inspection procedures are established to ensure that the AED is operational and the pads are not out of date.

2.24 When employers elect to have oxygen units in the workplace they should ensure that:

- a) the oxygen unit and oxygen cylinders are located in a secure and safe storage area that is accessible to first aid officers who are trained by a first aid provider to use the oxygen equipment; and
- b) regular maintenance inspection procedures are established that will ensure the unit is operational at all times.

2.25 Employers should provide additional training, as determined by a first aid provider, to first aid officers in the use of any first aid equipment that is provided by the employer.

2.26 Some examples of commonly needed additional contents for first aid kit include eye, burns and remote workplace modules. These additional modules may include:

- a) for eye injuries – additional quantities of sterile eye wash ampoules, eye pads and adhesive tape 1.25cm;

- b) for burns – additional non-stick or low adherent dressings in a variety of sizes and extra sterile saline solution; and
- c) for remote areas – additional quantities of sterile eye wash ampoules, sterile eye pads, adhesive tape 1.25cm, spray or wipe itch relief solution and sunscreen protection (minimum 30+ is recommended).

Undertake maintenance and replenishment of first aid kits

- 2.27 An employer should organise for the re-supply and maintenance of all kits and equipment that have been supplied for use by first aid officers and employees.
- 2.28 An employer should ensure that any items used from the first aid kits are replaced at the earliest opportunity.
- 2.29 The employer should delegate responsibility within each workplace for the checking and restocking of first aid kits. Alternatively, arrangements for on-site restocking of first aid kits can be made using a reputable first aid provider.

Note: Where an employer uses the services of a first aid provider to restock kits, they should check that the items being added are in accordance with the provisions detailed in paragraphs 2.19, 2.20 and 2.21 of this Part.

Allocate first aid officers

- 2.30 Employers should ensure that there are first aid officers in each workplace group as defined in paragraph 2.11. The number of first aid officers should be according to the following:
 - a) in workplace groups A and B with no specific hazards or high-level risks, the minimum requirements are:
 - (i) one first aid officer for 25 to 50 employees inclusive;
 - (ii) two first aid officers for 51 to 100 employees;
 - (iii) an additional first aid officer for every additional 100 employees.
 - b) in workplace groups A and B where specific hazards exist or high-level risks are identified, the minimum requirements are:
 - (i) one first aid officer for up to 25 employees;
 - (ii) two first aid officers for 25 to 50 employees;
 - (iii) an additional first aid officer for every additional 50 employees.
 - c) in workplace group A with less than 25 and group C with no specific hazards or high-level risks, a risk assessment may identify the need to provide a first aid officer.
- 2.31 The risk assessment undertaken for paragraph 2.30(c) workplaces should take into account factors that include:
 - a) the size and layout of the workplace;
 - b) access to trained first aid officers or other first aid services (first aid officers for shopping malls);
 - c) the location of the workplace and the distance to the nearest available ambulance or medical services;

- d) the number and distribution of employees including shift work arrangements and the isolation of employees whilst at work;
- e) the nature and specific hazards and risks of the work being performed; and
- f) any previous occurrences of accidents (including any injuries) in the workplace.

2.32 Employers should conduct a risk assessment to identify the need to increase the number of first aid officers in any a workplace.

2.33 Employers should ensure that any decision to determine and alter the number of first aid officers is undertaken in consultation with employees and/or their representatives, the health and safety representatives or health and safety committees.

Provide training for first aid officers

2.34 Employers should ensure that all designated first aid officers hold current first aid qualification from a recognised RTO.

2.35 Employers should ensure that they use an accredited RTO that can provide a nationally recognised certificate. Employers can choose to set up their own in-house training courses using accredited first aid trainers or contract out their first aid training.

2.36 Employers should ensure that all training for first aid officers is undertaken in accordance with the recommended minimum training levels as follows:

- a) **First Aid Officer –**
 - (i) Workplace Level II First Aid qualification; or
 - (ii) Senior First Aid (or equivalent);
- b) **Person in Control of a First Aid Room –**
 - (i) Suitably qualified and trained person, for example, First Aid Officer, Occupational First Aid qualification (or equivalent) or Registered Nurse.

2.37 Employers should ensure that the qualifications of the trainer and the resources used to undertake the training of first aid officers is appropriate to the needs of the workplace.

Provide and maintain first aid rooms where required

2.38 Employers should provide a first aid room:

- a) for Group A workplaces with more than 200 employees; or
- b) where the workplace is considered high-risk and has more than 25 employees.

2.39 Each first aid room and the equipment is the responsibility of at least one (1) employer designated first aid officer. This officer should be suitably qualified and trained (refer to paragraph 2.36).

2.40 When an employer provides a first aid room, they should ensure that it is available at all times for any ill or injured employee. However, it may be used for other situations, for example:

- a) breast-feeding mothers; or

- b) short-term rest room (where employees are not in need of first aid but require a short-term rest).

2.41 A first aid room should not be used as a childcare area, for children who are ill, a workplace or a storage room other than for first aid supplies and first aid equipment.

2.42 Employers should ensure that a first aid room:

- a) is suitably located and accessible;
- b) has convenient access for transport of ill or injured employees;
- c) is well lit;
- d) is well ventilated;
- e) has access to toilet and hand washing facilities;
- f) is of sufficient size to allow for easy movement within the room and allow for stretcher access by ambulance/medical services; and
- g) has an entrance that is clearly marked 'FIRST AID'.

2.43 Employers should provide the following items for a first aid room:

- a) first aid kit;
- b) sink or wash basin with hot and cold running water;
- c) approved hand washing solution in a pump pack dispenser along with disposable paper towelling;
- d) work bench and/or a dressing trolley;
- e) lockable cupboard;
- f) sufficient storage for clean dressings, utensils and linen;
- g) 'contaminated waste' bags with appropriate holder;
- h) bed, couch or stretcher, blankets, sheets and pillowcases;
- i) table or desk;
- j) telephone and/or emergency call system; and
- k) an injury register and/or a casualty report form.

Develop and implement a first aid policy

2.44 Employers should develop and implement a first aid policy to ensure that employees have a clear understanding of first aid arrangements within their workplace. This policy should form part of the Health and Safety Management Arrangements (HSMA). A first aid policy could include items such as:

- a) the numbers of first aid officers and their distribution;
- b) arrangements for any initial and ongoing training of first aid officers;
- c) the role of the first aid officers in any emergency plans including the wearing of any safety clothing and personal protective equipment (for example, reflective vests for visibility or hard hats for construction sites);
- d) arrangements for transportation to a hospital if required and the responsible person for payment of that transport in the event of any injury or illness whilst at work;

- e) the basic responsibilities of first aid officers including:
 - (i) familiarization with the location and responsibilities associated with the first aid kits in their workplace;
 - (ii) the proper use of the first aid kits that are provided;
 - (iii) the appropriate response to requests for first aid assistance in their workplace;
 - (iv) the rendering of first aid assistance in their workplace to employees and other persons within the level of training and the scope of responsibilities of the position;
 - (v) the documentation process for all situations where first aid has been administered;
 - (vi) where appropriate, the arrangements for ambulance or additional medical assistance;
 - (vii) the maintenance, stocking and cleaning of first aid kits when alternative arrangements are not made by the employer; and
- f) informing employees within their workplace of the location and use of first aid kits and first aid rooms.

2.45 Employers should ensure that a first aid policy details the need for first aid officers to advise an employee to seek medical attention or arrange for transportation to a medical facility when the first aider is unsure of the nature or extent of the injury or illness.

2.46 A first aid policy should detail the process for transportation by ambulance or a vehicle with an attendant who is not the driver. Employers should transport casualties by ambulance when:

- a) the injury or illness is serious or life threatening;
- b) the employee may lose or has lost consciousness;
- c) the injury or illness is unable to be determined; or
- d) the employee's condition is likely to become worse whilst being transported to a medical facility.

Provide information to employees on first aid procedures

2.47 Employers should provide employees with information on:

- a) the nature and location of first aid facilities in their workplace;
- b) the names, work locations and phone numbers of their first aid officers; and
- c) the procedures to be followed when first aid is required for example, first contact in the event of a first aid situation.

Note: First aid contact -This should be the first aid officer or, in their absence, his/her immediate supervisor.

2.48 Employers should ensure that all employees are provided with information on current first aid procedures when:

- a) an employee first commences with an organisation as a part of the induction process;

- b) there is significant change in the personnel, the workplace, the nature or type of duties performed; and
- c) there are specific hazards or high-risk work practices in the workplace.

Retain records on first aid incidents

- 2.49 Records of any injuries or illnesses requiring first aid management should be retained by the employer and using a secure storage facility to ensure confidentiality.
- 2.50 Employers should ensure that all records relating to first aid incidents are kept confidential and are retained for a minimum period of seven years.

EMPLOYERS IN CONTROL OF HIGH-RISK WORK

Identify hazards in high-risk workplaces

- 2.51 Employers should identify any high-risk activities, locations or environmental conditions that may pose a serious risk to employees to determine if additional first aid services or equipment is required.
- 2.52 The identification of hazards for high-risk work should be done in consultation with employees, health and safety representatives and first aid officers.

Assess the risks

- 2.53 When assessing the risks relating to high-risk work employers should follow the process outlined in Part 1 of this Code of Practice. Employers should consider the following issues when determining the likelihood and consequences associated with the identified hazards:
 - a) access to the workplace including security controlled or limited access workplaces;
 - b) the type and level of risk associated with the work being carried out;
 - c) known occurrences of incidents or accidents;
 - d) size and layout of the workplace;
 - e) location of the workplace;
 - f) number and distribution of employees including arrangements such as shift work, overtime, flexible hours and multiple work locations; and
 - g) distance to the nearest available and appropriate medical service, occupational health service or ambulance service.
- 2.54 In high-risk workplaces and remote locations, additional equipment such as oxygen and/or an AED may be required. This should be based on the risk assessment performed. When determining the training and equipment requirement, an employer should consider:
 - a) the distance from ambulance services and the expected call out times;
 - b) the type of high-risk work being undertaken;
 - c) the risk of injury or death; and
 - d) the availability of other medical support.

Provide additional first aid arrangements for high-risk work

2.55 Based on the results of any risk assessments, employers should decide whether additional arrangements for the provision of first aid services are necessary. Employers may also benefit by consulting with a first aid specialist or an RTO to determine what services or equipment may be suitable.

2.56 Additional provisions for first aid services may include:

- a) adding to the minimum content requirements of first aid kits;
- b) additional equipment, for example, Oxygen and/or AED's (taking into consideration the guidance detailed in paragraphs 2.22-2.24 of this Part);
- c) increasing the number of first aid kits in the workplace;
- d) the provision of a first aid room where the number of employees is less than 25;
- e) the provision for suitable means of communication in the workplace or whilst employees are at work (for example, mobile phones and two-way radio transmitters);
- f) the provision of suitable methods and additional equipment when there is a need to move the ill or injured (for example, a wheelchair or a portable stretcher);
- g) additional training for first aid officers where it has been identified on a risk assessment (for example, advanced first aid, advanced resuscitation or occupational first aid training);
- h) increasing the number of first aid officers; or
- i) adding additional equipment to first aid rooms.

2.57 When a workplace stores or uses chemicals, hazardous substances and/or dangerous goods, specialised first aid arrangements should be provided according to the directions on the relevant Material Safety Data Sheet (MSDS). Facilities may need to include emergency showers, eyewash stations and when required, poison antidotes.

2.58 If the workplace is a remote location, employers should consider remote area training for the First Aid Officer and the provision of remote area first aid kits.

RESPONSIBILITIES OF EMPLOYEES

2.59 Employees should report any injury or illness that occurs at work to their first aid officer or, in their absence, the employee's immediate supervisor.

2.60 Employees should follow all workplace procedures and directions with regard to first aid provisions. Specifically employees should:

- a) use first aid kits in accordance with the first aid policies and procedures;
- b) notify the employer designated first aid officer before using any first aid room;
- c) report any incidents that have resulted in an illness, injury or dangerous occurrence to the employer as soon as is practicable; and
- d) attend any training and information sessions concerning first aid procedures and induction familiarisation.

PART 3 – NOISE

INTRODUCTION

- 3.1 Occupational noise-induced hearing loss (NIHL) is a major health risk for employees in the workplace. The condition is irreversible and can lead to the degradation of a person's quality of life due to communication difficulties. Inability to communicate can also be a factor in interpersonal relationship problems and cause social isolation.
- 3.2 Hearing aids may improve the ability to hear but the damage to the hearing organs cannot be fully restored. Of those people affected with NIHL, 20 per cent or more also suffer from tinnitus (ringing in the ears) which is debilitating in itself and can contribute to other serious conditions such as Depression.
- 3.3 Exposure to excessive noise can also result in largely unrecognised costs to organisations by way of increased employee turnover, absenteeism and lowered performance and may be a factor in other, not directly related, accidents. Apart from the substantial economic cost to organisations, hearing loss can affect the health care and social services systems and the Australian economy as a whole.
- 3.4 For the purposes of the Safety Standards Regulations the exposure standard for noise in the occupational environment is an eight-hour equivalent continuous A-weighted sound pressure level, ' $L_{Aeq,8h}$ ', of 85 dB(A). For peak noise, the exposure standard is a C-weighted peak sound pressure level, ' $L_{C,peak}$ ', of 140dB(C). The exposure to noise is measured at the employee's ear position without taking into account any hearing protection.
- 3.5 Over long periods, repeated exposure to noise between 75 and 85dB (A) maybe a small risk to some people. With progressively increasing levels, the risk becomes greater. Workplace noise levels lower than the national standard is therefore desirable, if practicable.
- 3.6 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

- 3.7 This Part aims to provide practical guidance to duty holders on how to meet their duty of care under the Act and Part 3 Noise of the Safety Standards Regulations.

SCOPE

- 3.8 This Part aims to provide guidance on noise management for employers in all workplaces covered by the Act. It provides guidance in addition to that provided in Part 3 Noise of the Safety Standards Regulations.
- 3.9 This Part should be read in conjunction with Part 5 Vibration of this Code of Practice as exposure to vibration caused by machinery can also combine with noise to increase the risk of hearing loss.

DEFINITIONS

'Administrative noise control' – as defined in 3.02 of the Safety Standards Regulations.

‘A-weighting’ – refers to a standardised frequency response used in sound measuring instruments as specified in *IEC 61672.1:2004 – Electroacoustics – Sound level meters – Specifications*.

‘C-weighting’ – refers to a standardised frequency response used in sound measuring instruments as specified in *AS IEC 61672.1:2004 – Electroacoustics – Sound level meters – Specifications*.

‘Daily noise exposure level’ – see definition for ‘ $L_{Aeq, 8h}$ ’.

‘dB’ – means the abbreviation for decibel.

‘dB (A)’ – means A-weighted sound pressure level in decibels. See definition for A-weighting.

‘dB(C)’ – means C-weighted sound pressure level in decibels. See definition for C-weighting.

‘Decibel’ – is the unit used to indicate the relative magnitude of sound pressure level and other acoustical quantities. The range of sound pressures commonly encountered is very large so a logarithmic scale is used. The decibel is the unit used on this scale and is abbreviated to dB. On the decibel scale, the threshold of hearing occurs at a sound pressure level of about 0dB and the threshold of pain occurs in the 110dB to 130dB range. As the decibel is also used to describe the level of other quantities, such as sound power and vibration acceleration, it is always necessary to refer to the specific quantity being measured, for example, $L_{Aeq, 8h}$ or $L_{C, peak}$.

‘Engineering noise control’ – as defined in 3.02 of the Safety Standards Regulations.

‘Exposure standard’ – means the maximum level for noise exposure in the workplace as set out in 3.03(1) of the Safety Standards Regulations.

‘Hearing protector areas’ – means areas where persons may be exposed to excessive noise. During normal operations, no person should enter such an area without wearing appropriate personal hearing protectors. Hearing protector areas should be clearly defined and sign-posted according to *AS 1319:1994 – Safety signs for the occupational environment*.

‘ $L_{Aeq, 8h}$ ’ – eight-hour equivalent continuous A-weighted sound pressure level in dB(A) referenced to 20 micro Pascals means that steady noise level which would, in the course of an eight-hour period, cause the same A-weighted sound energy as that due to the actual noise over an actual working day. This is determined in accordance with *AS/NZS 1269.1:2005 – Occupational noise management – Measurement and assessment of noise immission and exposure*.

‘ $L_{C, peak}$ ’ – peak noise level means C-weighted peak sound pressure level in decibels (dB(C)) referenced to 20 micro Pascals determined in accordance with *AS/NZS 1269.1:2005 – Occupational noise management – Measurement and assessment of noise immission and exposure*.

‘Noise assessment’ – as defined in 3.02 of the Safety Standards Regulations.

‘Noise emission’ – is defined in *AS/NZS 1269.0:2005 – Occupational noise management – Overview* as the sound radiated into the environment or to a defined position from a defined source such as a machine or equipment.

'Noise immission' – Describes the influx of sound at a particular location from all sources such as machines, equipment, activities and the environment.

'Occupational noise-induced hearing loss (NIHL)' – means hearing impairment arising from exposure to excessive noise at work. Occupational noise induced hearing loss is also commonly known as industrial deafness.

'Personal hearing protector program' – means a program for personal hearing protection and, when required, regular hearing testing, which is adopted when technical or economic problems delay, or make impracticable, the reduction of exposure to excessive noise by engineering or administrative noise control measures.

'Personal hearing protectors' – mean a device, or pair of devices, worn by a person or inserted in the ears of a person to protect that person's hearing.

'Plant' – as defined in section 5 of the Act.

'Relevant plant' – as defined in 3.02 of the Safety Standards Regulations.

'SLC₈₀ rating' – The SLC₈₀ rating of a hearing protector, is derived from a test procedure as outlined in the AS/NZS 1270:2002 – *Acoustics – hearing protectors*. It is a numerical guide to the level of noise attenuation that can be expected from a particular hearing protector device (HPD).

'Table of noise exposure levels and exposure times equal to a L_{Aeq, 8h} of 85dB (A)' below shows the exposure time for noise levels of 85 dB (A) and greater. The measurement of decibels is logarithmic; an increase of 3dB requires a halving of the exposure period to give the same noise energy.

Noise level measured in dB(A)	Exposure time
85	8 hrs
88	4 hrs
91	2 hrs
94	1 hr
97	30 mins
100	15 mins
103	7.5 mins
106	3.8 mins
109	1.9 mins
112	57 secs
115	28.5 secs

Noise level measured in dB(A)	Exposure time
118	14.3 secs
121	7.1 secs
124	3.6 secs
127	1.8 secs
130	0.9 secs

'Tinnitus' – means ringing in the ears.

RESPONSIBILITIES OF MANUFACTURERS, SUPPLIERS AND INSTALLERS

Design and construct plant with safe noise levels

3.10 Manufacturers, suppliers and installers of relevant plant must comply with Part 3 Noise of the Safety Standards Regulations.

Note: refer to the 'AS/NZS 1269.1:2005 – Occupational noise management – Measurement and assessment of noise immission and exposure' for further information on noise exposure.

3.11 Manufacturers and suppliers should conduct research, design, development and construction of plant with the intention of minimising noise emission.

Manufacturers and suppliers should consider:

- a) the goals for noise reduction and the noise control policies of employers;
- b) budgets that will allow for effective noise controls;
- c) the effect on overall noise levels of building reverberation, the possible building layout and location of workstations relative to the plant;
- d) the transmission of noise through structures and ducts; and
- e) ways to reduce noise emissions in plant rooms and control rooms where appropriate.

3.12 When deciding whether plant is likely to create noise, manufacturers and suppliers should consider the range of uses, the available information on the conditions under which it is likely to be used and the foreseeable methods of use.

3.13 Manufacturers should:

- a) give employers access to results of noise emission measurements; and
- b) provide information on the means of installation, maintenance and use of plant that will enable it to generate the lowest possible noise levels.

3.14 Suppliers and installers should ensure that adequate information is available to employers prior to supply of the plant. The information should include:

- a) the results of noise emission measurements; and
- b) the procedures for achieving the lowest possible noise emission level during the installation, maintenance and operation of the plant.

RESPONSIBILITIES OF EMPLOYERS

Identify hazards

3.15 Employers must comply with Part 3 Noise of the Safety Standards Regulations and should read the *National Code of Practice for Noise Management and Protection of Hearing at Work* [NOHSC: 2009 (2004)] on which this Code is based, and *AS/NZS 1269.1:2005 – Occupational noise management – Measurement and assessment of noise immission and exposure*.

3.16 When identifying noise hazards employers should consider:

- Part 1 Risk Management of this Code of Practice; and
- the potential for noise exposure including:
 - multiple sources of noise exposure;
 - frequency;
 - duration of exposure; and
 - proximity of employees and contractors to the source of the noise.

3.17 When identifying noise hazards, employers should consult with those who understand the work processes as well as affected employees, contractors and/or their representatives or the health and safety representatives. It is recommended that employers engage a noise specialist if unsure of the noise levels.

Note: Subjective inspection or acoustical measurement of an identified noise hazard can determine how and where the noise is generated. It is recommended that employers engage a noise specialist if unsure of the noise level.

3.18 A walkthrough inspection of the workplace should identify noise emitting processes and tasks. Employers should source further information from plant manufacturers and suppliers if required.

Note: As an informal guide, when a raised voice is needed to communicate with someone one metre away, a workplace noise assessment should be considered.

Assess the risks

3.19 When the noise exposures of employees or contractors have been identified as likely to exceed the exposure standard, the employer must arrange for a noise assessment and a subsequent noise assessment in 5 years (Safety Standards Regulation 3.07).

3.20 If there is a change in the practices or administration after a noise assessment has been carried out and the employees or contractors may be exposed to a significant increase in the noise level because of the change, then the employer must revise the noise assessment or arrange for new noise assessment.

3.21 Employers should ensure that people who have the appropriate qualifications and experience carry out noise assessments.

3.22 Employers should consult with employees to determine the requirement for a noise assessment and time intervals between noise assessments.

3.23 Employers should carry out noise assessments whenever there is:

- a) installation, modification or removal of machinery that is likely to cause a significant change in noise levels;
- b) a change in workload or equipment operating conditions likely to cause a significant change in noise levels;
- c) a change in building structure likely to affect noise levels; or
- d) modification of work arrangements affecting the length of time employees would spend in noisy workplaces.

3.24 In workplaces where exposure is marginally below the exposure standard, employers should arrange for a noise re-assessment whenever there are changes that may increase exposure.

Implement risk control measures

3.25 Employers must not expose employees and contractors to noise, at or near the place of work, from plant or systems of work that exceeds the noise exposure standard (Safety Standards Regulation 3.08).

3.26 Employers should consider information on noise levels prior to purchasing plant and machinery, when determining the production methods and before implementing work systems and processes.

3.27 Employers should implement controls, which reduce the source of the noise by replacing the machine, or its operation, with a quieter machine or operation with equal or better efficiency.

3.28 Employers should prioritise the implementation of control measures according to the risk profile by controlling the noise sources that expose employees and others to peak noise levels above the exposure standard as well as those noise sources that produce the highest exposures affecting the largest number of people.

3.29 If the employees or contractors are exposed to noise levels above the exposure standard, employers must firstly implement engineering noise controls, then administrative controls and where these are not fully effective provide appropriate hearing protectors (Refer to paragraph 3.58 of this Part for further information on hearing protectors) and (Safety Standards Regulation 3.08).

Use engineering controls

3.30 Engineering treatment of the source is the preferred method of controlling noise in the workplace. Since all noise-emitting objects generate airborne energy (noise) and structure-borne energy (vibrations), the treatment of these noise problems may require modification, partial redesign or replacement of the noise-emitting object. Employers should consider:

- a) engineering treatment of the source; and
- b) engineering treatment of the noise transmission path, which can include enclosure of the operator.

3.31 When implementing engineering noise control measures with treatment at the source, employers should consider solutions such as:

- a) replacing the noisy machinery by installing newer equipment designed to operate at lower noise levels. The power sources and the transmission paths of the machinery should be designed to give quiet speed regulation (for

example, use of stepless electric motors). A vibration source can be isolated and treated within the machine. Cover panels and inspection hatches on machines should be stiff and well damped. Cooling fins can be designed to reduce the need for forced airflow and hence fan noise;

- b) correcting the specific noise source by minor design changes (for example, avoid metal-to-metal contact by using plastic bumpers, replacing noisy drives with quieter types and using improved gears);
- c) providing a high standard of plant and equipment maintenance to reduce noise levels to as low as practicable. Worn bearings and gears, poor lubrication, loose parts, slapping belts, unbalanced rotating parts, steam and air leaks all create noise which can be reduced by good maintenance;
- d) correcting the specific machine elements causing the noise rather than considering the entire machine as a noise source (for example, consider adding noise barriers, noise enclosures, vibration isolation mountings, lagging to dampen vibrating surfaces, mufflers or silencers for air and gas flows and reducing the air velocity of free jets);
- e) separating the noisy elements which need not be an integral part of the basic machine (for example, move pumps, fans and air compressors that service the basic machine away from employees); and
- f) isolating vibrating machine parts to reduce noise from vibrating panels or guards.

3.32 In addition to engineering changes to machinery and parts, employers can modify processes to reduce noise. Modification of processes can include some inherently quieter alternatives such as:

- a) mechanical pressing rather than drop forging;
- b) avoiding or reducing metal-to-metal impact; and
- c) suppressing vibration of the materials against the machinery surfaces during processing. This is achieved by selecting materials that are less likely to vibrate, by reducing stiffness and damping surfaces or by careful dynamic balancing.

3.33 Employers should consider modifying material handling processes to ensure that impact and shock during handling and transport are minimised as far as possible. This may be achieved by:

- a) minimising the fall height onto hard surfaces of items collected by tables and containers;
- b) fixing damping materials or stiffening, tables, walls, panels or containers where they are struck by materials or items during processing;
- c) absorbing shocks through the provision of wear resistant rubber or plastic coatings;
- d) using conveyer belts rather than rollers which are more likely to rattle; and
- e) controlling the speed of processes to match the desired production rates. This provides a much smoother workflow and there is less likelihood of noise generation due to stop-start impact noise.

3.34 Employers should consider engineering treatment of the noise transmission path between the source and the employees if treatment at the source of the noise

emission is not adequate. Employers should use the noise transmission path principles in the following way:

- a) isolating the noise sources by fully enclosing the machine(s) or placing them in a room or building away from the largest number of employees;
- b) separating the noisy area by a sound-reducing partition;
- c) acoustically treating the area to reduce noise by using sound-absorbing material on floors, ceiling and walls; and
- d) using acoustical silencers in intake and exhaust systems associated with gaseous flow activity.

Use administrative controls

- 3.35 Where it is not practicable to comply with the exposure standard for noise solely through engineering noise control measures, employers must implement administrative noise control measures according to Step Two of the Safety Standards Regulation 3.08(3).
- 3.36 Whenever practicable, the level of noise exposure should be reduced to or below the exposure standard. If the exposure standard level cannot be achieved, the employer should establish procedures and processes to ensure that there is a reduction in noise levels.
- 3.37 Employers should establish work practices to ensure regular inspection and maintenance of engineering controls such as vibration mountings, impact absorbers, gaskets, seals, silencers, barriers, absorptive materials and other equipment used to control noise.
- 3.38 If administrative controls are used, employers should have a regular checking and monitoring program in place to ensure that the administrative controls are implemented as intended and applied correctly.
- 3.39 When reducing noise exposure by administrative noise control measures employers should consider the following changes to work arrangements:
 - a) organising schedules so that noisy work is done when as few people as possible are present;
 - b) the observance of quiet work practices;
 - c) notifying people in advance when noisy work is to be carried out so they can limit their exposure to it;
 - d) limiting the entry of persons to noisy work areas;
 - e) sign-posting noisy areas;
 - f) providing quiet rest areas for food and rest breaks; and
 - g) limiting the time employees spend in noisy areas by moving them to quiet work before their daily noise exposure levels become excessive.

Develop a noise control policy and program of action

- 3.40 The employer should develop in conjunction with employees and/or health and safety representatives and health and safety committees, a written noise control policy and program of action when excessive noise exists. The aim should be to minimise the generation of noise emission from plant and/or processes and limit exposure to peak and daily noise levels.

3.41 Copies of the policy and program of action should be available as part of the dissemination of information in general and through induction and training courses to all employees, contractors and/or their representatives or health and safety representatives. The information should be provided in the appropriate language so that access to information is provided to all persons. This policy should be reviewed at regular intervals and updated as necessary.

3.42 Employers should consider the following in the noise control policy:

- a) goals for minimising daily exposure levels and peak noise levels in existing work areas;
- b) the design objectives for new work areas (both for the building and plant);
- c) selection, acquisition and purchase of quiet plant;
- d) noise controls to be used in temporary work areas and situations;
- e) agreements with contractors in terms of responsibilities for noise control and provision of information on noisy processes;
- f) funding for the noise control program;
- g) regular review of the noise control programs;
- h) audiometric testing when required; and
- i) the process for access to any audiometric records to the employees and contractors who were the subject of the tests.

3.43 Employers should implement the steps in the noise management program in the agreed timeframes. Employers should include the following steps:

- a) assign a member of management to have overall responsibility for implementing and monitoring the program;
- b) conduct a preliminary noise hazard identification check to determine whether problems with exposure to noise are likely to exist;
- c) decide if the noise source can be eliminated;
- d) decide the type and detail of the noise assessments, the time interval between assessments and the persons responsible;
- e) develop a program for the selection of new or replacement plant so as to minimise exposure to noise;
- f) decide whether or not engineering noise control measures are practicable and the priorities to be given to different noisy situations;
- g) decide on suitable administrative noise control measures such as scheduling of work, job rotation, limiting the entry of persons to work areas and observance of quiet work practices;
- h) select, provide and maintain suitable personal hearing protectors;
- i) identify, with the use of appropriate signs, hearing protector areas;
- j) provide on-going training to employees;
- k) provide audiometric testing where employees are exposed to excessive noise;

- l) develop monitoring procedures that should include the following:
 - (i) check that measures used to control noise levels, such as silencers or enclosures, are maintained in good order and in position during the operation of noisy machines;
 - (ii) check, when it is necessary, the noise level to ensure that hidden defects are not causing exposure to increased noise levels;
 - (iii) monitor the use of personal hearing protectors;
 - (iv) check that personal hearing protectors are maintained in good condition;
 - (v) maintain relevant records and make them available to all employees and/or their representatives and health and safety representatives on request. The records should be kept in a form easily understood by those likely to be exposed; and
 - (vi) provide for periodic management review of the effectiveness of the noise control policy and noise management program.

Provide audiometric testing

- 3.44 As part of the noise control policy, employers should monitor the hearing of employees exposed to noise by the use of regular audiometric testing. The audiometric testing scheme should include an initial reference test with subsequent periodic monitoring audiometric tests to follow. The initial reference audiogram (baseline reading) should be taken as soon as the employee commences work or before there is any exposure to workplace noise.
- 3.45 Monitoring audiometry should be carried out within 12 months of initial work exposure for comparison with the results of reference (baseline) audiometry. In the absence of significant threshold shift or change in the work situation, it may then be sufficient to repeat the test at yearly intervals.
- 3.46 An audiometric testing program should be available to any employee likely to be routinely exposed to excessive noise even if they regularly use personal hearing protectors. Changes in hearing levels over time should be thoroughly investigated.

Note: At high $L_{Aeq, 8h}$ (daily noise exposure levels) equal or greater than 100dB (A) more frequent audiometric testing may be desirable.

- 3.47 Employers should ensure that qualified and competent people carry out audiometric testing and assessment of the audiograms. The procedures and equipment used should be in accordance with the specifications in AS/NZS 1269.4:2005 – *Occupational noise management – Auditory assessment*.
- 3.48 Employers should ensure that the audiometric monitoring is scheduled well into the work shift so that comparison with the reference audiogram can reveal any temporary threshold shift due to inadequacies in the use of personal hearing protectors.
- 3.49 The employer should ensure that at audiometric testing:
 - a) the hearing status of the employee is discussed with the employee;
 - b) the best type of personal hearing protectors for the job is discussed;

- c) the personal hearing protection equipment is properly fitted and appropriate to the noise level anticipated and the degree of hearing protection required;
- d) instructions on the use should be repeated at each subsequent attendance for audiometric testing;
- e) the results are given to employees and contractors within two months of the audiometric testing;
- f) all results are accompanied by a written explanation, in an easy to read form, with the meaning and implications;
- g) individual results should be released to other parties only on the written authority of the employee; and
- h) any unidentifiable individual results and group data should be accessible to the relevant employer and/or the health and safety representatives and the relevant authority.

3.50 When temporary or permanent threshold shifts are revealed through audiometric assessments or an employee reports a recent diagnosis of tinnitus, the employer should be informed so they can arrange:

- a) to review the employee's work tasks to identify any changes that may have caused an increase in exposure to noise;
- b) a reduction in the levels of noise that the employee exposure to and a reduction in the duration of that exposure;
- c) to verify the nominal performance of the employee's personal hearing protector is adequate for the level of exposure to noise;
- d) to examine the protector carefully and ensure it is not worn or damaged;
- e) to check the protector fits the employee closely and there are no leakage paths for noise;
- f) to ask the employee if they have any difficulty using the protector;
- g) to check the employee actually uses the protector correctly and consistently whilst performing work activities; and
- h) to deal with any problems revealed by the above procedure and refer to expert advice as necessary.

3.51 When employees have sufficient hearing loss to interfere with the safe performance of work tasks, employers should take all reasonably practicable steps to modify the work environment. This can include:

- a) volume control telephones;
- b) acoustically treated meeting areas with low noise and low reverberation;
- c) supplementary visual warning signals; and
- d) alternative work for the employee when the preceding steps do not remedy the situation.

3.52 The reference audiogram should be updated whenever a significant permanent threshold shift has occurred (revealed by audiometry) or every 10 years, whichever occurs sooner. Subsequent monitoring audiograms should then be compared with this most recent reference audiogram. Records of previous reference audiograms should be retained.

3.53 Audiometric test records of employees, when released to the employer, should be kept during the employees' period of employment and longer if necessary, as they may provide a useful reference for workers compensation. The records should be kept in a safe, secure place and held as confidential documents.

Provide training

3.54 Employers should provide training as an integral part of a preventive strategy. The target groups include:

- a) managers and supervisors of employees considered at risk of noise-induced hearing loss and tinnitus;
- b) employees and contractors who may be exposed to excessive noise at work;
- c) workplace health and safety committees and health and safety representatives; and
- d) staff responsible for the purchasing of plant, noise control equipment, personal hearing protectors and for the designing, scheduling, organisation and layout of work.

3.55 The training objectives should be:

- a) to minimise noise-induced hearing loss and tinnitus by a risk management approach that emphasises engineering noise control measures;
- b) to promote an understanding of noise-related health effects including the cumulative effects of workplace noise and other noise sources, for example, from domestic and leisure activities; and
- c) to promote the adoption of a systematic approach to the management of exposure to excessive noise.

3.56 The needs of each target group may be different and the content and methods of presenting training material should be tailored to meet the specific needs of each group. Handouts, prepared as simple guidelines related to the needs of the group being trained, should be provided for all participants. The workplace noise control policy and program of action should be readily available to all participants.

3.57 The contents of the training program should be aimed at prevention of noise-induced hearing loss and tinnitus and may include:

- a) a definition of noise and excessive noise;
- b) the effects of noise on hearing;
- c) the social handicaps of noise-induced hearing loss and tinnitus;
- d) an overview of the workplace noise control policies and programs of action;
- e) the nature and location of noise hazard areas in the workplace which may be associated with technology, plant and/or work practices employees use in the course of their employment;
- f) the general noise control measures in use or planned;
- g) the specific control measures in relation to each employees work activities. This should include instruction in the correct use and maintenance of measures which minimise noise levels such as exhaust silencers and enclosures;

- h) when and how to use personal hearing protectors provided. This should include:
 - (i) selection;
 - (ii) proper fit;
 - (iii) care and maintenance;
- i) the reporting arrangements for defects in plant or the workplace activities which are likely to cause exposure to excessive noise; and
- j) the purpose and nature of audiometric testing.

Provide personal hearing protectors

Note: It may be more practical to protect the operator(s) instead of enclosing the sound sources. Engineering controls are safer than using personal protective equipment, which impedes the wearer's ability to hear warnings, and should be considered first.

- 3.58 When engineering and administrative noise control measures do not reduce the employee's exposure to, or below, the exposure standard for noise, employers must supply employees and contractors with effective personal hearing protectors (Safety Standards Regulation 3.08(4)). Hearing protectors should be regarded as an interim measure until control of excessive noise is achieved by engineering or administrative measures.
- 3.59 The removal of personal hearing protectors for even short periods can significantly reduce the effectiveness and provide inadequate protection. For example, taking off personal hearing protectors in a noisy environment for a total of just 15 minutes in an eight hour day reduces the protector performance to just 15dB regardless of how good the protector is in theory.
- 3.60 Where the work environment is not conducive to wearing personal hearing protectors for long periods, employers should allow employees and contractors regular periods in quiet areas without personal hearing protectors as part of the personal protection program.
- 3.61 Employers should ensure that areas where people may be exposed to excessive noise are sign-posted, as hearing protector areas, and the boundaries of these areas are clearly defined. Where a designated excessive noise area is sign-posted, visitors, employees, managers, supervisors, contractors or any other person should not enter during normal operations without wearing appropriate personal hearing protectors. This is regardless of how long the person spends in the hearing protector area. Signage should conform to specifications in AS 1319:1994 – *Safety signs for the occupational environment*.
- 3.62 Where sign posting is not practicable, employers should make alternative arrangements to ensure that employees and others can recognise circumstances in which personal hearing protectors are required. Methods of achieving this include:
 - a) attaching prominent warning notices to tools and equipment indicating that personal hearing protectors should be worn when operating them;
 - b) providing written and verbal instructions on how to recognise circumstances in which personal hearing protectors are needed; and
 - c) ensuring effective supervision of identified hearing protector areas.

3.63 Employers should ensure that personal hearing protectors provide reliable and adequate protection. Personal hearing protectors should be selected and maintained in accordance with *AS/NZS 1269.3:2005 – Occupational Noise management – Hearing protector program*. The attenuation values used in all selection procedures should be derived from attenuation measurements made in accordance with *AS/NZS 1270:2002 – Acoustics – hearing protector*.

Hearing protector classification

Class	SLC80 range	LAeq,8h dB(A)
1	10 to 13	Less than 90
2	14 to 17	90 to less than 95
3	18 to 21	95 to less than 100
4	22 to 25	100 to less than 105
5	26 or greater	105 to less than 110

3.64 Suppliers of hearing protectors should provide full information on the attenuation likely to be provided including the SLC80 ratings, Class and octave band attenuation values. The supplier's reports should be made available to employees, contractors and/or their representatives and where appropriate health and safety representatives.

3.65 When selecting hearing protectors employers should consider:

- the degree of attenuation required in the employee and contractor's environment. Personal hearing protectors with unnecessarily high attenuation (noise reduction) may increase communication difficulties and be uncomfortable;
- the suitability for the type of working environment and the work activities. For example, earplugs are difficult to use hygienically in work that requires them to be inserted with dirty hands and therefore in these circumstances, earmuffs would be more appropriate. However, earmuffs tend to be more uncomfortable in hot environments, or may make it difficult for the wearer to enter a confined space or to wear a helmet;
- the comfort, weight and clamping force of the hearing protector; and
- individual fit which is critical for optimum protection. Wearing work equipment may affect the performance of the protector. This should be checked while the user is wearing regular work equipment, such as helmets and respiratory protective equipment. Where employees wear spectacles, they should be fitted with hearing protectors (earmuffs) while wearing the spectacles. Disposable plugs do not need individual fitting; however, the ability of the material to conform to the user's ear canal should be a consideration.

3.66 Employers should ensure that personal hearing protectors are regularly inspected and maintained. Adequate provision should be made for clean storage of the protectors when they are not in use. Facilities should be readily available for the cleaning of reusable protectors.

3.67 Employers should ensure employees and others in the workplace are given instruction in the use, fit, care and maintenance of personal hearing protectors. Employers, managers and supervisors should encourage the use of personal hearing protectors by explanation, personal example and ensure that they are used properly where and when required.

Note: If personal hearing protectors reduce the effectiveness of the Emergency Warning and Intercommunication System (EWIS), employers should consider alternatives such as flashing or strobe lights for example.

RESPONSIBILITIES OF EMPLOYEES AND CONTRACTORS

3.68 Section 21(1) (a) of the Act requires that employees take all reasonably practicable steps to ensure that they do not take any action, or make any omission, that creates a risk, or increases an existing risk, to their health or safety or to the health and safety of others at or near the workplace.

3.69 Section 21(1) (b) of the Act requires that employees co-operate with their employer or any other person holding a duty under the Act to enable them to fulfil that duty. Safety Standards Regulation 3.09(1) (a) also requires that employees at work comply with any noise control measures implemented.

3.70 Safety Standards Regulation 3.10(1) (a) requires that contractors at a workplace comply with any noise control measures implemented.

3.71 Employees and contractors should comply with all established workplace procedures and cooperate in all activities that have, as the objective, the minimisation of occupational noise-induced hearing loss. They should actively:

- a) participate in any training required; and
- b) contribute to ongoing monitoring and evaluation of noise control measures.

Use personal hearing protection provided

3.72 Section 21(1) (c) of the Act requires that employees use equipment, in accordance with any instructions given by their employer, consistent with its safe and proper use, and in the manner necessary to protect their health and safety or the health and safety of others at or near the place of work.

3.73 Safety Standards Regulations 3.09(2) (a) and 3.10(2) (a) require that an employee or contractor use personal hearing protectors provided.

Report defective noise control equipment

3.74 Safety Standards Regulations 3.09(1) (b) and 3.10(1) (b) require that employees or contractors inform their employers, as soon as practicable, when they become aware of any defect with regard to any noise control equipment located at the workplace.

3.75 Employees and contractors should inspect personal hearing protectors regularly to detect and report damage or deterioration.

PART 4 – MANUAL TASKS

Under development

PART 5 – VIBRATION

INTRODUCTION

- 5.1 Vibration is the shaking that travels through structures, aircraft, automobiles, buildings, powered tools etc. The human body senses vibration through contact with objects such as tools, machinery, floors and equipment. There are two forms of vibration exposure according to contact points between the body and the vibrating source, whole-body vibration and hand/arm vibration.
- 5.2 Exposure to vibration occurs in many workplaces. Sources of exposure to vibration can include noise, plant and confined spaces. Hand/arm vibration is most common in industries where hand-held power tools and machines are used which transmit vibration to the hands. Whole-body vibration is most common where commercial, industrial or construction vehicles are driven regularly and for most of the day.
- 5.3 The risk of injury or illness associated with vibration will depend on a range of factors such as the susceptibility of the individual, intensity, frequency of exposure, duration (years) of exposure, level of insulation, grip force applied, state of tool maintenance and the parts of the body which are subjected to the vibration.
- 5.4 Symptoms may take several years or a few months to develop. Health consequences include damage to bones and joints, visual impairment, problems with balance due to inner ear damage, motion sickness and nerve and blood vessel degeneration.
- 5.5 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

- 5.6 This Part provides duty holders with practical guidance on ways to discharge their duty of care under the Act to employees and others in relation to vibration identified in the workplace.

SCOPE

- 5.7 This Part applies to all places of work covered by the Act. Plant is the main source of vibration at work and therefore this Part should be read in conjunction with Part 4 Plant of the Safety Standards Regulations.

DEFINITIONS

'Carpal tunnel syndrome' – Carpal tunnel syndrome or Median Neuropathy at the wrist is a medical condition in which the median nerve is compressed at the wrist, leading to pain, numbness, tingling and muscle weakness in the forearm and hand.

'Competent Person' – is defined in Part 20 of the Safety Standards Regulations.

'Raynaud's disease' – is a condition where cold or emotion provokes narrowing of the blood vessels, then dilation of the blood vessels and reperfusion (where parts of the body become inflamed and red). The arteries narrow and limit blood circulation to affected

areas. There is a restriction in the blood supply to the extremities of the body, usually the fingers and toes but also the nose and the ears. These body parts initially turn white and look dead (due to a spasm of arterioles) then blue (from pooling of deoxygenated blood in dilated veins) and then become inflamed and/or red.

'Vibration induced White finger' (Hand-arm vibration syndrome) – Vibration-induced White Finger is a form of Raynaud's disease. It is the vascular and neurological component hand/arm vibration syndrome. It is characterised by episodic blanching of the fingers especially when exposed to cold. Other symptoms include numbness, tingling and pain in the hands and fingers. Vibration-induced white finger disease also causes a loss of grip force and reduced sensitivity to touch.

RESPONSIBILITIES OF MANUFACTURERS, SUPPLIERS, ERECTORS AND INSTALLERS OF PLANT AND EQUIPMENT

Prevent risks of vibration

5.8 Manufacturers, suppliers, erectors and installers of plant should prevent the vibration from occurring during the use of plant in the design, construction and installation phase. This should include improving suspension systems, the equipment or plant designs and mountings.

5.9 Where the risk cannot be eliminated manufacturers, suppliers, erectors and installers of plant should use the following separation approaches to minimise risks:

- a) suspended cabs used on some commercial vehicles; and
- b) use of vibration isolation, for example, the use of rubber blocks or mounts on equipment or plant to reduce (isolate) the vibration.

Provide information

5.10 Where a risk of vibration has been identified, health and safety information should be provided with the plant in the instructions handbook. This should include:

- a) warnings for equipment that may cause hand/arm vibration;
- b) warnings about any vibration-related risk of injury arising from using the equipment;
- c) information on safe use and, where necessary, training requirements;
- d) information on how to maintain the equipment;
- e) a statement of the vibration emission or a statement that the vibration test has produced a vibration emission of less than 2.9 m/s^2 together with information on the test method used;
- f) warnings for equipment that may cause whole-body vibration:
 - (i) vibration emissions;
 - (ii) any maintenance procedures to preserve the performance of vibration reduction features;
 - (iii) whether there is likely to be any remaining risk from vibration; and
 - (iv) instructions on how to use the equipment to avoid the risks associated with vibration.

RESPONSIBILITIES OF EMPLOYERS IN CONTROL OF PLANT

Identify hazards

5.11 Employers should identify all situations where there is a risk of exposure to vibration with plant or systems of work associated with plant.

5.12 Employers should consult with employees and/or their representatives, health and safety representatives and other persons where applicable in the workplace to assist in identifying hazards associated with vibration.

5.13 When identifying hazards employers should consider:

- new or changes to equipment and/or plant in the workplace;
- changes made to the work area or work processes;
- work schedules reorganised; and
- employees assigned to new tasks.

5.14 Employers should use some of the following methods to identify potential hazards in the workplace:

- make a list of equipment that causes vibration and its use;
- collect information about the equipment from equipment handbooks;
- use observations, inspections and surveys;
- analyse records of injuries; and
- consult with specialists or experts in workplace vibration.

Assess the risks

5.15 Employers should undertake a risk assessment of all identified hazards to determine the level of exposure to vibration. The risk assessment should be undertaken for:

- current work practices, plant and equipment on a regular basis;
- new or altered work practices; and
- new or altered plant, equipment and work tasks in confined spaces.

5.16 In assessing the level of vibration, employers should consider the following factors that influence the level of vibration on the body and wrists:

- vibration frequency;
- level of insulation;
- duration of exposure;
- hardness of the material being worked on;
- grip force applied;
- cold conditions;
- prior medical conditions;
- whether the employee is a smoker (possible undiagnosed health related conditions such as narrowing of the arteries); and
- condition of tools (related to maintenance).

5.17 If excessive vibration has been identified as a hazard, employers should assess the employee exposure to vibration in the workplace by using a competent person to measure the vibration output in accordance with:

- a) for whole-body vibration: *AS 2670.1:2001 – Evaluation of human exposure to whole body vibration*; and
- b) for hand/arm transmitted vibration: *AS 2763:1988 – Vibration and shock – Hand transmitted vibration – guidelines for measurement and assessment of human exposure*.

Implement risk control measures

5.18 Employers should prevent plant vibration occurring in the workplace. Where this is not practicable, employers should use the hierarchy of controls to minimise exposure.

5.19 Employers should use alternative manufacturing methods or processes to eliminate the need for vibrating equipment. Where this is not practicable, employers should purchase equipment that produces less vibration.

5.20 Employers should eliminate or minimise exposure to vibration by:

- a) treating the vibration source (for example, isolate vibrating plant from its foundation through dampers and springs or redesign or modify the plant or equipment);
- b) treating the vibration transmission path (for example, isolate ducts from stationary plant or using a vibration damped seating in locomotive cabins); or
- c) treating the receiver (for example, using control rooms such as enclosures or locomotive cabins to isolate the receiver from vibrating plant and surfaces).

Establish limits for exposure to whole-body vibration

5.21 When implementing control measures, employers should use the ‘Health Guidance Caution Zones’ as per the Australian Standard, *AS 2670.1:2001 – Evaluation of human exposure to whole body vibration – General requirement*, which applies to people in normal health who are regularly exposed to vibration to assess possible health risks from whole-body vibration.

5.22 Employers should use the following control measures to reduce exposure to vibration in the workplace:

- a) improve vehicle suspension and install operator seats mounted on suspension systems incorporating spring and damper elements;
- b) provide seats with back rests incorporating lumbar support;
- c) mount machines and plant on vibration isolating mounting pads;
- d) use anti-fatigue mats under the feet for standing employees to dampen vibration;
- e) provide standing employees with a sit/stand seat or lean seat to reduce the energy transmitted along the long bones of the legs;
- f) isolate or dampen vibrating work platforms through appropriate suspensions;

- g) ensure that the plant and equipment is operated within the speeds suggested by the manufacturer, or reduce the speed of travel, to reduce vibration levels;
- h) encourage employees to use the back rest with lumbar support correctly positioned on chairs when sitting; and
- i) provide employees with footwear with vibration absorbing soles.

Establish limits for exposure to hand/arm vibration

5.23 Employers should refer to the Australian Standard *AS 2763:1988 – Vibration and shock – Hand transmitted vibration – guidelines for measurement and assessment of human exposure* for guidance on the evaluation of hand-transmitted vibration exposure. Employees should not be exposed to hand/arm vibration exceeding the average exposure limit over a four-hour period in a shift. This is set at 2.9m/s^2 . Where exposure exceeds an acceleration value of 2.9m/s^2 in the frequency range 5Hz to 1500Hz, the employee should be medically examined for the presence of 'Vibration-induced White Finger' or susceptibility for 'Vibration-induced White Finger'.

5.24 Employers should ensure that people with 'Vibration-induced White Finger' do not perform work which causes hand/arm vibration.

Select and provide appropriate tools

5.25 Employers should use the following control guidelines when purchasing and operating tools in the workplace:

- a) obtain specifications from tool manufacturers on vibration characteristics and the recommended length of exposure time;
- b) obtain information about the availability of accessories such as anti-vibration handles or internal damping mechanisms. Accessories may not have been provided with the equipment itself but can be installed after purchase of the tool; and
- c) choose tools that have a speed adjustment to decrease vibration, internal damping, vibration-isolated handles and automatic shut off when the tool is not in operation.

5.26 Employers should consider modification of existing tools to either reduce vibration or prevent the vibration from moving into the handle of the tool. Modifications, accessories, substitutes or tool revisions may be available from the manufacturer to reduce tool vibration. Modifications can include the use of:

- a) air-cushioned cylinders, air shut-off clutches and properly selected isolation mounts;
- b) insulation or change in gearing mechanisms to internally dampen hand tools;
- c) vibration-insulation rubber or foam to cover handles;
- d) vibration-absorbing gloves;
- e) tool stands, isolated fixtures and isolated handles to remove the vibrating source from the hand; and
- f) mufflers or baffles to redirect the air exhaust away from the employees' hands.

5.27 Problems from vibrating tools may also depend on the way they are used and employers should ensure that the effects of vibration are reduced by:

- a) the use of pressure regulators for pneumatic (air powered) tools so that the tool operates at the design pressure rather than full-line pressure;
- b) modification of the work process so that the grip force required is reduced. The larger the force the employee uses in gripping, the more vibration energy is absorbed. This can be achieved by using:
 - i) a slip-resistant surface on the tool handle (moist hands can cause employees to exert greater grip force to control the tool);
 - ii) a suspended balancing system to reduce the weight of the tool and the gripping force needed (this reduces the transmission of vibration energy to the hand); and
- c) exhaust mufflers or baffles to direct air away from employees' hands and faces.

Implement safe systems of work

5.28 Employers should ensure that safe work systems are designed, properly implemented and followed to assist in the prevention of workplace vibration injuries. These systems of work should be used in conjunction with other safety measures and include:

- a) limiting the time spent by each employee on a vibrating surface;
- b) rotating employees over a working day to reduce the vibration exposure for each employee. This could include having employees in shift teams so that an individual employee works, with vibrating tools, for no more than 4 hours through a working day;
- c) providing adequate breaks away from the vibrating sources. Employers may introduce work/rest breaks to avoid constant or continued exposure to vibration (for example, a 10 minute break each hour);
- d) ensuring that the equipment and plant are well maintained. This can include:
 - (i) keeping chisels and cutters sharp and screws tightened;
 - (ii) periodic replacement of damaged tools and tool shock absorbers;
 - (iii) maintenance of internal tool workings such as pneumatic cylinder stops;
 - (iv) lubrication of bearings and other moving parts, the rebalancing of rotating equipment and the replacement of leaking compressed air valves;
- e) improving the surrounding ground surface where vehicles are driven regularly (for example, repairing potholes, clearing debris or levelling the surface);
- f) maintaining the floor surfaces (including ramps and dock levellers) for vehicles such as forklifts so as to reduce exposure from driving over uneven or cracked surfaces; and
- g) checking with employees that vibrations have actually diminished.

Provide personal protective equipment (PPE)

5.29 Employers should select PPE based on individual fit, comfort, work tasks and the work environment in order to achieve a reduction in vibration exposure.

5.30 Employers should provide training and instruction on the correct use, care and maintenance of PPE.

Provide information, training and supervision

5.31 Employers should provide information and training to persons at the workplace that may be exposed to vibration. This should occur when:

- new equipment and plant is introduced into the workplace or changes are made to the existing equipment and plant;
- changes are made to the work area or processes;
- work schedules are reorganised; and
- employees are reassigned to new tasks.

5.32 Where employees may be exposed to whole-body vibration, employers should provide information about whole-body vibration such as the risk of back pain and what they can do to prevent injury. This can include how to:

- adjust the seat for a good seating position;
- adjust a suspension seat for the driver's weight. This is necessary when different people drive the vehicle;
- drive the vehicle to reduce vibration levels by driving at the speed suggested by the manufacturer or reduce the speed;
- plan work site routes with the smoothest terrain and keep speed low when crossing uneven terrain;
- steer the vehicle to avoid hitting objects and pot holes; and
- vary the pattern of work to break up periods of continuous driving.

5.33 Where employees may be exposed to hand/arm vibration, employers should educate the employees in:

- good working practices to reduce vibration directed into the hands, for example, resting the tool on a support or on the work piece as much as possible;
- how to grip tools properly for safe operation;
- the need for tools to be well maintained with the cutting edges sharpened and screws tightened;
- the problems with smoking with regard to the link between smoking and White Finger;
- recognising symptoms (finger tingling or whitening) which may indicate potential health problems; and
- the need to report early symptoms of vibration disease to a supervisor.

5.34 The employer should provide supervision to employees during the course of work to ensure that the plant and equipment is used in accordance with training and instructions.

Monitor and review control measures

5.35 Employers should implement a program to monitor the exposure to vibration if a significant risk has been identified. The monitoring program should include:

- a) regular vibration exposure surveys of employees;
- b) identification of sources of hazardous vibration;
- c) assessment of vibration control measures;
- d) suitability of any personal protective equipment provided;
- e) regular medical checks based on the recommendations of a registered medical practitioner; and
- f) periodic review of the effectiveness of the vibration management program.

5.36 Employers should ensure that a registered Medical Practitioner or a qualified nurse conducts any medical surveillance. Medical surveillance should be relevant to the workplace and include:

- a) discussing an employee's pre-employment history including prescribed medication for migraine, hypertension or heart disease;
- b) a medical examination within six months of commencing employment;
- c) a medical examination taken before a shift and after at least 12 hours away from exposure; and
- d) the provision of information for employees on 'Vibration-induced White Finger' and other symptoms of vibration exposure.

Keep Records

5.37 Employers should keep records to assist in identifying hazards, assessing risks, implementing risk control measures, reviewing and monitoring the adequacy of the control measures. These records should be relevant to the workplace and include:

- a) the date of purchase of plant and equipment and manufacturer's recommended maintenance schedule;
- b) the maintenance schedule including:
 - (i) exposure to vibration in terms of the frequency spectrum of vibration, the magnitude and duration of exposure per working day; and
 - (ii) action taken to minimise exposure to vibration;
- c) the training provided to employees; and
- d) reported instances of non-compliance.

RESPONSIBILITIES OF EMPLOYEES

5.38 Employees have a responsibility to ensure that they attend the required training for the operation of plant and equipment and to use the plant and equipment in accordance with this training and any instruction provided by the supervisors.

5.39 Employees should report to their supervisor:

- a) unusual vibration variances;
- b) symptoms of exposure to vibration;

- c) PPE they believe to be defective;
- d) any employee non-compliance with policies and procedures; and
- e) any misuse of equipment and plant.

5.40 Employees should use the PPE provided by the employer according to the manufacturers' instruction and any training provided.

5.41 Employees should contribute to, and assist the employer with, initiatives that enhance health and safety measures and reduce the exposure to vibration at the workplace.

PART 6 – HUMAN IMMUNODEFICIENCY VIRUS AND HEPATITIS B & C

INTRODUCTION

6.1 Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Human Immunodeficiency virus (HIV) are the most common blood-borne viruses that may be encountered in some workplaces and occupations. All three viruses can have very significant long-term adverse effects on the health of those infected by them.

6.2 An employer should identify occupations and work practices that may put employees at risk of infection by HBV, HCV and HIV. There is a wide range of potential exposure circumstances affecting many occupations. These include, but are not limited to, the following occupations and services:

- a) hospital, medical, dental, allied health and first aid employees;
- b) emergency work, including police, ambulance, fire brigade and related services;
- c) customs, quarantine and immigration staff;
- d) medical, forensic, pathology and other laboratory staff;
- e) post mortem, mortuary and funeral services;
- f) cleaning, laundry, garbage collection and sanitation services;
- g) parks and gardens staff;
- h) people who officiate at, or work in, contact sports;
- i) public transport staff;
- j) client contact staff where is potential for violence;
- k) the defence force;
- l) corrective services;
- m) teachers; and
- n) postal employees.

6.3 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

6.4 This Part provides duty holders with practical guidance on ways to discharge their duty of care in relation to minimising exposure of employees at work and others at or near the workplace to HBV, HCV and HIV under Section 16 of the Act.

SCOPE

6.5 This Part is applicable to all organisations where employers and employees, as defined under the Act, are at risk of exposure to HBV, HCV and HIV viruses in their workplaces and/or arising out of their occupations. Prevention and management of exposure to these viruses will also control exposure to less common blood borne viruses such as the Hepatitis D virus and Hepatitis G virus.

6.6 This Part does not apply to the exposure to non blood-borne viral, bacterial and other pathogens that may be encountered in the workplace.

DEFINITIONS

'Acquired Immune Deficiency Syndrome (AIDS)' – is a syndrome causing chronic infections and other significant health problems resulting from permanent damage to the body's immune system.

'Exposure' – for the purposes of this Part, exposure means contamination of a person with potentially infectious blood, other body fluids/substances, or their derivatives. Contamination usually occurs via contact with broken skin (including needle stick injuries) or mucous membranes.

'Hepatitis' – means inflammation of the liver caused by a variety of agents such as drugs and chemicals. For the purposes of this Part, the causal factor is viral.

'Hepatitis B virus (HBV)' – is a virus that causes inflammation of the liver. Approximately 5% of adults who have contracted Hepatitis B develop chronic hepatitis. Chronic hepatitis can possibly lead to cirrhosis of the liver, liver failure and/or liver cancer.

'Hepatitis C virus (HCV)' – is a virus that causes inflammation of the liver. Approximately 75% of people who have contracted Hepatitis C develop chronic hepatitis. Chronic hepatitis can possibly lead to cirrhosis of the liver, liver failure, and/or liver cancer.

'Human Immunodeficiency virus (HIV)' – is a virus that progressively destroys the immune systems of most people it infects resulting in AIDS.

'Pathogen' – is a microorganism, such as a virus or bacterium, capable of causing disease in humans, animals and plants.

'Post-exposure follow-up' – means the program for follow-up after exposure.

'Post-exposure prophylaxis' – is any prophylactic treatment started immediately after exposure to a disease (such as a disease-causing virus) in order to prevent the development of the disease. In the case of HIV, post-exposure prophylaxis refers to a course of antiretroviral drugs, which is thought to reduce the risk of seroconversion. Hepatitis B immunoglobulin is used as post-exposure prophylaxis after exposure to Hepatitis B.

'Prophylaxis' – is the treatment to prevent the onset of a disease.

'Standard precautions' – refers to the work practices required to achieve a basic level of infection control as outlined by the Infection Control Guidelines for the prevention of transmission of infectious diseases in the healthcare setting 2004 produced by the Department of Health and Ageing.

RESPONSIBILITIES OF EMPLOYERS

Identify hazards

6.7 When identifying hazards, an employer should give particular regard to potential sources of infection. Sources of infection can include:

- a) blood and other body substances from people who are infected with the viruses; and
- b) material contaminated or likely to be contaminated with infected blood, blood products or other body substances, such as:
 - (i) sanitary waste;
 - (ii) soiled linen;

- (iii) clinical and first aid waste;
- (iv) used needles; and
- (v) other sharp instruments or materials.

Note: People infected with blood-borne viruses may not show signs or symptoms of illness, therefore all blood and body fluids/substances should be regarded as potentially infectious.

6.8 Modes of transmission include:

- a) contact of non-intact skin with blood and body fluids/substances with contaminated items and surfaces;
- b) skin penetration injuries involving contaminated sharps;
- c) splashes of blood and body fluids/substances to the eyes, nose and mouth; and
- d) sexual contact.

6.9 Hazardous activities include:

- a) the provision of first aid;
- b) high risk occupational activities;
- c) undertaking medical procedures involving the handling of needles and other sharps; and
- d) the handling and disposal of discarded sharp objects such as needles and syringes found in public places.

6.10 Work practices and occupations where a hazard may exist should be identified through:

- a) consultation with employees to determine workplace practices which may result in transmission of HCV, HBV and HIV giving consideration to the transmission modes in the workplace;
- b) analysis of reports of potential HBV, HBC and HIV exposures including:
 - (i) accidental blood and body fluid/substance exposures;
 - (ii) skin-penetrating injuries involving contaminated sharps.
- c) workplace audits focussed on:
 - i) the potential exposure from activities and tasks; and
 - ii) the workplace layout; and
- d) work practices; and
- e) sources of exposure.

Note: The most common methods of transmission are contaminated sharps penetrating skin, infected blood or other body fluids/substances splashing into the eyes or other mucous membranes sites or onto broken skin.

Assess the risks

6.11 An employer should assess the risks arising from exposure to blood, body fluids/substances or contaminated materials. Risk assessments should take into account:

- a) the type, frequency and the probability of exposure;
- b) the amount and type of blood, body fluids/substances or contaminated materials encountered;
- c) possible routes of exposure;
- d) consideration of multiple exposures including multiple sources;
- e) frequency of contact with discarded used needles and syringes and the numbers of needles and syringes involved;
- f) factors contributing to the exposures and if there is recurrence;
- g) whether the exposure is routine, occasional or unpredictable;
- h) risks of exposure associated with workplace layout, type of equipment used and work practices;
- i) access to appropriate first aid and medical services, the availability of vaccines (for example, HBV vaccine) and the availability of other post exposure prophylaxis;
- j) the level of knowledge and training of employees regarding the viruses including training in safe work practices;
- k) the availability and use of personal protective equipment;
- l) individual risk factors for each employee, including damaged skin, dermatitis, eczema and HBV immune status;
- m) the likelihood and consequences of infection;
- n) effectiveness of current risk control measures; and
- o) the potential need for new measures.

Implement risk control measures

6.12 Employers should evaluate all procedures that may involve exposures to blood and body fluids/substances capable of causing pathogen transmission to identify ways to eliminate or reduce the risk of exposure.

Eliminate the risk

6.13 Whenever practicable, employers should use alternative processes to eliminate or reduce the risk of exposure. This may include for example:

- a) automated washing and decontamination systems to eliminate manual cleaning of sharps;
- b) modifying surgical procedures; and
- c) removing lancet and scalpel blades with clamps.

Use engineering controls

6.14 If it is not possible to eliminate the risk, employers should use engineering controls such as:

- a) syringes without needles (interlink syringes);
- b) interlink products; and
- c) retractable needles after use.

Use administrative controls

6.15 Employers should use administrative controls for the prevention and management of exposure to blood and/or body fluids either from a sharps injury or from splashing onto the mucous membranes or non-intact skin and include:

- a) for prevention:
 - (i) the use of standard precautions;
 - (ii) a HBV vaccination program; and
- b) for control:
 - (i) education and training programs;
 - (ii) development of safe work practices;
 - (iii) arrangements for the immediate first aid response;
 - (iv) provisions for post-exposure medical review and/or treatment, including post-exposure prophylaxis and ongoing monitoring;
 - (v) provision of post-exposure counselling if required;
 - (vi) procedures for recording the incident and reporting the incident to the employer; and
 - (vii) protocols for reviewing existing procedures in order to prevent further incidents.

Use personal protective equipment (PPE)

6.16 PPE should be used to reduce the risk of exposure to blood and body fluids/substances that cannot be eliminated or reduced by other control methods. Examples of PPE include:

- a) gowns and gloves for all procedures whenever there is a potential for contact blood and body fluids/substances; and
- b) goggles and face shields when splashing is possible.

Implement standard precautions

6.17 Standard precautions should be developed in accordance with the Infection Control Guidelines for the prevention of transmission of infectious diseases in the healthcare setting 2004 produced by the Department of Health and Ageing.

6.18 Employers should incorporate standard precautions into their safe work procedures to achieve a minimum level of exposure and ensure infection prevention. Standard precautions should apply to the handling of all blood and other body fluids/substances regardless of whether they contain visible blood. Standard precautions include the following work practices:

- a) a high standard of personal hygiene particularly hand hygiene;
- b) use of personal protective equipment which may include gloves, impermeable aprons or gowns, mask/face shields and or eye protection;
- c) appropriate handling and disposal of sharps and other clinical waste;
- d) appropriate cleaning, disinfection and/or sterilisation of reusable equipment;
- e) appropriate maintenance, general cleaning, clean up and spills management; and

- f) provision of appropriate support services such as laundering of work clothing (for example, laboratory gowns or coats).

Implement HBV vaccination protocol

6.19 Employers should develop guidelines for vaccination of all employees at substantial risk of contracting HBV at work. (Refer to Part 2 First Aid paragraph [2.10](#))

Note: A universal HBV vaccination program for infants and young adults is now in place in Australia but has not been in operation long enough for all adults to be vaccinated.

6.20 Vaccination protocols should be developed in accordance with the National Health and Medical Research Council (NHMRC) Immunisation Handbook (8th Edition). Some occupations and work situations where HBV vaccination is recommended are listed below:

- a) all staff directly involved in patient/client care, embalming or in the handling of human blood or other body fluids/substances, laboratory and especially microbiology staff;
- b) carers of the intellectually disabled;
- c) staff of correctional facilities;
- d) police, members of the defence forces and emergency services staff; and
- e) long-term business travellers or business travellers residing for some time in countries with a high prevalence of HBV.

6.21 Employers should develop and implement vaccination protocols in conjunction with a medical practitioner or on an accredited immuniser recommendations based on the latest NHMRC advice. Vaccination should be provided to the employee free of charge. As with all vaccinations, the HBV vaccine is associated with side effects that may cause some complications in a minority of persons, employees should always be advised to discuss vaccinations with a medical practitioner.

6.22 The vaccination procedure for HBV involves a follow-up process and employers should ensure that vaccinated employees are tracked to ensure that they have full immunity. Booster doses may be required for individuals who are at substantial occupational risk of exposure to HBV. Post-vaccination serological testing (three months after the third dose of HBV vaccine) is recommended by the NHMRC, for persons at significant occupational risk of exposure to HBV.

Note: The Australian Immunisation Handbook 2008 does not recommend booster doses in immunocompetent individuals after a primary course of hepatitis B immunisation as there is good evidence that a completed primary course provides long-lasting protection. This includes health-care workers and dentist. However, booster doses are recommended for Immunocompetent individuals.

6.23 Non-responders to the HBV vaccine are particularly at risk and employers should provide further management through other means including:

- a) additional training or supervision;
- b) additional PPE for the employee;
- c) referral to a medical practitioner for review; and

- d) instruction on post-exposure procedures that includes information on the need for prompt medical assessment.

6.24 Employers with 'at-risk employees' should develop, maintain and regularly update immunisation/health screening cards and/or records during the period of their employment. These records should be maintained in accordance with the organisation's policy for the retention of medical records.

6.25 Employees should have access to their individual medical screening records on request and extracts of these screening records should be available to employees whenever they change their place of employment. Employers should also recommend to employees that they maintain their own personal records of all immunisations and screening.

6.26 On completion of a risk assessment, an employer should implement control measures by referring to the hierarchy of controls.

- a) developing and implementing control policies and procedures in consultation with employees;
- b) monitoring the effectiveness of control strategies; and
- c) reviewing, updating policies/procedures and strategies as necessary.

Provide education and training

6.27 Employers should ensure that all employees at risk of contact with blood and body fluids/substances or contaminated materials in the course of their work, receive education and training with regard to HBV, HCV and HIV. Workplace education and training programs should:

- a) form part of induction programs for new employees; and
- b) be made available as refresher training on a regular basis according to the workplace training programs.

6.28 Employers should ensure that these programs:

- a) relate to the activities of the workplace, are targeted to specific tasks and delivered in a manner appropriate to the specific workplace;
- b) educate employees in safe work practices to prevent exposure;
- c) educate employees in the correct procedures for post-exposure management including first aid response;
- d) inform employees of the post-exposure testing, counselling and follow-up processes;
- e) inform employees of vaccination programs and encourage vaccination;
- f) inform employees about their legal rights and obligations regarding occupational health and safety;
- g) direct employees to other reliable sources of information;
- h) provide updates when there are changes in information about blood-borne pathogens such as HBV, HCV and HIV; and
- i) provide updates on changes in work practices and when new equipment is introduced.

Develop safe work procedures

6.29 Employers should develop safe work procedures in workplaces where employees may be exposed to blood and/or body fluids/substances with the intention of minimising the possibility of infection by blood-borne viruses. These procedures should include the procedures for the safe use of sharps.

Note: Safe work procedures are written instructions in response to an identified health and safety issue that may arise from undertaking a particular activity or task and describe the method(s) of undertaking that activity or task to minimise the risk of harm.

6.30 Employers should ensure that these safe work procedures are written/rewritten when designing a new activity or changing an existing one and when introducing new equipment to the workplace. A revised safe work procedure may be required when an investigation of an incident identifies a problem.

6.31 A safe work procedure should:

- identify the relevant supervisor for the activity and the employees who will undertake that activity;
- list all the tasks involved in the activity;
- list the equipment or substances used in those tasks including personal protective equipment;
- list the control measures to prevent injury including actions to be undertaken to address safety issues that may become evident while performing the tasks; and
- identify any training necessary to undertake the tasks.

Implement procedures for storage, transport and disposal of clinical waste

6.32 Employers should implement procedures to dispose of clinical waste such as blood-contaminated materials, potentially infectious waste and sharps including needles and syringes.

6.33 State and Territory authorities, including health departments, environmental protection agencies (EPAs) and local councils should be consulted to ensure that the classification of materials and the disposal of clinical waste products are in accordance with the regulation to protect human health and the environment. Employers should ensure that they comply with all applicable statutory requirements and guidelines.

Implement post-exposure procedures

6.34 Employers should develop management guidelines for the immediate first aid response to an exposure incident. These guidelines should be in accordance with the requirements of Part 2 First Aid of this Code of Practice. Employers should also consider incorporating the following emergency response procedures specific to dealing with exposure to HBV, HCV and HIV:

- prompt removal of contaminated clothing;
- prompt flushing of the wound under running water;
- washing the wound using water and liquid soap (except for the eyes, mouth and nose);

- d) rinsing of the eyes, mouth and nose (if affected) thoroughly with warm water (without soap) or saline;
- e) thoroughly pat drying the area;
- f) applying a sterile waterproof dressing such as an adhesive plaster if necessary;
- g) applying pressure through the dressing if bleeding still persists; and
- h) seeking medical advice.

6.35 Employers should develop guidelines regarding post-exposure medical assessment, treatment and review. This includes:

- a) seeking medical advice as soon as possible following any exposure incident involving blood and other body fluids/substances or contaminated materials;
- b) using a medical practitioner or other suitably qualified health employee to undertake the medical assessment;
- c) ensuring that the assessment addresses the risk of infection based on factors such as:
 - (i) the source of the blood or other body fluid/substance;
 - (ii) the circumstances of the exposure;
 - (iii) the affected person; and
- d) providing advice and information on the importance of monitoring and prophylactic treatment.

6.36 After some exposure events, post-exposure prophylaxis (PEP) treatment may be recommended by a health professional until the infectious status of the employee is known. This is particularly the case in moderate or high-risk exposures (for example, if the source is unknown) when the person is known not to be immune to HBV or where HIV exposure is suspected. In such cases prophylactic treatment is most successful if administered as close to the exposure incident as possible.

6.37 Employers should ensure that treatment for exposure to HBV and HIV begins as soon as possible after the exposure, preferably within 72 hours. Treatment of non-immune persons with HBV immunoglobulin and /or vaccination against HBV infection may provide up to 75 per cent protection if administered within this timeframe.

Note: There is no post-exposure treatment available for HCV that will prevent infection however early detection and treatment of HCV may be of value for some infected individuals.

6.38 Prophylactic treatments change as new information becomes available and employers should ensure that employees at risk of exposure have prompt access to health professionals who can provide up-to-date medical advice on the most appropriate approach.

Implement procedures for the provision of counselling

6.39 As exposure to blood, including needlestick injuries, can be a traumatic experience for some exposed persons, employers should implement procedures for the provision of post-exposure counselling. The procedures should cover the

provision of appropriate pre and post-test counselling for all exposed persons. As part of any medical assessment for HBV, HCV or HIV infection, counselling should be offered in conjunction with the medical assessment. Information on the available testing procedures and treatments should also be provided.

Implement guidelines for testing, monitoring and informed consent

- 6.40 Employers should develop post-exposure guidelines that include:
 - a) when testing should occur;
 - b) who should conduct the tests; and
 - c) the communication process for an affected employee.
- 6.41 The need for testing is linked to the outcome of any post-exposure medical assessment and the recommendation of the attending health professional. Testing is a voluntary, but recommended, option that is subject to privacy and anti-discrimination legislation. Employers should ensure that the employee's privacy and confidentiality is maintained and that informed consent is obtained and pre-test counselling is provided, before any testing is undertaken.
- 6.42 When the employee is willing to undergo testing employers should ensure that it is conducted within 72 hours of the exposure incident. For HBV, immediate detection of non-immunity in the exposed person and the subsequent provision of PEP treatment, within 72 hours of exposure, may provide protection from HBV.
- 6.43 For HIV exposure, depending upon the circumstances (for example, an unknown source) and risk of the exposure, testing may provide similar benefits to HBV exposure since post-exposure antiretroviral intervention may modify or prevent the spread of the virus.
- 6.44 Further testing of the exposed person for acquisition of a blood-borne infection may be appropriate, between six weeks and six months, depending on the nature and extent of the exposure and according to the recommendation of the attending health professional.
- 6.45 Employees exposed to potentially infectious blood, body fluids/substances or contaminated material may need to modify their work or personal activities until their infectious status is clarified. This can take up to six months following three blood tests, unless the employee was previously infected which makes the results available earlier.
- 6.46 After some exposure events, it may be appropriate to test the infectious status of an employee who has been identified as the potential source of the blood or body fluid (if known). However, in accordance with statutory privacy principles, this person has the right to refuse to be tested.
- 6.47 Organisations carrying out testing are subject to privacy legislation. This means they will not normally release the results of the tests to anyone but the employee undergoing the tests or to the employee's treating doctor. It is the employee's decision to disclose the results of the tests to their employer or other parties.

Develop guidelines for notification and record keeping

6.48 The Act requires employers to notify Comcare and keep records of all deaths, serious personal injuries and dangerous occurrences. Some high-risk incidents involving exposure to HBV, HCV and HIV viruses will fall into the category of dangerous occurrences and therefore are notifiable to Comcare.

6.49 Appropriate records should be kept in a secure place with access available to authorised persons only. The records should include:

- a) a register of incidents;
- b) the outcome and information from associated investigations;
- c) recommendations for action (for example testing and counselling);
- d) management response to recommendations such as medical testing, counselling and implemented changes to work practices and equipment; and
- e) evaluation of the effectiveness of the response.

6.50 Records should contain additional information regarding resulting disorders and required treatments only if the person involved discloses that information. To do so without such permission may constitute a breach of privacy laws.

Implement program of regular monitoring and evaluation

6.51 Employers should implement a program of regular monitoring and evaluation of work practices to ensure that they remain current and effective. Employees and their representatives should be involved in the monitoring and evaluation process.

6.52 Employers should regularly monitor and evaluate the overall effectiveness of safe work procedures and other safety policies, guidelines and protocols.

6.53 Employers should also focus on specific issues such as:

- a) the effectiveness of equipment;
- b) the level of compliance with standard precautions and other procedures;
- c) the level of uptake of vaccination programs;
- d) the effectiveness of information and training programs;
- e) the sources and causes of exposures to blood and body fluids/substances or contaminated materials;
- f) appropriate review and investigation of exposure incidents; and
- g) the effectiveness of post-exposure follow-up (refer to paragraph 6.34).

RESPONSIBILITIES OF EMPLOYEES

Comply with risk control measures

6.54 Section 21 of the Act requires employees to take all reasonably practicable steps to ensure that they do not take any action, or make any omission, that creates or increases a risk to the health or safety of that employee or to any other person at or near the workplace.

6.55 Employees should assist the employer meet his/her duty of care. Therefore, employees should:

- a) comply with safe work procedures including appropriate use of PPE;

- b) actively participate in any training required;
- c) actively contribute to ongoing monitoring and evaluation of safe work procedures, vaccination protocols, post exposure guidelines and procedures;
- d) notify their employer of any condition which may impact on their ability to safely perform work activities and tasks without risk to either their own health and safety or that of others;
- e) inform the employer immediately of any exposure to blood or body fluids; and
- f) notify the employer of any existing or potential problem in achieving compliance with risk control measures.

PART 7 – CONFINED SPACES

INTRODUCTION

7.1 A confined space is an enclosed, or partly enclosed, space that is at atmospheric pressure while it is occupied and is not primarily intended, or designed, as a place of work. A confined space is associated with hazards such as restricted means of entry and exit, hazardous atmospheric contaminants, unsafe levels of oxygen and may have the potential to cause engulfment.

7.2 Confined spaces present specific hazards to employees and contractors that may not be readily apparent. These include:

- a) toxic gas accumulation;
- b) vapours and fumes;
- c) explosive levels of gases or dust;
- d) oxygen depletion;
- e) engulfment;
- f) slips or falls;
- g) flooding; and
- h) excessive noise.

7.3 The risks posed by confined spaces are significant and the incidents related to the specific hazards have often resulted in fatalities, serious injuries or occupational diseases. Persons entering or working in confined spaces may be at risk of exposure to:

- a) suffocation;
- b) electrocution;
- c) acute or chronic poisoning due to fumes and vapours;
- d) dust related respiratory illnesses;
- e) burns;
- f) radiation related conditions;
- g) exposure to extreme climatic conditions; and
- h) sprains, strains, fractures resulting from slips, and falls.

7.4 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

7.5 This Part provides duty holders with practical guidance on ways to discharge their duty of care to employees and others in relation to confined spaces under the Act and Part 7 of the Safety Standards Regulations.

SCOPE

7.6 This Part is applicable to all work situations where entry to, or working in, a confined space is necessary.

7.7 This Part does not apply to underground mining and tunnelling construction nor does it apply to work which is carried out at other than normal atmospheric pressure.

DEFINITIONS

For the purpose of this Part, the definitions in the Safety Standards Regulations Part 20 and Part 7 Confined Spaces apply.

'Atmospheric contaminants' – see Safety Standards Regulation 7.02

'Confined space' – see introduction and Safety Standards Regulation 7.02.

'Entry to a confined space' – entry to a confined space for the purposes of this Part means entry into a confined space by any person (whole of body), or entry to the confined space by any person that may involve the breathing of air wholly from within that confined space.

'Hot work' – means welding, thermal or oxygen cutting, heating, and other fire-producing or spark-producing activity that may increase the risk of fire or explosion.

'Safe oxygen level' – is a safe level of oxygen content in air that is between 19.5 percent and 23.5 percent (by volume) under normal atmospheric pressure.

Note: At pressures, significantly higher or lower than the normal atmospheric pressure, expert guidance should be sought.

RESPONSIBILITIES OF MANUFACTURERS AND IMPORTERS

Eliminate risks in the design

7.8 Safety Standards Regulation 7.03 requires the manufacturer or importer of a confined space to ensure that, where practicable, the design eliminates the need for persons to enter the confined space. If this is not practicable and entry is required then:

- minimise the risks to persons entering or working in the confined space; and
- ensure that the confined space has safe means of entry and exit.

Ensure entry and exit is not affected

7.9 Safety Standards Regulation 7.04 requires a manufacturer, installer or employer who modifies a confined space to ensure that any alteration to the confined space does not detrimentally affect the safe means of entry and exit.

Note: When considering the design or modification of a confined space, duty holders should follow AS 2865:2001 – Safe working in a confined space.

RESPONSIBILITIES OF EMPLOYERS

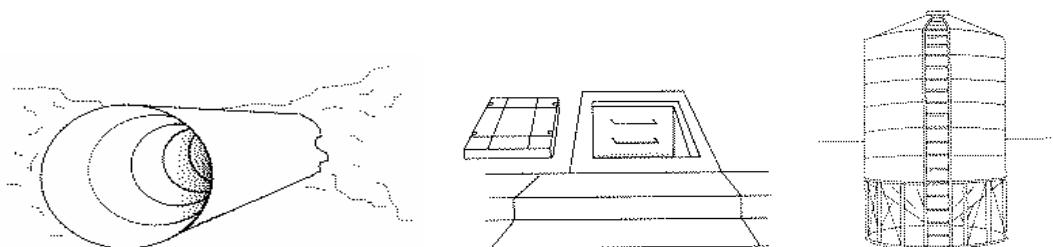
Identify hazards

7.10 Safety Standards Regulation 7.05 requires the employer to identify any confined spaces and the hazards associated with working in those confined spaces for any work proposal. This process involves the identification of all situations or events that have the potential to cause injury or illness. Employers should consider the prior use and activities conducted in the confined space such as use of atmospheric contaminants or hazardous substances in the area.

7.11 Some identified confined spaces include but are not limited to the examples below:

- a) silos or water tanks;
- b) pits, pipes and sewers;
- c) utility tunnels,
- d) shafts, wells, ducts and similar structures;
- e) the inside of a boiler (only accessible when the boiler is off);
- f) the inside of a fluid storage tank like compartment;
- g) small electrical vault;
- h) any ship board spaces entered through hatchways or access points; and
- i) any other similarly enclosed or partially enclosed structure where the space meets the definition of confined spaces.

Examples of confined spaces



7.12 There are many hazards related to confined spaces and employers should systematically determine the hazards including some of the following:

- a) unsafe oxygen levels. Oxygen deficiency may result from:
 - (i) slow oxidation reactions of either organic or inorganic substances;
 - (ii) rapid oxidation (combustion);
 - (iii) the dilution of air with an inert gas;
 - (iv) absorption by grains, chemicals or soils; or
 - (v) physical activity;
- b) oxygen excess which may be caused by a leaking oxygen supply fitting such as in gas cutting or heating equipment;
- c) hazardous substances can form contaminants on surfaces or in the atmosphere, (contaminants may be in the form of solids, liquids, sludges, gases, vapours, fumes or particulates). The sources of atmospheric contaminants encountered may include:
 - (i) the manufacturing process;
 - (ii) the substance stored or its by-products (for example, disturbing decomposed organic material in a tank can liberate toxic substances such as hydrogen sulphide, while biological hazards such as bacteria, viruses or fungi may also be present);
 - (iii) the operation performed in the confined space (for example, painting with coatings containing toxic or flammable substances and welding or brazing with metals capable of producing toxic fumes);

- d) flammable substances may result in explosion or fire or can form flammable atmospheres (such as methane) from a chemical reaction;
- e) engulfment is where material such as grain, sand, flour, dirt and fertilizer can completely immerse a person causing crush injuries or suffocation;
- f) other hazards can include:
 - (i) mechanical hazards such as the operation of moving equipment (for example, being trapped by augers, crushed by rotating or moving parts such as conveyor belts);
 - (ii) uncontrolled introduction of steam, water, or other gases or liquids;
 - (iii) electrical hazards resulting in electrocution;
 - (iv) noise which may be caused by hammering or the use of equipment within the confined space;
 - (v) environmental hazards such as the external weather conditions (either high or low), internal body temperature which can increase as a result of the work process, poor ventilation or the supply of inappropriate clothing;
 - (vi) radiation within a confined space (for example, from X-rays, radiation gauges, isotopes, lasers and welders);
 - (vii) manual handling;
 - (viii) biological hazards such as infections (for example, pneumonia and E-coli from sewers), allergic reactions (dermatitis) and insect bites; and
 - (ix) falls, trips and slips which can result in sprains, strains and fractures.

Assess the risks

7.13 Safety Standards Regulation 7.05(2) requires that a risk assessment is undertaken before any work commences. Safety Standards Regulation 7.05(3) stipulates that the risk assessment must include:

- a) whether it is necessary to carry out the work in the confined space;
- b) the nature of the confined space;
- c) the work to be carried out;
- d) the method by which the work may be carried out inclusive of systems of work;
- e) the use of plant;
- f) any potentially hazardous conditions which may exist inside the confined space; and
- g) whether emergency and rescue procedures are required.

7.14 Employers should ensure that a competent person with knowledge and experience of confined spaces conducts the risk assessment.

7.15 Safety Standards Regulation 7.05(2) requires that an employer must undertake a risk assessment when entry to a confined space is required. When undertaking a risk assessment for any confined space employers should consider:

- a) the type of confined space;
- b) the oxygen levels in the confined space;

- c) the number of persons occupying the space;
- d) the number of persons required outside the space to maintain equipment essential for the safety of those in the confined space ensuring that:
 - (i) adequate communication is in place and observation of the persons within the confined space is possible; and
 - (ii) rescue procedures are prepared and understood;
- e) whether all proposed operations and work procedures have been developed and implemented with particular attention to those activities which may cause a change in the conditions in the confined space;
- f) the soundness and security of the overall structure;
- g) whether there is adequate illumination for visibility;
- h) the identity and nature of the substances last contained in the confined space (the presence of atmospheric contaminants);
- i) the steps needed to bring the confined space to atmospheric pressure;
- j) the atmospheric testing to be undertaken and the parameters to be assessed before the entry permit is issued;
- k) whether all hazards which may be encountered have been identified (for example, entrapment);
- l) the competency, fitness and training of those persons involved in confined space work;
- m) whether there has been adequate instruction and training provided to those persons working in a confined space, particularly instruction regarding procedures that are unusual or non-typical including:
 - (i) mechanical or other plant and equipment to be used;
 - (ii) the use, availability and limitations of any personal protective equipment;
 - (iii) the issuing of protective clothing and rescue equipment for all persons likely to enter the confined space;
 - (iv) whether the sign, indicating that entry is permitted only after signing the entry permit, is in a manner and form appropriate to the persons at the workplace; and
- n) the need for additional protective measures, for example:
 - (i) prohibition of hot work in adjacent areas;
 - (ii) prohibition of smoking and naked flames within the confined space and, when appropriate, the adjacent areas;
 - (iii) avoidance of contamination of breathing atmosphere from operations or sources outside the confined space, such as from the exhaust of an internal combustion engine;
 - (iv) prohibition of movement of equipment such as forklifts in adjacent areas; or
 - (v) prohibition of spark generating equipment, clothing and footwear;
- o) whether cleaning in the confined space is necessary;
- p) whether hot work is necessary; and
- q) any arrangements for rescue, first aid and resuscitation.

Generic risk assessments

7.16 A generic risk assessment may be appropriate where the employer is responsible for multiple, or similar, confined spaces for similar work and/or there are identical risk factors and it is not practicable to undertake a separate risk assessment for each confined space.

Review of risk assessments

7.17 The employer must ensure that a risk assessment is reviewed and revised as necessary for each identified confined space prior to entry into that confined space if that initial risk assessment is no longer deemed valid, according to Safety Standards Regulation 7.05(7).

7.18 The employer in consultation with employees and/or their representatives or health and safety representatives should determine the review and revision process for risk assessments. Risk assessments should be revised whenever a significant change in the risk is likely to result from:

- installation or modification of plant;
- a change in equipment operating conditions;
- a change in the atmosphere or working environment; or
- a change in working arrangements or procedures.

Implement risk control measures prior to entry

7.19 Employers must ensure that any risks associated with a confined space are eliminated and, if it is not reasonably practicable, then the risk must be minimized. Strict liability applies to employers in relation to risk management of a confined space (Safety Standards Regulation 7.06).

Note: The hierarchy of control pyramid detailed in Part 1 of this Code of Practice provides the employer with a list of risk control measures that they should implement in the workplace in an order of priority.

Ensure the confined space is isolated from any hazardous services

7.20 Prior to any person entering a confined space, the employer should ensure that where practicable, potentially hazardous services including process services normally connected to that confined space are isolated in order to prevent:

- the introduction of any materials, contaminants, agents or conditions harmful to employees and others occupying the confined space; and
- the activation or energizing in any way of equipment or services that may pose a risk to the health or safety of employees and others within the confined space.

7.21 Employers must ensure that procedures for the issue of an entry permit are followed prior to entry to a confined space (Safety Standards Regulation 7.08).

Note: Refer to paragraphs 7.45 – 7.49 of this Part on administrative controls in relation to the procedures for issue of entry permits.

Withdrawing a confined space from use

7.22 It may be necessary for employers to withdraw a confined space from use. When this occurs, all persons who may be involved with the repair, maintenance or operation of the confined space should be advised of the withdrawal from use of that confined space.

Establish safety precautions

7.23 The employers should ensure that positive steps are taken to achieve the following:

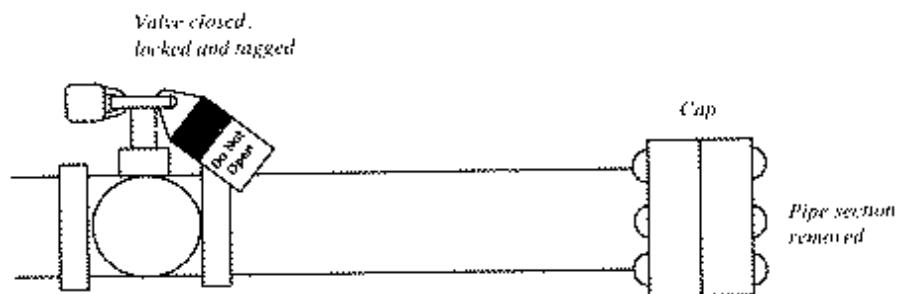
- a) prevention of accidental introduction of chemicals or materials through piping, ducts, vents, drains, conveyors, service pipes, or fire protection equipment into the confined space. Consideration should be given to hazards which may arise from the operation of some of the protective services in an occupied confined space (for example, fixed fire extinguishing system);
- b) de-energisation and lockout. If lockout is not practicable, then tagout or both lockout and tagout of machinery, mixers, agitators or other equipment containing moving parts in the confined space should be used. This may require additional isolation, blocking or de-energising of machinery itself to guard against the release of stored energy (for example springs); and
- c) isolation of all other energy sources that may be external to, but still capable of adversely affecting, the confined space (for example, heating or refrigerating methods).

Prevent contamination

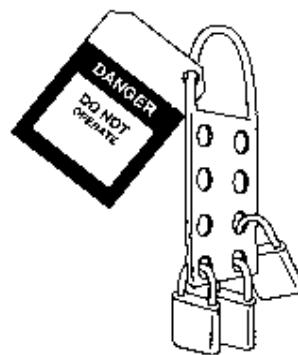
7.24 To prevent contamination, employers should isolate the confined space before entry is permitted. The method of isolation should be in accordance with the following or by an alternative method, which provides the equivalent or better security:

- a) removal of a valve, spool piece and expansion joint in piping leading to, or as close as practicable to, the confined space and blanking or capping the open end of the piping leading to the confined space. The blank or cap should be identified to indicate its purpose. Blanks or caps should be of a material that is compatible with the liquid, vapour or gas in the piping. The material should also have sufficient strength to withstand the maximum operating pressure, including surges, which can build up in the piping;
- b) insertion of a suitable full-pressure spade (blank) in piping between the flanges as close as practicable to the confined space. The full-pressure spade (blank) should be identified to indicate its purpose; or
- c) when neither of the methods described in items (a) and (b) is practicable, isolation by means of closing and locking or closing and tagging, or both, of at least two valves in the piping leading to the confined space. A drain valve between the two closed valves should be locked open or tagged open to atmosphere as part of this method.

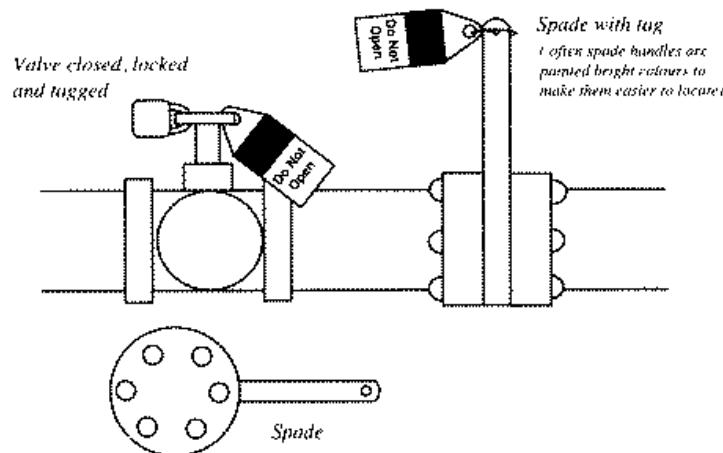
Open end of pipe capped nearest valve closed, locked and tagged



Example of tag and lockout with the padlocks of three employees



This diagram shows the insertion of full-pressure spade or blank. The nearest valve closed, locked and tagged. The spade is also tagged to indicate purpose



De-energise equipment and devices in a confined space

- 7.25 Before entry is permitted to any confined space, employers should ensure that equipment with the capability to move or which consists of moving parts (for example, agitators and fans) is secured to prevent that movement.
- 7.26 When there is equipment or devices with stored energy, such as hydraulic, pneumatic, electrical, chemical, mechanical, thermal or other types of energy sources, employers should check that they are reduced to a zero energy condition.

7.27 A person entering the confined space or a competent person authorised in writing by the employer should proceed to de-energise in the following manner:

- a) by placing a lock, tag, or both on the open circuit breaker or on the open isolating switch supplying electric power to equipment with hazardous moving parts. This indicates that a person is in a confined space and that such isolation should not be removed until all persons have left the confined space;
- b) when a lock is used, the key should be kept in the possession of the person entering the confined space or an authorised competent person. Spare keys should not be accessible except in cases of emergency;
- c) when the methods described in items (a) and (b) are not practicable, moveable components should be locked and switches, clutches or other controls should be tagged to indicate that a person is in a confined space and that the locks and tags should not be removed until all persons have left the confined space;
- d) when a power source cannot be controlled readily or effectively, a belt or other mechanical linkage should be disconnected and tagged to indicate that a person is in a confined space and that the belt or linkage should not be reconnected until all persons have left the confined space; and
- e) when more than one person is in the confined space, the isolating device should be either:
 - (i) locked or tagged, or both, by each person entering the confined space; or
 - (ii) locked or tagged, or both, by a competent person authorised in writing by the employer.

7.28 The effectiveness of any isolation method requires that a competent person, who has been authorised in writing by the employer, undertake the operation. Any person who proposes to enter the confined space should verify the employer authorisation.

7.29 Employers should ensure that locks, tags, blanks or other protective systems are removed only after the competent person, authorised in writing by the employer, ensures that work has been suspended or completed and all persons have vacated the confined space.

Establish cleaning and disposal procedures

7.30 Employers should ensure that where practicable, all substances, which are likely to present a hazard to persons who enter the confined space, are removed or cleaned prior to any entry to the confined space.

Note: Employers should consult the Australian Standard 'AS 2865:1995– Safe working in a confined space' for more detailed information on how to clean confined spaces.

7.31 Employers should identify any potentially hazardous levels of contaminants that could be trapped in sludge, scale or other deposits, brickwork, behind loose linings, in liquid traps or in instrument fittings capable of release when disturbed or when heat is applied. Such material may lodge in joints in vessels or inbends of connecting pipes or other places where removal is difficult.

7.32 Employers should ensure that, wherever practicable, a confined space is cleaned without entry. When entry is necessary for the purposes of cleaning an entry permit is required.

Use of the purging process

7.33 Employers must comply with Safety Standards Regulation 7.06(4) when purging of contaminants from the confined space is required. Care should be taken when purging a confined space to preclude rupture or collapse of the enclosure due to pressure differentials.

7.34 When flammable contaminants are purged, employers should ensure that the purging and ventilation equipment is designed for use in confined spaces and that precautions are taken to eliminate all ignition sources such as:

- a) static electricity where the use of non-conductive materials and anti-static clothing is recommended; and
- b) exhaust locations where the purging process ensures that any contaminants removed from the confined space are exhausted to a location where they present no hazard.

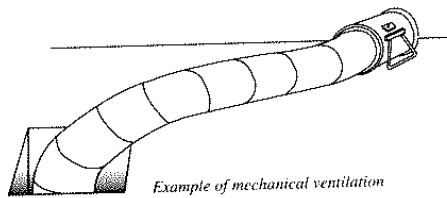
Implement risk control measures when entering a confined space

Provide for effective ventilation in a confined space

7.35 Employers should ensure that confined spaces are well ventilated at all times. This can be by natural, forced or mechanical means provided that the method used establishes and maintains a safe breathing atmosphere. The ventilation method should be continued for the duration of the occupancy and take into account the following:

- a) the operations which are likely to generate contaminants (mechanical ventilation equipment may not be adequate or sufficiently reliable to maintain a safe breathing atmosphere);
- b) whether the maintenance of a safe breathing atmosphere in the confined space is dependent on mechanical ventilation equipment, for example a fan. If this type of equipment is used it should:
 - (i) be continuously monitored while the confined space is occupied; and
 - (ii) have the controls (including any remote power supply) clearly identified and tagged to guard against unauthorised interference;
- c) whether the exhaust facilities are arranged to remove any contaminated air from the confined space and do not present a hazard to persons or equipment;
- d) that the combustion engines providing power for compressed air or any other use associated with the work being done in the confined space are located so that their exhaust emissions cannot enter into the confined space or contaminate air being supplied to the confined space; and
- e) that pure oxygen or gas mixtures with oxygen in concentration greater than 21 percent by volume are not used to ventilate the confined space.

Example of mechanical ventilation



Ensure safe atmospheric conditions are maintained

7.36 Safety Standards Regulation 7.06(2) details the requirements for safe atmospheric conditions that the employer must follow before any person enters a confined space. Employers should follow the *Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC: 3008 (1991)] to ensure that the contaminants in a confined space are below the exposure levels required for safe entry to a confined space.

Note: Although exposure standards have been set for a large number of chemicals, these still represent only a small fraction of all chemicals.

7.37 When atmospheric contaminants in a confined space cannot be reduced to safe levels, employers must follow Safety Standards Regulation 7.07 and ensure that no person enters the confined space without appropriate Personal Protective Equipment (PPE) such as air supplied respiratory equipment.

Conduct atmospheric testing and evaluation

7.38 When conducting an evaluation of the atmosphere in a confined space, employers should ensure that a survey of other hazards is performed from outside the confined space before any entry occurs. The results of the atmospheric testing should be recorded on the entry permit. The atmosphere testing should include:

- the oxygen content;
- the airborne concentration of flammable contaminants; and
- the airborne concentration of potentially harmful contaminants. If detected, suitable PPE would include air-supplied respiratory protective equipment to be worn during entry and occupation of the confined space.

7.39 Safety Standards Regulation 7.06(3) requires an employer to conduct atmospheric testing and monitoring of a confined space that is consistent with the risk assessment and ensure that it is carried out in a manner that is consistent with the risk assessment.

7.40 Employers should, when it is considered necessary (for example, as indicated from the risk assessment or because of the potential for future release of contaminants), make arrangements to monitor or retest the atmosphere within the confined space at regular intervals.

7.41 Employers should only allow for an evaluation of more remote regions within the confined space once the area adjacent to the point of entry to the confined space has been proven acceptable for entry. Evaluation of these remote regions may need to be undertaken by persons wearing air respiratory protective equipment.

Evacuate or monitor when there are flammable contaminants

7.42 Safety Standards Regulation 7.09 requires an employer to evacuate or continuously monitor the confined space when the concentration of flammable contaminants in the atmospheres is between 5% and 10% of the Lower Explosive Limits (LEL).

7.43 Employers should use a continuous-monitoring flammable gas detector to monitor the concentration of flammable contaminants in the atmosphere whilst a person is in the confined space. The detector should be fitted with latching, visible and audible alarms, which should activate at a contaminant concentration of 10% or more of the LEL.

7.44 When the concentration of flammable contaminants in the atmosphere of a confined space is, or exceeds, 10% of the LEL, the employer must evacuate the confined space in accordance with Safety Standards Regulation 7.09(2).

Provide written approval for entry to a confined space

7.45 When there is a need to enter a confined space, employers must, subject to a review of any risk assessments undertaken for a confined space, provide written approval in the form of an entry permit prior to work in a confined space being carried out. The entry permit must specify any precautions or instructions necessary for safe entry to the confined space and the performance of the work, taking into consideration the hazards identified in the risk assessment (Safety Standards Regulation 7.08(1)).

7.46 Employers should consider the following issues when providing information on an entry permit to a confined space:

- a) the location, type and method of work to be undertaken;
- b) the hazards that may be encountered;
- c) any isolation checklists;
- d) any atmospheric testing results as appropriate, for example:
 - (i) oxygen levels;
 - (ii) flammability or explosive levels;
 - (iii) atmospheric contaminant levels;
 - (iv) temperature and humidity; and
 - (v) radiation levels;
- e) the continuing review of ventilation and atmospheric conditions:
 - (i) working conditions, including awareness that conditions (physical or chemical) may change and may need repeated or continuous review; and
 - (ii) the possibility of heat stress from task generated heat, ambient temperature or the effect of wearing protective clothing;
- f) the likely levels of noise within the confined space;
- g) the clothing and equipment (refer paragraphs 7.57-7.60) including:
 - (i) the types of equipment and clothing required for the task;
 - (ii) the need for respiratory protective device;
 - (iii) the need for safety harness and line; and

- (iv) the need for emergency lighting (for example, a torch);
- h) means of communication (see paragraph 7.54);
- i) personnel including:
 - (i) the number of persons to enter the confined space;
 - (ii) stand-by personnel for communication and operation of essential equipment;
 - (iii) personnel for rescue and first aid; and
 - (iv) adequacy of personnel training and understanding of the hazards;
- j) other precautions including:
 - (i) signposting or barricading (refer paragraphs 7.55-7.56);
 - (ii) prohibition of smoking or naked flame within the confined space or surrounding area;
 - (iii) communication between stand-by personnel and backup personnel; and
 - (iv) appropriate instruction, supervision and risk assessment of work undertaken by contractors; and
- k) emergency precautions including:
 - (i) emergency procedures established;
 - (ii) provision and location of rescue equipment including emergency services;
 - (iii) location of first aid equipment; and
 - (iv) provision of fire fighting equipment.

7.47 The employer should ensure that the entry permit states the period of validity and that it is revalidated whenever it becomes evident that the duration of work will involve one of the following:

- a) a change in the person responsible for the direct control of the work in a confined space;
- b) a significant break in work continuity; or
- c) a significant change in atmosphere or the nature of the work to be performed.

7.48 The employer should record the name of each person entering a confined space and each person that is required for stand-by purposes.

7.49 The employer should ensure that the entry permit is displayed in a prominent place to facilitate signing and clearance. A copy of the entry permit should be held by the employer.

Provide a stand-by person

7.50 Safety Standards Regulation 7.10 requires that, before any person enters a confined space when a risk assessment has identified a risk to health and safety, the employer must provide at least one (1) stand-by person. The stand-by person must remain outside of the confined space at the time of entry into the confined space and for the duration of the work in the confined space.

7.51 Safety Standards Regulation 7.07(4) requires that when entry to a confined space is necessary before a risk assessment can be conducted, the employer must:

- a) ensure that there is at least one (1) stand-by person outside the confined space at the time of entry and for the time the confined space is occupied; and
- b) provide equipment that is readily accessible and appropriate to any hazard likely to be encountered.

7.52 When considering the risks involved, employers should provide a stand-by person in situations where:

- a) there may not be a safe oxygen level;
- b) atmospheric contaminants are present or may be present in concentrations above the exposure standards;
- c) there may be a risk of fire or explosion;
- d) there may be a risk of entrapment or engulfment;
- e) the work to be performed may generate a risk to health or safety; and
- f) equipment or conditions outside the confined space require control or monitoring to ensure the health and safety of persons in the confined space (for example ventilation, respirator air supply, vehicles and weather).

7.53 Employers should record the minimum number of stand-by persons required on the entry permit.

Develop effective communication

7.54 Employers should ensure that effective communication and, where practicable, observation between those in the confined space and the stand-by person(s) are capable of being constantly maintained. Communication can be achieved, dependent on the conditions existing in the confined space, in a number of ways including:

- a) voice;
- b) two way transmitters;
- c) hand signals; or
- d) other appropriate means (for example, where visual or oral communication is not possible, a system of rope signals could be devised).

Use appropriate signs and barriers

7.55 Safety Standards Regulation 7.06(5) requires the employer to erect signs and barriers whilst there is work in or near a confined space which they have control over in order to prevent persons who are not involved in the work task from entering the area.

7.56 When considering the most appropriate signs and barriers to use, employers should ensure that they are:

- a) prominently displayed and written in plain English stating that a person should not enter the area;
- b) in positions that clearly identify or block the confined space area; and
- c) prevent persons from entering or falling into the confined space.

Provide suitable safety equipment

7.57 Safety Standards Regulation 7.07(5) requires that where the employer provides equipment it must be:

- a) selected and fitted to the person who is to use it; and
- b) maintained in a proper working order.

7.58 When considering suitable equipment employers should consider:

- a) personal protection;
- b) rescue;
- c) first aid; and
- d) fire suppression.

Provide respiratory devices

7.59 Employers should ensure that employees are trained in the use of suitable supplied air respiratory protective devices. These devices should be worn when:

- a) the results of the risk assessment or monitoring indicates that a safe atmosphere cannot be established or maintained; or
- b) the nature of the work procedure within the confined space is likely to degrade or contaminate the atmosphere in the confined space (for example, hot work, painting or removal of sludge).

7.60 Employers should ensure that they follow the requirements of *AS/NZS 1715:1994 – Selection, use and maintenance of respiratory protective devices* to determine:

- a) the source of breathing air for any suitable supplied air respiratory protective devices; and
- b) specific details on how respiratory protective devices should be selected fitted, used, stored, maintained and inspected.

Provide safety harnesses

7.61 Employers should ensure that persons entering or working in a confined space are trained in the use of safety harnesses, safety lines or rescue lines when:

- a) there is a risk of falling during ascent or descent; or
- b) rescue by a direct route either vertical or horizontal is practicable.

7.62 It is not always desirable to specify the use of a safety harness, safety line or rescue line as this may be impracticable. When considering specifying the wearing of such equipment, employers should exercise care to ensure that such equipment would not introduce a hazard or unnecessarily hinder free movement within a confined space. In the event of free movement, being hindered, alternative plans should be arranged for example, a rescue and fall arrest system.

7.63 When selecting the most appropriate type of safety harness, safety line or rescue line, employers should take into account the possible hazards to any rescue arrangements involved.

Ensure safe use of electrical equipment

7.64 Employers should ensure that all electrical equipment used in a confined space that is connected to an external supply complies with all the provisions of Part 10 Electricity of the Safety Standards Regulations.

7.65 Where portable electrical equipment is used, employers should ensure that it is:

- connected, individually or collectively, to an earth free, extra low voltage supply from an isolating transformer(s) with the transformer(s) being located outside the confined space;
- protected through a residual current device which is located outside of the confined space;
- air-driven; and
- fitted with a flexible supply cable of a heavy-duty type. The cables should be suspended or guarded to minimize accidental damage.

Establish emergency and rescue procedures

7.66 When planning rescue procedures Safety Standards Regulation 7.10(2) requires employers to ensure that openings and exits are of adequate size to allow the rescue of all persons who may enter the confined space.

7.67 The employer must have in place appropriate rescue and first aid procedures and provisions that are planned (see Part 2 First Aid of this Code), established and rehearsed in accordance with Safety Standards Regulation 7.10(3).

7.68 Employers should ensure that all persons who may be involved in any rescues from confined spaces are aware of the rescue procedures and that the rescue procedures are well planned and well rehearsed.

Note: Rescue procedures are essential and must be followed by all persons at all times, including any provision(s) for contacting emergency services.

Provide education and training

7.69 Training of persons undertaking work in confined spaces or who are involved with rescue and emergency procedures associated with confined spaces should be undertaken in accordance with Safety Standards Regulation 7.11.

7.70 Employers should give consideration to:

- the type and level of training required;
- the skills of the trainer; and
- the contents of the course.

7.71 Employers should ensure that induction and refresher training is carried out at regular intervals, and that it is conducted as close as practicable in time to commencing work in the confined space. The training must be relevant to the specific task and/or procedure to be undertaken (Safety Standards Regulation 7.11).

7.72 When considering who should conduct training, employers should use qualified persons who have knowledge and experience in all aspects of confined space entry, hazard recognition, use of safety equipment and the methods of rescue.

7.73 The employer should continue with training until satisfied that each person has been trained to an acceptable standard of competency. Details of this training should be recorded, for example, in a personnel file.

7.74 All persons who may be involved with rescues in a confined space should be trained in first aid to the appropriate level based on the risk assessment of the work being undertaken.

7.75 While the emphasis placed on different aspects of risk management and the specific target group will differ from situation to situation, training for all groups should include the following:

- a) the provisions of the relevant regulations;
- b) the provisions of this Part which are directly relevant to their work;
- c) physical, chemical and biological hazards relating to work in or near confined spaces in general and the particular confined space;
- d) established healthy and safe work practices in the workplace, including lockout and isolation procedures;
- e) emergency procedures in the workplace and confined spaces, including rescue drills and the use of safety equipment;
- f) selection, distribution, use, fit and maintenance of personal protective equipment;
- g) hazard identification and risk assessment;
- h) emergency entry and exit procedures;
- i) communication procedures;
- j) recognition of any hazards specific to the activity;
- k) first aid and cardio-pulmonary resuscitation; and
- l) fire protection and suppression.

7.76 Employers should evaluate and review education and training programs in consultation with employees or their representatives to ensure that the content of the training programs is clearly understood and relevant to all employees. Evaluation will determine if the overall objectives of the training programs have been achieved as well as whether further training is required.

Establish record keeping procedures for training and entry permits

7.77 Safety Standards Regulation 7.12(1) requires the employer to retain a written risk assessment for a period of 5 years.

7.78 Safety Standards Regulations 7.12(3) and (4) require the employer to record the training that is provided to the employee during the period of employment and the employer must make those records available on request to:

- a) the employee to whom the record relates; or
- b) an investigator.

7.79 Employers should ensure that any records include:

- a) the names of employees receiving training and dates of attendance;
- b) the title of the training course and an outline of its contents;
- c) the duration of training;
- d) the names, qualifications and experience of the person providing the training; and
- e) whether the training program is registered or accredited by any statutory body, government department, educational institution or other association or organisation.

7.80 The employer should retain entry permits for at least 3 months after the permit has been issued.

RESPONSIBILITIES OF EMPLOYEES

7.81 Employees should assist employers comply with their obligations to provide a safe and healthy workplace and comply with safety policies and procedures concerning work in a confined space.

PART 8 – INDOOR AIR QUALITY

INTRODUCTION

- 8.1 Indoor workplaces usually rely on mechanical ventilation as well as circulating air. The mechanical ventilation system generally incorporates air conditioning through an integrated air heating and/or air cooling system.
- 8.2 Poor management of an air handling system can expose employees as well as the public, including the most vulnerable members of the community, to a range of contaminants and toxins such as:
 - a) volatile organic compounds (VOCs);
 - b) gases from combustion (carbon monoxide, nitrous and sulphurous oxides, ozone, etc);
 - c) particulate matter (asbestos, indoor combustion soot, metals, dust, etc); and
 - d) biological pollutants (for example, moulds and fungi, dust mites, bacteria, viruses, pollens).
- 8.3 An inadequate or poorly maintained air handling system can diffuse unpleasant odours, unsafe levels of gases, chemicals and particulate matter throughout a building. The consequence of inhaling contaminated air is that it may cause an increase in respiratory infections and allergic reactions. The Legionella Pneumophilia Bacterium (Legionnaire's disease) has been directly linked to stagnant water cooling towers and is the cause of a respiratory infection that is a serious life threatening illness.
- 8.4 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

- 8.5 Section 16 of the Act requires that employers protect the health and safety of employees, contractors at work and others at or near the workplace. To comply with this duty of care, employers should, as far as is reasonably practicable, ensure that there is an effective air handling system, which provides clean and safe air in the workplace.
- 8.6 This Part aims to provide practical guidance to employers on how to comply with the duty of care with regard to the provision of indoor air that is clean and without risk to the health and safety of employees and others.

SCOPE

- 8.7 This Part applies to all workplaces covered by the Act and is intended to provide practical guidance to the employer on managing indoor air quality as it relates to common indoor air pollutants.
- 8.8 This duty of care exists regardless of whether the air handling system is under the control of the employer or whether the indoor air is a building service provided under a tenancy arrangement.

- 8.9 This Part is not intended to replace the need for employers to seek advice and assistance from competent persons when addressing specific air quality issues and hazards.
- 8.10 This Part does not provide guidance on the thermal comfort of indoor air.

DEFINITIONS

'Air-handling system' – means a system for the purpose of directing air in a controlled manner to or from specific enclosures by means of air-handling plant, ducts, plenums, air-distribution devices, ventilation devices and automatic controls.

'Legionnaire's disease' – Legionella Pneumophilia is a bacterium, which invades the respiratory system presenting initially like Influenza. However, the condition escalates into a multi organ infection, which, in those most vulnerable, can be fatal.

'Water cooling systems' – means the cooling systems to regulate thermal comfort.

RESPONSIBILITIES OF MANUFACTURERS, SUPPLIERS AND ERECTORS/INSTALLERS

Ensure the air-handling system is designed and installed correctly

- 8.11 Air-handling systems, which are part of a building, are not usually considered plant as defined in the Safety Standards Regulations and the Act. However, in some instances an air-handling system or components may qualify as plant if, for example, it is installed subsequent to a building being constructed or as a 'stand alone' component to an existing building.
- 8.12 Manufacturers, suppliers and installers should ensure that the air-handling systems are designed and installed to meet the minimum standard for control of mechanical ventilation. This should be in accordance with the dilution index in the Australian Standards: *AS1668.2:2002 – The use of ventilation and air conditioning in buildings – Part 2: Ventilation design for indoor air contamination control*, and for Microbial control, by following *AS/NZS 3666.1:2002 – Air-handling and water systems of buildings – Microbial control – Part 1: Design, installation and commissioning*.

RESPONSIBILITIES OF EMPLOYERS WITH CONTROL OF THE AIR HANDLING SYSTEM

- 8.13 When the employer also has control of the air-handling system (that is, the owner/operator rather than receiving indoor air as part of a tenancy), a duty of care applies under Section 16 of the Act. This duty relates to the maintenance of the indoor air quality free from hazards, to ensure the health and safety of employees and contractors at work and others in the workplace.
- 8.14 Important factors for the control of contaminants in indoor air are:
 - a) the design and installation of the air-handling system; and
 - b) the ongoing operation, maintenance and testing of the system.
- 8.15 If an air-handling system or system component is within the definition of plant under the Act, then Part 4 Plant of the Safety Standards Regulations applies. This part details specific responsibilities that an employer must follow with respect to

safe design, manufacture, testing, installation, use, maintenance, repair and disposal of plant.

Identify hazards

8.16 Employers should consider the following issues when identifying any hazards for air-handling systems:

- a) the effectiveness and suitability of the air-handling system;
- b) the occupancy rates for the building;
- c) the outdoor air quality;
- d) the location of outdoor air intakes to minimise contamination, including from fumes and drift from cooling towers (for example, Legionella bacteria and vehicle exhaust fumes);
- e) the filtration of both outdoor and recycled air to remove particulate contaminants;
- f) the minimum outdoor air requirements and indoor airflows to control gases from combustion, people and products (for example, carbon monoxide, nitrous and sulphurous oxides and ozone);
- g) the exhaust arrangements to manage specific contaminants;
- h) the microbes found in building environments including viruses, fungi and bacteria;
- i) the more serious bacteria (Legionella) associated with air handling and water systems (cooling towers);
- j) the location and design of components of the air system for microbial control;
- k) the process for preventing accumulation of moisture and the nutrients necessary for bacteria growth in and around components of the air system;
- l) the water treatment systems for microbial control; and
- m) the design considerations to facilitate maintenance.

Assess the risks

8.17 Employers should ensure that a risk assessment is conducted which gives consideration to the risks specific to cooling towers used for air conditioning which include:

- a) stagnant water;
- b) nutrient availability;
- c) poor water quality;
- d) deficiencies in the cooling system; and
- e) location of and access to the cooling tower system.

Implement risk control measures

Develop effective procedures for the operation, maintenance and testing of the air – handling system.

8.18 When considering the procedures for the operation, maintenance and testing of air-handling water systems, employers should follow:

- a) *AS/NZS 3666.2:2002 – Air-handling and water systems of buildings – Microbial control – Part 2: Operation and maintenance*. This standard specifies the minimum requirements for the operation and maintenance of air-handling and water systems of buildings for the purpose of microbial control; and
- b) *AS/NZS 3666.3:2000 – Air-handling and water systems of buildings – Microbial control – Part 3: Performance-based maintenance of cooling systems*. This standard provides a performance based approach to the maintenance of cooling water systems for the control of microorganisms including Legionella within such systems.

8.19 Employers should take into consideration the following points when developing procedures for the air-handling system with cooling facilities:

- a) the process for conducting routine inspections;
- b) risk factors in water cooling systems to be assessed and managed for microbial control:
 - (i) monthly inspections and treatment of the water cooling system;
 - (ii) any safety practices required during maintenance and cleaning including the use of personal protective equipment;
- c) cleaning schedules for system components by competent persons:
 - (i) monthly inspections and (at least) six monthly cleaning of cooling towers;
 - (ii) monthly cooling water samples and the testing procedures;
- d) operation and maintenance manuals;
- e) record keeping procedures;
- f) procedures for recommissioning the water cooling system for seasonal use; and
- g) the process for disinfecting or decontaminating and retesting following unsatisfactory test results.

Conduct air-handling system quality tests

8.20 Employers should conduct monthly water sampling and testing of the air-handling system to identify any contaminants that may affect the health and safety of their employees, contractors at work or others at or near the workplace.

8.21 When water cooling system test results show a heterotrophic micro-organism (for example, general bacteria) count of $>100,000\text{cfu/ml}$ or a Legionella count $>10\text{cfu/ml}$, employers should review, investigate and take immediate remedial action in accordance with procedures detailed in *AS/NZS 3666.3:2000 – Air-handling and water systems of buildings – Microbial control – Part 3: Performance-based maintenance of cooling systems*.

8.22 Heterotrophic micro-organism counts of $>100,000\text{cfu/ml}$ or Legionella counts of $>1,000\text{cfu/ml}$ in three (3) consecutive readings no more than one week apart and following the application of appropriate treatment protocols should be **notified to Comcare** as a dangerous occurrence in accordance with section 68 of the Act.

These readings may also require notification to local health authorities depending on local State or Territory requirements.

Note: These levels are for guidance. At all times, maintenance should aim to achieve zero (<10cfu/ml) levels for Legionella.

Establish accurate and up to date record procedures

8.23 Employers should ensure that accurate and up to date records are kept including:

- all tests conducted and the results on the air handling system;
- any remedial action taken;
- the details of the competent person engaged to work on the air handling system; and
- the scheduling of regular testing and maintenance procedures.

RESPONSIBILITIES OF EMPLOYERS WITHOUT CONTROL OF THE AIR HANDLING SYSTEM

8.24 An employer, whether the controller of the air system or not, has a duty of care under section 16 of the Act to do all that is reasonably practicable to ensure that the indoor air quality in the workplace is clean and without risk to the health and safety of employees and others.

8.25 This could mean that the employer adopts a risk management approach in managing air quality in the workplace. For example, the tenant should seek confirmation that:

- the air-handling system design complies with the relevant Australian Standards;
- that the controller of the air-handling system will make available documentation showing that routine maintenance and testing is conducted to identify and control air pollutants generated in the workplace. This information should indicate:
 - that all air pollutants generated within the workplace are controlled; and
 - that there is an adequate response to air quality issues.

Establish tenancy agreements and procedures for the air handling system

8.26 Employers should include clear and detailed provisions for the air handling system when considering any tenancy agreement. The provisions in the lease agreement should ensure that:

- the air handling controller provides the employer with written reports for any maintenance undertaken and/or results of any tests conducted;
- remedial action is undertaken for hazards identified by the employer or as a result of any tests conducted; and
- immediate provision of information to Comcare or a relevant State or Territory health authority of any notifiable quantities of heterotrophic microorganisms or Legionella detected.

Develop procedures within the agreement for maintenance and testing

8.27 As part of the tenancy agreement, employers should monitor the maintenance and testing of the air-handling system to ensure its effectiveness. This can be by:

- a) regular consultation with the air-handling system controller on system operation and maintenance; and
- b) ensuring regular reports of microbial testing and the dosing regime for the cooling towers are supplied and assessed.

Control air pollutants

8.28 A properly designed, installed and operating air-handling system, in combination with an effective workplace-cleaning regime, is generally sufficient to maintain air quality in the office environment. Some housekeeping controls may assist by controlling:

- a) common odours from habitation and office processes;
- b) particulate matter (for example, dust generated by people and general office work);
- c) the low levels of common biological pollutants (for example, pollens); and
- d) the low levels of chemical pollutants generally found in an office environment (for example, volatile organic compounds emanating from furniture and floor coverings and ozone from photocopiers).

8.29 When workplace activities generate air pollutants, the employer should as far as is reasonably practicable, contain them within safe levels. Extraction ventilation, fume cupboards, chemical filters and dust collectors for machinery are commonly used control measures where elimination is impractical.

Respond to air quality issues

8.30 The employer should identify and establish effective responses to air quality issues in the workplace whether these originate from within the workplace or from the air-handling system. This may include:

- a) a failure in part or all of the air-handling system which may affect thermal comfort (for example, air-conditioning);
- b) odours suggesting a possible health and safety risk from air quality;
- c) fumes entering the air system from vehicle emissions or other combustion sources;
- d) chemical or dust spills in the workplace;
- e) Legionella bacteria detected in water cooling tower tests; and
- f) suspected biological attack (for example, powder identified in mail).

8.31 Employer responses to air quality issues should be in line with the assessed level of risk to employees and contractors at the workplace and others at or near the workplace. Responses should include consultation and cooperation with the air-handling system controller to address air-handling system related issues including:

- a) investigation of the issue in conjunction with the air handling system controller to determine the cause of any unsatisfactory air quality;

- b) timely remedial actions to address air quality issues by the air handling system controller;
- c) testing for suspected air pollutants;
- d) emergency evacuation of the workplace where an immediate health and safety risk may be present; and
- e) procedures for a suspected biological attack.

RESPONSIBILITIES OF EMPLOYEES

- 8.32 Employees should comply with any procedures established by the employer, or the air-handling system controller, to ensure that the quality of the indoor air is maintained.
- 8.33 Where an employee notices, or suspects, a potential risk associated with the indoor air quality, they should notify the employer immediately. This may include, but is not limited to:
 - a) unusual odours;
 - b) lack of air flow;
 - c) smoke or fumes; and
 - d) spills of hazardous substances.

PART 9 – SAFETY IN LABORATORIES

INTRODUCTION

9.1 Modern laboratories are inherently dangerous workplaces because of the nature of the activities undertaken which are hazardous, often unique, varied and frequently changing. The hazards and hazardous activities associated with laboratories can expose employees, students and the public to potentially dangerous situations such as:

- a) hazardous micro-organisms;
- b) chemical spills;
- c) toxic gases; and
- d) hazardous substances.

9.2 People working in laboratories will deal with multiple hazards as a part of their normal work activities. Laboratories are often designed to enclose or isolate areas within the workplace, specialised areas, which can increase the risk of an adverse event. Some examples of high-risk areas include:

- a) confined spaces;
- b) high level containment laboratories; and
- c) bio-security areas.

9.3 Incidents in laboratories may compromise the health and safety of employees and others resulting in death, injury or illness of an acute or chronic nature. The type of hazard determines the kinds of injuries and illnesses, which may develop. The injury or illness may become symptomatic after a short or long period of exposure, after brief contact with the hazard or after years of working in the laboratory.

9.4 The consequence of poor risk management systems, when the risks are not controlled or when there is a failure to adhere to safety policies, procedures and processes, is the possibility of adversely affecting the wider community. The impact may be contained to the local environment, where contamination extends to other areas within the workplace or the contamination may broaden to the surrounding community with catastrophic environmental damage the result.

9.5 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

9.6 The purpose of this Part is to provide practical guidance to employers under the Act on ways to protect the health and safety of employees and other persons in the laboratories and associated work areas.

SCOPE

9.7 This Part applies to all persons covered under the Act who are, or may be required to work, in or near a laboratory or an associated workplace.

9.8 This Part should be read in conjunction with Part 6 Hazardous Substances, Part 8 Storage and Handling of Dangerous Goods and Part 9 Major Hazard Facilities of the Safety Standards Regulations.

DEFINITIONS

Refer to the Safety Standards Regulations Part 6 Hazardous Substances, Part 8 Storage and Handling of Dangerous Goods and Part 20 for definitions in relation to laboratories.

'Laboratory' – includes any building or part of a building used, or intended to be used, for scientific or technical work, including research, quality control, testing, teaching or analysis. Such work may involve the use of chemicals (including dangerous goods and hazardous substances), pathogens and radiation, or processes including electrical or mechanical work. The laboratory includes other parts of the workplace such as instrument and preparation areas, laboratory stores and any offices attached or adjacent to the laboratory.

'Competent laboratory' – means a laboratory with sufficient equipment, personnel with expertise to carry out the determinations according to the relevant Australian Standards or by an alternative method of equivalent accuracy and precision. A competent laboratory is recognised and promoted as a competent facility able to perform specific types of testing, measurement, inspection and calibration, is accredited by the National Association of Testing Authorities (NATA) and participates in an inter-laboratory quality control scheme as recommended.

'MSDS' – is a very widely used abbreviation for Material Safety Data Sheet. A MSDS contains details of the hazards associated with a chemical and gives information on its safe use.

'Toxic effect' – means the property of an agent producing damage to an organism. This usually refers to functional (systemic) damage but may be developmental in respect of tissue and skeleton in the case of an embryo. The damage may be permanent or transient.

RESPONSIBILITIES OF EMPLOYERS

Ensure appropriate design and construction

9.9 When designing laboratories and installing equipment in laboratories employers should ensure that the design and construction are in accordance with the AS/NZS 2982.1:1997 – *Laboratory design and construction – Part 1:General requirements*.

9.10 This Australian Standard specifies requirements for the design and construction of laboratories. It covers aspects of laboratory building design and construction as they relate to the safety of occupants. It also addresses the specific construction requirements intended to minimize the hazards associated with building any laboratory. This Australian Standard also provides design advice for the following types of laboratories:

- a) biological;
- b) radiological;
- c) secondary schools; and
- d) tertiary facilities.

Identify hazards

9.11 Employers should refer to Part 1 of this Code of Practice for practical guidance on identifying hazards in the workplace. Hazards may include, but are not limited to:

- a) chemicals spills;
- b) contamination from a hazardous substance;
- c) radiation exposure;
- d) lack of sufficient oxygen in the laboratory; and
- e) exposure to airborne, physical, or biological hazards.

Assess the risks

9.12 Employers should conduct a risk assessment for any identified hazards in a laboratory according to the applicable Safety Standards Regulations and the general requirements for risk management in Part 1 and Part 11 and Part 12 of this Code for dangerous goods and hazardous substances.

9.13 Employers should ensure that reviews of any risk assessments are undertaken when:

- a) new hazards are identified in the laboratory;
- b) there is a significant change to any work to which the risk assessment applies;
- c) where the risk controls are no longer adequate; and
- d) at regular intervals as agreed in consultation with employees and/or their representatives.

Implement risk control measures

9.14 Employers must refer to Part 6 – Hazardous Substances and Part 8 – Storage and Handling of Dangerous Goods of the Safety Standards Regulations for the mandatory requirements for dangerous goods and hazardous substances.

9.15 Employers should select the most appropriate method of controlling any risks in the laboratory by following the hierarchy of controls as detailed in risk management Part 1 of this Code. Consideration should be given to the unique nature of the hazards in the laboratory and the level of risk control applied should be appropriate to the level of assessed risk.

Control chemical risks

9.16 Employers should control risks associated with laboratory chemicals. When selecting risk control measures employers should consider:

- a) AS/NZS 2243.2:2006 – *Safety in laboratories – Chemical aspects*, which sets out requirements and recommended procedures for safe working practices in the chemical laboratory. It includes procedures for handling flammable, toxic, unstable and highly reactive chemicals and makes special references to the handling of compressed and liquefied gases. This part also includes information on hazards associated with working in the chemical laboratory; and

b) AS/NZS 2243.10:2004 – *Safety in laboratories – Storage of chemicals*. This standard sets out the requirements for the safe storage of chemicals in packages when they are stored inside a laboratory, in associated storerooms or spaces that are support areas to the laboratory and when opening packages of chemicals. This part of the standard provides extensive information on the storage of specific chemicals.

Control biological risks

9.17 Employers should control the risks associated with biological hazards. When selecting control measures, employers should consider the AS/NZS 2243.3:2002 – *Safety in laboratories – Microbiological aspects and containment facilities*. This standard sets out the requirements, responsibilities and general guidelines relating to safety in laboratories where microorganisms and prions are handled. This part of the standard applies to laboratories (including animal, plant and invertebrate containment facilities) where microbiological work such as research, teaching, diagnosis, quality control or regulatory analysis is undertaken. Particular attention should be paid to the requirements for cleaning working areas and types of disinfectants and antiseptics used. This part should be read in conjunction with Australian Standard AS/NZS 2243.1: 2005 – *Safety in laboratories – Planning and operational aspects*.

Control radiation risks

9.18 Employers should control risks associated with radiation. When selecting control measures employers must consider the *Australian Radiation Protection and Nuclear Safety Act 1998* and supporting regulations and codes of practice; and should refer to the Australian Standards below for further information:

- a) AS 2243.4:1998 – *Safety in laboratories – Ionizing radiations*, sets out the precautions required to prevent unnecessary exposure of persons using ionizing radiations in laboratories and other persons who could be harmed by accidental or planned releases of radioactive substances. This part of the standard also looks at the nature of hazards related to ionizing radiations, laboratory design requirements and other essential radiation protection information; and
- b) AS/NZS 2243.5:2004 – *Safety in laboratories – Non-ionizing radiations – Electromagnetic, sound and ultrasound* provides information on non-ionizing radiations and the associated hazards encountered in laboratories. This part of the standard also specifies requirements and gives recommendations on other hazards associated with the use. The overall objective is to promote safe work practices when using non-ionizing radiations in order to prevent unnecessary exposure of persons working in laboratories containing non-ionizing radiation sources.

Control mechanical risks

9.19 Employers should control risks associated with mechanical hazards. When selecting control measures, employers should consider the AS 2243.6:1990 – *Safety in laboratories – Mechanical aspects*. The AS 2243.6:1990 sets out the general principles and requirements of safe working practice relevant to mechanical operations performed in laboratories and details potential mechanical

hazards. This part of the standard also covers safe working practices relevant to the use of compressed gas cylinders and cryogenic substances.

Control electrical risks

9.20 Employers should control risks associated with electricity. When selecting control measures employers must consider:

- a) Part 10 – Electricity of the Safety Standards Regulations and should consider;
- b) *AS 2243.7:1991 – Safety in laboratories – Electrical aspects.* This standard provides the general principles for the use of electrical equipment in all types of laboratories. This part of the standard covers equipment that may be used in the laboratory including office equipment such as word processors, photocopiers and typewriters. This part does not include the installation of electrical fittings during construction of the laboratory.

Control risks associated with fumes

9.21 Employers should control risks associated with fumes. When selecting control measures employers should consider:

- a) *AS/NZS 2243.8:2006 – Safety in laboratories – Fume cupboards.* This standard sets out safety requirements for fume cupboards and the methods of testing to be used when determining their performance. This part also describes typical materials used in the construction of fume cupboards and includes recommendations and requirements on material suitability. Fume cupboards covered by this part of the standard are intended primarily for use in general chemical operations but may be used for special applications. Recirculation fume cabinets are not included in this part of the standard; and
- b) *AS/NZS 2243.9:2003 – Safety in laboratories – Recirculation fume cupboards.* This standard sets out safety requirements and gives recommendations for the design, manufacture, use and maintenance of recirculating fume cabinets, sometimes incorrectly referred to as ‘ductless fume cupboards’, and the test methods to determine their performance. The objective of this part of the standard is to provide manufacturers of recirculating fume cabinets with design and performance requirements for the cabinets and their filtration systems. It also provides users with requirements and recommendations for selection, use and maintenance in order to prevent users selecting or using inappropriate equipment.

Provide Personal Protective Equipment (PPE)

9.22 PPE may be required to support other preventative measures. Employers should not regard PPE as a substitute for more effective control measures. PPE should only be used in conjunction with other more effective risk control measures.

9.23 Employers should refer to the Safety Standards Regulations Part 6 Hazardous Substances and to paragraphs 12.44–12.48 of this Code for provision and use of PPE.

Develop written safety procedures for the laboratory

9.24 Employers should develop and maintain effective and unambiguous procedures for working in the laboratory. These written procedures should include:

- a) the responsibilities and interrelationship of all personnel involved with health and safety in the laboratory;
- b) risk assessment reviews;
- c) inspections and testing of laboratory equipment;
- d) the delivery, handling, storage and use of any hazardous material;
- e) safe handling procedures for all hazardous substances including procedures to minimize contamination and infection for example, hand washing and the use of any PPE;
- f) any requirements detailed on the MSDS;
- g) any security arrangements;
- h) all training arrangements; and
- i) the emergency and evacuation procedures.

Provide training

9.25 The employer should arrange for training for all employees or any other person who requires access to a laboratory. This training should include:

- a) the laboratory health and safety procedures (safety rules/conduct);
- b) techniques required to complete daily tasks;
- c) specific hazards relating to daily tasks;
- d) workplace hygiene and housekeeping methods;
- e) emergency procedures;
- f) first aid and accident/injury/illness reporting; and
- g) use and storage of PPE.

9.26 Employers should ensure that they review the training program, including induction and refresher courses, at least once a year or each time there is change:

- a) in any hazard information available;
- b) in a work practice;
- c) in a control measure; and
- d) with the employee's duties where he/she is assigned:
 - i) a new task; or
 - ii) a new work area.

9.27 Employers should record all training and ensure that it includes:

- a) the names of all persons receiving training;
- b) the date of attendance at any training program;
- c) an outline of the course content;
- d) the names of any person providing the training and where applicable;
- e) the accreditation certificate number for each person.

Implement appropriate emergency and rescue procedures

9.28 Employers should develop emergency procedures in line with the specific risks associated with the laboratory. Each laboratory will require different emergency and evacuation procedures depending on the:

- a) size and layout of the laboratory;
- b) type of work being undertaken;
- c) hazards and procedures for dealing with dangerous and hazardous materials; and
- d) the nature and extent of the emergency.

9.29 When developing emergency and rescue procedures employers should ensure that:

- a) there are employees trained to deal with an emergency, including all evacuation procedures and the use of any PPE (for example, protective clothing or enclosed suits containing personal oxygen);
- b) all employees are trained in evacuation procedures including the need (where required) to comply with any containment procedures;
- c) first aid officers are appointed and trained to deal with any injuries; and
- d) emergency authorities (for example, the police, fire or ambulance) have been informed of any specific hazards or difficulties, which could be encountered during any rescue efforts.

RESPONSIBILITIES OF EMPLOYEES

9.30 Employees must assist employers comply with the Act and the requirements of the Safety Standards Regulations with regard to hazardous substances and dangerous goods including by complying with policies and safe work procedures.

9.31 Employees should use and store the PPE provided by the employer according to the manufacturers' instructions and any training provided.

9.32 Employees should report to their supervisors any PPE that is not fitted correctly and any damage to the PPE provided.

PART 10 – ASBESTOS IN SITU

Under development

PART 11 – STORAGE AND HANDLING OF DANGEROUS GOODS

INTRODUCTION

11.1 Dangerous goods are substances that may be hazardous to people, property or the environment and may cause accidents with significant consequences. Dangerous goods may be corrosive, flammable, explosive, oxidising or may be reactive with water.

11.2 Part 8 of the Safety Standards Regulations outlines the specific duties of manufacturers, suppliers, employers and operators of pipelines in relation to the storage and handling of dangerous goods or explosives in the workplace. Safety Standards Regulation 8.04(3) defines dangerous goods as goods that:

- a) are named in column 2 of Appendix 2 to the ADG Code;
- b) meet the criteria in Part 2 of the ADG Code;
- c) are determined by a relevant Competent Authority to be dangerous goods;
- d) are C1 combustible liquids;
- e) are C2 combustible liquids, if stored and handled with fire risk dangerous goods (within the meaning of Safety Standards Regulation 8.04(4)); or
- f) goods that are too dangerous to be transported.

11.3 Dangerous goods are classified according to their immediate physical or chemical properties such as flammability, explosion, corrosion and toxicity that may affect life, health, property or the environment. Hazardous substances are classified according to their immediate or long-term health effects.

11.4 Dangerous goods and hazardous substances are covered by separate parts of the Safety Standards Regulations because of the different risks and control measures involved. Part 6 of the Safety Standards Regulations covers Hazardous Substances whilst Part 8 covers Storage and Handling of Dangerous Goods.

11.5 Many hazardous substances are also classified as dangerous goods and employers are required to comply with both Parts of the Safety Standards Regulations.

11.6 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. [1](#)

PURPOSE

11.7 The purpose of this Part is to provide practical guidance to employers on how to comply with the Safety Standards Regulations Part 8 Storage and Handling of Dangerous Goods.

11.8 This Part endeavours to suggest a course of action that will lead to the achievement of the health and safety standards set by the Safety Standards Regulations for employees at work and other persons at or near the workplace.

SCOPE

11.9 This Part applies to employers, manufacturers, suppliers and employees covered by the Act and the Safety Standards Regulations where dangerous goods are stored or handled in places of work.

11.10 Safety Standards Regulation 8.05 outlines the different classes of dangerous goods. Table 1 below summarises the dangerous goods covered by the Safety Standards Regulations and this Part.

11.11 Three classes of goods are not covered by Part 8 of the Safety Standards Regulations. These classes include:

- Class 6.2 (infectious substances);
- Class 7 (radioactive substances); and
- Asbestos.

Table 1 Classes of dangerous goods

Classes of Goods	Description	Reference
Dangerous goods:		
Class 1	Explosives	AE Code
Class 2	Gases	ADG Code
Class 2.1	Flammable gas	
Class 2.2	Non-flammable, non-toxic gases	
Class 2.3	Toxic gases	
Class 3	Flammable liquids	
Class 4	Flammable solids	
Class 4.1	Flammable solids, self-reactive, desensitised	
Class 4.2	Substances liable to spontaneous combustion	
Class 4.3	Substances in contact with water emit flammable gases	
Class 5	Oxidizing substances; organic peroxides	
Class 5.1	Oxidizing substances	
Class 5.2	Organic peroxides	
Class 6	Toxic and infectious substances	
Class 6.1	Toxic substances	
Class 8	Corrosive substances	
Class 9	Miscellaneous substances and articles	
Goods too dangerous to be transported	Goods listed in Appendix 5 of the ADG Code and goods determined to be so by the Authority	ADG Code
C1 and C2 combustible liquids	Any liquid other than a flammable liquid that has a flashpoint and that has a fire point less than its boiling point. Combustible Liquid with a flashpoint > 60.5°C and ≤	AS 1940 – The storage and handling of flammable and

	150°C Combustible Liquid with flashpoint > 150°C	combustible liquids
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11.12 Safety Standards Regulation 8.02(2) specifies other dangerous goods that are not covered by the Safety Standards Regulations and this Part. They include:

- a) dangerous goods in transit if they are supplied to a workplace in a container that is not opened or are used at that workplace and the goods will be kept for no more than five (5) consecutive days;
- b) dangerous goods in a fuel system or equipment or which are essential to the operation of a fuel system or equipment;
- c) batteries connected to and which are essential for the operation of mobile plant, equipment, vehicles, boats, aircraft and appliances;
- d) fuel in fuel tanks and systems connected to, and which are essential for, the operation of mobile plant, equipment, vehicles, boats, aircraft and appliances; and
- e) dangerous goods contained in portable fire-fighting or medical equipment deployed for use at the premises.

Note: Dangerous goods not specifically covered under Part 8 of the Safety Standards Regulations are still covered by the general duty of care.

11.13 It is a requirement that the amount and location of dangerous goods in transit are properly packaged, labelled and included on the manifest register and site plan.

DEFINITIONS

‘The Australian Dangerous Goods Code (ADG Code)’ – The ADG Code provides information on the classification of dangerous goods, identification of packaging groups, and correctly labelling dangerous goods.

‘Hazardous area’ – means an area where an explosive atmosphere may occur continuously or intermittently, presenting a risk to safety. Hazardous areas include all storage and handling areas for dangerous goods with Class or Subsidiary Risk of 2.1; 3; 4 or 5 and dangerous goods that may generate combustible dusts.

‘IBC’ – means Intermediate Bulk Container.

RESPONSIBILITIES OF MANUFACTURERS, IMPORTERS AND SUPPLIERS OF DANGEROUS GOODS

11.14 Manufacturers, importers and suppliers of dangerous goods must comply with the relevant sections of the Safety Standards Regulations in Part 8 Storage and Handling of Dangerous Goods.

11.15 For the preparation of Material Safety Data Sheets (MSDSs), manufacturers, importers and suppliers of dangerous goods must comply with the *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC: 2011 (2003)].

RESPONSIBILITIES OF EMPLOYERS

Design safe facilities

11.16 Employers should consider the design of the facility and ensure that safety is part of the process. Design factors can include:

- a) structuring workplace layouts to ensure that the storage of incompatible substances and fire risk goods are located away from any bulk storage of combustible goods; and
- b) purpose designed buildings constructed of suitable materials for the types of goods to be stored in the workplace.

11.17 When a structure or plant has been designed and built for use for a specific dangerous good, care should be taken if the plant is to be used for a different substance. The employer should re-assess whether the structure or plant is suitable for use with that substance.

Identify hazards

11.18 Safety Standards Regulation 8.15 requires an employer to identify any foreseeable hazards and hazardous activities associated with the storage or handling of dangerous goods.

11.19 In order to identify the hazards associated with the storage and handling of dangerous goods Safety Standards Regulation 8.15 requires the employer to:

- a) collect information on potential hazards using sources such as the MSDS;
- b) consult with employees, suppliers or other persons with expertise;
- c) conduct regular inspections of the workplace and the procedures for storage and handling of the dangerous goods;
- d) examine plans of the workplace including buildings, water, gas, electricity, compressed air, steam, drains, fire services, chemical pipelines, roads, access ways and engineering specifications of relevant plant; and
- e) discuss risks with the employers of nearby workplaces and the relevant emergency services authority.

11.20 Hazard identification for structures, plant, equipment, systems of work and activities used in the storage and handling of dangerous goods involves collecting information on:

- a) physical components or characteristics that have the potential to harm the safety and health of a person, cause damage to property or the environment, either in their own right or in conjunction with the dangerous goods;
- b) systems of work including operating procedures and unusual operating conditions which could give rise to harm or damage; and
- c) activities that may pose a threat to the dangerous goods.

11.21 When identifying the hazards, the employer should consider:

- a) possible reactions between dangerous goods and any plant, structures or other substances;
- b) the chemical and physical reactions of dangerous goods;
- c) manufacturing, transfer or transport processes;
- d) plant and other structures used in the storage or handling of dangerous goods;
- e) any information about the hazardous properties;

- f) the kind and characteristics of incidents which may be associated with dangerous goods;
- g) the location of dangerous goods; and
- h) environmental factors that may have an effect on the goods.

11.22 Employers should refer to the MSDS for the chemical and physical properties of the dangerous goods. These include but are not limited to:

- a) physical state;
- b) flashpoint, fire point and explosive limits;
- c) viscosity;
- d) density;
- e) particle size;
- f) vapour pressure;
- g) solubility and pH;
- h) reactivity;
- i) boiling and/or freezing point or range;
- j) electrical and/or heat conductivity; and
- k) the nature and concentration of combustible products.

11.23 Employers should consider the inherent hazards or subsidiary risks such as:

- a) fire;
- b) explosion; and
- c) toxic effects such as inhalation, ingestion, absorption through the skin or eyes, or corrosive action.

11.24 Employers should refer to incident and dangerous occurrence reports as they provide useful information about the hazards and risks associated with dangerous goods.

Consider other hazard sources

11.25 Employers should take into consideration hazards that may arise from sources outside the workplace.

11.26 Employers should identify all hazards in the workplace including those that may be unrelated but when combined with dangerous chemicals have the potential to cause catastrophic results. For example, the fire risk is increased where grass is over grown or combustible items such as timber or cardboard boxes have been stored or dumped.

11.27 Other activities which are not directly related to the storage and handling of dangerous goods may generate potential hazards within the workplace. This may require the consideration of any adjacent storage areas that contain dangerous goods or the proximity of other work areas when identifying hazards.

11.28 The proximity of railway lines, pipelines, mobile phone repeater towers, and protected places such as schools and public buildings are required to be taken into consideration when assessing the hazards associated with the storage and handling of dangerous goods at a workplace.

11.29 Other sources of information, which provide the employer with information on the hazards and risks associated with dangerous goods, include:

- a) package markings and labels;
- b) instructions from manufacturers or suppliers of dangerous goods or equipment;
- c) dangerous goods authorities;
- d) National Industrial Chemical Notification and Assessment Scheme (NICNAS) summary reports;¹
- e) sources listed in the *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC: 2011 (2003)];
- f) fire services;
- g) Office of the Australian Safety and Compensation Council (OASCC); and
- h) trade unions, employer and/or industry associations.

11.30 Employers should consider processes and activities in the workplace in relation to the storage and handling of dangerous goods. These include procedures to identify any short cuts that may be occurring.

11.31 Employers should conduct periodic walk through inspections of workplaces to observe actual practices relating to the storage and handling of dangerous goods.

Assess the risks

11.32 The employer must assess all risks associated with each dangerous goods hazard (Safety Standards Regulation 8.16).

11.33 The employer should decide if there is sufficient expertise within the workplace to conduct the risk assessment or whether external advice is required. This decision will depend on the skills and experience available to undertake the risk assessment. The expertise required will depend on the classes of dangerous goods involved and the complexity of processes employed in the particular workplace.

11.34 Employers should consider the use of structured risk assessment processes, such as Hazard and Operability Studies (HAZOP) or Hazard Analysis (HAZAN). In some situations, it may be necessary to undertake a quantitative risk analysis (QRA) to assist in understanding the risks involved.

Implement risk control measures

11.35 Employers should ensure that all structures and plant associated with the storage and handling of dangerous goods is subject to a risk assessment and that appropriate control measures are implemented. At each stage of the operation, the risk assessment process should be followed. This includes:

- a) design – the hazards should be eliminated at this stage as far as practicable and the risks of the total system minimised;

¹NICNAS summary reports are produced under the Commonwealth *Industrial Chemical (Notification and Assessment) Act 1989*

- b) manufacture – to a high standard within the design specification with the use of quality, durable materials which will not be adversely affected by the storage and handling of the dangerous goods;
- c) installation – only after all hazards associated with the installation have been identified, the risks assessed and control measures implemented;
- d) commissioning – only after undergoing thorough testing to ensure that all hazards have been identified, control measures implemented and agreed procedures developed to ensure safe operation;
- e) operation – only in accordance with the agreed procedures by authorised personnel who have received appropriate training in the correct procedures;
- f) maintenance and repair – to ensure additional hazards are not introduced or the risks have not increased during normal operation or breakdown; and
- g) decommissioning (if required) – so as not to introduce additional risks or, where this is not practicable, the additional risks are minimised with appropriate control measures.

Control hazards at the design stage

- 11.36 Employers should consider all dangerous goods and the possible reactions when completing the risk assessment to determine the most appropriate control measure from the hierarchy of controls. Elimination of the hazard should be considered at the design stage of the system of work.
- 11.37 Employers should incorporate isolation and engineering controls into structures and plant at the design stage rather than modifying existing designs and installations. It may not be practicable to retrofit control features such as spill containment or natural ventilation once the plant or structure has been installed.
- 11.38 There may be a choice of physical processes that are available to achieve the same result. Employers should consider each alternative and implement the process that poses the least risk.

Control hazards in the workplace

- 11.39 Employers should consider the procedures for controlling the risks. The three main steps in risk control are:
 - a) development and implementation of control policies and procedures in consultation with employees;
 - b) monitoring the effectiveness of the control strategies; and
 - c) reviewing as necessary.
- 11.40 Safety Standards Regulation 8.17 specifies that employers must control risks by eliminating the hazard and if this is not practicable, by reducing the risk associated with the hazard.
- 11.41 Employers should follow the hierarchy of control measures to ensure safe outcomes in the workplace.

Eliminate hazards

11.42 The most effective control measure is to eliminate the hazards and risks at the source, which may include either the dangerous goods or activities surrounding the use of the dangerous goods.

11.43 In some situations, where the dangerous goods may not be essential for the operation, elimination of the dangerous goods may be appropriate. The employer may use:

- physical processes rather than a chemical process to clean an object such as using high-pressure water or steam rather than solvents or use water based paints rather than solvent based paints;
- clips, clamps, bolts or rivets rather than adhesive; and
- chlorine that is produced by electrolysis rather than storing/handling other dangerous goods which are comprised of chlorine or its compounds at the workplace.

Eliminate the activity

11.44 Employers should consider the workplace layout such as:

- ensuring that storage and handling areas are not used as thoroughfares to reduce the risk of collisions at the workplace; and
- restricting or prohibiting employees from carrying potential ignition sources such as matches, lighters, mobile phones, or spark producing tools in work areas.

Substitute or modify the hazards

11.45 Substitution is the replacement of dangerous goods or hazardous activities with a lower risk substance or activity. Employers should consider substitution of a dangerous good for a less hazardous substance such as:

- using a less volatile material to control a vapour hazard. This may cost less than the installation and maintenance of a mechanical ventilation system;
- using a non-dangerous good instead of a dangerous good by degreasing with a detergent instead of a chlorinated or volatile solvent;
- substituting a flammable liquid with a combustible liquid; and
- using dangerous goods with a single hazard as indicated by a single class without a subsidiary risk rather than mixing goods that have one or more subsidiary risks.

11.46 Employers should provide safe work processes for high-risk activities. These may include:

- using diluted acids and alkalis rather than concentrates;
- using stretch wrapping rather than flame heat shrink to palletised goods;
- using a pallet cage rather than stretch wrapping in areas where static electricity generated during the wrapping process would increase hazards;
- using a solid in paste or pellet form rather than as dust/powder;
- applying paint by brush rather than spray;

- f) transferring packages by conveyor rather than forklift; and
- g) using non-sparking tools in a hazardous atmosphere.

11.47 Reducing quantities of dangerous goods in the workplace correspondingly reduces the overall risk. Employers should reduce the quantities of dangerous goods by using inventories that ensure:

- a) ordering is only as required rather than storing large quantities of dangerous goods; and
- b) the prompt disposal of dangerous goods that are no longer required.

11.48 Where a workplace does not have the appropriate facilities to store dangerous goods safely, employers should use an alternative location that is a suitable store for dangerous goods.

Isolate the hazard

11.49 Isolation is the separation of dangerous goods from people and other property, including other dangerous goods. Isolation may be achieved by enclosing, separating by distance or by the use of barriers. Employers should ensure that the principles of isolation are a high priority when establishing new workplaces for the storage and handling of large quantities of dangerous goods. Isolation methods may include:

- a) distancing the dangerous goods from protected works, other dangerous goods, people and other properties so interaction is not possible;
- b) enclosing a hazardous activity;
- c) storing incompatible dangerous goods, such as Class 5.1 oxidizing agents and flammable or combustible materials, in separate buildings which are separated by sufficient distances so that interaction is impossible and an incident in one area will not involve another; and
- d) installing vapour barriers that have an appropriate fire resistance level to provide additional isolation.

Use engineering methods to control the hazard

11.50 Engineering controls involve the use of structures, plant, equipment and processes that employers should use to reduce hazards associated with the storage and handling of dangerous goods. These include:

- a) enclosing the dangerous goods or external hazard;
- b) providing adequate ventilation;
- c) sparging or blanketing exposed liquid surfaces with an inert atmosphere to prevent an explosive atmosphere forming;
- d) developing automatic processes to eliminate human error;
- e) fitting sensors and controls for liquid levels, pressure or temperature to minimise the formation of hazardous atmospheres and eliminate overflow and uncontrolled reactions;
- f) specifying the right electrical circuitry;
- g) constructing barriers between incompatible goods; and
- h) installing suitable devices to protect installations from external hazards.

Use administrative controls

11.51 In many cases, dangerous goods may need to be stored and handled within an existing workplace where there are constraints with the buildings and outside storage areas. Employers should consider the design of safe work practices and processes to control or reduce the risk.

11.52 When using administrative controls employers should ensure that employees are informed and trained to implement the controls.

11.53 Administrative controls rely on agreed work practices and procedures between the employer and employee. It is important that these controls are simple and developed to match the skills and capabilities of the people who will use them. Some examples of administrative controls are:

- a) safe work procedures that describe the correct methods for performing all activities;
- b) operating procedures that ensure the integrity of structures, plant and equipment are maintained at all times;
- c) training and supervision to provide the necessary knowledge and skills required to ensure correct procedures are followed safely;
- d) procedures that limit the number of people in the dangerous work area but also prevent lone occupancy;
- e) job rotation for employees to limit the period of exposure;
- f) procedures to ensure that work involving inspection, maintenance, repair testing and cleaning is carried out to minimise risk;
- g) the regular cleaning of contamination from walls and surfaces, dust and drip removal from all work areas and ensuring lids on containers are in place when not in use or when being moved;
- h) monitoring of workplaces to ensure that safe working conditions are maintained;
- i) procedures for waste disposal and effective decontamination and inventory control;
- j) the development of well designed and rehearsed emergency procedures; and
- k) the prohibition or control of activities that is inconsistent with the safe storage and handling of dangerous goods, such as eating, drinking, and smoking.

Provide Personal Protective Equipment (PPE)

11.54 PPE consists of devices and clothing that provide individual employees with additional protection from hazards.

11.55 Employers should not use PPE as the sole control measure except where no other control measure is practicable. For PPE to be effective, an employer should ensure that only approved clothing and equipment is used and that it provides the required level of protection.

11.56 Employers should provide comprehensive instruction to employees on the correct use of PPE and the circumstances when it is required.

- 11.57 All PPE should be readily available and correctly fitted for all employees. Employers should ensure that the PPE is cleaned and maintained on a regular basis to ensure that it is serviceable at all times.
- 11.58 In some cases, it will not be possible to reduce the risks to an acceptable level without the use of PPE. The MSDS for dangerous goods will normally contain recommendations on the selection and use of the required PPE. Employers should follow this advice unless the risk assessment determines other or additional protection measures are required.

Monitor and review controls

- 11.59 Safety Standards Regulation 8.17 requires employers to implement the required risk control mechanisms and continuously supervise those controls.
- 11.60 Over time, there may be an increasing risk of familiarity when working with dangerous goods. This could lead to complacency and shortcuts with potentially tragic outcomes. Employers should consult with employees and/or their representatives or HSRs on strategies to prevent this from occurring.
- 11.61 Where employers are required to implement numerous risk and administrative control measures in a workplace, a further administrative control such as a Safety Management System (SMS) may be required to monitor the compliance and effectiveness of these controls.
- 11.62 If a SMS is not required, the employer should ensure that a system for safety control management is developed specific to the particular workplace according to the nature of activities at that workplace. Many corporate and proprietary systems exist, which have common features, such as:
 - a) scope, policy and objectives;
 - b) assignment of responsibilities;
 - c) operating procedures;
 - d) standards, codes and laws;
 - e) management of change;
 - f) scheduling and establishing procedures for reviews; and
 - g) system auditing and corrective action.
- 11.63 Employers should ensure that only persons with the appropriate qualifications, knowledge, skills and experience are in control of work areas. Employers should arrange for adequate supervision of all employees and contractors at all times where dangerous goods are stored and handled.
- 11.64 Employers should ensure that all risks with unacceptable consequences are actioned immediately. It may be necessary to close down operations to eliminate the risk in the short term until effective risk control measures are in place.
- 11.65 If a breach of Part 8 of the Safety Standards Regulations occurs, the employer must take action as soon as practicable to address and rectify the breach and any risk resulting from that breach.

Specific risk control measures

11.66 Safety Standards Regulations 8.18 to 8.34 relate to the duties of employers to persons in the workplace, protected places and to the external environment. The employer has specific duties including:

- a) physically separating the dangerous goods from people and places;
- b) physically separating the dangerous goods from incompatible substances;
- c) keeping dangerous goods stable;
- d) using impact protection for structures and plant;
- e) using impact protection for containers;
- f) protecting the environment by:
 - (i) preventing spills;
 - (ii) preventing spills in the transfer of dangerous goods;
 - (iii) controlling hazardous atmospheres; and
 - (iv) providing suitable lighting;
- g) providing fire protection such as:
 - (i) sufficient water supply;
 - (ii) use of fire alarm systems;
 - (iii) use of hose reels;
 - (iv) use of fire hydrants;
 - (v) use of fire monitors; and
 - (vi) use of automatic sprinkler system;
- h) emergency preparedness including:
 - (i) providing safety equipment;
 - (ii) developing emergency plans;
 - (iii) implementing procedures; and
 - (iv) developing emergency spills procedures;
- i) developing and educating on security measures; and
- j) developing procedures for the disposal of plant, equipment and containers.

Separate dangerous goods from people, protected places, and other property

11.67 Safety Standards Regulation 8.18 requires an employer to use physical separation methods to eliminate or reduce, as far as is reasonably practicable, any risks to a person, protected place or any property at or outside the workplace that may result from a dangerous occurrence involving the storage or handling of dangerous goods.

11.68 Physical separation is the principal method by which risks to other occupancies are minimised. Separation may include:

- a) isolating the dangerous goods by distance;
- b) using effective barriers; or
- c) a combination of both.

11.69 In deciding what may be effective to control a specific risk, an employer should consider the types of hazard and risks the dangerous goods stored and handled in the workplace may pose to adjacent properties. This analysis should include:

- a) the quantity of dangerous goods stored and handled in the work area;
- b) the type of installation and the processes applied to the dangerous goods in the work area and their associated hazards;
- c) all other activities in the work area which may increase the risks; and
- d) any control measures in place that will reduce the risks.

11.70 When using barriers, employers should consider any risk posed to the barrier when used to isolate dangerous goods. For example:

- a) the effect that climatic elements may have on a barrier and its effectiveness;
- b) the level of fire resistance provided by the barrier; and
- c) the structural capability that may be required to withstand weather and overpressure resulting from internal or external incidents.

Separate dangerous goods from incompatible substances

11.71 Safety Standards Regulation 8.19 requires employers to separate dangerous goods from all other goods that are incompatible to prevent any dangerous interaction. Employers should separate the storage and handling of dangerous goods from incompatible goods in separate areas, or by using physical barriers or by distance if they must be stored within the same area.

11.72 Employers should not store dangerous goods above or below other goods with which they may interact.

11.73 Employers should, as far as practicable, prevent dangerous goods from:

- a) interacting with incompatible goods; and
- b) contaminating food, food packaging and personal use products, such as cosmetics, cigarettes, medication and toiletries.

11.74 Employers should ensure that workplace systems and procedures are developed and enforced. This includes the training and supervision of personnel so that there is segregation of incompatible substances at all times.

Keep dangerous goods stable

11.75 Safety Standards Regulation 8.20 requires an employer to, as far as is reasonably practicable, ensure that the dangerous goods are kept stable. Unless the goods are about to be used in a manufacturing process, an employer must ensure that the dangerous goods are stored and handled in such a way as to prevent them becoming unstable, decomposing or changing so that a different hazard is created or the risk associated with the dangerous goods is increased.

11.76 An employer must make sure the dangerous goods are stored in accordance with the ADG Code or the manufacturer's specifications. If the stability of the dangerous goods depends on the maintenance of proportions of the substances the employer must:

- a) maintain the specified proportions of substances that constitute the dangerous goods including any stabilising ingredients; and
- b) keep the goods at or below a control temperature.

Protect structures and plant from impact

11.77 To prevent damage from the movement of the structure or plant including any attached pipe work or equipment, an employer must ensure that structures or plant used for the storage or handling of dangerous goods are appropriately located and fixed to a stable foundation (Safety Standards Regulation 8.21).

11.78 The most likely sources of impact are vehicles or other mobile plant however, the employer should also consider any threats from external sources such as nearby railways, airports or construction activities.

11.79 Employers should ensure that control measures are in place for the prevention or control of an impact. Installation of crash protection measures, such as bollards and guardrails may provide impact protection. The impact control measures should absorb the energy of any reasonably foreseeable impact and minimise the likelihood of injury to anyone involved in the incident. Impact protection measures may be necessary for:

- a) structures containing dangerous goods;
- b) plant and equipment including storage and process vessels, associated pipe work, pumps and controls;
- c) storage areas (including transit storage) for packages, IBCs and associated shelves and racks; and
- d) exposed parts of the fire protection systems.

Protect containers for bulk dangerous goods from impact

11.80 Safety Standards Regulation 8.22 requires that a container, pipe work or any attached equipment must be protected from damage that may result from activities in the workplace. Bulk containers are usually designed focussing on the storage of the goods rather than the impact from other objects. The employer should ensure:

- a) the integrity of the container;
- b) the container location prevents impact from workplace activities; and
- c) any underground tanks are sited safely and protected from workplace activities.

Protect the environment

11.81 Employers should ensure that there is no seepage of dangerous goods from an underground tank or through faulty foundations of an underground tank. Leaked material can migrate through the water table and present a risk to people and property at considerable distances from the leaking tank.

11.82 Employers should construct underground tanks that are located and protected to eliminate the risk of environmental damage due to leaks from:

- a) failure, usually due to corrosion or stress loading; and
- b) spills from above ground pipe work and filling points.

11.83 Employers should consider other risks involved with the seepage of underground tanks such as the threat of dangerous goods building up in locations such as telecommunication pits or basements of buildings. This may endanger the people who are required to access these locations for the purpose of employment or residence.

Note: Underground storage installations for bulk dangerous goods and combustible liquids are usually subject to additional controls from environmental authorities and local government.

Ensure the integrity of containers

11.84 Understanding the risks associated with leaks from bulk containers, employers should ensure that they maintain the integrity of the storage container in all operating conditions. Factors to consider include:

- structural soundness to prevent leaks and withstand stresses from the product being stored;
- stability, rigidity and suitability of foundations;
- stresses imposed by pipe work and other attachments;
- atmospheric conditions including sun, wind and rain;
- the effects of external impacts; and
- the extent to which an acceptable level of corrosion is permitted over the service life of the container.

11.85 Employers should ensure that bulk containers are located to provide the maximum separation from other occupancies.

Contain spills of dangerous goods

11.86 Safety Standards Regulation 8.23 requires that if a spill, leak or accidental release of dangerous goods occurs, the employer must take action to contain the dangerous goods within the workplace (refer to paragraphs 11.137 – 139 for information on the emergency procedures for spills).

11.87 Open containers not in use, are a principal source of dangerous goods incidents. This leads to spillages, generation of ‘hazardous atmosphere’ and fire. Employers should train and supervise employees to ensure they seal containers correctly when the dangerous goods are not in use.

11.88 Employers should implement a spill containment system large enough to hold all spills safely until clean up. Factors the employer should consider include:

- the nature of the dangerous goods (whether liquid or solid);
- the quantity of the dangerous goods;
- the size of the largest container or reasonably foreseeable largest spill;
- the potential impact if the dangerous goods escape to the environment;
- whether it is necessary to provide for the management of firewater at an incident;
- a separate spill containment is provided for incompatible goods;
- the materials used to construct the containment system, as well as any materials used for absorption, are compatible with the dangerous goods;

- h) other materials in the vicinity that will prevent contamination of groundwater or soil; and
- i) the systems integrity will be maintained in any foreseeable incident.

Eliminate risks when transferring dangerous goods

- 11.89 Employers should ensure that the design of the transfer system and the transfer operation for dangerous goods meet the safety requirements by taking into account factors such as:
 - a) the hazards associated with dangerous goods and the proposed method of transfer;
 - b) the required flow or transfer rates and quantities; and
 - c) external hazards and adjacent activities.
- 11.90 The ADG Code includes specific requirements for the transfer of dangerous goods. Employers should ensure all components in the transfer system are compatible with, or suitably protected from, the goods being transferred.
- 11.91 Safety Standards Regulation 8.24 requires employers to ensure any risks associated with the transfer of dangerous goods to, from or within the workplace are eliminated as far as practicable. If elimination is not possible, employers should reduce the risk by considering:
 - a) spillage or overflow;
 - b) static electricity;
 - c) vapour generation;
 - d) incompatible transfer fittings;
 - e) sources of ignition; and
 - f) instability of the dangerous goods.
- 11.92 Employers should take particular care where spillage may occur away from spill containment installations, such as the transfer by pipe work through areas without bunding. Methods for preventing spills and overflow include:
 - a) overflow protection equipment on receiving vessels;
 - b) flow and pressure regulators on pipe work or pumps;
 - c) interlocking of valves and switches; and
 - d) systems for detecting losses from pipe work and fittings, such as static pressure loss detectors, measurement to determine losses in transfer or external sensors.
- 11.93 Vapour emissions resulting from transfer can be minimised and employers should consider the following:
 - a) the use of enclosed transfer systems;
 - b) keeping lids open only for the minimum period required for transfer;
 - c) minimising exposed surface areas;
 - d) avoidance of splash filling;
 - e) minimising the temperature of liquids being transferred; and
 - f) providing extraction ventilation for all sources of vapour.

11.94 Employers should ensure compatibility for all items that may need to interconnect, including:

- a) hoses, couplings and associated fittings;
- b) earthing connections;
- c) vapour recovery connections; and
- d) telemetry where required.

11.95 Employers must prevent static electricity generation when transferring flammable and combustible liquids, combustible powders and any other dangerous goods with a flammability hazard (Safety Standards Regulation 8.28).

Provide fire protection in the workplace

11.96 Safety Standards Regulation 8.25 requires employers to have a fire prevention and fire protection system in the workplace that is designed for use in relation to the types and quantities of dangerous goods stored or handled at that workplace.

11.97 When assessing the appropriate fire protection methods, the employer must consider:

- a) the conditions under which the goods are stored and handled at the workplace;
- b) the fire load of the dangerous goods;
- c) the compatibility of the dangerous goods with other goods;
- d) risks from other sources; and
- e) proximity to other workplaces or premises (Safety Standards Regulation 8.25(1)(a)).

11.98 Employers should ensure that the fire protection system has the capacity to quickly control and extinguish any fire involving the dangerous goods. Employers must also effectively protect the dangerous goods stored within the workplace from any fire in adjacent properties (Safety Standards Regulation 8.25(1)).

Note: The Building Code of Australia alone may not be sufficient for fire protection of different types of buildings storing dangerous goods. Additional fire protection for the dangerous goods and the building may be required.

11.99 The fire load will depend on the particular hazards associated with the dangerous goods and combustible liquids as well as the quantities being stored and handled. Employers should consider other factors that may influence the fire load including:

- a) storage configuration, height, and density of the dangerous goods;
- b) location, design, type of construction and total floor area of the building or work area;
- c) nature of any structures, plant, and equipment including their materials of construction;
- d) type of operations in the building or work area, with particular attention to whether the goods are bulk, or in open or closed packages; and
- e) if any processing of dangerous goods occurs within the workplace.

11.100 Employers should ensure that the fire protection system provides protection for the dangerous goods installation from off-site sources of exposure and off site premises from on-site exposure. Attention should be given to the types of structures present, with current and future activities.

Ensure the water supply is adequate

11.101 Employers should ensure that there is a reliable water supply for the fire protection system. The supply should be sufficient to supply both the internal fire protection equipment and additional equipment, used by the emergency services authority controlling a fire at the premises.

11.102 Where sufficient supply is not available from the main water supply, employers should supplement this with additional water storage and/or pumps. If the local authorities permit it, water may be obtained from reliable alternative sources such as close by rivers and dams, using whatever resources are suitable.

11.103 Employers should ensure the adequacy of the local water supply and pressure within the workplace by coordinating with the local emergency services authority to conduct regular checks.

Install fire alarm systems

11.104 Where required employers should ensure that the design and installation of the fire alarm system contains:

- automatic systems capable of being operated manually through the use of clearly identified alarm activators at convenient and safe locations, easily accessible to work areas;
- alarm signals that are distinguishable from any other signal to permit ready recognition and which are clearly audible throughout the premises;
- an effective visual system as an alternative which should be installed where there are high noise levels or where the use of protective clothing may prevent the recognition of an alarm signal; and
- a system that remains operable if the main power supply fails.

Install fire-fighting equipment

11.105 Employers should ensure that fire-fighting equipment is located so that:

- it is in a conspicuous position;
- it is readily accessible in the event of an incident, preferably being sited adjacent to exit doors or on exit routes;
- it is convenient to, and readily accessible from, the risk being protected; and
- all dangerous goods and other items being protected can be directly reached by the fire-fighting medium.

11.106 Safety Standards Regulation 8.25(b) directs employers to ensure that the installation, testing and maintenance of fire fighting equipment are in accordance with the manufacturer's specifications.

11.107 Employers should ensure that all fire fighting equipment is correctly labelled.

11.108 If at any stage the fire protection or fire fighting equipment becomes ineffective, the employer must ensure that any risks resulting from the loss of these items are

assessed. If alternative resources cannot be obtained to provide the required level of protection, it may be necessary to cease operating until effective fire protection can be restored (Safety Standards Regulation 8.25(2)).

Install hose reel systems

- 11.109 Employers should ensure that hose reel systems are located on each level of a building where dangerous goods are stored and handled. Where the total floor area exceeds 300m², hose reels should reach every location and installation within the building. Appropriate hydrant hose systems may be substituted for fire hose reels if there are trained persons capable of safely using the equipment.
- 11.110 Employers should ensure that hose reels have the required length, have the appropriately signage and if there is a possibility of damage to the hose reel, a protective cabinet or other suitable safety protection should be provided.
- 11.111 Employers should ensure that foam hose reels are capable of producing satisfactory foam that meets the manufacturers' specifications, are suitable for the risks and are identified by appropriate signage.

Maintain fire hydrants

- 11.112 Employers should ensure that fire hydrants are equipped with a hose branch and nozzle except where it is not appropriate to do so, for example:
 - a) where this equipment may be susceptible to theft; and
 - b) there are no properly trained personnel to operate them.
- 11.113 Employers should ensure that external hydrants are:
 - a) placed in a convenient position, but at a safe distance from exit doors and hard standing areas;
 - b) easily visible with appropriate identification signs; and
 - c) capable of providing the appropriate coverage.

Install fire control monitors

- 11.114 Employers should ensure that monitors are installed, in accordance with manufacturers' specifications, where fire control may require the direction of large quantities of firewater (or equivalent) at a fixed installation, with minimum exposure for fire fighters.
- 11.115 Employers should ensure that monitors are installed in consultation with the relevant fire brigade.

Install automatic sprinkler systems

- 11.116 Employer should install automatic sprinkler systems, which may comprise:
 - a) individual-actuation sprinklers;
 - b) deluge sprinklers;
 - c) foam sprinklers; or
 - d) a combination of any of the above.

Maintain portable fire extinguishers

11.117 Employers should ensure that all portable fire extinguishers are clearly visible, readily available, unobstructed, and appropriate for the identified risk, not adversely affected by hazardous or climatic conditions, properly serviced and regularly tested.

Note: AS 2444:2001 – Portable fire extinguishers and fire blankets – Selection and location provides relevant information on the selection and storage of fire extinguishers.

Develop and implement emergency procedures

11.118 Safety Standards Regulation 8.26(a) requires employers to develop, implement and maintain emergency procedures for all workplaces that store and handle dangerous goods. This ensures the safe management of all assessed emergencies such as fire, spillage, vapour release, uncontrolled reaction and external threats.

11.119 Employers should take into account when determining the extent of emergency procedures the size and complexity of the workplace, the types and quantities of dangerous goods and the processes involved when the goods are in use. The emergency procedures should include:

- the means of raising the alarm;
- the method for summoning the appropriate emergency services; and
- any actions to be taken by employees in an emergency to ensure the safety and health of all persons and to minimise damage to property and the environment.

Note: An example of an effective emergency procedure is a simple one-page document; in point form, suitable for display on signs or carrying by employees or visitors as a pocket card.

11.120 Employers must communicate the emergency procedures and provide training for all employees and other persons who may be affected if an emergency occurs in the workplace (Safety Standards Regulation 8.26(a)).

11.121 Safety Standards Regulation 8.26(b) requires that emergency equipment is available for dealing with the containment and clean up of any accident in the workplace.

Develop and implement emergency plans

11.122 Safety Standards Regulation 8.27 requires employers to ensure that an emergency plan is developed, implemented and maintained at the workplace where:

- dangerous goods with amounts larger than the manifest quantity in Schedule 7 to the Safety Standards Regulations, are being stored and handled at the workplace; and
- the goods are explosives, and their total quantity is a notifiable quantity under Safety Standards Regulation 8.44A(1).

11.123 The purpose of an emergency plan is to minimise the effect of dangerous occurrences in a workplace. The employer should implement an emergency plan that prioritises the most likely incidents. It should incorporate actions required for worst case scenarios and should be adaptable in all circumstances dependent upon the severity and the type of incident.

11.124 Employers should ensure that the emergency plan has a clean-up strategy for equipment and material that includes the availability of absorbents and neutralisers.

11.125 Employers when developing the emergency plan should:

- a) consult with employees, contractors and/or their representatives or health and safety representatives and the relevant emergency service authority; and
- b) provide a copy of the plan to the emergency services who may then issue written advice to the employer about the plan. If this occurs, the employer should consider the advice.

11.126 Employers should consult with local government authorities for environment and planning to ensure compliance with any legislation and emergency planning in the jurisdiction. The employer should also consider consulting with neighbours if an emergency may affect adjoining properties.

11.127 The emergency plan should be communicated to all persons who may be affected by an emergency.

Coordinate the emergency plan

11.128 Employers should ensure that the emergency plan is comprehensive and coordinates all aspects of emergency management including:

- a) copies of all emergency procedures;
- b) responsibilities of key persons in managing emergencies;
- c) circumstances to activate the plan;
- d) systems for raising the alarm;
- e) estimating the extent of the emergency;
- f) summoning emergency services authorities when an event becomes an emergency, or has the potential to become a dangerous occurrence;
- g) protection of all persons including detailed evacuation procedures and methods for accounting for all people at the workplace;
- h) isolation of the emergency area to prevent entry by non-essential personnel;
- i) roles of on-site emergency response teams;
- j) containment of any spillage;
- k) the requirement for waste firewater retention to ensure that contaminated firewater cannot enter waterways, drains or ground water;
- l) disconnection of power supplies and other energy sources except when required to maintain safety of a critical operation or to run emergency equipment such as fire booster pumps;
- m) prevention of dangerous goods or contaminated material of any kind from entering drains or waterways;
- n) provision of relevant information and assistance to the emergency services authority, both in anticipation of emergencies and when they occur;
- o) maintenance of site security throughout the emergency;
- p) provision for dealing with the public and the press; and
- q) site rehabilitation requirements.

- 11.129 Where there is a foreseeable incident, which may affect beyond the boundary of the workplace, the employer should ensure that the emergency plan addresses the management of the off-site effects. This may include providing warnings or communications to neighbouring workplaces and residences.
- 11.130 Where emergency plans include agreements with the employers of neighbouring workplaces to provide mutual aid in emergencies, these arrangements should be formalised in consultation with the emergency services and other involved parties to determine the plan's effectiveness.
- 11.131 Where the emergency plan includes activities that involve persons who reside or work adjacent to the workplace, employers should ensure that the relevant parts of the plan are communicated to those persons.

Implement the emergency plan

- 11.132 Employers should ensure that the emergency plan is tested when first devised and after each modification. Throughout the year, at suitable intervals, practice drills and simulated emergencies should be conducted and involve all employees and the emergency services. These drills should be focussed on familiarising anyone who is involved in the storage and handling of dangerous goods so that they are practised in any emergencies.
- 11.133 Safety Standards Regulation 8.27(4) directs employers to review the emergency plan:
 - a) within five years of its development;
 - b) at intervals of no more than five years;
 - c) a change in the circumstances that may include whenever there is:
 - i) a change to the risk at or near the workplace;
 - ii) when updated information becomes available; and
 - iii) when a possible deficiency is identified.

- 11.134 Employers must ensure that the emergency plans are readily available to all supervisors and employees at all times. Any changes to the plan or issues raised because of a review should be discussed with the emergency services authority (Safety Standards Regulation 8.27(3)).

Provide safety equipment to control risks

- 11.135 Employers should ensure that the safety equipment necessary for use with dangerous goods is compatible with, and suitably protected from, the dangerous goods. The risk assessment will determine the appropriate control measure required.
- 11.136 The employer must ensure that the equipment is available to relevant persons at all times and is maintained in accordance with manufacturer's specifications (Safety Standards Regulation 8.29).

Provide emergency equipment for spills

- 11.137 Safety equipment required to control spills must be provided by the employer and must be available, regularly maintained and checked to ensure it operates

effectively in accordance with the manufacturer's specifications (Safety Standards Regulation 8.29).

11.138 Employers should assess each spill risk associated with all the dangerous goods held at the workplace. The equipment required to contain and clean up after an incident will vary according to the type and quantity of the dangerous goods.

11.139 Safety equipment for use with dangerous goods should be appropriate to the dangerous goods type. Employers should consider the following equipment for use in an emergency:

- a) over packs such as oversized drums to contain leaks from containers;
- b) appropriate absorbent material suitable for the clean-up of spills;
- c) booms, plates and/or flexible sheeting for preventing spillage from entering drains and waterways;
- d) neutralising agents such as lime and soda ash;
- e) pumps and hoses for removing the spills material; and
- f) suitable protective clothing and equipment to protect the safety and health of personnel involved in the clean up.

Eliminate ignition sources in hazardous areas

11.140 Safety Standards Regulation 8.28 requires employers to eliminate or control the ignition sources in hazardous areas of the workplace. Within a dangerous goods environment, flammable or combustible gases, vapours, dusts and mists may occur and can form explosive mixtures with air in certain proportions.

11.141 Employers must identify ignition sources in a hazardous area and if elimination is not practicable, the employer must ensure they control and reduce the risk (Safety Standards Regulation 8.28). Examples of an ignition source include:

- a) naked flames associated with blow torches, shrink wrapping equipment, stoves, gas or oil heaters, pilot lights, driers, lighters and matches;
- b) incandescent materials such as glowing coals or lighted cigarettes, cigars and pipes;
- c) arcs from electric welding or arcing contacts on electric motors and switchgear;
- d) static sparks;
- e) mechanical sparks from grinding or from objects striking together;
- f) friction from moving parts such as fan blades rubbing nearby surfaces;
- g) heat which may be generated from appliances or from chemical and biological reaction vessels;
- h) internal combustion engines and vehicles;
- i) battery operated devices such as radio transmitters, pagers and mobile phones; and
- j) electrical fittings and equipment (including wiring, power points, switches, lighting, appliances and battery forklift trucks) which are not rated for safe operation in a hazardous area.

11.142 An employer should not permit the use of a flame or any other source of ignition during repairs in or adjacent to hazardous areas unless:

- close and experienced supervision is provided during the activities;
- the area where the repair work is to be carried out has been freed of possible hazards, including toxic or flammable gases and vapours, and combustible dusts;
- personnel involved in the operation are given precise, detailed instructions on the precautions which are to be taken before and while the ignition sources are in the area; and
- additional controls are in place such as atmospheric monitoring, isolation of switches, pipe work and valves.

11.143 For work involving ignition sources in a hazardous area, employers should use a formal work permit system. This permit is usually referred to as a 'hot work permit'.

Prevent static electricity

11.144 Safety Standards Regulation 8.28 states that in all hazardous areas, employers must take measures to eliminate or control the generation of static electricity to dissipate any static electricity that occurs safely.

11.145 Static electricity is generated by a wide variety of sources including:

- movement of dry powders and liquids that have a low electrical conductivity such as pouring, pumping, stirring, or high velocity flow;
- moving vehicles, equipment or components of plant;
- movements of personnel, especially when wearing clothing and footwear of low conductivity;
- fitting or removal of clothing, including protective clothing;
- application or removal of plastic wrap;
- particulate or aerosol spray, including spray painting or the rapid discharge of a carbon dioxide extinguisher;
- manual carrying of liquids in a non-conductive container or one with an insulating handle; and
- movement of packages by conveyor or by trolleys with non-conductive wheels.

11.146 Employers should consider the following procedures to eliminate or control the generation of static electricity in all hazardous areas:

- all tanks, pipe work, transfer systems and process plant should be earthed, or otherwise protected;
- liquid transfer rates and splashing should be minimised or within safe limits;
- the use of anti-static additives in non-conductive liquids;
- the wearing of conductive clothing, particularly footwear; and
- operating procedures should include instructions for avoiding the risks associated with static electricity.

Control hazardous atmospheres

11.147 Safety Standards Regulation 8.30 requires that an employer must ensure that any risk to a person's health and safety associated with any atmospheric conditions is eliminated, or, if this is not practicable, reduced as far as practicable.

11.148 Where the risk assessment process has identified the possibility of a hazardous atmosphere, employers should provide atmospheric testing and monitoring to ensure that a safe atmosphere is maintained. A hazardous atmosphere is one that contains:

- a) an oxygen level that is not safe for breathing;
- b) concentrations of hazardous gases, vapours, mists, fumes and dusts that are at or above relevant exposure standards; and
- c) concentration of flammable gases, vapours, mists, fumes and dusts at or above five per cent of the lower explosion limit.

11.149 Employers should consider the control measures for hazardous atmospheres including:

- a) preventing the entry of contaminants into the atmosphere using totally enclosed systems, or by blanketing an exposed surface with an inert atmosphere;
- b) extracting the contaminants from their sources through extraction ventilation;
- c) reducing the concentrations of contaminants by introducing uncontaminated air, either through general ventilation or by purging;
- d) limiting the introduction of processes and equipment into the area where the hazardous atmosphere may exist to those which will not constitute a risk in that atmosphere;
- e) ensuring appropriate personal protective clothing and equipment is worn by all personnel entering the area; or
- f) a combination of any of the above.

Manage ventilation

11.150 Employers should consider local exhaust ventilation from each significant source of contamination as it is usually more effective for the prevention of harmful atmospheres. Where a storage area for closed containers of dangerous goods has adequate openings to the open air, natural ventilation may be sufficient. In other circumstances, a mechanical ventilation system may be required.

Note: General ventilation should provide enough entry and exhaust capacity to provide airflow throughout the area and to prevent pockets of harmful atmosphere from developing.

11.151 Where there are dangerous goods with vapours heavier than air, employers should consider:

- a) removing the exhaust air from the lowest point above any spill containment while fresh air is introduced from above; and

- b) fresh air should always be drawn from a source uncontaminated by exhaust air or other pollutants; and
- c) the exhaust should be discharged where it will not cause other risks, and in compliance with environmental legislation concerning discharges to atmosphere; and
- d) the use of cross-flow ventilation with closely spaced registers that may be effective at eliminating pockets of hazardous atmosphere; and
- e) a ventilation system for a dangerous goods area exclusive to the particular building, room or space. Linking of ventilation systems should only be allowed where it will not facilitate fire spread and there will not be any other increased risk that may arise from the mingling of incompatible vapours.

Note: Part 7 Confined Spaces of the Safety Standards Regulations provides further information on ventilation.

Use purging

Note: Purging involves introducing air or an inert gas into a confined space to displace oxygen and/or flammable, toxic or corrosive fumes. Purging with inert gas is most commonly used above the liquid surface of reaction, mixing or bulk storage vessels to prevent surface oxidation or the formation of an explosive atmosphere.

- 11.152 Employers may require purging for empty vessels that have contained dangerous goods prior to entry by personnel carrying out maintenance activities.
- 11.153 Because purging may reduce oxygen levels or there may be residual contamination, employers should implement and enforce safe entry procedures. Entry to a confined space must be in accordance with Part 7 of the Safety Standards Regulations.

Provide sufficient lighting for the workplace

- 11.154 Safety Standards Regulation 8.31 specifies that the employer must ensure that adequate natural or artificial lighting is provided to all work areas and access ways. Appropriate lighting must be provided in all areas of the workplace. This could include internal roads, pathways, corridors, rooms and buildings where dangerous goods are stored or handled.
- 11.155 Employers should provide safe lighting considering the effects of light on the dangerous goods including the risks of particular types of lighting design as they may provide a hazardous ignition source.
- 11.156 Employers should consider the need for emergency illumination over exits and emergency locations.

Implement security measures

11.157 Safety Standards Regulations 8.32 and 8.33 require an employer to develop procedures to ensure the safety of visitors and the prevention of any unauthorised access to the workplace. When developing security systems and procedures, the employer should consider:

- a) security of personnel, product, processes, equipment, plant, buildings, documentation, information systems and any areas of special risk;
- b) the nature of identified hazards and their levels of risk;
- c) the location of the premises, including the nature of the surrounding community and environment;
- d) the likelihood of mischief or sabotage;
- e) the integrity and reliability of the security system hardware and design; and
- f) the back-up support required for personnel and the security systems.

11.158 Where it is necessary to control access of all people to the premises, the employer should ensure that the access control system includes:

- a) the means to identify the extent of access to be permitted for each person;
- b) the means to account for everyone on site at any given time; and
- c) the issue of restricted access passes to visitors, or prohibiting unaccompanied access.

11.159 Depending on the size and hazards of the particular premises, employers should consider security measures such as:

- a) fencing or enclosing areas where the dangerous goods are kept;
- b) providing locks on doors, windows and other openings to buildings, rooms, compartments or containers where dangerous goods are kept;
- c) continuously supervising areas where the dangerous goods are kept;
- d) security checks on all vehicles entering or leaving the premises; and
- e) limiting access by visitors, contractors and employees to authorised areas only.

11.160 Employees should receive training to ensure that they understand security measures and security signs. All visitors to the workplace should be provided with information and supervised appropriately.

Dispose of plant, equipment and containers

11.161 Safety Standards Regulation 8.34 requires employers to ensure that plant, pipe work, equipment or containers are free from dangerous goods or otherwise made safe prior to disposal. Prior to commencing the decommissioning, abandoning or disposal of plant used for dangerous goods, the employer must identify the hazards in order to assess and control the risks involved in the process (Safety Standards Regulation 8.16).

11.162 Employers should ensure that plant and equipment for disposal is subjected to the following precautions:

- a) identification of possible residual or resultant hazards;

- b) provision of appropriate fire protection, where required;
- c) ventilation to prevent build up of a hazardous atmosphere; and
- d) containment of any effluent.

11.163 Employers should decontaminate dangerous goods containers, such as drums, unless they are:

- a) for refill;
- b) for refurbishment; or
- c) otherwise made safe by measures that will prevent adverse health effects to people or damage to property and the environment.

11.164 When a container is no longer used for the storage of dangerous goods and the container has been cleaned and is 'free from dangerous goods' (Safety Standards Regulation 8.34), employers should remove or obscure all labels. This process avoids confusion as to the contents of the container.

11.165 Employers should ensure that used packaging, which is not free of dangerous goods, retains the labelling that properly identifies the residual hazard. When they are free of dangerous goods, the labelling should be removed. Disposal of containers that have not been cleaned free of dangerous goods may be subject to State and Territory environmental legislation.

11.166 Employers should not dispose of the container until the hazards are known and then only in an acceptable manner, after consultation with the relevant waste management authority if required.

11.167 Particular care should be taken if an employer becomes aware of unlabelled containers with unknown contents. It is good practice to isolate such a container until its contents are identified and it is appropriately labelled. If the contents cannot be identified, expert assistance should be obtained.

Provide information

Provide information for health and safety procedures

11.168 Safety Standards Regulation 8.35 requires that employers obtain, communicate and make available relevant information for dangerous goods stored and handled at the workplace. This will allow health and safety procedures to be developed, adopted and maintained in order to:

- a) ensure the safety and health of persons who may be affected by dangerous goods;
- b) enable persons to take appropriate action in case of emergencies arising from the storage and handling of dangerous goods; and
- c) prevent damage to property and the environment from the hazards arising from dangerous goods.

11.169 Where an employer develops and adopts health and safety procedures in accordance with the regulations, the employer should communicate those procedures to the relevant persons. People who may be affected by dangerous goods include:

- a) supervisors and employees;

- b) visitors and contractors;
- c) residents of adjoining properties, surrounding the workplace; and
- d) emergency services personnel.

11.170 The employer should ensure information provided is understood by all concerned, taking into account language and other communication difficulties. The information should include:

- a) relevant information extracted from, or based on the MSDS;
- b) information included on labels, safety signs, placards, registers, manifests and emergency procedure guides;
- c) extracts from chemical safety texts or proprietary databases;
- d) specific purpose guides prepared by industry groups; and
- e) other guides relevant to the hazards associated with the particular dangerous goods.

11.171 Where safety signs are used to warn persons about a hazard or inform of the responsibilities, the employer should ensure that the signs are displayed in a prominent position close to the particular hazard. Depending on the situation, the information may best be provided:

- a) in writing, such as written procedures, signs or instructions;
- b) in some form of practical training;
- c) in electronic format; or
- d) as a combination of any of the above.

11.172 Employers should seek safety information from all relevant sources including:

- a) manufacturers or suppliers;
- b) industry associations;
- c) professional associations;
- d) trade unions;
- e) regulatory authorities;
- f) academic institutions and publications;
- g) consultants; and
- h) emergency services.

Provide an MSDS

11.173 Safety Standards Regulation 8.36 requires an employer to obtain a current MSDS from a supplier the first time the dangerous goods of that kind are supplied to a workplace. The MSDS, provided by the supplier of the dangerous goods, must not be changed unless translation or reformatting of an overseas MSDS is necessary to comply with the Safety Standards Regulations.

11.174 The employer must make the MSDS accessible to all employees, emergency services employees and visitors to the workplace (Safety Standards Regulation 8.36). This may include using a microfiche and reader, computer databases, or computer links with the supplier or through web pages.

- 11.175 Where an employee is working with dangerous goods, or the employee representative or health and safety representative, requests an MSDS for the dangerous goods, the employer must provide them with a copy of the MSDS (Safety Standards Regulation 8.36).
- 11.176 A retailer is not required to obtain an MSDS from the supplier for dangerous goods that are in consumer packages intended for retail sale. This exemption does not apply if:
 - a) it is intended that the container be opened on the workplace except for taking a sample or tinting paint; and
 - b) the dangerous goods are provided for trade use via a wholesale or trade supply counter or section.
- 11.177 While employers are not required to have an MSDS for dangerous goods in transit, they are required to have safety and health information concerning those dangerous goods accessible and available for their employees and any other person who may be affected by the dangerous goods while they are in transit.

Ensure risk assessments are made available to employees

- 11.178 Under Safety Standards Regulation 8.37, an employer must make accessible to employees and workplace health and safety representatives a risk assessment or review prepared under Safety Standards Regulation 8.16.

Provide information for plant and structures

- 11.179 Safety Standards Regulation 8.38 requires employers to provide information about the plant and structures to anyone who has reason to operate access, maintain, repair, inspect or test them.
- 11.180 Employers should provide information to employees to equip them with sufficient knowledge and understanding of the plant, structures and their associated hazards so as:
 - a) to enable the employees to perform their duties efficiently and safely; and
 - b) to guard against the plant and structures being compromised or damaged.
- 11.181 Information should be relevant to activities performed by the employee and be consistent with the extent of contact they have with the plant or structures. Employers should consider information, which may include:
 - a) the purpose for the design of the relevant plant and structures;
 - b) testing or inspections to be carried out prior to, during and on completion of the intended activity;
 - c) concise operating procedures and systems of work necessary for the safe use of the plant;
 - d) warnings about particular hazards;
 - e) details about installation, commissioning, testing, operation, maintenance, cleaning, transport, storage and/or dismantling, as appropriate;
 - f) particular hazards associated with the structures, plant and their contents;
 - g) site specific and external risks that may impact on the plant and structures; and

- h) emergency operating procedures.

11.182 The supplier and installer should provide the primary source of information to the employer. Additional information may be sourced from designers, manufacturers, suppliers, statutory authorities and emergency service authorities.

11.183 The employer should ensure that the information is in a language that is easily understood by all employees. The information may be provided:

- a) in writing, for example, written procedures, signs or instructions;
- b) explanations and/or demonstrations delivered during specific training;
- c) in electronic format; or
- d) as a combination of any of the above.

Maintain a manifest register for emergency purposes

11.184 An employer must maintain a register of manifest quantities if:

- a) dangerous goods or combustible liquids mentioned in column 2 of an item in Schedule 7 to the Safety Standards Regulations are stored and handled at the workplace; and
- b) the total quantity of any of the dangerous goods or combustible liquids exceeds the manifest quantities in column 5 of an item in Schedule 7 to the Safety Standards Regulations (Safety Standards Regulation 8.39).

11.185 The employer must ensure when preparing a dangerous goods register that:

- a) the register is located in a place at the workplace, decided in consultation with emergency services; and
- b) the register is readily accessible to emergency services and Comcare (Safety Standards Regulation 8.39).

11.186 Safety Standards Regulation 8.39(3) sets out the information that must be included in the register. Employers must ensure that the register contains:

- a) a manifest of the quantities of dangerous goods;
- b) detailed information on the dangerous goods stored such as type;
- c) the location within a storage area; and
- d) the register must be revised within seven days of any significant change in any of the information contained in it.

11.187 Employers should ensure that dangerous goods shipping documents contain the information required for dangerous goods in transit.

Maintain a register of information for dangerous goods.

11.188 Safety Standards Regulation 8.59 requires an employer to keep an updated register listing each of the dangerous goods stored or handled at the workplace.

11.189 The register should provide the product names of the dangerous goods that are stored or handled in the workplace. The register should also include the MSDS for each of the dangerous goods where one is required under the regulations. The register must be readily accessible to an employee who works with dangerous goods (Safety Standards Regulation 8.59).

11.190 Dangerous goods contained in a package that under the ADG Code does not have to be marked and dangerous goods in transit do not have to be included in the register. However, safety information should be on hand to provide the emergency services relevant information if required.

11.191 Employers should ensure that the register is updated when:

- new dangerous goods are introduced to the workplace;
- the use of existing dangerous goods is discontinued; and
- the manufacturer or supplier of dangerous goods provides a revised or updated MSDS.

11.192 If an employer must keep a register under Part 6 of the Safety Standards Regulations, the majority of the information contained in the register will be the same. It is more than appropriate to maintain a single register as long as it meets all the requirements determined in both sets of regulations.

Provide a diagram of the site plan

11.193 Safety Standards Regulation 8.39 requires that in addition to the dangerous goods register, the employer must also prepare a site plan of the workplace. The site plan must be amended to reflect any change in the details of the plan within 7 days of the change. The site plan must include a detailed description of any adjoining or adjacent properties or workplaces.

11.194 Employers should ensure that the site plan of the workplace indicates the location of:

- essential services, including fire services and isolation points for fuel and power;
- register of dangerous goods;
- main entrance and other entry points;
- each class of dangerous goods;
- combustible liquids stored and handled with fire risk dangerous goods, if:
 - the combustible liquids are in bulk; or
 - the packaged combustible liquids are in a total quantity of more than 1,000 kg or 1,000 L in a storage area;
- C1 combustible liquids stored and handled in isolation from dangerous goods;
- dangerous goods in transit;
- each individual storage area and how they are identified;
- manufacturing and process areas; and
- drains.

Review and revise risk assessments

11.195 Safety Standards Regulation 8.16(3) requires that employers review each risk assessment at least once every 5 years. A review must be carried out prior to the introduction of changes such as:

- dangerous goods not normally kept at a workplace are introduced;

- b) dangerous goods are stored and handled in different areas since the last assessment was completed;
- c) new or improved control measures have become more practicable or safer; or
- d) plant or structures are modified.

11.196 Safety Standards Regulation 8.16(4) requires the employer to keep a record of each risk assessment and review. The employer must keep the records up-to-date and available to:

- a) Comcare on request;
- b) employees who may be affected by any risk contained in the assessment; and
- c) all health and safety representatives at the workplace (Safety Standards Regulation 8.37).

11.197 The detail in the records will vary depending on the nature and severity of the risks identified. If a risk does not need to be controlled, it may not be necessary to maintain an extensive record of the risk. However, employers should record risk assessments including the:

- a) business or workplace name;
- b) names of assessors and their appointments;
- c) date the assessment was conducted;
- d) areas within the workplace that were assessed;
- e) dangerous goods, the MSDS or other information reviewed;
- f) processes or activities that were assessed;
- g) details of all risks identified;
- h) decisions about the risk and why they were made;
- i) practicality of reducing the risk; and
- j) controls in place to eliminate or reduce the risk.

NOTIFICATION OF STORAGE AND HANDLING OF DANGEROUS GOODS

11.198 Safety Standards Regulations 8.41, 8.44A and 8.63 apply to an employer if:

- a) the total quantity of any of the goods or liquids stored and handled at the workplace exceeds the manifest quantity in Schedule 7 to the Safety Standards Regulations;
- b) there are explosives where the net explosive quantity (that is, the quantity exclusive of non-explosive components) is greater than 2 kilograms (a notifiable quantity); and
- c) Schedule 7 dangerous goods to the Safety Standards Regulations are transferred through pipelines.

11.199 Employers must notify Comcare in writing, using the approved form, and include:

- a) the details of the class of dangerous goods or explosives to be stored or handled at the workplace; and

- b) the maximum quantities of the dangerous goods or combustible liquids that will be stored and handled.

11.200 Employers must provide this information every two years unless there is a significant change in amounts of dangerous goods or combustible liquids at the workplace. Employers must also notify Comcare as soon as possible if there is a change in risk associated with the dangerous goods at or outside the workplace.

11.201 The employer must provide Comcare with any information relevant to the storage or handling of dangerous goods, upon request.

Mark containers on receivable dangerous goods

11.202 Safety Standards Regulation 8.45 outlines the requirements of marking containers at the workplace. For all dangerous goods, including those in containers, the employer should ensure that the goods are labelled according to the ADG Code.

11.203 When an employer could reasonably be expected to know that the labelling of the dangerous goods package received does not comply with the ADG Code, the employer must either:

- a) not accept the goods; or
- b) mark the container in accordance with the ADG Code, if the goods have already been accepted.

11.204 If a label is defaced or illegible, the employer should replace it. Portable tanks and intermediate bulk containers (IBC) must be placarded with emergency information panels containing the required information.

Mark containers at the workplace

11.205 Safety Standards Regulation 8.46 specifies that employers must ensure containers at the workplace are marked correctly.

11.206 While the goods are at the workplace, the markings on a container of dangerous goods must be maintained with accurate information.

11.207 A container that is marked for use for particular dangerous goods must be used only for those goods.

11.208 Where the labelling of a small package is not practicable, the employer should ensure that the necessary health and safety information is provided in another effective manner. This may be achieved by labelling the shelf on which the dangerous goods are kept.

11.209 Different groups of people may use the dangerous goods at different times. Employers should ensure that procedures are in place to indicate to all persons, in contact with the dangerous goods, the contents of the containers and their particular properties. Before a person is required to handle the unlabelled container, they should have access to health and safety information relating to the contents of the container.

Note: Information on marking of packages is available in Part 7 of the ADG Code.

11.210 Employers are not required to mark a container with decanted dangerous goods if:

- a) the dangerous goods are to be used immediately after the goods are transferred to the container; and
- b) the container is cleaned and free of the dangerous goods immediately after use (Safety Standards Regulation 8.47).

Provide placards for the workplace

- 11.211 Safety Standards Regulations 8.51 and 8.52 outline the requirements for placarding dangerous goods. Employers must ensure that placarding is part of an overall management policy for workplaces where dangerous goods are stored and handled. Placards are required to alert emergency services, people at the workplace and the public to the location and nature of the substances stored.
- 11.212 Employers must ensure that placards display the emergency procedures to inform emergency services personnel, employees and the public with appropriate safety responses and environmental protection. The placards must be maintained, not be obscured and be replaced if illegible.

Calculate the quantities of dangerous goods.

- 11.213 When calculating the quantities for placarding, employers must comply with Schedule 7 to the Safety Standards Regulations. The calculation includes all containers of dangerous goods stored or handled as if they are full, even when they are not, unless they are entirely free from dangerous goods.
- 11.214 When determining the aggregate amount of dangerous goods employers must convert all volumes to litres and all mass measurements to kilograms and add the number of kilograms to the number of litres. The quantity of gas is always based on the water capacity of the cylinder. To determine the capacity of gas in a cylinder look for the stamp on the cylinder neck or foot ring.

Use placards

Placard bulk dangerous goods

- 11.215 Safety Standards Regulation 8.48 provides that if an employer receives bulk dangerous goods and the employer knows or should know that the placard does not comply with the ADG Code they should:
 - a) not accept the goods; or
 - b) ensure the goods are placarded in accordance with the ADG Code after accepting them.
- 11.216 Safety Standards Regulation 8.49 specifies that where dangerous goods or combustible liquids are stored in bulk the employer must ensure that a bulk dangerous goods placard and a C1 combustible liquids placard (if applicable) are displayed.
- 11.217 This does not apply to:
 - a) dangerous goods in bulk in an IBC or in a bulk container intended for transport;
 - b) C1 combustible liquids that are either in isolation from other dangerous goods or are in a quantity of not more than 10 000L; and

- c) Class 2.1, Class 3 dangerous goods or C1 combustible liquids that are stored in an underground tank at a service station.

11.218 Employers should ensure that placarding for bulk dangerous goods or combustible liquids is located so that there can be no confusion as to the application of the placard. The placard should be immediately visible to emergency services personnel approaching the storage location from the most likely direction.

Provide placards to the perimeter or access points to the workplace

11.219 Safety Standards Regulation 8.50 specifies that employers are required to placard workplace boundaries using the 'HAZCHEM' outer warning placards for any of the dangerous goods listed in column 2 as soon as any one of the placarding quantities from column 4 Schedule 7 to the Safety Standards Regulations are exceeded.

11.220 Employers should position an outer warning placard at each entrance to the workplace for the emergency services to gain entry to the workplace in an emergency. If the entrances are set back from the road, it may be necessary to provide a warning at the road.

11.221 At large workplaces, outer warning placards may be more effective if they are duplicated on the approaches to the particular buildings or areas where dangerous goods are located. The outer warning placard may be the only dangerous goods placarding required, depending on the quantity of dangerous goods stored and handled at the workplace.

11.222 An employer may make alternative arrangements for the placement of placards, in consultation and agreement with emergency services.

Locate placards correctly within the workplace

11.223 Safety Standards Regulation 8.52 requires employers to display a placard for the dangerous goods or combustible liquids, when a placarding quantity of packaged dangerous goods or combustible liquids are stored or handled at the workplace. The placard should be located as close as practicable to the area where the dangerous goods or combustible liquids are stored.

11.224 Employers must include all the applicable class and subsidiary class labels required by Safety Standards Regulation 8.52. Employers are to group placards together and display them either vertically or horizontally on shared signs. They must be visible and easily understood by anyone approaching the area within the workplace where the packaged dangerous goods are stored.

11.225 For those areas where there is regular variation in the types of dangerous goods, such as areas where dangerous goods are in transit or are held, employers may use magnetic or removable labels. If the public have access to the area, the labels should be protected from tampering.

11.226 When there is some doubt as to whether a placard is required, employers should provide an appropriate placard to indicate that dangerous goods are present to encourage the exercise of caution whilst in the vicinity.

11.227 Safety Standards Regulation 8.53 requires employers to display a placard (complying with item 5 of Schedule 8 to the Safety Standards Regulations) at the workplace, for dangerous goods too dangerous to be transported if:

- the dangerous goods listed in column 2 of item 23 in Schedule 7 to the Safety Standards Regulations are being stored and handled; and
- the total quantity of dangerous goods is more than the placarding quantity in column 4 of item 23 in Schedule 7 to the Safety Standards Regulations.

11.228 Safety Standards Regulation 8.54 requires that a C1 combustible liquids placard (complying with item 2 of Schedule 8 to the Safety Standards Regulations) be displayed at the workplace if:

- the C1 combustible liquids of a class mentioned in column 2 of item 25, 26 or 27 of Schedule 7 to the Safety Standards Regulations are being stored and handled in the workplace in isolation from dangerous goods; and
- the total quantity of packaged C1 combustible liquids is more than the placarding quantity in column 4 of Schedule 7 to the Safety Standards Regulations.

11.229 Safety Standards Regulation 8.55 requires the employer to ensure that the placards are clearly visible from each normal approach to the workplace and that the placards for dangerous goods or combustible liquids are displayed:

- as close as practicable to each outside storage area at the workplace where the goods or liquids are stored or handled; and
- either as close as practicable to the dangerous goods or combustible liquids, or each entrance to the workplace.

Ensure the accuracy of placards

11.230 Safety Standards Regulation 8.56 requires that any placard for dangerous goods stored or handled at a workplace is accurate and revised as soon as practicable if there is a change to the class or quantity of the dangerous goods.

Provide education, training and supervision

11.231 Safety Standards Regulations 8.57 and 8.58 outline the duties that employers owe to employees in a workplace.

Consult with employees

11.232 Safety Standards Regulation 8.57 requires that employers must consult with employees and with their representatives regarding matters, which include:

- induction, training and supervision;
- provision of information;
- hazard identification, risk assessment and risk control; and
- any proposed changes to the storage and handling of dangerous goods in the workplace that are likely to affect the safety and health of the employee.

11.233 Employers should also consult employees before the introduction of new or modified tasks or procedures associated with the storage and handling of

dangerous goods. Changes arising from consultation should be considered and, if appropriate, implemented.

Provide induction and training

- 11.234 Safety Standards Regulation 8.58 specifies that an employer must provide induction, information, training and supervision for all employees and anyone else under their control who is involved with the storage and handling of dangerous goods.
- 11.235 Employers should design induction and training to take into account the requirements of particular employees and the tasks they perform.
- 11.236 Depending on the complexity of the operation, the employer should consider the use of a formal induction program. The induction program should ensure that each person, who may be involved with the storage and handling of dangerous goods, achieves the appropriate knowledge and level of competency.
- 11.237 Employers should ensure that persons who have completed induction training are supervised until they are capable of performing their duties safely.
- 11.238 Site training should be provided for those persons who work directly with dangerous goods. It should also be provided to those persons involved:
 - a) in the purchase and distribution of dangerous goods;
 - b) in the operation, testing, inspection, cleaning or adjustment of plant and equipment used with the dangerous goods;
 - c) in providing and maintaining fire protection and personal protection equipment; and
 - d) in management and supervision.
- 11.239 Employers should provide induction and training to employees and other persons at the worksite, which will allow them to demonstrate competence in the following matters:
 - a) the relevant provisions of the dangerous goods Safety Standards Regulations and this Code of Practice;
 - b) the nature of the hazards and properties of dangerous goods;
 - c) the processes for identifying, assessing and controlling each risk associated with the employee's duties;
 - d) the use and maintenance of measures for the control of each risk;
 - e) safety systems (if any) and the systems of work that relate to the storage and handling of the dangerous goods;
 - f) the safe management and safe conduct in the workplace;
 - g) the effective operation of the emergency plans for the workplace;
 - h) issues relating to plant and equipment;
 - i) the equipment that may be required for use in an emergency;
 - j) the correct use, fitting and maintenance of personal protection equipment; and
 - k) specific controls required around dangerous goods installations.

11.240 Employers should ensure the competency level of employees is at a level that they are able to demonstrate:

- a) an understanding of the hazards and risks associated with working with dangerous goods;
- b) the processes, procedures and practices relating to their specific work area;
- c) what to do if an incident/accident occurs;
- d) emergency procedures relevant to their work area; and
- e) reporting of incidents or other matters that may have an impact on the risks associated with the dangerous goods.

11.241 Employers should ensure that training programs are reviewed at regular intervals including the ongoing monitoring of work practices, to ensure that safe practices are maintained.

11.242 If changes, such as the introduction of new dangerous goods or plant, in operating procedures or in the layout occur in the workplace, employers should assess whether the training requires adaptation. Additional training on new practices should be provided before changes are implemented. Refresher training should also be undertaken at regular intervals, to ensure all persons at the workplace maintain appropriate skills and knowledge.

11.243 Safety Standards Regulation 8.58 requires an employer to keep a record of any induction and training activities for each employee for at least 5 years. Training records should include:

- a) the names of the employees or other trainees;
- b) dates of attendance;
- c) the title and content of the training course;
- d) the duration of training;
- e) the name of the training provider; and
- f) how outcomes of training were assessed.

Provide supervision

11.244 Employers should ensure that only supervisors who have sufficient training and knowledge with dangerous goods are appointed to roles that influence how employees or contractors apply procedures.

Ensure the safety of visitors

11.245 The employer should provide information to, control the access of, and supervise visitors to the workplace. The appropriate control measures should ensure, as far as practicable, the risks to visitors and others are minimised.

11.246 An employer should ensure unauthorised access to the workplace is controlled by implementing effective security measures. In view of the hazards associated with the storage and handling of dangerous goods, access to premises and work areas should be restricted to those having a legitimate purpose.

RESPONSIBILITIES OF AN EMPLOYER WHO BUILDS, OWNS OR OPERATES A PIPELINE

11.247 Safety Standards Regulation 8.62 applies to employers who build, own or operate a pipeline.

11.248 Safety Standards Regulation 8.62 requires employers who build, own or operate a pipeline, to ensure that the pipeline is designed, manufactured, installed, commissioned, operated, maintained and decommissioned so that the risk associated with the pipeline:

- is eliminated; or
- if it is not practicable to eliminate the risk, the risk is reduced as far as practicable.

11.249 Employers must ensure that as far as practicable, activities, structures, equipment or substances that are not part of the pipeline do not affect the dangerous goods or the pipeline in a manner that increases the risk (Safety Standards Regulation 8.62(2)(b)).

11.250 To ensure the pipeline is located and operated in a safe manner, employers must identify the hazards, undertake hazard identification and a risk assessment to identify and control any risks associated with operating a pipeline (Safety Standards Regulation 8.62(2)(c)). Controls should be in place to reduce risks associated with a pipeline and its contents to persons at the workplace and areas of public access.

11.251 Employers should review each risk assessment within a five–year period. When circumstances change and new risks are introduced associated with the operation of the pipeline or other information becomes available, a new risk assessment is to be completed.

11.252 The employer should put in place controls to ensure that, as far as practicable:

- unintentional movement of the pipeline is prevented;
- the pipeline is sound and is fit for the purpose for which it is designed;
- emergency shutdown devices are fitted to the pipeline; and
- any maintenance work carried out on the pipeline does not contribute to or cause a dangerous occurrence.

Notify dangerous goods transferred through pipelines

11.253 Safety Standards Regulation 8.63 specifies if an employer intends to begin operating a pipeline that will carry dangerous goods, Comcare must be notified. The notification must be in writing using the approved form containing the following information:

- the name of the employer who owns and operates the pipeline;
- the location of the pipeline including where it begins and ends (the supplier and receiver of the goods);
- the names, titles and contact details of two people responsible for the pipelines operation;

- d) whether current procedures for the safe operation and maintenance of the pipeline are in place;
- e) whether current procedures for responding to an emergency relating to the pipeline are in place;
- f) details of pipeline identification numbers which are used in the workplace;
- g) details of emergency services points of contact;
- h) details of each Class of dangerous goods being transferred through the pipeline; and
- i) the maximum quantities of dangerous goods transferred through the pipeline each calendar year.

11.254 Employers must re-notify every two years after the first notice, unless there are changes to that notice or if any of the following circumstances apply:

- a) before action is taken to modify, relay or renew the pipeline, or to make the pipeline safe; or
- b) if all or part of the pipeline is removed, decommissioned, closed or abandoned.

RESPONSIBILITIES OF EMPLOYEES

11.255 Safety Standards Regulation 8.67 requires an employee or contractor, aware of a matter that may affect the ability of the employer to comply with the regulation, to report it to the employer as soon as practicable.

PART 12 – HAZARDOUS SUBSTANCES

INTRODUCTION

- 12.1 A hazardous substance can be a solid, liquid, gas, pure substance (one ingredient) or mixtures of substances. Hazardous substances can harm the health of people exposed to the substance. A hazardous substance is a substance described in the Hazardous Substances Information System: <http://hsis.ascc.gov.au/Default.aspx>
- 12.2 Part 6 of the Safety Standards Regulations outlines the specific duties of manufacturers, suppliers, and employers in relation to the manufacture, supply and handling of hazardous substances in the workplace. The Safety Standards Regulations ensure that those with a duty of care in the workplace assess, manage and control all identified hazardous substances.
- 12.3 Individuals may be exposed to hazardous substances in occupations where there is use of materials, chemicals, solvents, paints, cleaning agents, dusts, smoke and fumes. Manufacturers and suppliers should classify the type of hazardous substance according to the *Approved Criteria for Classifying Hazardous Substances* [NOHSC: 1008 (2004) 3rd edition].
- 12.4 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

- 12.5 The purpose of this Part is to provide practical guidance to duty holders to assist them comply with the health and safety requirements of the Act and Part 6 Hazardous Substances of the Safety Standards Regulations.

SCOPE

- 12.6 This Part applies to manufacturers, suppliers, employers, employees, contractors at work and others at or near the workplace covered by the Act. It applies to workplaces where hazardous substances are used or stored and applies to the Commonwealth jurisdiction and non-Commonwealth licensee organisations. Responsibilities may fall under more than one capacity, that is, as a manufacturer as well as an employer.
- 12.7 An importer of a hazardous substance is deemed to be the manufacturer if there is no registered place of business in Australia by the manufacturer at the time of importation (s18(3) of the Act).
- 12.8 This Part should be read in conjunction with Part 6 Hazardous Substances of the Safety Standards Regulations.

DEFINITIONS

All definitions relevant to Part 6 Hazardous Substances of the Safety Standards Regulations apply to this Part. In addition, the following definitions apply.

‘Breathing zone’ – is the breathing zone described as a hemisphere of 300 mm radius, extending in front of the face and measured from the midpoint of an imaginary line joining the ears.

‘Exposure standard’ – refer to Part 20.1 of the Safety Standards Regulations.

‘Hazardous Substance’ – is defined in 6.03 of the Safety Standards Regulations.

‘Inspirable’ – is that fraction of dust which enters the respiratory tract as defined in *Australian Standard AS 364:2004 – Workplace atmospheres – method for sampling and gravimetric determination of inhalable dusts*.

‘National Exposure Standard’ – The ASCC issues a list of National Occupational Exposure Standards, which determine safe exposure levels. Exposure to hazardous substances should be kept to as low as reasonably practicable and below the National Occupational Exposure Standard (NES).

‘No effect’ – means the greatest concentration or amount found by experiment or observation which causes no detectable adverse alteration of morphology, functional capacity, growth, development, or life span of the target organism under defined conditions.

‘Respirable fibre’ – is a particle with a diameter less than 3 micrometres and a length greater than 5 micrometres and with a length to width ratio of greater than 3:1. These fibres can reach the deepest part of the lung.

‘Type 1 ingredient’ – refer to Part 6 Hazardous Substances of the Safety Standards Regulations.

‘Type 11 ingredient’ – refer to Part 6 Hazardous Substances of the Safety Standards Regulations.

‘Type 111 ingredient’ – refer to Part 6 Hazardous Substances of the Safety Standards Regulations.

RESPONSIBILITIES OF MANUFACTURERS AND SUPPLIERS

- 12.9 Division 2 Part 6 of the Safety Standards Regulations sets out the mandatory requirements for manufacturers and suppliers in relation to the provision of information on the MSDS and labelling of a hazardous substance.
- 12.10 Retailers and retail warehouse operators are exempt from the register provisions of the Safety Standards Regulation 6.14(3) for goods intended for retail sale. The exemption applies to a consumer package (on the premises) that holds less than 30 kilograms or 30 litres of the substance handled in an unopened state.

RESPONSIBILITIES OF EMPLOYERS

Identify hazards

- 12.11 The identification of hazards and a risk assessment must be undertaken before the introduction of a hazardous substance to the workplace (Safety Standards Regulation 1.05(4) (a)). The employer must also undertake a risk assessment for work that involves a potential exposure to a hazardous substance (Safety Standards Regulation 6.17(1)).

12.12 Employers should refer to the Hazardous Substances Information System <http://hsis.ascc.gov.au/Default.aspx> for assistance in determining the hazardous properties of the substance.

Obtain MSDS and make available to employees

12.13 Employers should refer to the MSDS provided by the supplier and the labelling information on the chemical to identify the hazards (Safety Standards Regulation 1.05(4)(a)). If there is any doubt that a substance is hazardous, further information should be requested from the supplier. Information regarding health hazards and safety precautions for the safe use and handling of the hazardous material should be obtained.

12.14 The employer must obtain the chemical MSDS before a hazardous substance is first supplied to the workplace (Safety Standards Regulation 6.12(1)). The MSDS should be regularly checked for currency when the hazardous substance register is updated.

12.15 An MSDS is not required if the employer is a retailer or a retail warehouse operator stocking consumer packages of less than 30 kilograms or 30 litres intended for retail sale (Safety Standards Regulation 6.12(3)).

Note: Information for the protection of health and safety in the event of a spill, clean up or disposal of a hazardous substance should be provided on consumer packages.

12.16 Safety Standards Regulation 6.12(2) requires the employer to make the MSDS readily accessible to any employee who may be exposed to the hazardous substance. A copy of the MSDS must be included in the hazardous substance register.

12.17 The hazardous substance information provided in an MSDS by the supplier must not be altered however, an employer may change the appearance of an MSDS so as to:

- make the format consistent with the approved format, for example if, the MSDS is from overseas and is not consistent with any of the acceptable formats described in the *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC: 2011 (2003)];
- translate the MSDS into another language;
- prepare the MSDS for electronic dissemination; and
- attach additional information to the supplier's MSDS. Any attached information must clearly indicate that the information is not part of the supplier's information. Specific workplace safety information may be added in this manner.

Ensure containers are labelled

12.18 The employer must ensure that all hazardous substance containers supplied or produced, used or handled in the workplace are appropriately labelled. The labels must not be altered, defaced, modified or removed (Safety Standards Regulation 6.13).

12.19 The employer must ensure that when a substance is decanted into another container, that container is labelled with the product name, the risk and safety

phrases in accordance with the Safety Standards Regulation 6.13(2) and the *National Code of Practice for the Labelling of Workplace Substances* [NOHSC: 2012 (1994)].

- 12.20 When a hazardous substance is used immediately after decanting labelling is not required, provided the employer ensures that the container is cleaned to the extent that it no longer contains the hazardous substance (Safety Standards Regulation 6.13(4)).
- 12.21 Where labelling is required for a decanted hazardous substance container that is small (for example, a laboratory test tube), the employer should ensure that the label is attached either to supporting apparatus (the test tube rack) or by tag to the decanted container.
- 12.22 If the contents of the container are unknown, the employer should clearly mark the container with '**Caution: do not use: unknown substance**'. This container should be isolated from other stores until the contents are identified and the container appropriately labelled. If the contents cannot be identified, the substance should be disposed of in accordance with the requirements of the relevant waste management authority.
- 12.23 Employers must ensure that all hazardous substances used in the workplace are identified and that a risk assessment is conducted to determine the possible consequences due to exposure to that hazardous substance (Safety Standards Regulation 6.04). If a hazardous substance, container is not opened and the container is not subject to any damage a risk assessment may also be required.
- 12.24 Schedule 1 to the Safety Standards Regulations lists hazardous substances that are not to be used at work other than in the circumstances listed in column 3 of that Schedule (Safety Standards Regulation 6.16). Employers may apply for an exemption for the use of a hazardous substance in circumstances other than those already permitted by the schedule. Schedule 1B to the Safety Standards Regulations provides details on how to apply for an exemption.
- 12.25 Most of the hazardous substances listed in Schedule 1 to the Safety Standards regulations also have carcinogenic properties. If the use of an identified scheduled carcinogenic substance is not permitted, or if it is no longer required, then that substance should be disposed of safely in accordance with the relevant waste management, environment regulatory and legislative requirements.

Assess the risks

- 12.26 The employer must conduct a risk assessment on an identified hazardous substance, or work process involving the hazardous substance, that has the potential to expose an employee to a health and safety risk (Safety Standards Regulation 6.17).
- 12.27 When conducting a risk assessment on a hazardous substance or work process involving a hazardous substance, the employer must refer to the information provided on the supplied MSDS, any labelling information on an opened or unopened container and any other relevant equivalent information if the MSDS cannot be obtained (Safety Standards Regulation 6.17).

12.28 An employer should consider the following when assessing the work process:

- a) Exposure can occur through:
 - (i) inhalation (for example, breathing in the substance);
 - (ii) ingestion (for example, swallowing, either directly or indirectly as a result of a substance settling on food, or from contaminated hands);
 - (iii) absorption through the skin or eyes either from direct contact or indirect contact through contaminated surfaces or clothing; or
 - (iv) injection into the body by high pressure equipment or contaminated sharp objects;
- b) the form of the hazard (for example, a substance in solid form may be much less hazardous than the same substance in liquid form);
- c) the chemical and physical properties of the substance (for example, boiling points vary between substances so that different vapours can be created at different temperatures);
- d) the type of health effects (for example, cancer causing properties);
- e) the type of exposure (for example, a single contact, repeated low level contact or contact in combination with other substances);
- f) the quantities used; and
- g) the effectiveness of control measures in place.

12.29 If it is not practicable for an employer to perform a separate risk assessment for the hazardous substance at each workplace, a generic risk assessment may be undertaken where the work and risk factors are identical (Safety Standards Regulation 6.17). The generic risk assessment should be designed to identify any differences in the nature of the work and work processes using the hazardous substance that could change the risk factors.

12.30 If the risk assessment determines there is a significant risk to the health and safety of employees from a hazardous substance, the employer must comply with Safety Standards Regulations 6.19 Risk Control, 6.20 Atmospheric Monitoring and 6.21 Health Surveillance. The employer must also:

- a) prepare an assessment report; and
- b) update the hazardous substance register to indicate compliance with Part 6 of the Safety Standards Regulations.

12.31 An employer should record information on the decision making process detailing the hazards identified, the associated risks and the safety arrangements.

Note: Further guidance on risk assessment is provided in the National Code of Practice for the Control of Workplace Hazardous Substances [NOHSC:2008 (1997)] and the Guidance Note for the Assessment of Health and Safety Arising from the Use of Hazardous Substances in the Workplace [NOHSC:3017 (1994)].

12.32 The employer must make the assessment report available to an employee who may have been exposed to the hazardous substance where there are significant health risks (Safety Standards Regulation 6.17(8)).

12.33 If the risk assessment determines there is no significant risk to health and safety from the use of the hazardous substance in the workplace, the employer should ensure that the hazardous substance is listed in the hazardous substance register and the risk assessment process is recorded (Safety Standards Regulation 6.17(4)).

12.34 Employers should ensure that the risk assessment is revised when:

- a process, plant or substance is modified;
- a new process, plant or substance is introduced;
- new information is available on the hazards in relation to a hazardous substance;
- atmospheric monitoring or health surveillance indicates inadequate control of the exposure to the hazardous substance; or
- new or improved control measures become available.

12.35 Employers should review the risk assessment at least every five years in accordance with Safety Standards Regulation 6.17(7). A complete reassessment may not be required if there has been no significant change to the operation or the degree of employee exposure from the initial risk assessment.

Implement risk control measures

12.36 Employers should consider the use of control measures in combination using two or more control measures to reduce employee exposure to as low a level as possible.

12.37 The employer should ensure that all control measures perform as intended and continue to prevent or adequately control the exposure of employees to a hazardous substance.

Eliminate the hazard

12.38 Employers should eliminate the hazardous substance wherever practicable. Elimination includes:

- using a physical process in preference to a chemical process when cleaning an object (for example, the use of ultra-sound);
- using clips, clamps or bolts instead of adhesives; or
- purchasing material in ready-cut and right-sized form to eliminate the production of dust on site.

Use substitution control measures

12.39 Employers should substitute, wherever practicable, a less hazardous form of the substance or using the same substance in a less hazardous process. Employers should substitute by:

- replacing a chlorinated degreasing solvent with a detergent;
- using a water-based paint in place of an organic solvent-based paint;
- using a substance in paste or pellet form rather than a powder; or
- using paint brushes in preference to aerosol sprays.

Use isolation control measures

12.40 Employers should use isolation methods to prevent exposure such as the separation of the process from employees by distance or the use of barriers. Isolation methods include:

- a) designated work areas using bunting, ropes or similar barriers with appropriate signage to prevent unauthorised entry; and
- b) a remote operation system for the process.

Use engineering controls

12.41 Engineering controls involve the use of plant and processes to minimise the generation of a hazardous environment or for the containment of a hazardous substance so as to limit the area of contamination in the event of spills or leaks. Types of engineering controls can include enclosure or partial enclosure, local exhaust ventilation and the automation of processes. Employers should use engineering controls whenever practicable by using:

- a) ventilated booths for spray painting or fibre glassing;
- b) robot welding;
- c) local extraction systems attached to grinding machines;
- d) automation for the removal of objects from degreasing baths;
- e) closed reaction vessels; and
- f) a well designed exhaust ventilation system that will carry contaminants away from the employees' breathing zone and not through the breathing zone.

12.42 Employers should ensure that where engineering control measures are used to control exposure, they are tested at specified intervals to ensure effective performance.

Use administrative controls

12.43 Employers should use administrative control, wherever practicable, by the use of safe work practices that require employees to work in safer ways. Safe work practices include:

- a) safe systems of work set out in policies and procedures;
- b) work practices which reduce the number of employees exposed;
- c) reducing the period of exposure for employees;
- d) prevention of non-essential access to the work area;
- e) regular cleaning to remove contamination from walls and surfaces;
- f) using industrial vacuum cleaners, or wet mopping and wiping if vacuuming is not practicable;
- g) providing systems for the safe storage and disposal of hazardous substances;
- h) prohibiting eating, drinking and smoking in contaminated areas;
- i) keeping lids on containers when not in use;
- j) providing and ensuring use of facilities for effective decontamination;

- k) providing adequate change room facilities to ensure clothing worn by employees to a workplace is not contaminated;
- l) ensuring that contaminated protective clothing is not re-used and is laundered at an appropriate facility;
- m) using hazardous materials in a form and shape that requires minimum cutting and handling on site;
- n) using waste plastic bags or other containers which prevent fibre and/or dust emission from contaminating the workplace; and
- o) the safe disposal of chemical waste in accordance with the local waste disposal authority.

Provide Personal Protective Equipment (PPE)

- 12.44 An employer must take all reasonably practicable steps to prevent or control exposure to hazardous substances by the use of control measures as high as possible on the hierarchy of controls (Safety Standards Regulation 6.17). If exposure cannot be controlled using more effective methods, Safety Standards Regulation 6.19(4) obliges an employer to provide suitable PPE.
- 12.45 PPE includes gloves, face shields, respirators, aprons, overalls, footwear and glasses. Employers should ensure that all protective clothing and equipment conforms to relevant Australian Standards.
- 12.46 Employers should ensure that training in the use and maintenance of PPE is provided.
- 12.47 PPE should only be used where there is no other practical method for controlling the hazardous substance and as a short-term solution whilst more effective control measures are being implemented. Employers must provide suitable PPE when:
 - a) it is not technically feasible to achieve adequate control by other means (in these cases, exposure should be reduced as far as practicable by other measures and then, in addition, suitable PPE should be used to secure adequate control);
 - b) PPE is necessary to safeguard health until such time as adequate control is achieved by other means, for example, where urgent action is required because of plant failure;
 - c) There are routine maintenance operations where the infrequency and small number of people involved may make other control measures impracticable; and
 - d) its use supports other more effective control measures on the hierarchy of controls.
- 12.48 Employers should ensure that PPE is:
 - a) properly selected for the individual and task;
 - b) readily available;
 - c) clean and functional;
 - d) correctly used when required;

- e) correctly stored;
- f) maintained by appropriately trained staff; and
- g) correctly maintained and serviced in accordance with the manufacturer's guidelines (for example, filters and cartridges should be replaced at regular intervals).

Control hazardous atmospheres

12.49 Safety Standards Regulation 6.19(1) requires an employer to ensure that no employee is exposed to an airborne concentration of a hazardous substance in the breathing zone at a level that exceeds the appropriate exposure standard for that hazardous substance for the specified period.

12.50 Airborne contaminants such as dusts, gases, vapours, fumes and mists have the potential to create hazardous atmospheres. Employers should ensure that atmospheric monitoring involving the periodic and/or continuous sampling of workplace atmospheres is undertaken to obtain a quantitative measure of the exposure to inhalable hazardous substances.

12.51 Monitoring involves the use of valid and suitable techniques to derive a quantitative estimate of the exposure of employees to hazardous substances.

12.52 Employers must ensure that atmospheric monitoring is carried out when a risk assessment indicates that atmospheric monitoring is required. It may also be undertaken to determine the effectiveness of control measures implemented to reduce employee exposure (Safety Standards Regulation 6.20).

Note: The results of the monitoring can be compared against the relevant exposure standard in the Hazardous Substances Information System (HSIS).

12.53 Employers should ensure that atmospheric monitoring is carried out by a competent person who has sufficient knowledge, skill and experience in atmospheric monitoring. Procedures for monitoring should detail:

- a) when and how the monitoring is done;
- b) the sampling procedures;
- c) the analytical methods used;
- d) the sites and frequency of sampling; and
- e) the result analysis.

12.54 Employers should consider what type of airborne contaminant monitoring is required to provide the most useful information. Types of monitoring include;

- a) static or fixed position monitoring – which measures contaminants at a specific location. Results may not indicate an employee's actual exposure; and
- b) breathing zone monitoring – which is a more accurate measure of the employee's exposure.

Note: These methods of monitoring are only testing exposure through inhalation and may not represent an employee's total exposure. Hazardous substances can enter the body through other routes such as ingestion.

12.55 Employers should calculate the exposure of employees with reference to the exposure standards. There are different types of exposure standards that are determined by measurement over a specified period. The exposure standards are:

- a) time weighted average (TWA) – means the average airborne concentration of a particular substance when calculated over a normal eight-hour working day for a 40 hour working week;
- b) short term exposure limit (STEL) – means a 15-minute TWA exposure that should not be exceeded at any time during the working day even if the eight-hour TWA average is within the TWA exposure standard. Exposures at the STEL should not be longer than 15 minutes and should not be repeated more than four times per day. There should be at least 60 minutes between successive exposures at the STEL; and
- c) peak/limit – means a maximum concentration that should not be exceeded at any time during a working day.

Note: Refer to Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC: 3008 (1995)] 3rd Edition for guidance on the exposure limits and calculations.

12.56 Exposure standards do not represent 'no effect' levels at which every person can be guaranteed protection. Therefore, employers should keep employee exposure to any hazardous substance to as low a level as possible. Compliance with the relevant exposure standard should not preclude further efforts to reduce exposure.

12.57 The absence of a specific exposure standard for a hazardous substance should not be considered an indication that exposure need not be controlled. Where there is no exposure standard, employers should endeavour to control the exposure to the hazardous substance to the lowest possible level. What constitutes the lowest possible level should be determined during the risk assessment process.

Maintain register of all hazardous substances used at the workplace

12.58 An employer must keep and maintain a register that is easily accessible to persons who may be exposed to hazardous substances (Safety Standards Regulation 6.14).

12.59 The register must include a list of all hazardous substances and a copy of the MSDS for all the hazardous substances used or handled in the workplace. The register should be kept in a convenient location, close to the work area where the hazardous substances are used (Safety Standards Regulation 6.14).

12.60 Employers should maintain the register by updating information as new hazardous substances are introduced to the workplace, when MSDSs are revised and when the use of an existing hazardous substance is discontinued.

Record monitoring results

12.61 Employers must provide details of any workplace assessments and reports, atmospheric monitoring and training records in the register in accordance with Safety Standards Regulations 6.17, 6.20, 6.21 and 6.22. The register should include the results of any assessments such as the:

- a) work unit;
- b) date when the MSDS and other information was reviewed;

- c) date when the workplace was inspected;
- d) process followed for assessment;
- e) hazardous substances reviewed;
- f) risk management decisions made;
- g) control measures in place; and
- h) the assessment team or the name and position of an assessor.

12.62 Employers must make the monitoring records accessible and readily available to employees (Safety Standards Regulation 6.20(2)). This includes results of any monitoring that has been undertaken in accordance with Safety Standards Regulation 6.20(3) for employees who have been, or could have been, exposed to a hazardous substance.

12.63 Employers should ensure that the records contain sufficient detail to determine:

- a) the hazardous substances concerned, the results and when the monitoring was done;
- b) what monitoring procedures were adopted including the duration of sampling;
- c) the locations where samples were taken, the operations in progress at the time and, in the case of personal samples, the names of those individuals concerned;
- d) whether the results reflected normal operating conditions;
- e) how the results were interpreted; and
- f) the effectiveness of control.

Note: refer to paragraph 12.85 – 12.92 of this Code of Practice for further information on record keeping.

Notify Employees

12.64 Safety Standards Regulation 6.17A requires an employer to advise an employee, as soon as practicable after the event, when accidental exposure of the employee to a scheduled carcinogenic substance is thought to have occurred.

12.65 Safety Standards Regulation 6.17A(2) applies to an employee who leaves the organisation and has been exposed to, or the employer reasonably suspects that the employee has been exposed to, a scheduled carcinogenic substance. An employer must provide the employee with details of the exposure including:

- a) the name of each scheduled carcinogenic substance to which the employee was likely to have been exposed;
- b) the period of known exposure to the substance;
- c) the period of likely exposure to the substance;
- d) a copy of any assessment reports;
- e) details of how and where the employee can obtain any relevant additional records; and
- f) the advisability of having periodic health assessments and the type of test that is applicable.

Provide health surveillance

12.66 Employers must undertake health surveillance of employees when it has been assessed as necessary from the risk assessment (Safety Standards Regulation 6.21).

12.67 Health surveillance, which includes biological monitoring where appropriate, is the process of monitoring the health of employees exposed to certain hazardous substances for which there are known and acceptable health surveillance procedures. Health surveillance procedures include:

- a) confirming that the absorbed dose is below the accepted level;
- b) indicating biological effects requiring cessation or reduction of exposure; and
- c) collecting data to evaluate the effects of exposure.

12.68 Employers must provide health surveillance for employees who have been identified in the workplace risk assessment as having:

- a) a significant risk to health from one of the hazardous substances listed at Schedule 2 to the Safety Standards Regulations; or
- b) exposure to a hazardous substance for which:
 - (i) an identifiable disease or health effect may be related to that exposure;
 - (ii) there is reasonable likelihood that the disease or health effect may occur under the particular conditions of work;
 - (iii) there are valid techniques for detecting indications of the disease or the effect; or
 - (iv) there is a valid biological monitoring procedure available and a reasonable likelihood that values might be exceeded.

12.69 Employers should consider situations that may require health surveillance including when:

- a) the risk to health is controlled through less effective control methods, such as the use of personal protective equipment;
- b) the control methods have deteriorated, for example, due to lack of or improper maintenance;
- c) health symptoms have been reported which are likely to be related to the use of the substance; and
- d) incidents or dangerous occurrences (for example, a spill or leak) have occurred when using a hazardous substance.

12.70 Employers must ensure that the health surveillance is carried out by a qualified medical practitioner who is trained in the required medical tests and examinations for the particular hazardous substances (Safety Standards Regulation 6.21(2)).

12.71 Safety Standards Regulation 6.21(2)(c) requires the employer to consult with the employee concerned in order to give the employee a choice in the selection of medical practitioner. The employer must also pay all expenses associated with health surveillance of the employee in accordance with Safety Standards Regulation 6.21(3).

12.72 Employers should ensure that the health surveillance includes:

- a) the nature, extent and duration of exposure;
- b) the health effects resulting from that exposure;
- c) the frequency at which any health effects may be expected to occur;
- d) an assessment of any epidemiological information on human exposure including toxicological data;
- e) the sensitivity, specificity and reliability of the detection and measurement of these health effects;
- f) the remedial action to reverse or arrest the health effects; and
- g) the resources and level of competency required to perform the monitoring and surveillance.

Note: Guidance on methods of health surveillance is provided in the NOHSC publication Guidelines for Health Surveillance [NOHSC:7039 (1995)].

Provide biological monitoring

12.73 The assessment of the airborne concentration of a particular contaminant and the subsequent comparison with the appropriate exposure standard is usually the primary technique for monitoring the working environment. However, employers may be required to use biological monitoring for employees in some situations, so that there is a comprehensive monitoring process.

12.74 When indicated biological monitoring involves the measurement of the levels of a substance or its metabolites in body fluids (such as blood or urine) or in exhaled breath. Biological monitoring has specific advantages for assessing individual variations such as:

- a) differences in individual size, fitness, personal hygiene, work practices, smoking habits, alcohol and drug usage and nutritional status;
- b) differences between individuals in uptake, metabolic rate and excretion of toxic substances; and
- c) in the individual responses to a particular hazardous substance.

Note: Biological monitoring does have limitations, in particular the collection, preservation of samples and the interpretation of results. There is limited knowledge of suitable and definitive biological tests for most substances.

Provide the results of health surveillance

12.75 Safety Standards Regulation 6.21(5) requires an employer to reassess workplace controls if the employer receives advice from a medical practitioner that adverse health results have been obtained from an employee undergoing health surveillance.

12.76 The employer may be required to cease all operations related to the exposure until the employer can implement appropriate controls to minimise any further risks to the health and safety of employees.

12.77 An employer must ensure that an employee who has undergone health surveillance is:

- a) notified of the results of the surveillance as soon as practicable;
- b) given an explanation of the results; and
- c) on termination of employment, given access to the results of the health surveillance if the employee is working in a lead-risk job (Safety Standards Regulation 6.21(4)).

12.78 Safety Standards Regulation 6.21(4)(d) requires an employer to notify Comcare of any adverse results detected in the health surveillance that is consistent with exposure to the relevant hazardous substance.

12.79 Records and reports produced as a result of health surveillance are confidential and the employer must ensure that only the employer and the employee have access to them (Safety Standards Regulation 6.21(6)). The employer must obtain written consent from the employee who has been subject to the health surveillance, prior to the release of any information to third parties.

Provide instruction and training

12.80 Safety Standards Regulation 6.18 requires employers to induct and train employees and anyone supervising employees where work activities have the potential to expose those persons to hazardous substances. The training provided must be commensurate with the associated risks identified in the risk assessment and should include instruction in:

- a) the nature of the hazard associated with the substance;
- b) the process followed for the risk assessment;
- c) the level of identified risk;
- d) the control procedures for the use of the hazardous substance;
- e) the need for, and proper use and maintenance of, measures to control the risk; and
- f) the use, fit, testing and storage of personal protective equipment when it has been provided.

Provide structured induction training programs

12.81 Employers should ensure that the induction and training program includes the following:

- a) the labelling of containers of hazardous substances, the information that each part of the label provides and why the information is being provided;
- b) the availability of MSDSs for hazardous substances, how to access the MSDS and the information that each part of the MSDS provides;
- c) information about hazardous substances to which employees are or may be exposed in the course of their work (information should include the nature of the hazards, risks to health arising from exposure to the hazard, the degree of exposure and possible routes of entry of the hazardous substances into the body);
- d) the assessment process and how the employee can contribute through consultation;

- e) the work practices and procedures to be followed in the use, handling, processing, storage, transfer, cleaning up and disposal of hazardous substances;
- f) the measures used to control exposure to hazardous substances including any information that the employee requires for the correct use and maintenance of control measures;
- g) the proper use, fit and maintenance of PPE;
- h) the procedures to be followed in case of an emergency involving hazardous substances including any special decontamination procedures to be followed;
- i) first aid and incident reporting procedures to be followed in case of injury or illness;
- j) the nature of, and reasons for, any monitoring required and how to access the results of that monitoring;
- k) the nature of, and reason for, any health surveillance required;
- l) the importance of minimising dust and fume generation in the workplace atmosphere;
- m) the specific nature of the operations which could result in exposure;
- n) the importance of maintaining a high level of personal hygiene and not smoking in the workplace;
- o) employees' rights and obligations in relation to health surveillance; and
- p) the duties under the Safety Standards Regulations for suppliers, employers and employees.

12.82 The amount of detail and extent of training required will depend on the nature of the hazards associated with the work activity, the complexity of the work procedures and control measures required to minimise the risk of exposure. Training should be conducted in conjunction with other more effective risk controls.

Review of induction and training

12.83 Employers should review their induction and training programs and provide retraining or refresher courses to employees each time there is a change in work practices, control measures or a dangerous occurrence.

Record induction and training

12.84 The employer must keep records containing details of induction and training given by an employer to employees on hazardous substances in a suitable form for at least five years from the date of the last entry according to Safety Standards Regulation 6.22(3). The records should include:

- a) the names of employees receiving training and the dates of attendance;
- b) an outline of the course content; and
- c) the names of persons providing the induction and training programs.

Maintain records and provide information

12.85 Employers should ensure that any person who may have been exposed to a hazardous substance in the workplace has access to the relevant information (including the hazardous register) about the substance. The employer has a duty of care to provide information on hazardous substances that may have been produced as a by-product of the employer's operations where an MSDS may not be available.

Inform persons about enclosed hazardous substances

12.86 When a hazardous substance in a workplace is contained in an enclosed system, such as plant forming part of the manufacturing process (for example, a pipe or piping system), employers must disclose the existence of, and clearly identify the hazardous substance to persons who may be exposed (Safety Standards Regulation 6.15).

Produce assessment report when required

12.87 The risk assessment report should provide details of the assessment process including information as to why a particular decision was made about the significance of the risks and the reasons for the particular control measure. Employers should record information in writing and make this information readily accessible to employees. The report should include:

- a) description of work unit;
- b) name of assessor or assessment team;
- c) personnel involved;
- d) work area, date and time;
- e) a list of hazardous substances used or produced in that work unit and a notation to indicate whether an MSDS is available;
- f) hazard information;
- g) a summary of processes – a description of normal operations in the work unit noting any changes observed or anticipated which might affect accuracy of the assessment;
- h) risk identification – possible routes of entry into the body resulting from exposure and the procedure for assessment of the degree of exposure;
- i) the existing control measures;
- j) the risk analysis;
- k) the recommendations – actions to be taken from the risk analysis, such as the control measures;
- l) induction and training requirements;
- m) the results of any monitoring;
- n) the circumstances in which reassessment would be required;
- o) signature, date and position of the assessor/assessment team; and
- p) signature, date and position of the employee accepting the assessment.

Maintain health surveillance records

12.88 Employers should ensure that records are in a convenient and accessible location so that managers, employees and/or their representatives or health and safety representatives can gain access to the information to which they are entitled. Suitable storage systems for records include traditional book entry records, microfiche and computerised databases. The records must be readily retrievable and accessible to the employee at all reasonable times (Safety Standards Regulation 6.20(3) (b)).

12.89 Employers should ensure that risk assessment reports, which indicate a need for monitoring or health surveillance and the results of that monitoring or health surveillance, are kept as records in a suitable form for at least 30 years from the date of the last entry made (Safety Standards Regulation 6.22).

12.90 An employer must keep a record of the full name, date of birth and address of each employee identified as likely to have been exposed to a scheduled carcinogenic substance in connection with a circumstance mentioned in column 3 of Schedule 1A to the Safety Standards Regulations. The record must be kept for at least 30 years from the date of the last entry in the report (Safety Standards Regulation 6.22(2A)).

Note: Retention for a period of at least 30 years is necessary because some health effects, such as cancers, have a long latency period.

12.91 Employers must ensure that all other records, including assessment reports, which do not indicate a need for monitoring or health surveillance and records of induction and training, are maintained for at least five years in a suitable form (Safety Standards Regulation 6.22(2)).

12.92 Where ownership of an organisation is transferred, employers should ensure that the records are maintained and kept for the required period by the subsequent owner to ensure that:

- health surveillance results are retained as a confidential record and kept by the employer for at least 30 years from the date of the last entry made in the records;
- written consent is obtained from the employee before the records are given or shown to a person who is required, in the course of their duties, to have access to the records; and
- where an employer ceases operations the records must be provided to Comcare (Safety Standards Regulation 6.22(4)).

Provide information to emergency services

12.93 Employers must make available to the emergency services the hazardous substances register containing information on the hazards present at any location involving the manufacture, use, storage or disposal of hazardous substances (Safety Standards Regulation 6.23). Other relevant information should be provided such as the location of fire hydrants, the workplace register, assessment reports and emergency response plan. Wherever practicable, employers should cooperate with any reasonable requests for information.

Note: It is not appropriate or necessary for emergency services to have access to monitoring or health surveillance results.

12.94 Employers should prepare a suitable emergency response plan in consultation with emergency services where appropriate. Part 11 Storage and Handling of Dangerous Goods of this Code of Practice contains information on the emergency response plans.

RESPONSIBILITIES OF EMPLOYEES

12.95 Employees have a general duty under the Act to ensure their health and safety and that of colleagues and persons at or near the workplace.

12.96 Employees must notify the employer as soon as they become aware of any matter that may prevent the employer from complying with the Act and the Safety Standards Regulations, for example, informing the employer of unlabelled containers (Safety Standards Regulation 6.24).

12.97 Employees have a duty to use PPE in accordance with the manufacturers' directions and the training provided or as required by the employer, supervisor or the stated policies and procedures.

PART 13 – SYNTHETIC MINERAL FIBRES

INTRODUCTION

13.1 Synthetic Mineral Fibres (SMF) is a general term used to describe a number of fibrous materials made from glass, rock, alumina and silica. SMF is widely used commercially in construction and residential dwellings as insulation, reinforcement for cement, plaster and plaster materials. SMF is a hazardous substance defined under Part 6 of the Safety Standards Regulations.

13.2 The two basic forms of Synthetic Mineral Fibre (SMF) insulation are bonded and un-bonded:

- the bonded form is where adhesives or cements have been applied to the SMF before delivery and the SMF product has a specific shape; and
- the un-bonded form has no adhesives or cements and the SMF is loose material as a package. The un-bonded form can be packed loose or mixed with adhesives or cements before or during installation.

13.3 The extensive use of SMF as insulation exposes a large number of employees, contractors and other third parties to airborne respirable fibres from the manufacturing of the product through to its use. There are three main factors which alone, or in combination, largely determine the fibre levels present during specific applications of SMF. These are:

- the degree of disturbance of the product;
- the proportion of respirable fibres in the product; and
- the extent of any binders, cladding or sealants.

13.4 Short-term exposure to SMF can produce skin, eye and upper respiratory tract irritation. Long-term exposure increases the risk of lung cancer and fibres such as rockwool, ceramic and glass fibres have been classified as Class 2B carcinogens.

Note: Class 2B – Possible Human Carcinogen. This category is used for agents, mixtures and exposure circumstances for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals.

13.5 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

13.6 The purpose of this Part is to assist duty holders comply with the Act and Part 6 Hazardous Substances of the Safety Standards Regulations by ensuring the health and safety of employees and contractors at work and others in the workplace when using SMF.

SCOPE

13.7 This Part applies to all persons involved in the manufacture, handling and installation of SMF. It also applies to any person covered under the Act who works or may be required to work with SMF.

13.8 This Part should be read in conjunction with the Safety Standards Regulations Part 6 Hazardous Substances, the Material Safety Data Sheet (MSDS), safety precautions and the labelling information on the particular type of SMF.

DEFINITIONS

'Breathing zone' – refers to the breathing zone described by a hemisphere of 300 mm radius extending in front of the face and measured from the midpoint of an imaginary line joining the ears.

'Ceramic Fibres' – are amorphous, glassy, predominantly alumino-silicate materials which are created from molten masses of either alumina and silica or naturally occurring kaolin clays. Australian materials are generally only made from alumina and silica melts.

'Fibre' – is a particle with a length to width ratio of at least 3:1.

'Glasswool' – is a fibrous product formed by either blowing or spinning a molten mass of glass. The resultant fibres are subsequently collected as an entangled matt of fibrous product.

'Inspirable' – is that fraction of dust which enters the respiratory tract as defined in Australian Standard AS 3640:2004 – *Workplace atmospheres – method for sampling and gravimetric determination of inhalable dust*.

'Respirable fibre' – is a particle with a diameter less than 3 micrometres and a length greater than 5 micrometres and with a length to width ratio of greater than 3:1. These fibres can reach the deepest part of the lung.

'Rock wool' – is a fibrous product formed by either blowing or spinning from a molten mass of rock. In Australia, this is usually basalt. The resultant fibres are subsequently collected as an entangled matt of fibrous product.

'SMF or MMMFS' – means synthetic Mineral Fibres or Man Made Mineral Fibres. It is a generic term to describe a number of amorphous (non-crystalline) fibrous materials including glass fibre, mineral wool and ceramic fibre.

RESPONSIBILITIES OF MANUFACTURERS

13.9 The manufacturing process should be designed so that the lowest practicable amount of fibres are released and become airborne. Appropriate professional advice from an industrial ventilation engineer or occupational hygienist may be required.

13.10 Manufacturers should package SMF materials in a form that minimises the release of fibres and/or dust.

13.11 Manufacturers should supply SMF materials that emit the minimum amount of fibres and/or dust, especially during cutting and shaping.

13.12 Manufacturers must produce for an employer an MSDS for the particular form of SMF and comply with the labelling requirements under Part 6 Hazardous Substances of the Safety Standards Regulations.

RESPONSIBILITIES OF EMPLOYERS

Identify hazards

13.13 SMF is considered a hazardous substance and employers must comply with the requirements of the Safety Standards Regulations in Part 6 Hazardous Substances. The MSDS and the labelling information provided by the manufacturer will identify the hazards associated with the particular form of the product.

Assess the risks

13.14 Employers should ensure that they obtain information about the type of SMF used and the likely exposure levels of inspirable and respirable dust or fibres that employees may experience with each given task.

13.15 The risks associated with SMF are significant and employers should ensure that airborne concentration of inspirable fibrous dust meets the requirements of the Australian Standard *AS 3640:2004 – Workplace atmospheres – method for sampling and gravimetric determination of inhalable dust*. The exposure levels should not exceed 0.5 respirable fibres per millilitre of air (f/mL).

13.16 Employers should refer to the information on airborne concentration of respirable fibres and the likely consequences for employees in contact with SMF by referring to the *Guidance Note – Membrane Filter Method for the Estimation of Airborne Synthetic Mineral Fibres* [NOHSC:3008 (1989)].

Implement risk control measures

13.17 There is no safe low level for use of SMF guaranteed not to cause an increase in the risk of cancer. Therefore, employers must ensure that adequate control measures are implemented to protect employees and contractors at work and other persons at or near the workplace from the SMF fibres and dust (Safety Standards Regulation 6.19).

13.18 An employer using SMF materials should, where practicable, select materials or product-forms to minimise the amount of cutting to reduce the release of fibres and/or dust.

13.19 Employers should refer to the product MSDS and labelling information to assist in determining the necessary control measures to be implemented.

13.20 In situations where almost all the airborne material is fibrous, secondary yet complementary, employers must ensure that the exposure is consistent with the exposure standard (2 mg/m³ time-weighted average) of inspirable dust to minimise short-term irritation of the upper respiratory tract from largely non-respirable fibres (Safety Standards Regulation 6.16(1)). This inspirable standard is not to take precedence over the respirable fibre standard.

13.21 Where there is reasonable concern over the possible respirable fibre concentrations, employers should ensure that air monitoring is carried out by a competent person. Employees should be kept informed of the air monitoring and the record of the monitoring kept for a period of 30 years.

Note: Air monitoring may not be required when it has been clearly established that the work practices outlined in the Schedules contained in the National Code of Practice for the Safe Use of Synthetic Mineral Fibres [NOHSC: 2006 (1990)] are being carried out.

- 13.22 When there is concern about the exposure to airborne contaminants when working with rockwool, ceramic fibres or glasswool employers should ensure that the safe work practices are being followed.
- 13.23 Employers should seek to develop safe work practices, which can produce the lowest practicable exposure levels to SMF.
- 13.24 Employers should implement control measures such as:
 - a) engineering controls, for example, exhaust ventilation;
 - b) safe work practices such as:
 - (i) work practices designed to minimise the release of, and exposure to, fibres and/or dust;
 - (ii) the use of materials, such as binders, which reduce the liberation of fibres;
 - (iii) correct tools selection and correct use for the task;
 - (iv) manual tools to trim or cut SMF materials. If power tools are used, these should be fitted with exhaust extraction at the point of dust generation;
 - (v) storage of SMF materials in low traffic areas kept in sealed containers or under sheet covers;
 - (vi) spraying or gunning of SMF material before use;
 - (vii) handling in a wet rather than dry form where practicable;
 - (viii) the designation of work areas using ropes (or similar barriers);
 - (ix) employees not engaged in SMF work should not be within 3 metres of the SMF work area; and
 - (x) use of signs where practicable, for all overhead works involving SMF. An example of an appropriate sign is as follows:

**SMF WORK AREA
FOLLOW SAFETY INSTRUCTIONS**

Note: All warning signs should comply with Australian Standard AS 1319:1994 – Safety signs for the occupational environment.

Provide facilities for personal hygiene

- 13.25 Employers should ensure that facilities are readily available for general hand washing and should develop policies and procedures to ensure that employees are instructed on the importance of proper personal hygiene.

Control the removal of waste products

- 13.26 Employers should ensure that:

- a) waste material is removed promptly to avoid the dispersal and contamination of other areas of the workplace;
- b) waste is placed in plastic bags or other such containers which prevent fibre and/or dust emission in the work areas;
- c) waste is disposed of in accordance with the requirements of the local waste disposal authority;
- d) plant cleanliness forms part of the procedures to control dust; and
- e) an industrial vacuum cleaner is used, if possible, however wet mopping and wiping is acceptable if vacuuming is not practicable.

Control the removal of SMF products

- 13.27 Procedures to be applied for removal depend on the form of the original SMF insulation installed and employers should refer to the MSDS for the type of SMF and follow the instruction on safe removal of the product (refer to Safety Standards Regulation 6.17).
- 13.28 The removal of bonded material is easier and less hazardous and employers should ensure that any physical abrasion, including cutting, should be kept to a minimum during removal. Such removal can be performed in a dry condition if there is minimal physical abrasion.
- 13.29 Only in circumstances where heat or other causes have made the bonded SMF attach itself to the substrate should physical abrasion take place. If this occurs, employers should ensure that the removal is performed as for un-bonded SMF removal.
- 13.30 Removal of un-bonded material is difficult and more hazardous and employers should ensure that the un-bonded material is thoroughly wetted before removal takes place.
- 13.31 If dry removal is necessary for unbonded SMF material, when there are electrical and heat considerations, employers should ensure that there is increased respiratory protection provided especially when working in enclosed or poorly ventilated spaces or where the SMF insulation has undergone physical change.

Personal protective equipment (PPE)

- 13.32 Employers should refer to the Safety Standards Regulations Part 6 Hazardous Substances and to paragraphs 12.44 – 12.48 of this Code for provision and use of PPE.

RESPONSIBILITIES OF EMPLOYEES

- 13.33 Employees should comply with safe work practices, health and safety policies and procedures.
- 13.34 Employees should use and store the PPE provided by the employer according to the manufacturers' instructions and any training provided.
- 13.35 Employees should report to their supervisors PPE that is not fitted correctly and any damage to the PPE provided.

PART 14 – VINYL CHLORIDE

INTRODUCTION

14.1 Vinyl chloride is a toxic colourless chemical compound manufactured in a gas or liquid form. Vinyl chloride is highly flammable and is extremely unstable at high temperatures with the vapour forming an explosive mixture with air. Vinyl chloride is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes, wire and cable coatings and packaging materials.

14.2 Industries where there is a high risk to employees and other persons include:

- the car industry;
- furniture manufacturers;
- construction and housing;
- PVC (polyvinyl chloride) manufacturing;
- plastics manufacturing;
- resins manufacturing; and
- rubber manufacturing.

14.3 Employees and other persons exposed to vinyl chloride vapour are at risk of serious health conditions. The primary route of exposure is by inhalation. At high vapour concentrations, vinyl chloride depresses the function of the central nervous system causing dizziness, light-headedness and unconsciousness. Liquid vinyl chloride, under pressure at room temperature, can be absorbed through the dermis of the skin and may cause burns due to the rapid evaporation of liquid vinyl chloride that then freezes the skin.

14.4 Vinyl chloride is a Category 1 Carcinogen as there is evidence of a causal link between human exposure and the development of cancers. Other health effects related to exposure may include:

- bone resorption, particularly of the finger tips (acro-osteolysis);
- Raynaud's disease, a condition which affects the circulation of the hands and feet;
- scleroderma, a degenerative condition which causes stiffness of the skin and soft tissues; and
- hardening (fibrosis) of the liver.

14.5 Long term repeated exposure to vinyl chloride vapour could cause cancer of the liver angiosarcoma (ASL). There is generally a latency period of 20 years or more between the time of first exposure and the development of the tumour. ASL is rare among the general population and has been directly linked to vinyl chloride exposure.

14.6 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

14.7 The purpose of this Part is to provide guidance to employers on the safe use and handling of vinyl chloride during manufacture and subsequent polymerisation to polyvinyl chloride (PVC), to provide a safe and healthy workplace for employees, contractors and others at or near the workplace.

SCOPE

14.8 This Part applies to the manufacture, packaging, storage, handling, use or disposal of vinyl chloride or PVC, but not to the handling or use of fabricated products made of PVC. In particular it:

- covers control measures and monitoring of exposure to vinyl chloride in the workplace;
- is based on the principle that the exposure to vinyl chloride should be reduced as far as reasonably practicable;
- is directed at the control of vinyl chloride emissions in the workplace in order to minimise personal exposure; and
- provides a guide to appropriate work practices required for vinyl chloride control.

14.9 This Part should be read in conjunction with the Safety Standards Regulations Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods.

DEFINITIONS

'Exposure standard' – refer to Part 6 Hazardous Substances of the Safety Standards Regulations.

'Vinyl chloride vapour' – is the volatile form of vinyl chloride, which can be either gas or vapour. Vinyl chloride is a liquid when under pressure at room temperature and is a gas at room pressure at room temperature.

RESPONSIBILITIES OF EMPLOYERS

Identify hazards

14.10 The employer must ensure that all the requirements of the Safety Standards Regulations Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods are followed as well as any specific directions on the MSDS and labelling in relation to the precautions and safety phases of the hazardous substance.

14.11 Vinyl chloride is listed as a Schedule 1A carcinogen in all circumstances and employers must follow the requirements under the Safety Standards Regulations Part 6.17A Hazardous Substances.

14.12 Vinyl Chloride is also classified as a Class 1 carcinogen and as such is listed as a Schedule 2 to the Safety Standards Regulations -Hazardous substance for which surveillance is required. Employers must follow the health surveillance directives contained in the Safety Standards Regulations Part 6 Hazardous Substances.

Assess the risks

- 14.13 Employers must refer to Part 8 Storage and Handling of Dangerous Goods and Part 6 Hazardous Substances of the Safety Standards Regulations when performing a risk assessment.
- 14.14 Employers should refer to the MSDS and labelling information for the vinyl chloride to determine the exposure risk to employees.
- 14.15 Employers must ensure that atmospheric monitoring is performed if the risk assessment demonstrates a significant risk to health from use of vinyl chloride to employees (Safety Standards Regulation 6.17(5)).

Implement risk control measures

- 14.16 Employers must control atmospheric concentrations of vinyl chloride vapour and should ensure that it conforms to the recommended national exposure standard on the understanding that exposure should be reduced to as low a level as reasonably practicable (Safety Standards Regulation 6.19).
- 14.17 Where reasonably practicable, employers must ensure engineering and work practice controls are implemented to reduce the airborne vinyl chloride concentrations. Engineering and work practice controls should also take into account the flammability and explosiveness of vinyl chloride (refer to Storage and Handling of Dangerous Goods Part 8 of the Safety Standards Regulations).
- 14.18 Employers should ensure that employees or other persons do not regularly work or remain present in areas where vinyl chloride concentrations could reasonably exceed the national exposure standard.
- 14.19 Employers should ensure that if vents are required, they are positioned so that the outlets cause the least possible contamination to the working atmosphere or any neighbouring locations.
- 14.20 Employers should ensure that solid, liquid and solid/liquid waste materials containing significant levels of residual vinyl chloride are transferred to special containers and pits in designated areas. The transport and storage of this waste material should be in such a manner that the vinyl chloride vapour concentrations in the immediate area do not exceed the national exposure standard.
- 14.21 Where reasonably practicable, employers should ensure the waste materials are stripped of vinyl chloride before disposal in accordance with the relevant state and territory legislative requirements.
- 14.22 Employers should ensure control measures for the operation of plant using vinyl chloride are recorded in the hazardous substances register.
- 14.23 When a non-routine operation necessitates opening plant and equipment which may release vinyl chloride liquid or gas to the atmosphere, employers must ensure that respiratory protective equipment is worn (Safety Standards Regulations 6.19 (4) and (5) Hazardous Substances).
- 14.24 Employers should ensure precautions are taken so that other persons at or near the workplace are not exposed to concentrations of vinyl chloride above the national exposure standard during this operation.

14.25 Employers must ensure that respiratory protective equipment is used when the risk control measures are not sufficient to keep the concentrations below the recommended national exposure standard (Safety Standards Regulation 6.17)

Control work in confined spaces

14.26 Entry into a confined space that may contain vinyl chloride should only occur when absolutely necessary and employers should ensure that the time of potential exposure to vinyl chloride is minimised.

14.27 In accordance with Part 7 Confined Spaces of the Safety Standards Regulations, employers must ensure that an entry permit is obtained from a competent person prior to entering a confined space.

14.28 Before a person enters any confined space that may contain vinyl chloride, the atmosphere should be analysed for vinyl chloride and oxygen content. In addition, employers should take all reasonably practicable measures to reduce the vinyl chloride vapour concentration to below the national exposure standard.

14.29 Where it is not reasonably practicable to reduce and maintain the vinyl chloride vapour concentration below the national exposure standard, employers must provide respiratory protective equipment and protective clothing and ensure that it is worn (Safety Standards Regulations 6.19(4) and (5) Hazardous Substances).

14.30 Employers should ensure that any permit to work allowing a person to enter a confined space without respiratory protection should clearly state that the person issuing the clearance is satisfied that:

- the vinyl chloride vapour concentration is below the national exposure standard; and
- no circumstances are foreseen whereby employees and contractors may be exposed to vinyl chloride vapour concentrations above the national exposure standard.

Performing maintenance work

14.31 Maintenance work may involve exposure to high vinyl chloride vapour concentrations. Employers should ensure supervision of maintenance employees and contractors to ensure that the requirements of the Safety Standards Regulations and this Code of Practice are applied.

14.32 Employers should ensure a high standard of maintenance of plant and equipment to facilitate compliance with the national exposure standard.

14.33 Employers should ensure that a procedure is established whereby remedial action is initiated immediately after any faults or defects are identified in the control measures. All repairs and routine maintenance of control measures should be recorded in a maintenance register. This should include the date the fault or defect was found and the date of completion of remedial action, repair or replacement.

14.34 Employers should ensure that all the likely areas for vinyl chloride leakage from equipment are regularly monitored in order to prevent any exposure to employees in the workplace.

14.35 Employers should ensure that all ventilation equipment used to control vinyl chloride is thoroughly examined and maintained at least once every six months with the results recorded in the register as part of the maintenance program developed by the employer.

Provide personal protective equipment (PPE)

14.36 Employers must provide PPE to all persons employed in areas where vinyl chloride concentrations exceed the national exposure limit in accordance with the Safety Standards Regulations 6.19 (Hazardous Substances).

14.37 Employers should follow the *Australian Standard AS/NZS 1716:2003 – Respiratory protective devices* to determine the most appropriate device and the equipment should be used in accordance with *Australian Standard AS/NZS 1715:1994 – Selection, use and maintenance of respiratory protective devices*.

14.38 Employers should refer to the Safety Standards Regulations Hazardous Substances Part 6 and paragraphs 12.44 – 12.48 of this Code for the provision and use of PPE.

Establish a monitoring program

14.39 Employers are required to ensure that health surveillance is provided for all employees exposed to vinyl chloride as it a hazardous substance requiring health surveillance (Schedule 2 to the Safety Standards Regulations).

14.40 Employers should ensure that fixed point and personal monitoring procedures are established and analysed to determine the exposure concentrations of employees.

14.41 Employers should ensure that all monitoring is carried out by a suitably qualified person who is capable of analysing the results.

14.42 Employers must record the results and provide this information to employees in the workplace where the personal or atmospheric monitoring exceeds the national exposure limit (Safety Standards Regulation 6.21(4)).

14.43 Employers should investigate the workplace where monitoring has detected the exposure limit to be breached and record the results of the investigation.

Provide education and training

14.44 The employer must provide appropriate information to all employees likely to be exposed to vinyl chloride in the course of work activities (Safety Standards Regulation 6.20(3)).

14.45 Employers must provide employees, associated with vinyl chloride, with information about health surveillance and future medical surveillance requirements (Safety Standards Regulation 6.21).

14.46 Employers must ensure that they provide education and training in accordance with Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods of the Safety Standards Regulations and should consider any further information requirements from the MSDS and labelling for the chemical.

14.47 Employers must ensure that all employees, and others associated with vinyl chloride in the workplace, receive education and training on the safe use and maintenance of respiratory protective devices according to the Safety Standards

Regulation 6.18 and *Australian Standard AS/NZS 1715:1994 – Selection, use and maintenance of respiratory protective devices*.

Maintain records

14.48 Employers must ensure that they maintain records according to the requirements of the Safety Standards Regulations, Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods, and the requirements under Schedule 1A and Schedule 2 to the Safety Standards Regulations.

RESPONSIBILITIES OF EMPLOYEES

14.49 Employees have a responsibility to ensure that they participate in consultation with an employer in the formulation of control measures to contain vinyl chloride vapour emissions.

14.50 Employees should ensure that they participate in the training and education programs required and follow safe work practices and procedures to reduce the exposure to vinyl chloride.

14.51 Employees should ensure that they use and store PPE in accordance with the manufacturers' instructions and according to training and education received.

PART 15 – CARCINOGENIC SUBSTANCES

INTRODUCTION

15.1 Carcinogenic substances are chemicals or other substances that can alter the structure of DNA and cause cancer. People who are likely to work with carcinogenic substances, including scientists and construction employees involved in the removal of asbestos, are at risk of developing cancer if they are not adequately protected.

15.2 Unlike most toxic health effects, which usually manifest during the exposure period, a carcinogenic effect (from the initiating events to clinical expressions of the disease) may take a few to many years to develop. A diagnosis of cancer may not be made until long after cessation of exposure.

15.3 There are three categories of carcinogens:

- Category 1 refers to established human carcinogens – there is sufficient evidence for a causal link between cancer and human exposure;
- Category 2 refers to probable human carcinogens – there is sufficient evidence to provide a strong presumption that human exposure might result in the development of cancers; and
- Category 3 refers to suspected (possible) human carcinogens – there is a possibility that the substance has the potential for a carcinogenic effect on humans but the available information is not adequate for making a satisfactory assessment. There is some evidence from appropriate animal or epidemiological studies, but this is insufficient to place the substance in Category 2.

15.4 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. [1](#)

PURPOSE

15.5 This Part provides guidance on how to comply with the Act and the Safety Standards Regulations as they relate to exposure or potential exposure to carcinogenic substances.

15.6 This Part is designed to assist duty holders provide a safe and healthy workplace for employees, contractors and others at or near the workplace when handling any carcinogenic substances.

SCOPE

15.7 Category 1 scheduled carcinogenic substances, listed in Schedule 1A and Schedule 1 (Part 2) to the Safety Standards Regulations must not be used except in the circumstances listed in column 3 of the same schedules.

15.8 The Safety Standards Regulations must be consulted for the mandatory requirements relating to the handling of scheduled carcinogenic substances. The handling of category 2 and 3 carcinogenic substances is permitted, however they are hazardous substances and as such, Part 6 Hazardous Substances applies.

DEFINITIONS

'Health surveillance' – means the monitoring of an employee, including the use of biological monitoring, to identify changes (if any) in the employee's health due to exposure to a hazardous substance, but does not include the monitoring of atmospheric contaminants.

'Scheduled carcinogenic substance' – means a substance mentioned in column 2 of Schedule 1A to the Safety Standards Regulations.

'Substance' – includes a chemical entity, composite material, mixture or formulation, and other than in relation to an article that contains asbestos, does not include an article.

RESPONSIBILITIES OF EMPLOYERS

Identify scheduled carcinogenic substances

- 15.9 Schedules 1 and 1A to the Safety Standards Regulations should be consulted to determine if any scheduled carcinogenic substances are present in the workplace.
- 15.10 If a scheduled carcinogenic substance is identified and handling is not permitted or it is no longer required, the substance should be disposed of in accordance with local waste management and environmental legislative requirements.

Assess the risks

- 15.11 Employers must carry out a detailed assessment in accordance with Safety Standards Regulations 1.05 Risk Management and 6.17 Hazardous Substances if a Schedule 1 carcinogenic substance:
 - a) is identified in the workplace and its handling is permitted as described in Schedule 1 to the Safety Standards Regulations; or
 - b) an exemption has been granted by the SRC Commission; and
 - c) if any other scheduled carcinogenic substance is identified in the workplace or proposed for use in the workplace.
- 15.12 Employers should consider the following in addition to the requirements of the Safety Standards Regulations and *National Code of Practice for the Control of Workplace Hazardous Substances* [NOHSC: 2008 (1994)] when undertaking a risk assessment:
 - a) the assessment should take place prior to the use of any scheduled carcinogenic substance;
 - b) a generic assessment is not suitable or sufficient for work with any scheduled carcinogenic substance;
 - c) the assessment of work involving potential exposure to scheduled carcinogenic substances should include a thorough evaluation of the likely routes of exposure and the potential effectiveness of the planned control measures in preventing exposure; and
 - d) a risk assessment report must be made, should be included in the hazardous substances register in the workplace and the register should list the employees who may have been exposed to the scheduled carcinogens (Safety Standards Regulation 6.17(5)).

Implement risk control measures

Control the risk

- 15.13 Employers must refer to the listed carcinogenic substances in Schedule 1A and Schedule 1 (Part 2) to the Safety Standards Regulations and must not use these substances except in the circumstances listed in column 3 of the same schedules.
- 15.14 Employers must refer to the Safety Standards Regulations for the mandatory requirements relating to the handling of scheduled carcinogenic substances. The handling of category 2 and 3 carcinogenic substances is permitted, however they are hazardous substances and as such, Part 6 Hazardous Substances applies.
- 15.15 Employers should refer to the Part 12 Hazardous substances of this Code of Practice and the MSDS for guidance on risk control measures in relation to the hazardous carcinogenic substance.
- 15.16 Employers should refer to Part 12.44-12.48 for information on Personal Protective Equipment.

Health surveillance

- 15.17 Employers should consult Schedule 2 to the Safety Standards Regulations to determine if health surveillance is required for the particular chemical substance. For scheduled carcinogenic substances not on the list, expert advice should be sought on the availability of appropriate health surveillance procedures.
- 15.18 Safety Standards Regulation 6.21 must be followed for all hazardous substances, including all carcinogenic substances, if a risk assessment identifies that an employee has been exposed to a significant health risk because of exposure to a Schedule 2 hazardous substance.
- 15.19 Employers must provide health surveillance if the risk assessment indicates a significant risk to the health of employees.
- 15.20 If health surveillance of an employee is necessary because of the risk assessment, employers should ensure that the health surveillance is continued throughout the period of use of the scheduled carcinogenic substance. It may be appropriate, on professional advice, for an employer to continue health surveillance of employees after exposure to a scheduled carcinogenic substance has ceased (Safety Standards Regulation 6.21).

Maintain records

- 15.21 If an assessment report indicates the need for, or contains the results of, atmospheric monitoring or health surveillance, the employer must record and keep in a suitable form any information regarding the employee's exposure to a scheduled carcinogenic substance. The record must be kept for at least 30 years from the date of the last entry in the report (Safety Standards Regulation 6.22).
- 15.22 The employer must keep a record if the assessment report indicates that the employee, during the course of employment, is likely to have been exposed to a scheduled carcinogenic substance in or in connection with the circumstances listed in column 3 of Schedule 1A (Safety Standards Regulation 6.22(2A)). The assessment record must include the employee's personal information and the particulars of the exposure event such as:

- a) the full name of the employee;
- b) his or her date of birth;
- c) the address of each employee identified as having been exposed; and
- d) keep the record for 30 years from the date of the last entry in the report.

15.23 The employer should include in the record any other particulars, which may be relevant to the employee's exposure such as:

- a) the employee's date of commencement and termination of employment specifying periods of potential exposure;
- b) the employee's present and past job descriptions and areas of work;
- c) the relevant assessment report;
- d) how and where an employee can obtain any relevant additional records;
- e) the advisability of having periodic health assessments and the types of tests recommended;
- f) the records of maintenance schedules in relation to the control measures including dates of audit;
- g) the type of personal protective equipment; and
- h) the remedy for any faults in the operation or equipment.

15.24 According to Safety Standards Regulation 6.17A, an employer must provide the employee with a written record of the employee's exposure to a scheduled carcinogenic substance on the termination of their employment.

Notify Comcare

15.25 Section 68 of the Act requires employers to inform Comcare of certain work-related incidents. This includes notification of leaks, spills or incidents that expose, or could expose, a person to a carcinogenic substance.

15.26 If an employer has created any records of atmospheric monitoring, health surveillance, risk assessments conducted of employees exposed or likely to have been exposed, to a carcinogenic substance and the employer ceases operations in the State or Territory where the records were created, the employer must give these records to Comcare (Safety Standards Regulation 6.22).

Apply for exemption on use

15.27 Employers may seek an exemption for the use of a hazardous substance with carcinogenic properties listed in Part 2 of Schedule 1 to the Safety Standards Regulations. To apply for an exemption the application form approved by the SRC Commission must be completed. The exemption application consists of an application form and a schedule of the required information on items for which the exemption is being sought. The application form is available on Comcare's website.

15.28 Employers should consult 'Guidance on the Application, Assessment and Approval Process for Exemptions from Prohibitions on Hazardous Substances with Carcinogenic Properties' on the Comcare website.

RESPONSIBILITIES OF EMPLOYEES

15.29 Employees have a duty under the Act to:

- a) avoid increasing the risk to themselves and others through either actions or omissions;
- b) follow safety instructions while using any substances or equipment; and
- c) cooperate with employers so they can fulfil their duties.

PART 16 – TIMBER PRESERVATIVES

INTRODUCTION

16.1 Timber preservatives are hazardous substances used to control and prevent damage to timber and timber structures by insects (such as termites, borers and beetles), wood rot, wood fungus as well as general timber decay. Timber preservatives can be grouped using the following:

- a) water-borne preservatives (for example, copper chrome arsenic, boron compounds and sodium fluoride);
- b) oil-type or oil-borne preservatives (for example, creosote); and
- c) light organic solvent preservatives (for example, solutions containing pentachlorophenol, copper naphthenes and tributyltin oxide).

16.2 Exposure to treated timber and timber preservatives occurs in occupations such as power and telecommunication, construction, agriculture, maintenance, pest control and treatment plant operations. The hazardous substances can enter the body through inhalation of dust, ingestion and through skin absorption.

16.3 The risks associated with exposure to treated timber and timber preservatives are dependent on the type of preservative used. Occupational related diseases and illnesses such as contact dermatitis, asthma, damage to nerves in feet and hands, headaches and nausea have been reported as acute reactions. Serious long-term health effects include cancer related diseases of the lungs and upper respiratory tract.

16.4 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. I

PURPOSE

16.5 This Part aims to provide guidance for the use of timber preservatives and the handling of timber treated with preservatives, to assist employers provide a safe and healthy workplace for employees, contractors and others in the workplace.

16.6 This Part assists employers comply with the health and safety requirements under the Act and the Health and Safety Standards Regulations Part 6 Hazardous Substances.

SCOPE

16.7 This Part applies to all workplaces covered by the Act where timber preservatives are used and where timber treated with preservatives is handled.

16.8 Timber preservatives are classified as hazardous substances and therefore this Part should be read in conjunction with Part 6 Hazardous Substances and Schedule 2 to the Safety Standards Regulations to determine health surveillance requirements.

16.9 This Part does not cover work practices applicable to the manufacture of timber preservatives.

DEFINITIONS

'Exposure standard' – refer to Safety Standards Regulations Part 20.

'MSDS' – means Material Safety Data Sheet.

RESPONSIBILITIES OF SUPPLIERS

16.10 Suppliers of timber preservatives must prepare an MSDS on their products. Suppliers of treated timber should prepare information sheets and make these available to employers and employees on request (Safety Standards Regulation 6.05).

Note: Treated timber products should be branded to identify the type of treatment they have received.

RESPONSIBILITIES OF EMPLOYERS

Identify hazards

16.11 Employers should refer to information provided on the treated timber product, the MSDS and labelling for the chemicals used to treat the timber.

16.12 Exposure of employees and contractors to atmospheric concentrations of treated timber preservative vapours should conform to the recommended national exposure standard on the understanding that exposure should be reduced to as low a level as is reasonably practicable.

Assess the risks

16.13 Timber preservatives are considered hazardous substances and probable carcinogens and as such, employers must refer to Part 6 Hazardous Substances of the Safety Standards Regulations and should refer to Part 12 Hazardous substances of this Code of Practice for further guidance.

16.14 Employers should ensure that they undertake a general workplace, as well as a specific chemical based, risk assessment. The risk assessment should determine the likelihood of employee or contractor exposure to the timber product or timber preservative and the severity of the consequences resulting from that exposure.

Implement risk control measures

16.15 Employers should minimise the health hazards associated with timber preservatives and timber treated with preservatives by controlling hazards at their source. These measures may include, but are not limited to:

- selection of treatment processes that minimise and ultimately eliminate exposure of persons handling treated products;
- substitution of toxic materials by the least toxic alternatives;
- engineering controls, such as containment of processes involving timber treatment;
- provision of adequate and approved drainage to remove excess preservatives;
- use of mechanical ventilation to remove vapours and dusts at their sources; and

- f) ensuring that contaminated protective clothing is not re-used or is laundered at an appropriate facility.

Implement safety procedures for timber preservatives

- 16.16 Employers should ensure that general hygiene control precautions are followed to prevent the ingestion, inhalation of and contact with timber preservatives.
- 16.17 Employers should ensure employees do not smoke, eat, drink or use toilet facilities unless hands and any exposed skin is washed according to the MSDS directions.

Note: Skin contact is the most likely route for timber preservative absorption and therefore any skin contact with treatment solutions, including the wet residue on treated timber, should be avoided. Inhalation of sprays, mists or dusts should also be avoided.

- 16.18 Employers should refer to the specific MSDS requirements for the safe use of timber preservatives and follow the requirements of Part 6 Hazardous Substances of the Safety Standards Regulations.
- 16.19 Employers should also refer to the relevant Parts of this Code of Practice (Part 11 Storage and handling of dangerous goods and Part 12 Hazardous substances) for further guidance.
- 16.20 The transfer of concentrates from original to subsequent containers, other than for direct usage, is discouraged. If transfers are made, employers should ensure that the new containers are appropriately labelled. Containers should be disposed of in accordance with the requirements of the appropriate authorities and relevant legislation.

Provide personal protective equipment (PPE)

- 16.21 Employers must make available to an employee suitable PPE and should ensure that it is used in accordance with the instructions provided by the manufacturer (Safety Standards Regulation 6.19). There are two methods of manual application of preservatives to timber and employers should ensure that the appropriate PPE is provided for the particular process:
 - a) brushing, deluging or dipping – This activity requires protective clothing with long sleeves, full leg coverage, impervious boots and gauntlet gloves. Respiratory equipment should be worn where atmospheric concentrations of any chemical exceed, or are likely to exceed, 50 percent of the relevant exposure standard; and
 - b) spraying – Manual application by spraying is not to be conducted in unventilated areas or confined spaces. In well-ventilated areas, the protective equipment required includes:
 - (i) hooded coveralls (treated so as to be solvent or water repellent) fastened at the neck, ankles and wrists;
 - (ii) full-length trousers;
 - (iii) PVC apron;
 - (iv) impervious boots;

- (v) chemical face shield or goggles;
- (vi) gauntlet gloves; and
- (vii) respiratory equipment.

16.22 When applying preservatives remotely (by pressure impregnation, mechanical dipping or spraying) the precautions differ with the chemical used. Employers should refer to the MSDS and any other information provided on the specific chemical to ensure that the correct PPE is provided.

16.23 When using **water borne preservatives** employers should provide the appropriate PPE such as:

- a) for normal plant operations – coveralls and impervious boots;
- b) when mixing liquid concentrates:
 - (i) fastened coveralls at wrists, ankles and neck;
 - (ii) PVC apron;
 - (iii) gauntlet gloves;
 - (iv) face shield or goggles; and
 - (v) respiratory protection.

16.24 Employers should ensure that, when mixing **dry chemical**, all of the above PPE applies and additionally a particulate respirator (*Australian Standard AS/NZS 1716:2003 – Respiratory protective device* Class M for toxic dusts and Class H for arsenics) and chemical goggles if eye protection is not incorporated as part of the respirator.

16.25 When using **creosote or other oil based and organic solvent preservatives** during normal plant operations, the employer should ensure that coveralls and impervious boots are worn. During cylinder opening operation a respirator with organic vapour cartridge, appropriate eye protection and gauntlet gloves are required.

16.26 Employers should ensure that exposed skin is protected from sunlight with an ultraviolet block-out preparation.

Implement procedures for safe storage of treated timber and timber treatment chemicals

16.27 Employers should ensure treatment solutions are stored in containers that prevent the escape of vapour and spillage/leakage of liquid. Organic preservatives should be stored in a well-ventilated area. Storage should be well away from foodstuffs, food containers and food preparation and consumption areas.

16.28 Employers should ensure that separate lockable storage is provided for chemicals that require restricted access. Records should be kept of all chemicals entering and leaving the store. Liquid chemicals should be stored within a non-permeable bunded area capable of containing at least 120 per cent of the total volume of the chemicals stored (refer to the *Australian Standard AS/NZS 2843.1:2006 – Timber preservation plant site design* for more information on the design and layout of preservation plant sites).

16.29 Employers should ensure freshly treated timber is stored in well-ventilated areas in a manner that prevents contamination of other materials with the treatment

fluid. This timber should be stored over an approved drainage and collection area to allow sufficient time for drainage and surface drying.

- 16.30 Employers should consider the location and design of any storage area taking into account the risks of fire and explosion. Chemicals should be stored so that decontamination in response to a spill can be easily facilitated.
- 16.31 Employers should ensure that the local fire authorities are notified of all chemicals and solvent carriers in the store.

Implement procedures for safe handling and carriage of treated timber

- 16.32 Employers should ensure that the correct handling procedures are developed and implemented; taking into account the chemical properties of different timber preservatives that may have different drying rates.
- 16.33 Employers should ensure that the handling procedures also include the application method that may affect the chemical properties for the particular timber preservative used.

Water borne preservatives

- 16.34 Where treated timber is wet with preservative solution, employers should ensure that water repellent coveralls, head covering, impervious boots and PVC gauntlet gloves are provided and worn. If the treated timber is surface dry, then there are no additional requirements except that the wearing of leather or cotton gloves is recommended.

Creosote and other oil-borne preservatives

- 16.35 Employers should ensure that the appropriate person protective clothing is used where creosote-treated timber is mechanically handled and when close contact is essential (immediately following treatment). The personal protective clothing is specific to the length of exposure period and includes:
 - a) where close contact is necessary within a three-month holding period, employers should ensure that the following clothing is worn:
 - (i) hooded coveralls, fastened at neck, ankles and wrist;
 - (ii) goggles
 - (iii) gauntlet gloves; goggles;
 - (iv) impervious boots; and
 - (v) a respirator with twin cartridge combined dust and organic vapour cartridge;
 - b) where close contact is necessary beyond the three-month holding period, employers should ensure the following protective clothing is worn:
 - (i) full-length coveralls;
 - (ii) impervious boots;
 - (iii) gauntlet gloves; and
 - c) exposed skin should be protected from sunlight with an ultraviolet block-out preparation.

Note: Other oil-borne preservatives do not require the use of ultraviolet cream.

Light Organic Solvent Preservatives

- 16.36 The precautions are as for water-borne preservatives except that coveralls need not be water repellent.
- 16.37 Exposure of skin to timber preservatives and inhalation of both vapour and contaminated timber dust may occur when working with treated timber. Employers should provide local exhaust ventilation to remove the dust and vapours at the source. If such measures are impracticable, employees should be provided with the protective clothing and equipment such as masks or respirators as stipulated by the MSDS. Dust should be cleared and not left to accumulate.

Implement emergency procedures

- 16.38 Employers should ensure emergency clothing, respirators, showers and eyewash fountains are available in the workplace. Emergency and first aid instructions should be posted in a prominent place together with the names, addresses and telephone numbers of emergency personnel. Employers should refer to the Safety Standards Regulations Part 6 Hazardous Substances and Part 12 of this Code of Practice for more information about emergency plans.

Ensure proper disposal

- 16.39 Treated timber should not be burnt in cooking or heating fires or in confined or unventilated spaces.
- 16.40 Employers should ensure that treated timber is disposed of in accordance with the appropriate environmental legislation and requirements of the local authorities.

Provide education and training

- 16.41 Employers should ensure that employees receive education and training about the safety precautions associated with timber preservatives and treated timber.
- 16.42 Employers should ensure that all the employees follow the procedure directions for safe use of these products.

RESPONSIBILITIES OF EMPLOYEES

- 16.43 Employees have the general duty of care under section 21 of the Act to take reasonable care to ensure their safety and the safety of others affected by their acts or omissions.
- 16.44 Employees should familiarise themselves with information contained in the MSDS and other chemical labelling requirements associated with chemicals that they are required to use.
- 16.45 Employees are required to wear PPE where necessary and ensure that it is correctly fitted, used and stored.
- 16.46 Employees should report any damage to the PPE to their supervisor.

PART 17 – INORGANIC LEAD

INTRODUCTION

17.1 Lead ore is a naturally occurring metal found in small concentrated deposits. It is an easily accessible mineral ore and is widely distributed throughout the world. This availability has led to extensive occupational use over a long period.

17.2 There are a large number of occupations that either use materials containing lead or disturb existing lead products in, for example, older buildings or industrial sites. Industries where lead use poses a particular risk include:

- a) paint manufacturers and industries including:
 - (i) protective coatings used on industrial buildings, plant and equipment;
 - (ii) marine, automotive and vehicle paints; and
 - (iii) specialised paints, such as road marking and sign writing applications;
- b) building product manufacture inclusive of:
 - (i) flashing;
 - (ii) sheet lead;
 - (iii) PVC products;
 - (iv) lead solder; and
 - (v) plumbing fittings;
- c) petrol and lubricant manufacture including leaded petrol, some types of oil and grease and waste oil;
- d) demolition and renovation where hazardous lead dust can accumulate or where the workplaces are not cleaned properly; and
- e) other industries where work practices such as burning, sanding and grinding can disturb or create hazardous lead fumes and dust.

17.3 Exposure is through the inhalation, ingestion and dermal absorption of lead fumes, dusts and particles. Lead is described as a 'multi-source toxin' that can have many subtle, but serious, long-term health effects even when the intake is less than 1 mg/day. Symptoms of chronic poisoning consist of lead deposits along the edge of the gums, abdominal colic, fits and spasms. Nervous system symptoms include apathy, irritability, insomnia and behavioural irregularities in children.

17.4 Pregnant women and young children are particularly vulnerable to lead. Lead absorption affects the developing embryo/foetus and therefore women have been traditionally excluded from employment in lead processing workplaces. Children succumb to lead poisoning at blood levels significantly lower than those for adults.

17.5 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

PURPOSE

17.6 This Part aims to assist duty holders comply with the health and safety responsibilities under the Act and Part 6 Hazardous Substances of the Safety Standards Regulations.

17.7 This Part provides a practical guide on how to minimise risk of disease and illness for employees, contractors at work and others at or near the workplace because of occupational exposure to inorganic lead.

SCOPE

17.8 This Part should be read in conjunction with Part 6 Hazardous Substances Safety Standards Regulations for the control of exposure to inorganic lead.

17.9 This Part is specifically concerned with occupational exposure to inorganic lead. It does not apply to occupational exposure to organic lead, specifically lead alkyls.

DEFINITIONS

'Atmospheric lead level' – means the concentration of lead in air expressed in milligrams per cubic metre (mg/m³).

'Blood lead level' – means the concentration of lead in whole blood expressed in micromoles per litre (μmol/L) or micrograms per decilitre (μg/dL).

'Confirmed blood lead' – refers to the sampling of blood lead levels in accordance with Industry and Australian Standards for example AS 2636:1994 – *Sampling of venous and capillary blood for the determination of lead content* and AS 2411: 1993 – *Determination of lead in venous blood – Flame atomic absorption spectrometric method*.

'Inorganic lead substances' – can be lead metal; or an inorganic lead compound; or lead salt of an organic acid.

'Lead process' – refers to the following:

Lead Processes I – Any work which exposes a person to lead dust in air or lead fumes arising from the manufacture or handling of dry lead compounds, except galena (lead sulphide) when its character or composition remains unchanged. Any work in connection with the manufacture, assembly, handling or repair of, or parts of, electric accumulators (batteries) which involve the manipulation of dry lead compounds, pasting or casting of lead. Lead process that include the:

- a) breaking up or dismantling of lead accumulators and the sorting, packing and handling of plates or other parts containing lead removed or recovered from those accumulators;
- b) spraying with molten lead or alloys containing greater than five per cent by weight of lead;
- c) melting or casting of lead alloys containing greater than five per cent by weight of lead in which the temperature of the molten material exceeds 450°C;
- d) recovery of lead from its ores, oxides or other compounds by a thermal reduction process;
- e) dry machine grinding, discing, buffing or cutting by power tools lead or alloy containing greater than five per cent by weight of lead;

- f) machine sanding or buffing of surfaces coated with paint containing greater than one per cent by dry weight of lead;
- g) processes whereby electric arc, oxy-acetylene, oxy-gas, plasma arc or a flame, is applied for the purposes of welding, cutting or cleaning to the surface of any metal which is coated with lead or paint containing greater than one per cent by dry weight of lead;
- h) radiator repairs where exposure to lead dust or fumes may occur; and
- i) fire assay where lead is used.

Lead Processes II – Any work involving the melting of lead or alloy containing greater than 50 per cent lead by weight where the exposed surface area of the molten material is less than 0.1m² and the temperature of the molten material does not exceed 450°C. This includes:

- a) hand-grinding and finishing of lead or alloy containing greater than 50 per cent by weight of lead;
- b) spray painting with lead paint containing greater than one per cent by dry weight of lead;
- c) working with galena (lead sulphide) when its character or composition remains unchanged; and
- d) working in any lead process not listed in lead processes I.

'Lead-risk job' – means a work activity or sequence of work activities in which the blood-lead level of any employee might reasonably be expected to rise, or does rise, above the lower of the following lead levels of 1.45 µmol/L (30 µg/dL) or the removal level prescribed in relation to the employee.

'Return level' – means a confirmed blood lead concentration at which an employee, who has been removed from a lead-risk job to a job that is not a lead-risk job, can now be considered by a medical practitioner for return to a lead-risk job.

'Removal level' – means a confirmed blood lead concentration at which an employee needs to be transferred from a lead-risk job to a job, which is not a lead-risk job.

'Medical removal' – means a protective, preventive health mechanism integrated with the health surveillance provisions, which include biological monitoring. It provides temporary removals from further lead exposure for employees discovered through health surveillance to be at risk of sustaining material impairment to health from continued exposure.

RESPONSIBILITIES OF EMPLOYERS

- 17.10 Generic assessments for lead-containing hazardous substances may be undertaken where a single employer controls many similar workplaces or by a trade association on behalf of a number of different employers with essentially identical workplaces. In each case, the individual employer retains the responsibility to ensure the generic assessment is valid for that workplace.
- 17.11 Safety Standards Regulation 6.17A requires the employer to assess whether a task is a lead-risk task. This should occur prior to the commencement of any work related task. A lead-risk task is one in which the blood lead level of the employee might reasonably be expected to rise above 1.45 µmol/L (30 µg/dL).

17.12 Employers should also refer to the relevant Parts of this Code of Practice (Part 11 Storage and handling of dangerous goods and Part 12 Hazardous substances) for further guidance.

Provision of information to new employees

17.13 As well as the general requirements of providing information to employees, employers should ensure that when interviewing applicants for job areas where employees may be exposed to lead, the following minimum information is supplied to job applicants:

- a) lead is a toxic substance which is retained within the body long-term;
- b) lead can affect the nervous and reproductive systems, kidneys and interfere with the ability of the body to make haemoglobin;
- c) the unborn child and infants are particularly susceptible to the effects of lead and, on this basis, employees who are pregnant or breastfeeding are excluded from working in lead-risk jobs;
- d) employers should note that in accordance with (b) and (c) above, some people may be assessed as unsuitable for employment in lead-risk jobs;
- e) potential employees should be aware of the need to cooperate with employers to minimise their exposure to lead; and
- f) it is a condition of employment that employees periodically have appropriate blood tests and medical examinations to determine exposure levels.

Criteria for exclusion from a lead-risk job

17.14 Certain conditions indicate a greater risk to health from exposure to lead. In these circumstances, employers should ensure that employees are excluded from lead-risk jobs until their circumstances change and/or their respective blood lead levels indicate it is safe to return. Criteria for exclusion from working in a lead-risk job are:

- a) medical conditions such as blood disorders or diseases and reproductive problems;
- b) pregnancy;
- c) breast feeding; and
- d) prior exposure, which may have resulted in known high blood, levels of lead.

Identify hazards

17.15 Employers should obtain an MSDS from the supplier of the lead-containing substances as far in advance of the first supply as possible.

17.16 Employers must ensure that lead and lead containing substances are listed and kept up to date in the workplace register of hazardous substances according to Safety Standards Regulation 6.14.

17.17 Employers should ensure that the hazard identification involves:

- a) identification of lead-containing hazardous substances used or produced in the workplace; and
- b) observation of the lead processes which should be categorised into identifiable units, (for example, handling, transport, storage, processing, manufacturing, and maintenance).

Assess the risks

- 17.18 Employers should make a critical appraisal of the use of lead and lead-containing substances in the workplace and determine the potential risk of exposure. In assessing the number of persons who could be exposed to lead and lead products, the employer should consider:
 - a) those employees engaged in lead processes;
 - b) those employees who could be affected by lead due to their proximity to the lead process; and
 - c) other persons near the work area such as contractors and cleaners and maintenance employees.
- 17.19 Employers should assess the risk to employees by:
 - a) assessing the frequency and duration of exposure to lead and lead products relevant to changing work patterns;
 - b) determining the atmospheric lead levels in the breathing zone of exposed employees levels;
 - c) analysing the collated results of atmospheric monitoring; and
 - d) analysing the biological monitoring results of employees working in each lead process over the 12 months prior to the assessment.
- 17.20 Employers should group the results of the individual assessments under the units of the lead processes. This should provide employers with information to identify those areas that may present a lead exposure hazard so that control measures can be implemented.

Implement risk control measures

- 17.21 Where there are tasks in a lead process area that are assessed as not being lead-risk tasks, the employer should develop and implement a plan to ensure that these tasks do not become lead-risk tasks. These tasks should be assessed at least every five years.
- 17.22 Employers should ensure that the exposure of employees and contractors to atmospheric concentrations of inorganic lead conforms to the recommended national exposure standard on the understanding that exposure should be reduced to as low a level as reasonably practicable. Exposure should not exceed the recommended national exposure standard.
- 17.23 When there is a risk to health and safety from a lead-risk task, as determine by the risk assessment, the employer should:
 - a) select appropriate measures to achieve and sustain control;
 - b) ensure these hazard control measures are properly used and maintained; and
 - c) arrange induction and training.

Ensure the containment of lead contamination

17.24 An employer should, as far as is practicable, ensure that contamination by lead is confined to the area where the lead process is carried out so that the surrounding environment is not affected.

17.25 Employers should control all lead emissions from those areas by whatever medium they are transmitted (for example, air, water, vehicle wheels and shoes).

17.26 Employers should consider lead control measures such as:

- using ventilation systems fitted with collection units;
- taking steps to ensure that employees do not carry lead outside the premises, (for example, on their bodies or clothing);
- locating washing, showering and changing facilities so that employees leaving work do not have to pass through lead contaminated areas after using these facilities;
- keeping lead waste in enclosed containers; and
- ensuring the safe disposal of waste.

Ensure appropriate cleaning of the workplace

17.27 Employers should ensure that work areas are cleaned as frequently as necessary to remove lead deposits to reduce the risk of inhalation and ingestion of lead. In particular, the following should be cleaned at the recommended minimum frequencies:

- external plant surfaces (for example, chemical reactors and machines) according to the degree of contamination or once per day;
- washing and changing rooms (for example, facilities for eating and drinking) should be washed and cleaned at least once per day;
- the frequency of cleaning inside walls and ceilings will vary according to the degree of contamination however, overhead ledges and fixtures should be cleaned as frequently as necessary to prevent the accumulation of lead deposits; and
- floors and workbenches at least once per day.

17.28 Employers should ensure that the method of cleaning the workplace does not create a risk for the cleaners or other persons. Compressed air, compressed gas or dry sweeping methods should not be used for cleaning.

17.29 The methods of cleaning should not spread contamination of lead and employers should consider:

- the use of a fixed vacuum cleaning apparatus or an approved mobile vacuum system; and
- wet cleaning methods such as mopping.

Implement safe work practices

17.30 Employers should ensure that safe work practices are used such as wet work methods. Wet work methods include the wetting of lead materials and surfaces during activities such as grinding, rubbing and scraping down lead painted surfaces. The surface or materials should be thoroughly wetted and should not be

allowed to dry out. This process is intended to prevent dry lead dust becoming airborne.

17.31 Employers should consider the circumstances when addressing dust prevention and use appropriate methods. If the method is likely to create an unsafe situation then it should not be used. For example:

- a) water use near furnaces is an explosion risk;
- b) where electrical safety cannot be maintained; and
- c) where lead materials containing arsenides or antimonides could on contact with water, create arsine or stibine gases.

Note: Water sprays should not be used to control an airborne dust cloud, as they are ineffective.

17.32 When wet methods are used, the employer should ensure that there is no risk to employees from splashing of lead materials.

Establish air monitoring and health surveillance procedures

17.33 The employer should ensure that all control measures are examined visually by a competent person at least weekly, to detect any obvious defects such as damage or wear, as part of the monitoring program.

17.34 The employer should monitor the levels of lead and lead products during the manufacture, use, handling and storage of the substance that includes the examination and testing of control measures (for example, exhaust ventilation systems and the calibration of thermostatic controls).

17.35 The employer should ensure that the monitoring program of the workplace incorporates regular inspections (at least 3 monthly) by a competent person.

17.36 If the risk assessment indicates that health surveillance of employees is required because of exposure to lead and lead products, the employer, in consultation with the employees and their representatives, should evaluate the results of the health assessment. The health assessment should include an estimation of the atmospheric lead level and should occur:

- a) at intervals of not longer than twelve months;
- b) as soon as practicable following a significant change in:
 - (i) the use;
 - (ii) the composition of lead-containing materials used in that job; or
 - (iii) an existing lead process;
- c) when requested to do so by Comcare; and
- d) at the commencement of a new lead process and repeated within four weeks after the commencement of that process.

17.37 The employer should provide the health surveillance results to the employee and/or their representatives and the aggregate results of lead exposure assessments of employees in the designated work groups to the employees and where applicable to the health and safety representatives.

Provide appropriate amenities for employees

- 17.38 Employers should ensure that employees do not eat, drink, chew gum, smoke in or carry smoking materials to any lead processing area. Drinking fountains may be provided in areas other than the eating and drinking area, provided those facilities are free from lead contamination and, as far as is practicable, cannot be contaminated by lead.
- 17.39 Employers should provide employees with an eating and drinking area (dining room) which is protected from lead contamination. The dining room should be:
 - a) constructed to prevent the entry of fumes and dust into the area;
 - b) situated away from the designated lead processing areas; and
 - c) close to washing and changing facilities.
- 17.40 Employers should ensure that walls, floors and furniture in dining and changing areas have smooth, impervious surfaces for easy cleaning. There should be suitable facilities for storage of food, drink, and smoking materials. Food should not be stored in lockers used for protective clothing or respiratory equipment.
- 17.41 Employers should ensure that employees remove lead contaminated clothing and equipment and wash exposed areas such as hands and faces before entering the dining room.
- 17.42 The provision of appropriate amenities by the employer should enable the employee to:
 - a) minimise secondary lead exposure from contaminated clothing;
 - b) minimise ingestion of lead from for example, hands and face; and
 - c) avoid the spread of lead contamination to the employee's family especially to young children.
- 17.43 Where lead processes I (see definition) are carried out, an employer should:
 - a) provide two separate changing rooms for employees where:
 - (i) one should be used exclusively for dressing, undressing and storage of personal clothing; and
 - (ii) the other should be used exclusively for dressing, undressing and storage of work clothing, protective clothing and all equipment worn or used in the lead process area; and
 - b) provide one locker in each changing room for each employee and ensure that every changing room is constructed to avoid lead contamination from the lead process area.
- 17.44 Where lead processes II (see definition) are carried out, an alternative, but less desirable, method of protection may be used. This method involves the use of two lockers for each employee, one for the contaminated items and one for uncontaminated items.

Provide personal protective equipment (PPE)

- 17.45 Employers should provide and maintain PPE including gloves, face shields, respirators, aprons, overalls, footwear and glasses as determined by the risk assessment.
- 17.46 Employers should provide education and training on the proper use, storage and maintenance of supplied PPE.
- 17.47 The employer should not allow personal clothing in the change room intended for protective clothing, or vice versa, to prevent contamination of personal clothing worn outside the workplace.

Note: Refer to paragraphs 12.44 – 12.48 Hazardous substances of this Code of Practice for further information on PPE.

Provide education and training

- 17.48 Employers must ensure that employees receive education and training about the safety precautions associated with the manufacture, use, handling and storage of lead and lead products in accordance with the requirements under Part 6 Hazardous Substances of the Safety Standards Regulations.

Maintain accurate records

- 17.49 The employer should maintain accurate records for each employee subject to health surveillance. In particular, when an employee is medically removed from a lead-risk job the records should include:
 - a) the name, gender and date of birth of the employee;
 - b) the date of each occasion that the employee was removed from a lead-risk job and the blood lead level reached, as well as the corresponding date on which the employee was returned to a lead-risk job; and
 - c) a brief description of how each removal was accomplished.

RESPONSIBILITIES OF EMPLOYEES

- 17.50 Employees have a responsibility to ensure that they have attended the required training and information sessions on safe practices for the prevention of lead contamination.
- 17.51 Employees should report to their supervisor:
 - a) any suspected breakdown of the work practices;
 - b) symptoms of exposure to lead and lead product poisoning;
 - c) PPE they believe to be defective;
 - d) any employee demonstrating non-compliance with policies and procedures; and
 - e) any misuse of PPE.

PART 18 – ETHYLENE OXIDE

INTRODUCTION

18.1 Ethylene oxide is a gas primarily used in the manufacture of other chemicals. It is used to manufacture ethylene glycol for automotive antifreeze/coolant and polyester. Ethylene oxide is also used for the sterilisation of equipment in hospitals and veterinary institutions. A small amount is also used to control pests on stored agricultural products.

18.2 Ethylene oxide is an extremely reactive chemical. Pure ethylene oxide (liquid or gas) is extremely flammable and air/ethylene oxide mixture can explode if exposed to an ignition source. Ethylene oxide has a very high odour threshold and this property increases the likelihood of exposure to concentrations that exceed the occupational exposure limit for this hazardous substance.

18.3 The routes of exposure include inhalation, ingestion, through the mucous membrane and intravenously via an incomplete sterilisation process of an instrument used in surgical procedures.

18.4 The health risks to humans can be acute and chronic. Acute reactions include:

- a) headaches;
- b) nausea and vomiting;
- c) upper respiratory tract symptoms such as hoarseness and a cough;
- d) conjunctivitis;
- e) dermatitis;
- f) burns to entry sites such as mucous lining of mouth and eyes;
- g) fatigue; and
- h) pulmonary oedema.

18.5 Ethylene oxide has been assigned a Category 2 classification, a probable human carcinogen (see Part 15 Carcinogenic Substances of this Code for further information on carcinogenic substances). It should be treated as carcinogenic to humans and therefore should be used and handled with great caution.

18.6 The multiple uses of ethylene oxide, the reactive properties of the chemical, the various entry sites and the solubility with biological tissue such as blood enables fast absorption and distribution to vital organs. This property increases the likelihood of systemic exposure resulting in significant health consequences in the short and long term.

18.7 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. [1](#)

PURPOSE

18.8 The purpose of this Part is to provide guidance on the safe use of ethylene oxide so that duty holders can discharge their duty under the Act and the Safety Standards Regulations by providing a healthy and safe workplace for employees and contractors at work and others at or near the workplace.

SCOPE

- 18.9 This Part aims to assist employers minimise the risks arising out of the handling and use of ethylene oxide in sterilisation/fumigation processes in workplaces.
- 18.10 This Part should be read in conjunction with Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods of the Safety Standards Regulations.

DEFINITIONS

‘DNA’ – is the Deoxyribonucleic acid genetic material.

‘Excursion Limit’ – means the exposure standards for airborne contaminants are expressed as a TWA concentration over an entire eight-hour working day. However, during this eight-hour averaging period, excursions above the TWA exposure standard are permitted providing these excursions be compensated for by equivalent excursions below the standard during the working day. Because some substances can give rise to acute health effects even after brief exposures to high concentrations, it is evident that excursions above the TWA concentration should be restricted.

The permissible frequency of these excursions, their magnitude and duration should be based upon a number of factors such as the nature of the contaminant, its cumulative effects and whether brief exposures can produce acute effects (see also *Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC: 3008 (1995) 3rd Edition].

‘Exposure Standard’ – is defined in Part 20 of the Safety Standards Regulations.

‘Health Surveillance’ – is defined in Part 6.03 Hazardous Substances of the Safety Standards Regulations.

RESPONSIBILITIES OF DESIGNERS, MANUFACTURERS AND INSTALLERS

Designers and Installers of chambers and cabinets

- 18.11 Designers should use the combined sterilisation and aeration facility wherever possible to overcome the risk of exposure during transfer.
- 18.12 Designers and installers should ensure that the design and installation of sterilisation chambers and aeration cabinets complies with the legislative requirements and should refer to the Australian Standards for technical guidance. *Australian Standard AS 1210:1997 – Unfired pressure vessels (known as the AS Unfired Pressure Vessels Code)*

Note: Designers and installers should comply with the operator and environmental aspects of the relevant Australian Standards.

Designers and Installers of the Cylinder System

- 18.13 Designers and installers of the cylinder system should ensure that all hoses and piecework are designed for the maximum operating pressure and be provided with:
 - a) safety relief valves on all liquid lines to prevent rupture;

- b) the means of depressing the valves;
- c) vents piped to the water scrubber or to a dedicated exhaust system on all such safety valve systems;
- d) a pressure regulator on the line which should be set only marginally higher than the cabinet working pressure; and
- e) a fitted safety valve system, which prevents flow back of gas during cylinder change over.

RESPONSIBILITIES OF EMPLOYERS

18.14 The Safety Standards Regulations Part 8 Storage and Handling of Dangerous Goods and Part 6 Hazardous Substances set out mandatory duties for the employer in relation to the management of hazardous chemicals such as ethylene oxide.

Identify hazards

18.15 Employers should ensure that exposure to ethylene oxide is kept as low as practicable and under no circumstances should it exceed the national exposure standard. Ethylene oxide sterilisation should be used only when safer alternatives cannot be used.

18.16 Employers should ensure that they have identified the hazards associated with ethylene oxide by referring to the MSDS and labelling information about the chemical properties.

Assess the risks

18.17 Employers should refer to Safety Standards Regulations Part 6 Hazardous Substances for the mandatory obligations and Part 12 of this Code of Practice for guidance on risk assessments for hazardous chemicals.

18.18 The risks to human health are considerable as ethylene oxide is a recognised carcinogen and reproductive toxicant as well as a suspected toxicant for all major systems of the body. Employers should assess the likelihood of exposure in relation to this hazardous chemical in light of the known consequences.

18.19 Employers should consider the number of employees exposed to the chemical, the size of the area, the temperature and any other factors that may increase the likelihood of exposure and/or consequences.

Implement risk control measures

18.20 Employers must ensure that they comply with the exposure standards (Safety Standards Regulation 6.19) and should not exceed the excursion limits (see definition in this part).

Fumigation/Sterilisation

18.21 Employers should ensure that fumigation or sterilisation is carried out under vacuum in a specially designed chamber fitted with appropriate ethylene oxide monitoring equipment. The procedures for management of the fumigation or sterilisation chamber should include that:

- a) the fumigation or sterilisation chamber is flushed with nitrogen prior to product introduction;
- b) mechanical ventilation is installed in all potential leak areas;
- c) the fumigation or sterilisation chamber door is not opened if the ethylene oxide concentration within the chamber is above 5 ppm;
- d) the concentration of ethylene oxide within the working area in the vicinity of the fumigation or sterilisation chamber is monitored; and
- e) an alarm is triggered when 5 ppm is exceeded.

Establish safety procedures for chamber operation

18.22 Employers should ensure that safe work practices are followed by establishing suitable safety procedures such as:

- a) when entering areas where exposure to ethylene oxide is likely or when changing ethylene oxide gas cylinders, the employee should wear chemical resistant clothing buttoned to the neck and wrist and washable hat, elbow length butyl rubber gloves and a full-face piece respirator with organic vapour cartridge;
- b) routine for cleaning personal protective equipment (PPE) including washing the gloves, respirator and contaminated clothing after daily use. If the equipment is rubber, wash it with detergent and warm water;
- c) other than as specified above, the products should be used in accordance with instructions on the label attached to the container;
- d) physical isolation of the area in which ethylene oxide is used from other areas (for example, it should be located in a separate room). If this is not possible, the steriliser (and aerator) should be recessed in an equipment room so that the doors and the control panels are flush with the wall and all of the mechanical components are behind the wall in the plant room;
- e) the installation of properly designed local ventilation systems with (for example, exhaust vents, canopy or hood type) vents placed in locations such as:
 - (i) above the sterilizer door to capture vapours escaping when the door is opened;
 - (ii) where any leaks could be expected (such as near pressure relief valves);
 - (iii) in plant rooms near cylinders and hoses; and
 - (iv) near the exhaust vent of the aerator;
- f) the exhaust gases from the sterilizer should be scrubbed by passing them through a water spray. For larger areas two water spray operations should be considered;
- g) the disposal of an exhaust mixture of ethylene oxide and water should be by a suitable trade waste disposal organisation or local authority;
- h) all points where there is exposure to ethylene oxide such as from an open junction to a drain should be enclosed, baffled and ventilated to the exterior; and
- i) all discharge vents should be ventilated to the exterior.

Establish safe procedures for the Unit Dose Canister System operation

- 18.23 Employers should ensure that only those sterilizers, which require the canister to be inside the chamber with the door closed before the canister can be punctured, are used.
- 18.24 Employers should ensure that these sterilizers incorporate measures to protect against the hazard of explosion. They should be intrinsically safe, flameproof or fitted with an explosion disc. Any explosion disc should pose no risk to persons operating or maintaining the machine.
- 18.25 Employers should ensure that the empty canister from the completed sterilization cycle is aerated along with the load before non-incineration disposal.
- 18.26 Employers should ensure that there are written procedures which incorporate direction for canister use, handling and disposal of cartridges according to the instructions provided by the designer or manufacturer.
- 18.27 Employers should ensure that the signage on use, handling and disposal of canisters is clear, concise and easily read outlining the written procedure for the change over of cartridges and this sign should be displayed on the steriliser door.

Control the access to work areas

- 18.28 Employers should ensure that areas containing ethylene oxide sterilisers, aerators, including aeration rooms, cylinders or piecework are accessible only to authorised personnel or escorted visitors.
- 18.29 Employers should maintain and display in a prominent place a register of the authorised personnel.

Provide personal protective equipment (PPE)

- 18.30 In certain circumstances, PPE may be required to support other preventative measures. Employers should not regard PPE as a substitute for more effective control measures. PPE should only be used in conjunction with other more effective control measures.
- 18.31 Employers should refer to the Safety Standards Regulations Part 6 Hazardous Substances and to paragraphs 12.44 – 12.48 of this Code for provision and use of PPE.

Ensure safe storage of cylinders

- 18.32 Employers should ensure all cylinders, including those that are in use, full or empty, are isolated and chained in a secure well-ventilated room or enclosure or located outside the building. The cylinders should be protected from sunlight and excessive heat and stored away from other combustibles or possible ignition sources.
- 18.33 Employers should ensure that the storage area complies with Australian Standard *AS 2030:1999 – The approval, filling, inspection, testing and maintenance of cylinders for the storage and transport of compressed gases (SA Gas Cylinders Code)*.

18.34 Employers should ensure that areas where cylinders are stored have placards displaying the safety precautions in accordance with Part 8 Storage and Handling of Dangerous Goods of the Safety Standards Regulation.

Develop emergency procedures

18.35 Employers must establish emergency procedures in accordance with Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods of the Safety Standards Regulations.

Provide education and training

18.36 Employers must ensure that the employees are trained in the risks and control measures for use, handling and disposal of ethylene oxide (Safety Standards Regulation 6.18).

Maintain records of atmospheric and health monitoring

18.37 Employers are required to establish an appropriate atmospheric monitoring program in consultation with employees and /or their representatives or health and safety representatives. The program should include static, personal and leak detection monitoring as necessary. Atmospheric monitoring should be used as a regular performance indicator of the existing control measures as well as to ensure that employees are not exposed to a harmful work environment.

18.38 Record keeping ensures that there is adequate health monitoring of the employees and employers should include the following information in the results of air monitoring:

- times and results of the monitoring;
- the kind of monitoring procedures that were adopted inclusive of the duration;
- the locations where the samples were taken and the specific operations in progress at the time;
- in the case of personal samples, the name of the person concerned;
- whether the results reflected normal operating conditions;
- how the results were interpreted;
- the effectiveness of the control measures; and
- the preventative and remedial action that was subsequently taken.

Establish a Maintenance Program

18.39 The employer should ensure that all control measures implemented perform as originally intended and continue to prevent or control the exposure of employees to ethylene oxide or its mixtures.

18.40 Employers should ensure that a regular and ongoing maintenance program is implemented to detect and rectify any leaks and faulty parts at an early stage. Any deficiencies in the system should be reported and recorded.

18.41 When establishing the maintenance program, employers should implement a daily testing/inspection program that includes:

- gas cylinder connections where applicable;

- b) the steriliser door gasket for any sign of damage or build up of foreign material;
- c) the steriliser door gasket during a cycle with an ethylene oxide gas monitor; and
- d) the aerator cabinet door gasket during a cycle.

18.42 Employers should ensure that cleaning is programmed regularly such as:

- a) daily cleaning inclusive of the steriliser chamber door and gasket, the inside door and the chamber of the aerator;
- b) weekly inspection should ensure that:
 - (i) air changes are adequate to cope with minor leakages;
 - (ii) that the sites of any leaks are identified early;
 - (iii) that maintenance procedures are undertaken;
- c) monthly cleaning of dust accumulation in the fine mesh filters around the control boxes in the aerator is required;
- d) at periodic intervals, at least 12 monthly, or as recommended by the manufacturer or as required by the relevant State or Territory authority the employer should:
 - (i) clean the top of the aerator;
 - (ii) ensure that the motor ventilation holes are free of dust;
 - (iii) check plugs and thermocouple wires are secure; and
 - (iv) remove and replace the absolute filter on the floor inside the chamber.

Develop a testing regime

18.43 Employers should test the unit dose system weekly according to the risk assessment process. The procedures for testing should include:

- a) leak tests for the door gaskets, cylinder fittings if applicable and any other connections which could allow for leakage of the chemical; and
- b) record keeping on the maintenance and inspections and include:
 - (i) initiation and completion dates of the inspections and/or maintenance procedures;
 - (ii) the components that were inspected, the extent of the maintenance required and a list of the replacement parts;
 - (iii) the date the leak test took place, the points of any leaks and the dates when the leaks were detected and repaired;
 - (iv) the date, time, cylinder weight and installer of cylinder replaced; and
 - (v) the batch number of gas cylinders or canisters.

RESPONSIBILITIES OF EMPLOYEES

18.44 Employees should comply with the policies, procedures and training provided to ensure their health and safety as well as the health and safety of any contractors and persons at or near the workplace.

- 18.45 Employees should use and store the PPE provided by the employer according to the manufacturers' instructions and any training provided.
- 18.46 Employees should report to their supervisors any PPE that is not fitted correctly and any damage to the PPE provided.

PART 19 – ULTRAVIOLET RADIATION IN SUNLIGHT

INTRODUCTION

- 19.1 Excessive exposure to ultraviolet radiation (UVR) in sunlight is the predominant cause of skin cancer in Australia. Each year there are approximately 380,000 new cases of skin cancer and over 1,200 fatal cases. UVR exposure is also a major cause of eye damage including photoconjunctivitis, photo keratitis, cataracts and cancers of the eye.
- 19.2 Persons who may be at a higher risk of exposure include power and telephone technicians, couriers, van and truck drivers, postal employees, construction employees, surveyors, defence force personnel and police officers.
- 19.3 Harmful exposure levels of solar UVR are commonplace in Australia. The greatest exposure occurs from direct sunlight in the middle hours of the day during summer. However, harmful exposure can occur on cloudy days, when a person is shaded from direct sunlight and even during the winter months.
- 19.4 Limiting exposure to UVR in sunlight is important to minimise the risk of harmful health effects to employees and contractors in the performance of outdoor work.
- 19.5 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. [1](#)

PURPOSE

- 19.6 This Part aims to provide practical guidance to duty holders under the Act on ways to discharge their duty of care to employees and contractors at work and others at or near the workplace in relation to ultraviolet radiation in sunlight.

SCOPE

- 19.7 This Part applies to all employees covered by the Act who are exposed to solar UVR in the course of their work.
- 19.8 This Part does not apply to artificial sources of UVR.

DEFINITIONS

'UVR' – means the ultraviolet radiation of wavelengths between 100 and 400nm.

'Solar UVR' – means the ultraviolet radiation emitted by the sun.

'UV Index' – is a measure of the maximum daily level of solar ultraviolet radiation reaching the ground, based on the potential for skin injury.

'UPF rating' – means the material with a specified ultraviolet protection factor. The UPF indicates the percentage of UVR absorbed and transmitted by the fabric.

'EPF rating' – means the eye protection factor rating. The EPF has a numerical rating scale from 1 to 10, which indicates how well a lens blocks UVR.

‘SPF rating’ – means the sun protection factor rating. The SPF is a measure of the protection provided by sunscreens.

‘Photosensitising substance’ – means a substance, which can worsen the effects of UVR.

RESPONSIBILITIES OF EMPLOYERS

Identify hazards

19.9 Employers should identify all situations in which employees may be exposed to harmful levels of solar UVR. Harmful exposure can occur:

- a) while carrying out work tasks;
- b) during breaks;
- c) through open windows or glass;
- d) on cool or cloudy days;
- e) within very short periods of time, such as between 5 and 10 minutes; and
- f) in a variety of other circumstances.

Assess the risks

19.10 An employer should assess risks associated with exposure to solar UVR by considering:

- a) the time of day when employees are exposed to UVR (it is most intense between 10:00 am and 3:00 pm);
- b) the total amount of exposure occurring over the course of the day;
- c) the season as UVR levels are more intense during the summer;
- d) latitude as the closer the work location is to the equator there will be a corresponding increase in the intensity of UVR;
- e) altitude as UVR intensity increases around 4% with every 300m rise above sea level and stratospheric ozone depletion over Antarctica allows more UVR to reach the ground in southern parts of Australia;
- f) forecasted UV Index levels;
- g) the shade provided by the physical environment in which the work is carried out;
- h) reflective surfaces, for example:
 - (i) water;
 - (ii) reflective building glass;
 - (iii) white surfaces such as sand, rock, cement or snow;
 - (iv) unpainted corrugated steel or aluminium roofing that are part of the environment in which the work is carried out;
- i) the amount of protection provided by vehicle glass;
- j) the level of protection provided by sun-protective items already in use; and
- k) any photosensitising substances associated with the work.

19.11 There is no particular method for measuring exposure to UVR. As a minimum, employers should take into consideration the advice from the following organisations when assessing the risk of exposure to UVR:

- a) ARPANSA; and
- b) Cancer Council.

Implement risk control measures

- 19.12 Due to a number of uncontrollable variables associated with exposure to solar UVR it is not practical to apply set exposure limits, however employers should eliminate exposure to solar UVR in the workplace to the extent that is reasonably practicable.
- 19.13 Where elimination is not reasonably practicable, employers should minimise exposure by implementing a control strategy that combines a number of measures. Where employees may be exposed to solar UVR and photosensitising substances exposures to both should be minimised.
- 19.14 Employers should follow the hierarchy of control pyramid as detailed in Part 1 Risk Management to minimise exposure to UVR and should include, but not be limited to, the following.

Provide shade

- 19.15 Shade can be from permanent objects such as trees, buildings and other structures. In the absence of such objects, employers should provide shade with the use of canopies, tents, screens and other portable structures. Materials with a UPF of 50+ should be used where practicable.
- 19.16 Employers may use laminated front windscreens, tinted side and rear windows to reduce the amount of UVR entering a vehicle. Windows should be raised during periods of high UVR intensity.

Note: shade will only lessen exposure to solar UVR. Sunburn can still occur in shaded areas, due to the scattering of solar UVR by clouds and reflection from surfaces.

Schedule work to reduce exposure

- 19.17 Employers should reorganise work routines so outdoor tasks occur early in the day or late in the afternoon, when UVR is less intense.

Move the job indoors or into a shaded area

- 19.18 Employers may rotate employees and contractors between indoor and outdoor tasks to lessen the individual's total UVR exposure.

Provide personal protective equipment (PPE)

- 19.19 Employers should provide PPE that complies with AS/NZS 4399:1996 – *Sun Protective Clothing, with a UPF rating of at least 30+*. The clothing should cover as much skin as possible, preferably consisting of lightweight, comfortable long sleeved shirts with a collar and long trousers. Where this level of protection is not reasonably practicable, shirts with sleeves at least to the elbow and shorts at least to the knee should be chosen.
- 19.20 Employers should provide hats designed to afford maximum protection from the sun, such as broad brimmed (>7cm) hats made of fabric with a UPF of 50+. Where hard hats are required brims and neck flaps should be worn.

19.21 Employers should provide sunglasses that meet the requirements of AS/NZS 1067: 2003 – *Sunglasses and fashion spectacles*, have an EPF 10 rating, are preferably close fitting and wrap-around in design to afford the greatest eye protection.

Provide sunscreen

19.22 Employers should provide broad-spectrum water resistant sunscreen with an SPF rating of 30+ and it should be applied to areas of skin not covered by clothing. No sunscreen offers 100% protection from UVR and most people apply sunscreens at approximately half the required thickness and only achieve a third to a half of the sunscreen rating. Sunscreen should be:

- applied at a rate of about 1 teaspoon to each unprotected limb;
- applied to clean dry skin twenty minutes before going outside;
- reapplied every two hours, or more often. Factors such as thickness, absorption into the skin, sweating and contact with water should be taken into consideration as they can reduce the effectiveness of sunscreen; and
- SPF 30+ lip balm or zinc cream should be applied to lips.

Note: People with a natural suntan also need to apply sunscreen, as a tan does not provide any significant protection from UVR.

Provide information, training and supervision

19.23 Employers should provide information and relevant training for employees who are likely to be exposed to solar UVR in their work and those people responsible for organising outdoor work. Information and training should include:

- the nature of solar UVR, including seasonal and daily intensity variations as detailed in paragraph 19.10 of this Part;
- the harmful health effects of UVR;
- correct use of the control measures utilised in the work activity;
- protection from photosensitising substances, where applicable; and
- information on self-screening for skin cancer.

19.24 Employers should provide supervision to ensure compliance with control measures.

Monitor and review effectiveness of control measures

19.25 Employers should monitor and review the effectiveness of control measures to ensure that control measures are implemented as planned, are effective and that the control measures have not introduced new hazards or worsened existing hazards. Employers should consider:

- consulting with employees regarding the effectiveness and implementation of control measures and any concerns or difficulties employees may have experienced;
- measuring and reviewing the degree of compliance with control measures;
- monitoring sunburn rates from reported incidents;
- repeating the UVR risk assessment process to gain information on changes in UVR risk levels and whether controls are working; and
- reviewing and improving control practices and procedures.

RESPONSIBILITIES OF EMPLOYEES

19.26 Employees who may be exposed to UVR in the workplace should comply with measures to assess and control UVR exposure, including:

- a) making proper use of protective equipment provided by the employer;
- b) complying with administrative control measures; and
- c) participating in and making use of training to ensure their health and safety and that of other persons.

19.27 Employees should report to their employers any existing or potential problem in achieving compliance with control measures.

PART 20 – OCCUPATIONAL DIVING

INTRODUCTION

- 20.1 Occupational diving is diving in the course of employment. It comprises all diving work carried out as part of a business, a service that is for research or profit. Many organisations in the Commonwealth jurisdiction conduct diving work, for example the Royal Australian Navy, the Australian Federal Police, marine parks and Commonwealth Fisheries.
- 20.2 Diving is an activity that can have significant associated risks, due to hazards including dangerous animals, severe weather, cold water, strong currents and artificial or contaminated air supplies. These hazards can cause injuries, sunburn, hypothermia, hypoxia or carbon monoxide poisoning and changes in ambient pressure can lead to decompression illness.
- 20.3 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. [1](#)

PURPOSE

- 20.4 The purpose of this Part is to provide practical guidance on ways to manage the risks assessed as typical when conducting occupational diving work. This Part aims to assist the duty holder to comply with the Act.

SCOPE

- 20.5 This Part applies to all employers, employees, contractors and self-employed persons who undertake occupational diving work in the Commonwealth occupational health and safety jurisdiction.
- 20.6 This Part includes diving while breathing compressed air, snorkelling and free diving, as part of a work task.
- 20.7 It does not apply to people in the offshore petroleum industry, who are covered by the *Petroleum (Submerged Lands) Act 1967* and the *Petroleum (Submerged Lands) (Diving Safety) Regulations 2002*.

Note: Refer to ‘AS/NZS 2299.1:2007 – Occupational diving operations – standard operational practice,’ which provides further guidance on occupational diving.

DEFINITIONS

‘Actual bottom time’ – is a term used in common dive tables to represent the amount of time a diver spent underwater. This time begins upon descent and ends upon the beginning of ascent.

‘ADAS’ – The Australian Diver Accreditation Scheme (ADAS) is a Commonwealth Government not-for-profit diver training and accreditation scheme developed under the auspices of the Petroleum Sub-Committee of the Australian and New Zealand Minerals and Energy Council (ANZMEC).

‘Bottom time’ – has a variable definition – in square wave diving, the time between descending below the surface to the beginning of ascent. In multi-level diving, the time between descending below the surface and beginning the safety stop. Other definitions may apply depending on the specific type of diving.

‘Carbon monoxide CO’ – is an odourless, tasteless, highly poisonous gas given off by incomplete combustion of hydrocarbon fuels.

‘Carbon monoxide poisoning’ – refers to an illness from inhaling excess CO characterised by a range of symptoms such as headaches to unconsciousness and death.

‘Closed circuit’ – is a SCUBA system in which the exhaled gases are not released as exhaust; rather, they are filtered and recycled into the gas supply.

‘Competent person’ – has the meaning given by Part 20 of the Safety Standards Regulations and for the purposes of construction diving, a competent person must hold an Australian Diver Accreditation Scheme (ADAS) Diving Certificate which is relevant to the work being carried out.

‘Construction diving work’ – is underwater diving work to assemble, construct, industrial cleaning, maintain, demolish, dismantle, install, inspect, remove, repair, salvage, sample, search for, photograph, film, video, or make a sound recording of a thing, structure or part of a structure.

Construction diving work does not include underwater diving work for inspecting, glass cleaning, vacuuming, sampling, photographing, filming, videoing or making a sound recording for:

- a) entertainment or publishing industry;
- b) tourism;
- c) print and electronic media;
- d) art;
- e) protected heritage object or to decide the heritage status of an object;
- f) training to go recreational diving for the purposes listed;
- g) aquarium general care; or
- h) scientific research (see definition of Scientific Diving below).

‘Decompression’ – refers to the equalisation of gas in body tissues once they have been saturated with nitrogen.

‘Decompression illness (DCI)’ – refers to an acute illness resulting from the formation of bubbles in the blood or tissues following or during ascent or decompression. Symptoms include pain in or around a joint, an itch or a rash and localised swelling. Decompression illness may also be called decompression sickness, arterial gas embolism, DCI, the bends, the staggers, chokes and niggles.

‘Decompression schedule’ – is a specific decompression procedure for a given combination of depth and bottom time.

‘Decompression stop’ – is a specified time during ascent spent at a specific depth, for purposes of nitrogen off-gassing. When the stop is not mandatory, it is called a safety stop.

'Diver' – is a person diving as part of his/her work. A diver can be an employee, contractor or self-employed person.

'Diving Operator' – means a business or agency that has ownership of the diving operation/project.

'Diving operation' – is an operation consisting of one or more dives. A diving operation begins when a diver, or the first diver taking part in the operation, starts to prepare to dive. It ends when the diver, or last diver, taking part in the operation leaves the water, the chamber or environment in which the dive took place, and has completed any necessary decompression procedures. It includes any time taken for therapeutic recompression if that is necessary.

'Diving profile' – refers to the nature of the dive, for example, the depth, number of ascents and decompression stops.

'Diving project' – means a project consisting of one or more diving operations.

'Free diving' – means diving without the use of breathing apparatus such as a diving bell, self-contained breathing apparatus (SCUBA) or a snorkel.

'Hypoxia' – means the lack of oxygen.

'Recompression' – means a treatment for decompression sickness or air embolism, where an individual is reintroduced to a controlled high-pressure environment and gradually returned to normal pressure. This usually occurs in a pressurised chamber known as a decompression chamber.

'Repetitive dive' – is where more than one dive is made on the same day with some time spent at the surface between dives (surface interval).

'Restricted diving work' – is where the construction diving work is at a depth of more than 30m and/or requiring a decompression stop.

'Scientific diving' – is diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. Scientific diving does not include tasks associated with commercial diving such as rigging heavy objects underwater, inspecting pipelines; construction; demolition; cutting or welding or the use of explosives. Scientific diving is classified as occupational diving in Australia.

'Snorkelling' – means swimming with a snorkel and face mask.

'SSBA/Hookah' – refers to a surface-supplied compressed air apparatus, providing air to one or more divers through a hose, for use in shallow waters <30m.

'Underwater diving work' – refers to work carried out underwater while breathing compressed air, snorkelling or free diving.

RESPONSIBILITIES OF EMPLOYERS

Identify hazards

20.8 When conducting a risk assessment, an employer should ensure the process is carried out by a competent person and in accordance with the risk management principles of Part 1 of this Code of Practice.

20.9 This process should be conducted at the start of every diving project and repeated every time there is a significant change to minimise risk exposure. Significant changes include change in weather conditions, currents, underwater visibility or change of staff or a diver. A change of location or work activity may be a new diving project. The competent person should also decide on and implement control measures for each identified risk, in accordance with Safety Standards Regulation 1.06.

20.10 Employers should consider environmental factors such as but not limited to:

- a) strength and direction of wind;
- b) current, wave or swell height and tidal direction;
- c) visibility;
- d) entrapment hazards;
- e) depth at worksite;
- f) water temperature;
- g) time of day;
- h) underwater terrain;
- i) atmospheric temperature and humidity;
- j) contaminants, hazardous substances, biological pollutants or explosives;
- k) presence of dangerous marine animals;
- l) water inlets; and
- m) other hazards peculiar to the dive location.

20.11 Employers should also consider task related factors such as:

- a) the complexity of the diving task or the presence of a component which is non-routine in nature which may increase the level of risk associated with a diving operation;
- b) diving operation and emergency response capability;
- c) isolation of the dive site; and
- d) shipping movements.

20.12 Employers should also consider the hyperbaric and physiological factors such as:

- a) frequency of diving, including repetitive diving and multi-day diving;
- b) depth of dive;
- c) duration of dive;
- d) breathing gas;
- e) exertion required to reach dive site or conduct task;
- f) speed of ascent;
- g) excessive noise;
- h) immediate pre-dive fitness (prior dives, prior physical exertion, fatigue, recent illness); and
- i) altitude exposure.

20.13 Employers should also consider associated hazards that could affect the health and safety of employees or contractors such as:

- a) manual handling;
- b) boat handling;
- c) dive platforms;
- d) crane operation;
- e) rigging; and
- f) emergency response factors inclusive of the location and availability of appropriate emergency response systems and the emergency procedures.

Assess the risks

20.14 When assessing risks employers should consider the following:

- a) decompression illness from ambient pressure changes and extended periods of diving;
- b) hypoxia or carbon monoxide poisoning from inappropriate or poorly maintained equipment or incorrect mixture of air;
- c) overexposure, sunburn, heat stress/stroke and the risk of longer term health effects such as skin cancer from environmental conditions; and
- d) injuries from vessels underway, dangerous marine animals, non-routine occupational tasks such as retrieval of entangled equipment or associated activity factors such as rigging and manual handling.

20.15 Employers should consider the factors that contribute to decompression illness when assessing the risk such as:

- a) vigorous exercise during or after decompression;
- b) poor physical fitness and obesity;
- c) water temperature, for example, cold water and hot showers;
- d) dehydration;
- e) increased carbon dioxide pressures;
- f) alcohol and/or drug consumption including prescription drugs;
- g) physical injury;
- h) high risk dive profiles;
- i) rapid and multiple ascents;
- j) repetitive and multi-day diving; and
- k) altitude exposure, particularly post dive if travelling by air.

Note: The use of SSBA (Hookah) by divers in the Commonwealth jurisdiction is widespread inclusive of the construction industry. Sea urchin, abalone, tropical lobster and most other commercial dive targeted species are harvested by divers using surface supplied compressed air (by hookah). Carbon monoxide (CO) is the single largest cause of poisoning in diving due to practices involving unattended air supplies or inappropriately mounted or damaged air intake hoses. The largest source of CO is exhaust fumes from internal combustion engines supplying pressurised air to divers (by hookah).

- 20.16 Employers should ensure that, when assessing the risk of CO poisoning, all factors are considered. This includes the wind direction as well as an assessment of the equipment for all known hazards (for example, ignition and flashing from poorly maintained compressors).
- 20.17 When using Hookah systems, employers should ensure that the air intake is not compromised by inappropriate positioning and that the compressors are monitored during the dive operation.

Implement general risk control measures

Ensure medical fitness

- 20.18 Employers should ensure that their divers are assessed as medically fit to dive. A diver should be certified by a medical practitioner as fit for compressed gas diving, or fit to undertake a strenuous activity such as snorkelling, to ensure that the diver does not suffer any negative health effects from the activity.
- 20.19 Higher risk diving profiles include profiles that routinely require decompression stops, multiple ascents, dives below 30m or decompression using gases other than air. An employer should:
 - a) ensure the diving medical practitioner is aware of any higher risk diving profiles likely to be undertaken by the diver for whom they provide the certificate;
 - b) view the diver's current, original medical certificate of fitness to dive and ensure any work carried out is within any limits stated in the certificate;
 - c) keep the certificate or a copy for at least a year after the certificate expires; and
 - d) request divers to advise them of any conditions, such as colds, ear infections, hangovers or other contradictions to diving.

Ensure technical qualifications

- 20.20 Employers should ensure their divers are qualified and competent to undertake occupational diving work. A diver should be trained to carry out any tasks required in the occupational diving project safely.
- 20.21 For construction diving work, an employer should hold a proof of competency certificate, from an accredited diving scheme (such as ADAS), which is relevant to the work being carried out and ensure that the employee or contractor is a competent person for the type of work.
- 20.22 For construction diving, the employer should ensure that the work is within any restrictions stated in the proof of competency certificate. The proof of competency certificate should be kept for at least one year after the diving work has been completed.
- 20.23 For any diving work, an employer should not allow a person to dive unless they have acquired, through training, qualifications or experience, the capacity to do the work in a safe manner. The employer should ensure that the diver is competent and can safely perform any activity that is reasonably likely to be necessary, while the diving operation is in progress.

20.24 When determining the appropriate level of competency employers should consider the following factors:

- a) diving environment;
- b) diving equipment and breathing gas to be used;
- c) the decompression schedule to be used;
- d) tasks to be undertaken;
- e) any tools to be used; and
- f) any other hazards associated with the task.

Implement specific risk control measures

20.25 Employers should control the risk of injury and equipment damage from vessels underway by adopting appropriate control measures such as:

- a) propeller guards;
- b) ensuring divers are equipped with appropriate emergency breathing supplies;
- c) each diver should carry a knife at all times when diving. The knife should be worn in such a position that it will not obstruct any discarded equipment (for example, released weights);
- d) buoys or markers to separate diving activity from vessel activity;
- e) appropriately sized and displayed flags and lights to indicate diving activity;
- f) ensuring relevant surface persons maintain a watch for approaching vessels; and
- g) appropriate communication systems, which allow contact to be made with the approaching vessel in a timely manner.

20.26 Employers should ensure the control of the risk of decompression illness by:

- a) encouraging their divers to avoid the factors that contribute to decompression illness; and
- b) selecting and using appropriate internationally recognised decompression schedules in dive tables or dive computers, such as those referred to in *AS/NZS 2299.1:2007 – Occupational diving operations – Standard operational practice* manual. This Standard has been developed for diving activities using air or oxygen-nitrogen mixtures where oxygen concentrations are in the range of 20% to 22%. This Standard does not apply to diving work beyond 50m.

Note: The Royal Australian Navy or the Defence and Civil Institute of Environmental Medicine (DCIEM), Canada has further guidelines for information.

20.27 Employers should control the risk of hypoxia by ensuring breathing air used in diving operations:

- a) is free from objectionable or nauseating odour;
- b) contains not less than 20% and not more than 22% by volume of oxygen;
- c) contains not more than 11mg/m³ of carbon monoxide at 15°C and 100 kPa (10 ppm by volume);

- d) contains not more than 900 mg/m³ of carbon dioxide at 15°C and 100 kPa (480 ppm by volume);
- e) for high pressure cylinders, contains not more than 100 mg/ m³ of water at 15°C and 100 kPa (130 ppm by volume);
- f) contains not more than 1 mg/m³ of oil at 15°C and 100 kPa when sampled from a cylinder filled to a pressure of at least 12 MPa; and
- g) when supplied from a compressor – ensure that the compressor is not used for diving operations unless the compressor has undergone a test to ensure that the compressed air satisfies the requirements specified in items (a) through to (f) above. Testing should occur within the six-month period preceding the operations and every six months during the operation as appropriate.

20.28 Employers should ensure that open circuit scuba is not used when:

- a) diving to a depth of over 30m;
- b) using a tool powered by anything other than a person;
- c) doing work requiring a decompression stop;
- d) when there is risk of being injured or trapped as a result of anyone's use of mechanical lifting equipment; or
- e) when the diver is underneath something that would require the diver to move sideways other than at an upward angle when ascending.

20.29 Employers should ensure work below 50m is not carried out using SSBA. These diving operations should involve the use of a closed diving bell and a suitable mixed gas breathing medium or a manned submersible craft.

20.30 Employers should control the risk of injury or carbon monoxide poisoning by ensuring that:

- a) inspection procedures are in accordance with the manufacturer's instructions and incorporate a list of essential pre-dive checks. This list should be provided and maintained at each dive location;
- b) all plant and equipment used in connection with diving projects is operated, maintained and serviced in accordance with the manufacturer's instructions and is:
 - (i) not altered, modified or changed in any way that might impair the safe and efficient operation of the equipment;
 - (ii) not used if it can be demonstrated that such plant or equipment is not in a safe working order; and
 - (iii) cleaned (and disinfected if necessary), dried and stored in a dedicated area to prevent deterioration, contamination or transmission of disease; and
- c) all potential sources of carbon monoxide are identified and that none gets into the diver's air supply. Safe level of carbon monoxide is under 11mg/m³ of carbon monoxide at 15°C and 100 kPa (10 ppm by volume).

Monitor and review control measures

20.31 When controlling the identified risks employers should ensure that a competent person:

- a) implements control measures to prevent or minimise exposure to the risks;
- b) maintains the risk control measures while the identified risk exists;
- c) monitors and reviews the effectiveness of the control measure;
- d) ensures that work stops immediately each time there is a significant change and that work is not restarted until a competent person, who is out of the water, has carried out the risk assessment process again;
- e) devises a more effective control measure to prevent or minimise exposure to the identified risk if the control measure is found to be ineffective;
- f) keeps a written record of each time the process is carried out; and
- g) keeps the written record for at least one year after the last day of work.

Keep written records

20.32 The employer should ensure that the written record of the risk assessment process contains the following:

- a) the date of the risk assessment;
- b) the work start dates, any restart date and the completion date;
- c) the type of work;
- d) the location of the dive site;
- e) the name of each person at the dive site who will be involved in the work;
- f) each hazard identified;
- g) the assessment of the risk of death, injury or illness that may result from the identified hazard;
- h) the control measure in place;
- i) any incident that occurred at any time; and
- j) keep the record for at least a year after the last day of work.

DIVING SUPERVISOR RESPONSIBILITIES

20.33 Employers should appoint a diving supervisor to assist in risk control. An employer should ensure that a diving supervisor is present at every dive operation. A diving supervisor should not dive while on duty as a diving supervisor. If SSBA is in use and the vessel is working 'live', the diving supervisor should not also be the boat handler.

20.34 An employer should ensure that the diving supervisor is at least 18 years of age and that for construction diving, the diving supervisor holds an ADAS or similar qualification.

20.35 The responsibilities, duties and competencies of diving supervisors should include:

- a) complete working knowledge of the Dive Plan and associated tasks;
- b) knowledge of any signals and communications in use;
- c) knowledge of any dive tables or dive computers in use;

- d) knowledge of all diving plant and equipment in use;
- e) knowledge of first aid and oxygen administration, except where a second person with such training and knowledge is present and remains at the surface; and
- f) maintenance of a constant lookout over any divers in the water.

Note: Except where authorised by the diving supervisor, the number of Dive Teams allowed per surface lookout is one. Where conditions do not permit constant, easy observation of a dive team, then surface marker buoy/s shall be used to mark the site at which the divers are working.

20.36 A diving supervisor should not:

- a) leave the boat at any time other than in an emergency; or
- b) carry out any activities in the boat such as reading, sleeping or fishing, which may divert his/her attention from the responsibilities set out above.

20.37 A diving supervisor should report to the employer:

- a) the death of, or serious personal injury to, a person;
- b) the incapacitation of a person that prevents the person from performing work for a period of 3 or more days;
- c) a decompression illness or a pulmonary barotrauma or a case of omitted decompression;
- d) an occurrence where the standby diver is deployed for an emergency, except for the purposes of training, exercises or drills; or
- e) a failure of life support equipment or man-riding equipment (winch and riding belt).

Implement emergency plans

20.38 When establishing effective emergency plans, employers should ensure that the plans exist in writing at every dive site. The written emergency plans should include:

- a) first aid procedures;
- b) process for the rescue of a diver;
- c) evacuation procedures including evacuation to the nearest recompression facility; and
- d) missing person procedures.

20.39 An employer should ensure:

- a) the plan is made available to all relevant persons;
- b) that effective and efficient rescue and resuscitation procedures have been developed; and
- c) that a rescue drill is performed at least once a year to assess and maintain the level of competency required to carry out the emergency plans.

First aid and oxygen provision

20.40 An employer should ensure:

- a) a first aid kit is available at the dive site (refer to Part 2 First Aid of this Code of Practice). The contents of the kit should be sufficient to cater for the injuries that may occur. Consideration should also be given to the number of divers, distance from emergency services and the nature and type of underwater diving which is being undertaken;
- b) a person on the surface at the dive site should hold current training in diving first aid;
- c) an oxygen system capable of providing a spontaneously breathing person with an inspired oxygen concentration of or very near 100% is available at the dive site. The equipment should also facilitate oxygen enriched artificial ventilation of a non-breathing person. The person administering the oxygen should have received training in the correct use of the system;
- d) oxygen equipment and oxygen levels are checked at the start of any dive operation by a person who has received training to carry out the checks correctly. Any other maintenance of the oxygen system should be carried out by an authorised service agent; and
- e) sufficient oxygen is available to supply the injured person taking into account the locations of the dive site and access to medical facilities.

Rescue of a diver procedures

20.41 When developing effective rescue procedures an employer should consider the following factors:

- a) the size, type and location of the dive site;
- b) the appropriateness of rescue procedures to the dive site;
- c) the adequacy of the communication system so that clear messages and information can be relayed to the appropriate personnel with minimum delay;
- d) the location of rescuers and their skills and fitness levels. Rescuers should be skilled in diving and the management of diving related incidents, injuries and illness. They should also have a level of fitness that ensures their own health and safety is not compromised and be suited and equipped to enter the water quickly;
- e) the availability, locality and appropriateness of rescue equipment such as rescue boards, tenders, floatation devices and ropes. Any rescue vessels or equipment should be maintained in a ready condition and positioned so they can be used to reach a diver in distress with minimum delay; and
- f) access to Recompression Chambers/Hyperbaric Units for treatment for decompression illness according to the Australian Standard AS/NZS 2299.1:2007 – *Occupational diving operations – standard operational practice*.

Maintain a dive safety log

20.42 An employer should ensure that a dive safety log is kept about each dive (usually by the dive supervisor). A dive safety log provides required information about dives. The dive log is a record of the diving that can be used as a tool to monitor

and review the occupational diving work as well as assist in decompression management. A dive safety log should contain:

- a) the date to which the entry relates;
- b) the diving contractor's name and address;
- c) the name of the diving supervisor or the names of the diving supervisors who supervised the operation;
- d) the location of the diving operation and if the diving was done from a vessel or installation, the name;
- e) the purpose of the diving operation;
- f) the name of each person who took part in the operation (whether as a diver or as a member of a dive team);
- g) the name of each person who took part as a diver or stand-by diver in the operation;
- h) for each diver:
 - (i) the breathing apparatus and breathing mixture used;
 - (ii) the times at which the diver left the surface, reached the bottom, left the bottom and arrived at the surface again, and the total bottom time; and
 - (iii) the maximum depth reached;
- i) details of any emergency or incident of special note that happened during the operation;
- j) the decompression schedule followed including details of the depths and the duration at each depth during decompression;
- k) details of any decompression illness and any treatment given;
- l) details of any significant defect or significant failure of diving plant or equipment used in the operation;
- m) details of any environmental factors relevant to the operation; and
- n) anything else that is likely to affect the health or safety of anybody who took part in the operation.

20.43 An employer should ensure the dive safety log is kept for 7 years after the last entry in it.

RESPONSIBILITIES OF EMPLOYEES

20.44 Employees have a duty under the Act to:

- a) avoid risks to themselves and others through either actions or omissions;
- b) follow safety instructions while using any substances or equipment; and
- c) cooperate with employers so they can fulfil their duties.

20.45 When ensuring medical fitness to dive, a diver should:

- a) obtain a medical certificate of fitness to dive and ensure that the medical practitioner is aware of any higher risk diving profiles they are likely to undertake;

- b) only conduct diving work that is within any limits stated in the certificate; and
- c) not dive while suffering temporary conditions such as colds, ear infections or hangovers that are contraindicated to diving.

20.46 When ensuring technical competence to dive, a diver should obtain a statement of attainment from an ADAS or similar accredited training organisation in relation to training that is relevant in a substantial way to the work. The statement of attainment from the training organisation should be within the registered training organisation's scope of registration. This is to ensure that the diver is able to carry out the work, including any special requirements of the activities, safely.

20.47 A diver should read and understand the record made of the risk assessment. Each time there is a significant change, the diver is not to start work until they have read, understood and signed the new record of the risk assessment.

20.48 Divers should check the equipment they intend to use before each dive to ensure its operational integrity and efficiency.

20.49 A diver should be familiar with the emergency plans.

20.50 A diver should complete a dive safety log for his/her own records, which should include such information as:

- a) date of dive;
- b) operation number of dive;
- c) location and nature of dive;
- d) environmental conditions;
- e) dive operation such as:
 - (i) time in and time out;
 - (ii) max depth;
 - (iii) bottom time;
 - (iv) decompression tables followed by diver; and
 - (v) depth and duration of safety stop;
- d) emergency or incident that occurred during dive; and
- e) any diver discomfort or injury.

PART 21 – SPRAY PAINTING

INTRODUCTION

- 21.1 Spray painting is painting using a device that sprays paint. The spray painting process is used to paint vehicles, furniture, ships, aircraft, buildings, structures and machinery. Spray painting may not be considered the primary task and may be incorporated as part of another occupation.
- 21.2 The types of hazards associated with spray painting include toxic vapours and mists from paint ingredients, thinners, solvents, lacquers, degreasers, resins, surface preparation products, dusts from sanding, rust converters and rust removers. Some substances cause skin irritations and allergic reactions. Aside from the health hazards, there is a potential for fire and explosion when combined with other hazardous substances. Associated hazards include the use of plant, electrical use, and paint injection from airless guns, manual handling and noise.
- 21.3 The extensive use of paints across industries exposes a significant number of people to the harmful effects of paints. The consequences of this exposure can range from acute short term irritant symptoms to debilitating long term carcinogenic illnesses such as ‘Painter’s Syndrome’ and kidney damage.
- 21.4 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. [1](#)

PURPOSE

- 21.5 The purpose of this Part is to provide practical guidance to employers on how to meet their obligations to employees and contractors at work and other persons at or near the workplace under the Act and the Safety Standards Regulations as they apply to spray painting.

SCOPE

- 21.6 This Part is concerned with the safe use and handling of hazardous substances and the operation of high-powered equipment. It should be read in conjunction with Part 4 Plant, Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods of the Safety Standards Regulations.
- 21.7 This Part applies to all industries in the Commonwealth occupational health and safety jurisdiction and to non-Commonwealth licensee organisations where occupational spray-painting is carried out.
- 21.8 This Part does not contain guidance on risk management of associated hazards such as manual handling and noise and employers should refer to Part 3 Noise and Part 5 Manual Handling of the Safety Standards Regulations and the relevant Parts of this Code of Practice.

DEFINITIONS

‘*Electrostatic spray painting*’ – means spray painting using an electrically charged spray painting substance.

'Painter's syndrome' – means chronic toxic encephalopathy with disturbances in concentration and memory loss reported after heavy exposure to solvents for more than 10 to 20 years.

'Spray booth' – means a structure that is designed to enclose or otherwise accommodate articles being spray painted. The spray booth controls hazards such as dust, mist, aerosols, fumes or flammable vapours generated by spray painting. The spray booth has the appropriate exhaust ventilation to provide for the prevention of ignition sources and is a structure that is used only for spray painting.

'spray painting' – means the process of spraying a spray painting substance that has been converted into a mist or aerosol onto a surface whether for decoration, preservation, insulation or otherwise.

'spray painting substance' – means a substance used in spray painting and includes, but is not limited to, paints, powders, lacquers, paint removers, rust converters and removers, surface removers, surface preparation products, resins, solvents and thinners.

MANUFACTURERS OF BOOTHS

21.9 Manufacturers should ensure that the booth is:

- a) designed and constructed for safe use;
- b) prevents the escape of hazardous substances; and
- c) tested for compliance with the safety requirements.

21.10 Manufacturers and importers should ensure that the booth has been fitted with an effective ventilation system that incorporates:

- a) a filtration system to remove airborne residue produced during a spray painting process; and
- b) an exhaust capture system.

SUPPLIERS OF BOOTHS

21.11 The supplier of a spray-painting booth should take all reasonably practicable steps to ensure that information is given to the employer about:

- a) the use for which the booth has been designed and tested;
- b) safe use of the booth; and
- c) the maintenance procedures for the booth, including the filters.

RESPONSIBILITIES OF EMPLOYERS

21.12 Employers must, as far as is reasonably practicable, protect the health and safety of all employees and contractors at work and persons at or near the workplace. The Safety Standards Regulations set out the obligations in relation to dangerous goods, hazardous substances, manual handling, noise, and plant.

21.13 Employers must refer to the chemical MSDS and should refer to the labelling information provided when assessing the hazards and risks associated with exposure (Safety Standards Regulation 6.17).

21.14 Employers should refer to Part 11 Storage and handling of dangerous goods and part 12 Hazardous substances and any other relevant part of this Code of Practice for further guidance.

Identify hazards

21.15 Employers should obtain an MSDS from the supplier of paints and other hazardous substances to determine the particular hazards. The hazards associated with spray painting can be categorised into three stages:

- a) Preparation including:
 - (i) paint and surface preparation; and
 - (ii) mixing and pouring;
- b) the spray painting operations and work practices; and
- c) the clean up, such as cleaning, maintenance and storage of the hazardous substances.

21.16 Employers should ensure that all the hazards have been identified. This includes:

- a) identification of all chemical substances, paints, solvents, dusts, powders and resins that are used in the spray painting process in the workplace;
- b) identification of all flammable substances;
- c) inspection of the electrical equipment;
- d) the type of plant and equipment used;
- e) any manual handling tasks; and
- f) the work processes involved.

Assess the risks

21.17 Employers should make a critical appraisal of the use of all hazardous substances in the workplace and determine the potential risk of exposure to employees. In assessing the number of employees who are at risk of exposure to hazardous substances the employer should consider:

- a) those employees engaged in spray painting process;
- b) those employees who could be affected because their work area is in the proximity of the spray painting booth or area; and
- c) other persons near the work area such as contractors, cleaners and maintenance personnel.

21.18 Employers should assess the risk to employees by:

- a) assessing the frequency and duration of exposure to the spray painting process;
- b) reviewing the work patterns;
- c) determining the atmospheric levels in the breathing zone of exposed employees;
- d) analysing the collated results of atmospheric monitoring; and
- e) analysing the biological monitoring results, of employees spray painting lead based hazardous substances, over the 12 months prior to the assessment.

Implement risk control measures

21.19 Employers must ensure that the exposure of employees to atmospheric concentrations of hazardous substances does not exceed the recommended national exposure standard (Safety Standards Regulation 6.19).

21.20 Employers should endeavour to reduce the exposure to as low a level as is reasonably practicable.

21.21 When the risk assessment shows that there is a risk to health or safety the employer must refer to Part 6 Hazardous Substances of the Safety Standards Regulations and should refer to the relevant parts of this Code of Practice when:

- selecting appropriate measures to achieve and sustain control;
- ensuring that these hazard control measures are properly used and maintained; and
- arranging induction and training.

Use a Spray Booth

21.22 An employer should ensure that spray painting is carried out in a spray booth unless:

- the painting consists of minor spotting or touch-up operations; or
- the painting is carried out on plant or items that are fixed or too large to move into a booth.

21.23 When the booth is in operation, an employer should ensure that:

- no person is in the spray booth during spray painting other than the person performing the spray painting; and
- any person in a spray booth during spray painting is wearing appropriate personal protective equipment (PPE).

21.24 An employer should ensure that the booth's ventilation system can produce and maintain the air movement at a safe level. The safe level is dependent on the type of booth and is calculated by determining the total air movement averaged over the area of the booth. This includes:

- for a full down draft booth – not less than 0.3 metres per second;
- for a booth used only for electrostatic spray painting – not less than 0.4 metres per second; or
- for any other booth – not less than 0.5 metres per second.

21.25 Employers should ensure that the air movement is measured:

- when the booth is empty;
- during the booth's spray cycle;
- in the area of the booth where the painting is done; and
- for a booth that is not fully contained or enclosed – at the entry to the booth where the internal environment commences.

Maintaining a spray painting booth

21.26 The employer should ensure the booth is:

- a) regularly inspected by a competent person to ascertain whether the booth can be used safely and without risk to health; and
- b) appropriately maintained by a competent person.

21.27 When assessing the regularity of the inspections employers should give consideration to:

- a) the inspection intervals recommended by the manufacturer, importer, or supplier of the booth;
- b) the types of spray painting processes done in the booth;
- c) how often the booth is used;
- d) the types of hazardous substances; and
- e) the volume of spray painting and hazardous substances to be used in the booth.

Ensure that spray painting outside spray booths is safe

21.28 Employers should use spray-painting booths unless it is not reasonably practicable to do so. This may occur when:

- a) the shape, size or weight of the article prevents it from being moved easily;
- b) it does not fit into a booth (for example, ships and aircraft);
- c) the painting is infrequent; or
- d) the operation is minor (for example, spot painting).

21.29 An employer should ensure that when spray painting outside a spray-painting booth is necessary, the process is carried out in the open air away from structures, people and processes. Where practicable this should be 6 metres from every building and from every other item or structure, which might obstruct ventilation. Employers should ensure that the spray painting:

- a) is effectively isolated from every other process in which persons are employed (a separation distance of 6 metres measured in any direction from the place at which the spray painting substance is being applied);
- b) is effectively isolated from all plant, machinery and equipment that is or might be a source of ignition (a separation distance of 2 metres measured vertically above and 6 metres measured in all other directions from the place where the spray painting substance is being applied); and
- c) effective isolation procedures are in place to prevent access, such as signs and physical barriers that will depend on the risk assessment.

21.30 If it is not reasonably practicable to spray paint in the open air, the employer should ensure that the spray painting is carried out in a place that is adequately ventilated (by natural or mechanical ventilation) and that:

- a) the spray painting is effectively isolated from every other process in which persons are employed (refer to paragraph 21.29(a) for the guidance on separation zones);
- b) is effectively isolated from all plant, machinery and equipment that is or might be a source of ignition (refer to paragraph 21.29(b) for guidance on separation zones); and

- c) effective isolation procedures (refer to paragraph 21.29(c)).

Note: Spray-painting is not effectively isolated if a substance from the spray painting can be inhaled by a person engaged in another process. Isolation from an ignition source is not effective if there is a risk that a substance from the spray painting will be ignited by a source of ignition from or associated with nearby plant, machinery or equipment.

Ensure electrical safety

21.31 Employers should ensure that all electrical equipment used in the spray painting workplace complies with Part 10 Electricity of the Safety Standards Regulations and should also refer to the Australian Standard AS 2381.1:2005 – *Electrical equipment for explosive atmospheres – selection, installation and maintenance – general requirements*. This Standard specifies the general requirements, additional to those required for basic electrical safety, for the selection of electrical equipment, instruments and associated equipment. It also outlines safety requirements for installation and maintenance to ensure safe use of electrical equipment in hazardous areas where flammable materials are generated, prepared, processed, handled, stored or used.

Ensure electrical safety when electrostatic spray painting is used

21.32 Employers should ensure that the Safety Standards Regulations Part 10 Electricity is followed and that electrostatic equipment is operated by competent and trained personnel in accordance with the safety precautions outlined in the *Australian Standard AS 2268:1979 – Electrostatic paint and powder spray guns for explosive atmospheres*. This Standard includes appendices, which recommend conditions for the use of flammable paints, or powders that apply to paint or powder spray areas and the use of flammable liquids.

21.33 Employers must refer to the Safety Standards Regulations in Part 8 Storage and Handling of Dangerous Goods to ensure that, when electrostatic spray painting is undertaken, there is effective management of the electrical ignition source by earthing and isolation of the electrical equipment and measures are in place to prevent any electrostatic build up.

21.34 To implement effective control measures, the employer should ensure that all the electrostatic spray painting equipment is provided with automatic controls that operate immediately to disconnect the power supply to any high voltage transformer, if safety is compromised. These automatic controls should include:

- a) an audible warning of stoppage in the event of a failure of the ventilation system or stoppage of any conveyor carrying objects through the high voltage electric field used in the process;
- b) if the operator is holding a hand-held device – an effective earth of the following items:
 - (i) the handle of the device; and
 - (ii) the article being painted;
- c) if the painting is carried out in a spray booth – the following:
 - (i) all metal work of the booth and all metal articles inside the booth or within 2 metres of the booth must be earthed;

- (ii) there should be clearly legible warning notices bearing the words 'DANGER – HIGH VOLTAGE' on the equipment used to carry out electrostatic spray painting; and
- (iii) the equipment used to carry out electrostatic spray painting is not used unless the exhaust system is in operation.

Provide Personal Protective Equipment (PPE)

- 21.35 Where a safe oxygen level cannot be maintained or the airborne contaminants cannot be reduced to safe levels (refer to the exposure standards in Part 6 Hazardous Substances of the Safety Standards Regulations), the employer must ensure that persons carrying out spray painting wear appropriate PPE.
- 21.36 Employers should refer to the Safety Standards Regulations Hazardous Substances Part 6 and paragraphs 12.44 – 12.48 of this Code for the provision and use of PPE.
- 21.37 Employers should ensure that PPE is used in conjunction with other more effective control measures designed to control the risk at the source.
- 21.38 Employers should ensure that the PPE is:
 - a) provided for each person;
 - b) suitable for the task;
 - c) correctly used;
 - d) maintained according to the manufacturer's directions;
 - e) readily available; and
 - f) stored correctly.
- 21.39 Employers should ensure that, if PPE is worn for long periods, scheduled rest breaks are programmed to prevent heat stress.

Provide health surveillance

- 21.40 Employers should periodically assess the health of persons who are exposed to hazardous substances according to the requirements of Part 6 Hazardous Substances of the Safety Standards Regulations.

Provide education and training

- 21.41 Employers must ensure that employees receive education and training about the safety precautions associated with the manufacture, use, handling and storage of hazardous substances and dangerous goods in accordance with the requirements under Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods in the Safety Standards Regulations.
- 21.42 Employers should ensure that employees receive education and training on the safe use, handling, maintenance and storage of spray guns and PPE.

Maintain records

- 21.43 Employers must ensure that hazardous substances are listed and kept up to date in the workplace register of hazardous substances according to the Safety Standards Regulation 6.14.

21.44 The employer should maintain accurate records for each employee subject to health surveillance. In particular, when an employee is medically removed because of a lead-risk job the records should include:

- a) the name, sex and date of birth of the employee;
- b) the date of each occasion that the employee was removed from a lead-risk job and the blood lead level reached;
- c) the corresponding date on which the employee was returned to a lead-risk job; and
- d) a brief description of how each removal was accomplished.

Note: Refer to Part 17 Inorganic Lead of this Code of Practice and Part 6 Hazardous Substances of the Safety Standards Regulations for guidance on the use of lead based paint.

RESPONSIBILITIES OF EMPLOYEES

21.45 Employees should assist employers comply with the requirements of Part 8 Dangerous Goods and Part 6 Hazardous Substances of the Safety Standards Regulations to ensure the health and safety of persons at or near spray painting activities in the workplace.

21.46 Employees have a responsibility to ensure that they have attended the required training for the use, handling and storage of hazardous substances and that they abide by the training provided and the policies and procedures on spray painting safety.

21.47 Employees should use the PPE as directed by the supervisors and follow the manufacturers' instructions.

21.48 Employees should report to their supervisor:

- a) any suspected breakdown of the work practices;
- b) symptoms of exposure to lead and lead product poisoning;
- c) PPE they believe to be defective; and
- d) any employee demonstrating non-compliance with policies and procedures and any misuse of equipment.

PART 22 – ABRASIVE BLASTING

INTRODUCTION

22.1 Abrasive blasting is a procedure used for cleaning surfaces such as steel, bricks and cement for the removal of rust, scale, old paint, graffiti or other matter, before the application of a protective coating.

22.2 Hazards associated with abrasive blasting include the use of hazardous substances (such as copper, aluminium oxide, nickel and zinc slag) in the blasting process creating inspirable and respirable dusts. Other hazards are associated with tasks involving the use of plant and equipment.

22.3 The prime risk to health over time in abrasive blasting is from the atmospheric contaminants. The likelihood of injury and diseases caused by materials being abraded is significant because this activity produces high concentrations of contaminated respirable dust.

22.4 Prolonged inhalation of crystalline silica can cause silicosis, heavy concentrations of iron oxide from iron castings, lead from toxic metal, mercury, arsenic, zinc and cadmium can be sources of chronic respiratory disease.

22.5 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. [1](#)

PURPOSE

22.6 This Part provides guidance to duty holders on how to meet the requirements of the Act with regard to protecting the health and safety of employees and persons at or near the place of work where abrasive blasting is carried out.

SCOPE

22.7 This Part applies to all places of work where abrasive blasting is performed, where abrasive blasting products and equipment are used or stored and where processes associated with abrasive blasting are undertaken.

22.8 This Part should be read in conjunction with the Safety Standards Regulations Part 3 Occupational Noise, Part 6 Hazardous Substances, Part 7 Confined Spaces and Part 8 Storage and Handling of Dangerous Goods.

DEFINITIONS

'Abrasive blasting' – means the process of cleaning, smoothing, roughening, cutting, preparing or removing the surface, or part of the surface, of any article or building. It can be by means of blasting, blowing, throwing or otherwise propelling a stream of abrasive substance against the article or building including the propelling of an abrasive substance by means of compressed air, steam or water at a high pressure.

'Abrasive blasting enclosure' – means a structure that is designed to:

- a) enclose or otherwise accommodate articles undergoing abrasive blasting;
- b) isolate or minimise hazards of dusts or debris generated by abrasive blasting;

- c) provide for the prevention of ignition sources;
- d) safely filter and discharge any exhaust ventilation to a suitable point outside the workplace; and
- e) be used only for abrasive blasting.

'Atmospheric contaminants' – atmospheric contaminants are determined in accordance with the “*Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC: 1003 (1975)] and the ‘*Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC: 3008 (1995)]’.

'Abrasive substance' – means any substance used as an abrasive for abrasive blasting. It can include metal shot, grit or slag whether or not included in water or some other liquid or steam.

'Inspirable dust' – means any dust that may be inhaled into the upper respiratory tract.

'MSDS' – means Material Safety Data Sheet.

'Respirable dust' – means the dust that is small enough to be inhaled into the lungs. This can result in permanent scarring of the lung tissue.

RESPONSIBILITIES OF EMPLOYERS

- 22.9 Abrasive blasting is used in a wide range of industries and employers must ensure that they do not use prohibited substances listed in Schedule 1A Carcinogenic Substances to the Safety Standards Regulations. If use of hazardous substances is required, it must be in accordance with Schedule 1 and Schedule 2 to the Safety Standards Regulations and meet the relevant exposure standards.
- 22.10 Employers must ensure that the hazard identification process is comprehensive with reference to the chemical MSDS and relevant information and labelling provided by the manufacturer in accordance with Part 6 Hazardous Substances and Part 8 Storage and Handling of Dangerous Goods of the Safety Standards Regulations.
- 22.11 Employers should also refer to the relevant Parts of this Code of Practice (for example, Part 11 Storage and handling of dangerous goods and Part 12 Hazardous substances) for further guidance.

Identify hazards

- 22.12 Inhalation of inspirable and respirable atmospheric contaminants is the major hazard associated with abrasive blasting and employers should consider a number of factors when identifying hazards. These include:
 - a) the abrasive medium used;
 - b) the surface being treated;
 - c) the size of the dust particles;
 - d) whether the dust particles are inspirable or respirable;
 - e) whether the area where the abrasive blasting is carried out is considered a confined space;

- f) how easily the abrasive material breaks down; and
- g) the amount and size of particulate produced and able to be projected towards a person.

22.13 Employers should consider the associated hazards such as occupational noise, manual handling, working in confined spaces, slips, trips and falls, vibration and heat exposure and refer to the specific requirements in the Safety Standards Regulations and the relevant Parts of this Code of Practice.

Assess the risks

22.14 Employers should assess the risk factors associated with the dust generated from abrasive blasting which include:

- a) the type of particulate involved and the biological effects;
- b) the concentrations of the airborne particulate in the defined breathing zone;
- c) the size of the particulate in the defined breathing zone;
- d) the duration of exposure;
- e) the amount of dust generated and whether the dust is inspirable or respirable; and
- f) the individual responses to exposure (for example, the employee may be asthmatic).

22.15 Employers should assess the risks specific to the toxic contaminants produced such as:

- a) Silica – through use of river sand, beach sand or quartz rock which can lead to the development of some cancers;
- b) Lead – through abrasive material and paint from the blasting surface that is absorbed by inhalation via dust and fumes as well as ingestion.

Implement risk control measures

22.16 The many types of chemical substances used in abrasive blasting produce particular toxic dust and the employer must refer to the Safety Standards Regulations and the supplied MSDS and labelling information to assess the degree of risk posed from its use.

22.17 An employer must ensure that substances, which may result in the exposure of persons to atmospheric contaminants, which exceed the national exposure standards, are not used for the purpose of abrasive blasting (Safety Standards Regulation 6.19).

Select less hazardous abrasive medium

22.18 Employers should consider a less hazardous blasting medium, which will generate minimum dust levels. Metallic and garnet abrasives resist shattering on impact, chilled iron or cast steel grit is clean and recyclable and should be used where feasible.

Adopt a less hazardous surface preparation method

22.19 Employers should select alternative methods of surface preparation to reduce the amount of atmospheric contaminants. These include:

- a) wet abrasive blasting – this process uses a standard blast machine and compressed air with water added to suppress dust. The water should be added before the abrasive material leaves the nozzle;
- b) high-pressure water jetting – is the use of a large volume of water via a pressure pump (greater than 20 500 kPa but less than 172 500 kPa; 3,000 to 25,000 psi). This process has limited use as it can only remove loose paint and rust and not tight paint, rust or mill scale;
- c) ultra high pressure water jetting – water under pressure (greater than 172 000 kPa to 257 800 kPa; 25,000 to 40,000 psi or higher) which has the capacity to remove tight rust and paint but not mill scale;
- d) water jetting with abrasive injection – pressurised water containing an abrasive substance is injected into the water stream at the nozzle. This process can remove tight paint and mill scale;
- e) centrifugal wheel blasting – this is a rotary assembly which is enclosed with a dust collector driven by air or electricity. The wheel propels abrasive substances to remove paint, rust and scale mill; or
- f) vacuum blasting – standard abrasive nozzle inside a shroud close to the work surface. A tight seal is maintained and the dust is vacuumed away from the surface.

Isolation of the abrasive blasting process

22.20 If a less hazardous blasting medium is not practicable, employers should consider the use of isolation cabinets and chambers to minimise the exposure to dust particulates. These include:

- a) blasting cabinets – these cabinets are suitable for blasting small objects and operate by manipulating the object within the cabinet. Employers should ensure that the cabinet is properly designed to prevent the escape of dust; and
- b) blasting chambers (blast rooms) – these chambers should be used for transportable objects too large for a blasting cabinet. Blasting is done manually working inside the chamber. Employees and contractors should wear a hood or helmet type, airline respirator complying with AS/NZS 1716:2003 – *Respiratory protective devices*, fitted with an inner bib and shoulder cape, jacket or protective suit.

22.21 Employers should use temporary enclosures when the object cannot be transported because of its size or it is a fixed structure, such as a bridge.

22.22 Employer should use exclusion zones, if it is not practicable to use cabinets or chambers, when open air blasting is required. Exclusion zones may be used to protect employees, contractors and other persons in the vicinity from exposure to hazardous dust levels. The extent of the zone should be assessed against the prevailing conditions at the time of blasting.

- 22.23 Employers may use exclusion zones in conjunction with blasting chambers and temporary enclosure to enhance safety measures.
- 22.24 If exclusion zones are required employers should ensure that the warning signs are in accordance with *AS 1319:1994 – Safety Signs for the occupational environment*. Persons inside the exclusion zone should wear respiratory equipment as outlined in *AS/NZS 1716:2003 – Respiratory protective devices*.

Use administrative controls

- 22.25 Employers should use administrative controls in addition to the more effective substitution and isolation control methods. These include:
 - a) limiting the exposure by job rotation;
 - b) shifting the site of the blasting away from other persons;
 - c) scheduling blasting work outside of normal working hours;
 - d) not blasting in windy conditions; and
 - e) having designated blasting areas where other persons are not permitted when blasting work is being carried out.
- 22.26 Employers should ensure that good housekeeping procedures are in place. Good housekeeping minimises the dust in the workplace. The dust should be cleared as soon as practicable after the blasting has occurred. The dust should be vacuumed with an industrial vacuum cleaner designed for removing particulates hazardous to health. Persons performing the cleaning operation should wear the personal protective equipment.

Provide personal protective equipment (PPE)

- 22.27 The employer must ensure that employees and contractors, carrying out abrasive blasting who may be exposed to atmospheric contaminants arising from the blasting, are provided with suitable PPE. This includes an air-supplied respirator if the exposure anticipated is above the national exposure standards for the particular contaminant/s (Safety Standards Regulation 6.19).

Note: refer to ‘Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC: 1003 (1975)]’ and the ‘Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC: 3008 (1995)]’.

- 22.28 Employers should ensure that employees and contractors are supplied with an airline positive pressure hood or helmet complying with *Australian Standard AS/NZS 1716:2003 – Respiratory protective devices* fitted with an inner bib and a shoulder cape, jacket or protective suit. The jackets or suits should be fitted with leather or elastic straps at the wrist and ankle and overlapping flaps at all suit closures.
- 22.29 Employers should ensure that air-purifying respirators are used by the operator and any person near the work area during the blasting process, during maintenance, repair work or during the clean up process where dust from the process is visible.

- 22.30 Employers should ensure that the selection, use and maintenance of respiratory devices is undertaken in accordance with *AS/NZS 1715:1994 – Selection, use and maintenance of respiratory protective devices*. Air monitoring of the workplace will enable the appropriate respirator to be selected.
- 22.31 Employers should ensure that each employee is fitted individually and is aware of the safe use and storage of the equipment.

Provide air monitoring and health surveillance

- 22.32 Employers should ensure that the appropriate control measures are in place by atmospheric testing and health surveillance monitoring.
- 22.33 Employers should ensure that the atmospheric testing is conducted by a trained specialist in accordance with *AS 2985:2004 – Workplace atmospheres – Methods of sampling and gravimetric determination of respirable dust* and *AS 3640:2004 – Workplace atmospheres – Methods of sampling and gravimetric determination of inspirable dust*.
- 22.34 Health surveillance is required where it has been identified on a risk assessment that the employees are exposed to hazardous substances. Employers should refer to the Safety Standards Regulations Part 6 Hazardous Substances for the mandatory requirements.

Provide amenities

- 22.35 Employers should ensure that amenities are provided to enable the employee to shower and change clothes after the completion of the blasting process and to wash his/her hands and face prior to eating drinking or smoking.
- 22.36 Employers should ensure that they have first aid facilities and appropriately trained personnel according to Part 2 First Aid of this Code of Practice to deal with the types of injuries specific to abrasive blasting.

Provide education and training

- 22.37 Employers must provide education and training in accordance with Part 6 Hazardous Substances of the Safety Standards Regulations and the training requirements specified by the MSDS and any other information on the hazardous substance provided.

Maintain records

- 22.38 Record keeping must be kept in accordance with the requirements of Part 6 Hazardous Substances of the Safety Standards Regulations with regard to the use and storage of hazardous substances, health monitoring and atmospheric recording.

Control measures for associated hazards and risks

- 22.39 Employers should refer to the Safety Standards Regulations for the mandatory safety requirements for Occupational Noise Part 3, Manual Handling Part 5 and Confined Spaces Part 7 and other Parts of this Code of Practice for further guidance.

- 22.40 Employees should comply with the policies, procedures and training provided to ensure their health and safety as well as the health and safety of other persons near the workplace.
- 22.41 Employees should use and store the PPE provided by the employer according to the manufacturers' instructions and any training provided.
- 22.42 Employees should report to their supervisors any PPE that is not fitted correctly.
- 22.43 Employees should report any damage to equipment that may allow dust to escape into the work area and any other issue that they consider a health and safety risk.

PART 23 – CONSTRUCTION INDUCTION TRAINING

Under development

PART 24 – FALLS IN CONSTRUCTION

Under development

PART 25 – CASH IN TRANSIT

INTRODUCTION

25.1 Cash in transit (CIT) is the transportation of cash, securities and other financial instruments, jewels and bullion by road by means of armoured and non-armoured vehicles on behalf of other persons for hire and reward.

25.2 CIT companies provide an essential public service by supplying cash to businesses. The nature of this activity defines the associated hazards. These include:

- a) firearm hold-ups;
- b) vehicle accidents;
- c) excessive noise;
- d) lifting and carrying items;
- e) fatigue from shift work;
- f) stress related to workplace violence;
- g) environmental factors such as extremes of heat and cold temperatures; and
- h) exposure to bio-hazardous substances.

25.3 Armed hold-ups are serious crimes and can be the cause of debilitating physical and mental injuries. Attacks can occur in public places such as banks, streets and retail stores and, depending on the location, have the potential to compromise the safety of a large number of people.

25.4 The likelihood of injury to employees and persons at or near the workplace is significant due to the nature of the activity and the consequences can include death, serious injury or illness. Some possible injuries and health effects include:

- a) internal injuries from assault weapons;
- b) fractures and contusions from assault or vehicle accident;
- c) sprains and strains;
- d) industrial deafness;
- e) infectious diseases;
- f) fatigue and stress related injuries; and
- g) exposure injuries related to excessive heat or cold.

25.5 This Part of the Code must be read in conjunction with the introduction to the Code, including in relation to consultation. It should also be read in conjunction with Part 1 Risk Management. 1

Note: The Occupational Health and Safety (Safety Standards) Regulations 1994 and other Parts of this Code of Practice provide direction and guidance on risk management; manual handling; industrial noise; driver fatigue; blood borne pathogens; dangerous goods and hazardous substances. Please read this Part in conjunction with the Safety Standards Regulations and this Code of Practice.

PURPOSE

25.6 The purpose of this Part is to provide guidance to employers and other duty holders on how to comply with the Act and provide a safe and healthy workplace for employees in the CIT industry and others at or near the workplace.

SCOPE

25.7 This Part applies to all persons in the Commonwealth jurisdiction including non-Commonwealth licensee organisations associated with the CIT industry including employers in control of workplaces, employees, contractors and suppliers and installers of plant (ATMs).

25.8 It applies to work performed in relation to the transportation of cash or other valuable items under a contract arrangement, with or on behalf of other persons, businesses or entities, by means of armoured or non-armoured (soft skin) vehicles.

25.9 It applies to escort services for the purposes of protection of cash or other valuables and to the provision of management, secretarial, administrative support services as well as maintenance for ATM machines (and equivalent technologies, where cash is exposed) and users of CIT services.

25.10 This Part does not apply to the distribution and delivery of goods not defined as cash or valuables for the purposes of protected transportation. It does not apply to ancillary or incidental transport of cash by the owner in an “in-house” arrangement.

Note: This Part applies to the occupational health and safety requirements under the Act. Employers should refer to other relevant state and territory legislation and regulation with regard to their CIT operations within that jurisdiction.

This may include but is not limited to legislation and regulation for:

- a) the security industry;
- b) use of firearms;
- c) fair trading; and
- d) road transport and traffic management.

DEFINITIONS

‘Armoured vehicle’ – is a vehicle purpose designed that offers resistance to armed attack and is manned by uniform personnel.

‘ATM’ – means automatic teller machine.

‘Cash’ – means cash (other than coin) securities and other financial instruments (other than executed non-negotiable cheques and executed bank cheques), jewels and bullion.

‘CIT’ – means cash in transit.

‘Competent person’ – means a person who has acquired a level of knowledge about health and safety in the CIT industry through training, qualifications and/or experience or a combination of knowledge and skills to carry out a risk assessment competently and/or training and supervision of CIT activities.

‘Covert operations’ – means the CIT operation is concealed and involves the transport of cash or valuables in unmarked vehicles by non uniformed armed/unarmed personnel.

‘GPS’ – means Global Positioning System.

‘Other valuables’ – includes cash, bullion, jewellery, bank notes and drafts.

‘Overt operations’ – means the operation is done openly and without any attempt at concealment.

‘Soft skin vehicle’ – is a vehicle that is not an armoured vehicle used for transporting cash and other valuables.

‘Users of CIT services’ – includes Local Government Authorities, shopping centre owners/managers, financial institutions, retail shops owners and/or managers.

RESPONSIBILITIES OF MANUFACTURERS, SUPPLIERS AND INSTALLERS OF ATM MACHINES

25.11 Manufacturers, suppliers and installers of ATMs or similar technology should take all reasonably practicable steps to:

- a) ensure that the ATM or similar technology is designed, constructed and installed, and when properly used, safe for employees;
- b) undertake the necessary research, testing and examination to minimise the risk to health and safety of employees that may arise out of its use; and
- c) ensure that adequate information is made available to an employer in connection with its use by employees at work.

RESPONSIBILITIES OF CIT USERS

25.12 CIT users have a duty to reduce the level of risk posed to employees and other persons undertaking or impacted by CIT work. This can be achieved by:

- a) where possible, consultation shall occur prior to new cash points being installed, including consulting with the CIT operators, employees and any other person who performs CIT work;
- b) cooperating with CIT operators and employees to ensure CIT work is performed in a safe manner and in accordance with legal requirements and the safety elements of this Part;
- c) providing information, instruction and training to their employees in relation to the risk of robbery, including emergency procedures;
- d) providing historical information on previous security breaches and the occurrence of any relevant incident or contributory factor; and
- e) providing a safe work environment through layout design and parking space in close proximity to sites being serviced by CIT operators (refer to paragraph 25.13).

RESPONSIBILITIES OF EMPLOYERS

25.13 Employers should consider the building layout in consultation with specialist security organisations and personnel to minimise the risk of armed hold-ups. The building layout considerations should include:

- a) safe access and egress;
- b) dedicated vehicle parking;

- c) vehicle loading docks;
- d) strong interior and exterior lighting;
- e) open glass front facade for visibility;
- f) positioning of cash transaction points including ATMs, in safe well lit low risk areas;
- g) entrance foyers, lobbies and car parks which are easily observed by pedestrians and motorists;
- h) the expected public activity in the vicinity of the CIT operations; and
- i) security devices including surveillance cameras located in appropriate areas.

Provide information to contractors

25.14 Employers who contract out CIT services should ensure that:

- a) the contractor is provided with all information pertaining to the CIT operation that may affect the safety and security of contractors, employees and the public including:
 - (i) risk assessments and control measures;
 - (ii) any history of prior incidents and hold-ups; and
 - (iii) any other information deemed relevant to the safety and security of the CIT operation;
- b) the contractor has safe work systems and procedures; and
- c) the contractor is compliant with the relevant legislation, regulation and codes of practice.

Consult with all person involved in CIT operations

25.15 Employers in control of the workplace should take all reasonably practicable steps to identify the hazards associated with each CIT site and task. The risk assessment should be conducted by a competent person in consultation with the employer, employees and other persons directly involved in the CIT work.

25.16 Employers should consult with employees and/or other persons undertaking CIT work about health and safety when:

- a) there are proposed changes to the premises, systems or methods of work, plant and substances in use;
- b) the risk assessment process is undertaken;
- c) the control measures are proposed;
- d) introducing or altering procedures for monitoring the hazards and associated risks;
- e) determining the adequacy of site facilities; and
- f) changing the consultation arrangements.

25.17 Employers should consult with employees and other persons undertaking CIT work about:

- a) hazards in the workplace;
- b) safety and security risk assessments;
- c) systems of work;

- d) safe operating procedures;
- e) risk control measures;
- f) the review of procedures, systems of work and risk assessments; and
- g) any other safety and security issues.

25.18 Employers should consult with CIT clients, government bodies, associations and industry specialists to ensure all safety and security hazards are identified and addressed as early as possible in the planning phase of the CIT operation.

25.19 When determining the likely hazards employers should consider the following:

- a) the incident, injury and dangerous occurrence reports;
- b) inspection reports on the vehicles used;
- c) inspection reports on the CIT sites;
- d) surveys assessments of the routes for transfer;
- e) observing the systems of work and work practices;
- f) determining the levels of training, experience and competence for the tasks; and
- g) testing vehicles and equipment.

25.20 Employers should consider the safety and security hazards associated with an urgent one-off job prior to accepting or undertaking the job and conduct a site visit to ensure that all aspects of the site are subject to a risk assessment.

Identify hazards

25.21 When identifying hazards, employers should consider the whole system of work and any factors that can be hazardous to health and safety. As a minimum, the following should be considered:

- a) Personnel
 - (i) the level of training, experience and competency to perform the tasks;
 - (ii) the varying roles (drivers, escorts, cash carriers, escort, guard);
 - (iii) shift work arrangements;
 - (iv) fatigue and stress related hazards;
 - (v) the number and frequency of manual handling tasks;
- b) Operations
 - (i) work practices and systems of work;
 - (ii) time of day for the work to be performed;
 - (iii) method of transport;
 - (iv) task to be performed (driving, escort, pick-up and delivery; ATM work);
 - (v) traffic and pedestrian flow;
 - (vi) facilities such as first aid and amenities;
 - (vii) the methods of transport;
- c) Equipment
 - (i) personal protective equipment (PPE);

- (ii) firearms, use and training requirements;
- (iii) systems of communication (back to base radio mobile phones);
- (iv) the maintenance schedules for all equipment (vehicles, firearms etc).

- d) Environment
 - (i) locations for CIT transfers (client sites, shopping centres, retail outlets, financial institutions, ATM's);
 - (ii) the proximity of the parking at the transfer sites;
 - (iii) parking restrictions;
 - (iv) effectiveness of the lighting in all transfer areas;
 - (v) exposure to temperature variations;
 - (vi) exposure to blood and body fluids;
- e) Other factors
 - (i) access and egress to all sites (ramps, stairs, open areas); and
 - (ii) any other hazards with the potential to cause injury or illness.

Assess the risks

- 25.22 Employers should ensure that a safety and security risk assessment is conducted for each site and all associated tasks for the CIT work.
- 25.23 Employers should consider the likelihood and consequences of death or serious injury from each identified hazard by considering the following factors:
 - a) the risk of injury to an employee or other person in the workplace;
 - b) the likelihood of injury or illness occurring;
 - c) the severity of the injury or illness possible from the hazard;
 - d) any other factors that may contribute to the risk;
 - e) available health and safety information related to the hazard or risk; and
 - f) any other information that may assist with the risk assessment such as incident reports.
- 25.24 Employers should ensure that contributing factors to the risk are assessed for each identified hazard in relation to the CIT activity such as:
 - a) the type of operation (overt or covert);
 - b) the regularity of the client runs and the time of the work (traffic volume);
 - c) the amount of cash and the weight in each transfer;
 - d) the mix of types of work being performed (patrol, security);
 - e) how many people are exposed (crew levels; public activity);
 - f) the maintenance of skills and relevant experience of the employees involved in the CIT operations;
 - g) factors contributing to fatigue and stress such as shift length, breaks, shift times;
 - h) rotation and the regularity of overtime;
 - i) adherence to safety procedures;
 - j) the surveillance equipment and techniques;

- k) adequacy of the communication system in all hazardous situations;
- l) the suitability of the vehicles for the operation (armoured or non-armoured);
- m) the environmental conditions;
- n) outcome of a security site assessment;
- o) the suitability of equipment for the operation (firearms);
- p) the condition of the vehicles and equipment; and
- q) other factors such as:
 - (i) previous incidents or hold ups;
 - (ii) customer information;
 - (iii) individual personnel limitations; and
 - (iv) any other identified risk factor.

Implement risk control measures

- 25.25 Employers should consider the hierarchy of controls when implementing risk control measures. If it is not possible to eliminate the hazard or risk, employers should minimise the risk by:
 - a) selecting control measures which adequately control the exposure to that risk;
 - b) not creating another hazard or new risk; and
 - c) allowing the employee to perform the necessary work tasks without discomfort or distress.
- 25.26 Employers should consider substitution of an item or task with equipment or a process, which provides less exposure to the risk if elimination of the item or task is not reasonably practicable.
- 25.27 If substitution is not possible, employers should use isolation as a control measure to place some barrier between the hazard and the employee that prevents exposure to the hazard. This can be achieved by using, for example, a barrier between the vehicle cab and the vehicle body.
- 25.28 A combination of the risk controls from the hierarchy model should be considered by the employer to minimise the risk to the lowest level practicable if one single measure does not effectively control the risk.
- 25.29 Employers should use administrative controls in combination with other control measures such as substitution or isolation. Some examples include:
 - a) regular job rotation or re-rostering to different runs to reduce stress levels;
 - b) standard operating procedures;
 - c) adequate resources inclusive of:
 - (i) safe staffing levels;
 - (ii) communication types and procedures;
 - (iii) selection of appropriate vehicles; and
 - (iv) selection of appropriate PPE;
 - d) procedures for varying the route and times for the transfer of cash and valuable;

- e) cash limits across footpaths as determined by the risk assessment;
- f) training in specific roles, annual refresher courses; and
- g) structured supervision.

Develop standard operating procedures

25.30 Employers should develop safe operating procedures in consultation with all involved CIT users and employees and these procedures should be based on the risk assessment and the control measures. Safe operating procedures can include:

- a) clearly defined communicated roles and duties of each employee performing the CIT work operation (driver, escort guard or cash carrier);
- b) pre-departure checklists;
- c) regular testing of the safety features such as communication devices and duress alarms;
- d) regular inspections and scheduled maintenance of the vehicles, PPE and other safety equipment;
- e) procedures for the maintenance of confidentiality such as the description of the site by code;
- f) variation in the CIT delivery and pick-up times and routes where possible;
- g) system of communication with the base, including provision of daily welfare checks;
- h) procedures for site servicing such as arrival on site and departure procedures (this is supplemented by the risk assessments);
- i) procedures to defer pick-up and arrangements for back-up assistance in circumstances where suspicious behaviour or other potential hazards have been identified;
- j) procedures for vehicle collision and/or vehicle equipment breakdown;
- k) process to monitor adherence to determined cash limits;
- l) hold-up and post hold-up procedures (refer paragraph 25.55);
- m) process to address fatigue and stress;
- n) hazard and incident reporting process;
- o) systems for regular monitoring and review (refer paragraph 25.53); and
- p) any other identified hazard or risk such as manual handling and noise management.

Allocate appropriate resources

25.31 Employers should ensure that the level of staffing has been subject to a risk assessment to determine minimum safe levels.

25.32 Employers should ensure that the assessed staffing levels are maintained throughout the CIT operation.

Provide communication systems

25.33 Employers should provide communication systems that ensure the safety of employees and other persons conducting CIT operations. These include back-to-base equipment, personal duress alarms and arrangements for emergency

communication. Communication ‘black spots’ identified on the risk assessment should be controlled with the appropriate equipment and procedures.

Select appropriate vehicles

- 25.34 Employers should ensure that vehicles are selected in accordance with the nature of the operation and the risk assessment. Employers should ensure that the vehicle conforms to the Australian Standard design requirements, is mechanically sound and is serviced and maintained regularly and adequately by a competent person to ensure continued safety to the user.
- 25.35 Employers should ensure that soft skin vehicles, used for covert operations, are unmarked and employees or other persons conducting the covert operation are not in uniform and may or may not carry firearms, depending on the risk assessment.
- 25.36 Employers should ensure that soft skin vehicles used for overt operations carry the company signage and the employees or other CIT operators in the workplace wear uniforms and carry firearms.
- 25.37 Employers should ensure that soft skin vehicles used for CIT operations include the following minimum safety features:
 - a) drop safe, secure container to carry the cash or valuable;
 - b) back to base radio with override button for use in an emergency situation;
 - c) alternative communication method effective in ‘black spots’;
 - d) hands free telephone;
 - e) duress alarm with back to base alert;
 - f) remotely activated central locking; and
 - g) engine immobiliser designed to prevent unauthorised ignition of the vehicles.
- 25.38 Employers should ensure that armoured vehicles used for CIT operations are purpose built for the transportation of cash and other valuables and contain the following minimum features:
 - a) ballistic rated protection from armed attack;
 - b) back to base radio with override button for use in an emergency;
 - c) alternative communication method effective in radio reception ‘black spots’;
 - d) hands free mobile telephone;
 - e) duress alarm with back to base alert;
 - f) remotely activated central locking or alternative method of preventing unauthorised entry into the vehicle; and
 - g) may carry GPS or other vehicle tracking systems.
- 25.39 Employers should ensure that armoured vehicles used for overt CIT operations carry the company signage and the employees conducting the CIT operation are uniformed and have the necessary PPE and firearms.

Provide personal protective equipment (PPE)

- 25.40 Employers should provide PPE and any other equipment determined as essential items in the safety risk assessment. The PPE should be:

- a) appropriate to the CIT operation;
- b) comply with the relevant Australian Standards;
- c) be mechanically sound; and
- d) be maintained regularly to ensure the serviceability and safety to the user.

25.41 Employers should ensure that, when the safety and security risk assessment determines that firearms are essential, the equipment is supplied according to the requirements of the relevant state or territory legislation or regulation.

Note: Firearms are controlled by state and territory legislation and regulation. When using firearms, the employer must refer to the state or territory legislation and regulation where the CIT operation is conducted.

Vary the route and time procedures

25.42 Where possible, employers should consider varying the route taken for the CIT operation as well as the time for pick up and delivery.

Provide education and training

25.43 Employers should ensure that all persons performing CIT operations hold the appropriate qualifications in accordance with the Security Industry requirements. Evidence of appropriate qualifications should form part of the pre employment process. All persons engaged to perform CIT work should only perform duties within the scope of their qualifications.

25.44 Employers should ensure that all persons who perform CIT work receive training appropriate to their work activities. The target groups include:

- a) employees, contractors and others engaged for CIT operations or otherwise participating in CIT work which has the potential to expose them to the risk of injury or illness;
- b) managers and supervisors of all CIT employees or those who are responsible for implementing safe operating procedures;
- c) staff responsible for the purchasing of plant, PPE, designing, scheduling and organising the work activities; and
- d) safety and security assessors.

25.45 Employers should ensure that all CIT employees receive general induction, CIT operational specific and task specific training. The education and training should include:

- a) general induction and site specific training inclusive of the statutory responsibilities of employers and employees;
- b) the nature and extent of the hazards identified in relation to work performed including:
 - (i) the incident reporting process (hold-ups or attempted robberies, vehicle collisions or other types of incidents);
 - (ii) the hazard reporting process for defects in plant and equipment; and
 - (iii) any dangerous occurrence events or other hazards where safety may have been compromised;

- c) safe operating policies, procedures and control measures to minimise the risk and effect of robbery. This should include:
 - (i) departure, arrival and on site procedures;
 - (ii) staffing levels;
 - (iii) communication systems;
 - (iv) cash limits;
 - (v) the use and operation of the vehicles and their safety features, plant and associated equipment;
 - (vi) where and how to use PPE including the correct selection and use of firearms;
 - (vii) fitting, proper care and maintenance of PPE;
 - (viii) confidentiality in relation to the CIT sites;
 - (ix) how to access health and safety information; and
 - (x) procedures to be adopted in the event of a hold-up or other emergency, vehicles collision or breakdown and/or other type of incident; and
- d) the effect of a robbery on an employee and/or any other person undertaking CIT work.

25.46 Employers should ensure that persons undergoing on-the-job training receive the appropriate training, instruction and information in relation to the CIT operations. Where applicable, training should be provided for specific roles such as escort or support.

25.47 Employers should ensure that refresher programs form part of the education and training cycle and encompass simulated street operations for armoured vehicle operators.

25.48 Employers should ensure that a briefing is conducted for all employees and other involved persons prior to the initial CIT operation and at regular intervals thereafter. This briefing should include the risk assessment undertaken for the site and the safe operating procedures.

25.49 Employers should ensure that all site assessors, engaged for the purpose of site safety and security risk assessment for CIT operations, meet the requirement of competent person, hold qualifications in Security Risk Management and have CIT industry experience.

Provide supervision

25.50 Employers should provide supervision to all CIT employees and others in the workplace to ensure that:

- a) the appropriate qualifications and licences are held and maintained;
- b) knowledge and skills are acquired through competency training qualifications and experience;
- c) occupational health and safety management systems are in place;

- d) safe work practices are adopted and followed;
- e) PPE is properly used; and
- f) refresher training is in place, are attended and that attendance is recorded.

25.51 Employers should ensure that a person who is gaining experience to provide CIT services (covert or overt) is under the supervision of a competent person for a minimum of three months and/or until such time as the person demonstrates competence to perform the service.

Provide information

25.52 Employers should provide all employees and other persons involved in CIT operations with access to information on the risk assessments, safe operating procedures and any other relevant health, safety and security information. This may include:

- a) the results of applicable safety and security risk assessments;
- b) information on safe operating procedures;
- c) reviews conducted of the risk assessments or safe operating procedures; and
- d) other relevant occupational health and safety information.

Monitor and review

25.53 All persons undertaking CIT work should carry out this work in a lawful and competent manner. Employers should have a system for continuous monitoring that includes:

- a) the consultation process followed;
- b) adherence to the safety and security policies and procedures;
- c) work processes inclusive of review of the safety and security risk management procedures;
- d) the effectiveness of the control measures in place; and
- e) the use and maintenance of the appropriate PPE.

Implement incident response procedures

25.54 Employers should ensure that there is an incident response procedure in place and include:

- a) information and training specific to robbery, attempted robbery and any violent incident or emergency to all persons undertaking CIT operations prior to conducting CIT work;
- b) clear and precise procedures for safety during a hold-up;
- c) training in procedures for safety during a hold-up;
- d) post hold-up procedures that include:
 - (i) critical incident response;
 - (ii) hazard and incident reporting process;
 - (iii) critical incident debriefing in the form of counselling and support; and
 - (iv) review process post hold-up.

Implement post-hold-up procedures

25.55 Employers should ensure that the post hold-up procedures include initial and longer-term responses. The initial procedure should include:

- a) as soon as it is safe to do so, the most appropriate staff member should activate the duress facility to ensure that the police are contacted and an ambulance is dispatched if required;
- b) first aid and support for any injured and/or traumatised employees and members of the public;
- c) a process for ensuring that evidence is left undisturbed with the area cordoned off as a crime scene until the police arrive. Evidence includes anything that the robber(s) have come into contact with;
- d) asking staff to note down the description of the robber(s) and the words used in the crime as soon as practicable;
- e) asking all the witnesses to remain at the scene until the police arrive. If any witnesses wish to leave the scene, then names, addresses and telephone numbers should be recorded;
- f) allowing staff to contact their families to advise them of the situation;
- g) assisting members of the public to contact relatives and assist with help to vehicles or provide alternative transport; and
- h) when required, providing a professional posttraumatic counselling service. Ensure all staff has access to the counsellor. Allow for the option of employees seeking assistance from their General Practitioner or Psychologist.

25.56 Employers should ensure that there is a procedure for management of any longer term issues in relation to post hold-up psychological effects by:

- a) assisting with workers compensation claims as a result of the hold-up;
- b) ensuring that follow up counselling is available to all employees;
- c) encouraging employees to return to work and their normal duties as soon as possible. Seek guidance from a health professional in relation to a return to work program;
- d) maintaining contact with any staff members who require more time off work to offer support and counselling;
- e) providing other duties in other areas of the workplace to those employees who are too traumatised to return to their normal duties; and
- f) providing support and guidance to staff who are required to attend court as a witness, seek compensation through the crime victims tribunal system or making a workers compensation claim.

Keep records

25.57 Employers should ensure that appropriate information is recorded and retained in relation to the health and safety of employees and others involved in CIT operations. Records can include:

- a) risk assessments, work-sheets and checklists;
- b) the process and methods used for the risk assessments;
- c) the risk control measures;

- d) any reviews of the systems of work;
- e) any health and safety audits;
- f) first aid, accident, incident and hazard reports;
- g) training programs; and
- h) plant and equipment maintenance schedules and reports.

RESPONSIBILITIES OF EMPLOYEES

- 25.58 The Act requires employees to take all reasonable care to protect their health and safety and that of other employees and persons near the work sites.
- 25.59 Employees should ensure they are conversant with the risk assessment for the site prior to commencing the service.
- 25.60 Employees should not divulge information to third parties that may increase the risk of a security incident.
- 25.61 Employees should assist the employer to comply with the legal obligations by providing information on safety and security hazards and risks and participating in the management of risk control measures.
- 25.62 Employees should ensure that they report all hazards, risks, incidents, injuries and dangerous occurrences according to the employer incident reporting process.
- 25.63 Employees should report any variations to the environment at the site that may necessitate a review of the service.
- 25.64 Employees should use and store the PPE provided by the employer according to the manufacturers' instruction and any training provided.
- 25.65 Employees should report to their supervisors any PPE that is not fitted correctly and any damage to the PPE provided.
- 25.66 Employees should not:
 - a) interfere with or misuse any equipment provided;
 - b) obstruct any attempt to administer aid to prevent serious injury; or
 - c) refuse a reasonable request to assist in addressing or preventing a serious risk to the health, safety and welfare of persons at work.