Compliance code

Plant

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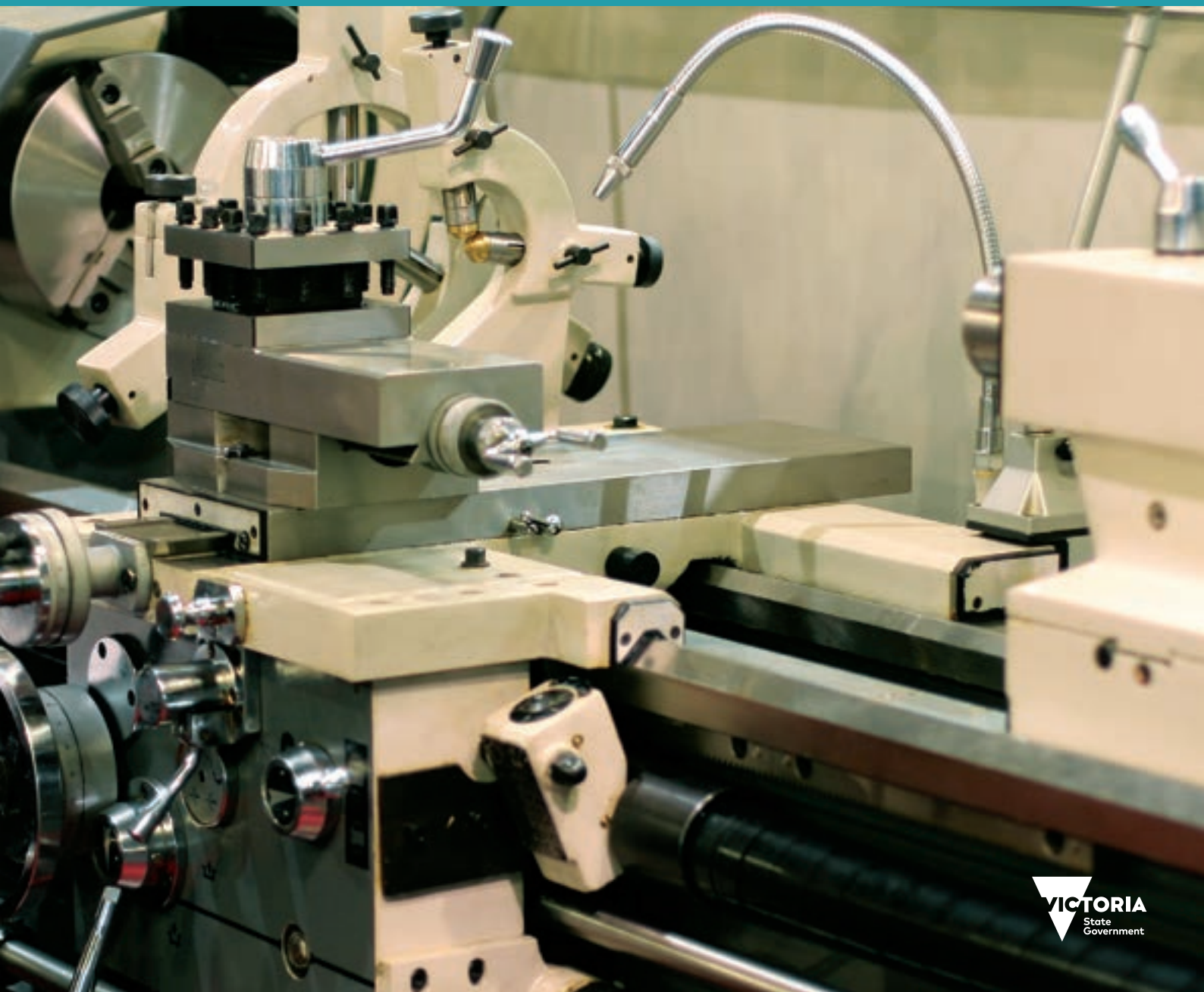

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Preface

This compliance code (**Code**) provides practical guidance for those who have duties or obligations in relation to plant under the *Occupational Health and Safety Act 2004* (**OHS Act**) and *Occupational Health and Safety Regulations* 2017 (**OHS Regulations**).

The Code was developed by WorkSafe Victoria (**WorkSafe**). Representatives of employers and employees were consulted during its preparation. It was made under the OHS Act and approved by Robin Scott MP, Minister for Finance.

Duty holders under the OHS Act and OHS Regulations should use the Code together with this legislation. This Code replaces the Code of Practice (No. 19) – Plant (1995), which is no longer in force and effect.

While the guidance provided in the Code is not mandatory, a duty holder who complies with the Code will – to the extent it deals with their duties or obligations under the OHS Act and OHS Regulations – be taken to have complied with those duties or obligations.

If conditions at the workplace or the way work is done raise different or additional risks not covered by the Code, compliance must be achieved by other means. WorkSafe publishes guidance to assist with this at **worksafe.vic.gov.au**.

Failure to observe the Code may be used as evidence in proceedings for an offence under the OHS Act or OHS Regulations. However, a duty holder will not fail to meet their legal duty simply because they have not followed the Code.

A WorkSafe inspector may cite the Code in a direction or condition in an improvement notice or prohibition notice as a means of achieving compliance.

A health and safety representative (**HSR**) may cite the Code in a provisional improvement notice when providing directions on how to remedy an alleged contravention of the OHS Act or OHS Regulations.

Approval for the Code may be varied or revoked by the Minister. To confirm the Code is current and in force, go to **worksafe.vic.gov.au**.

Part 1 – Introduction

Purpose

1. The purpose of this Code is to provide practical guidance to duty holders about how to comply with their duties under the OHS Act and Part 3.5 of the OHS Regulations associated with **plant** (see paragraphs 5 and 6 of this Code).

Scope

2. The Code provides information for duty holders about meeting their obligations under Part 3.5 of the OHS Regulations, as well as providing information about how to identify hazards and controls risks associated with plant used in a workplace. This Code also provides information for duty holders about compliance with the OHS Act where relevant (for example, an employer's duty to consult with employees).

3. It is not possible for this Code to deal with every risk associated with the use of plant in the workplace that a duty holder might encounter. The guidance in this Code needs to therefore be considered with regard to the particular characteristics and circumstances of the workplace.

Application

4. This Code applies to:

   - employers, employees, self-employed persons, and persons with management or control of any workplace in Victoria
   - persons who install, erect or commission plant to be used at any workplace in Victoria, and
   - designers, manufacturers and suppliers of plant to be used at any workplace in Victoria.

   Additionally, the code may be useful for HSRs.

Note: The word **must** indicates a legal requirement that has to be complied with. The words **need(s) to** are used to indicate a recommended course of action in accordance with duties and obligations under Victoria's health and safety legislation, while **should** is used to indicate a recommended optional course of action.

Part 1 – Introduction

What is plant?

5. This Code applies to the items of plant described in Regulation 74 of the OHS Regulations:

   - plant that lifts or moves persons or materials, including objects and substances such as empty receptacles, bins landfill rubbish, metals and soil (eg lifts, escalators, cranes, hoists, powered mobile plant, elevated work platforms),
   - pressure equipment, tractors, earthmoving machinery, lasers, scaffolds, temporary access equipment, explosive-powered tools, turbines and amusement structures, and
   - plant that processes material by way of a mechanical action that:
     - cuts, drills, punches or grinds the material (eg woodworking saws, drill presses, clicking presses, bench grinders)
     - presses, forms, hammers, joins or moulds the material (eg power presses, die casting machines, forging hammers, plastic injection moulding machines), or
     - combines, mixes, sorts, packages, assembles, knits or weaves the material (eg dough mixers, packaging machines, knitting machines). OHS Regulations r74

   This includes plant where the functions referred to above are incidental to the main purpose of the plant.

6. Plant not covered by the OHS Regulations and, therefore, not covered by this Code includes:

   - plant that relies exclusively on manual power for its operation,
   - plant that is designed to be primarily supported by hand,
   - ships, boats, aircraft, and
   - vehicles designed to be used primarily as a means of transport on a public road or rail (eg motor cars, trains, motor bikes), unless the vehicle is used at a workplace other than on a public road or railway, then the employer duties in Division 5 of Part 3.5 of the OHS Regulations apply. OHS Regulations r74(2) and r74(4)

7. Plant which is not covered by the OHS Regulations may still be covered by the OHS Act. Plant is defined in the OHS Act as including: any machinery, equipment, appliance, implement and tool; any component of any of those things; and anything fitted, connected or related to any of those things. OHS Act s5 Employers have duties under the OHS Act to provide or maintain plant that is, so far as reasonably practicable, safe and without risks to health. OHS Act s21(2)(a)

8. There also may be other duties under other parts of the OHS Regulations which are relevant to managing the hazards and risks associated with plant in the workplace. For example, duties associated with falls from heights, hazardous manual handling, asbestos and noise.

Who has duties?

9. **Employers** must provide and maintain, so far as is reasonably practicable, a working environment for their employees that is safe and without risks to health. OHS Act s21 To ensure that employers provide a working environment that is safe and without risks to health, they must eliminate risks to health and safety so far as is reasonably practicable, and if it is not reasonably practicable to eliminate the risks to health and safety, reduce those risks so far as is reasonably practicable. OHS Act s20

Part 1 – Introduction

For information about what *reasonably practicable* means when complying with Part 3 of the OHS Act or the OHS Regulations, see the WorkSafe Position *How WorkSafe applies the law in relation to reasonably practicable* at **worksafe.vic.gov.au**.

10. Employers must also, so far as is reasonably practicable, monitor conditions at any workplace under the employer's management and control. OHS Act s22

11. Employers must also, so far as is reasonably practicable, ensure that persons other than employees are not exposed to risks to their health or safety arising from the business activities undertaken by the employer. OHS Act s23

12. An employer's duties under section 21 and section 35 of the OHS Act extend to independent contractors engaged by the employer and any employees of an independent contractor working at the workplace. However, these extended duties are limited to matters over which the employer has control or would have control if there was not an agreement in place purporting to limit or remove that control. OHS Act s21(3) and s35(2)

13. Regulations that set out the way an employer complies with their duties to employees under section 21 and section 35 of the OHS Act also apply in respect to independent contractors engaged by the employer and any employees of the independent contractor in relation to matters over which the employer has control. OHS Regulations r8(1)

14. There are specific duties if employers use specific risk controls - for example, guarding. Further information on specific risk controls is contained in Part 3.4 of this Code. Employers also have specific obligations for controlling risks associated with specific types of plant – for example, powered mobile plant. Further information on controlling risks associated with specific types of plant is contained in Part 3.5 of this Code. This includes:

    - providing and maintaining plant and associated systems of work that are safe and without risks to health, and
    - ensuring the safe use, handling, storage and transport of plant.

    OHS Act s21(1) and s21(2)(a) and (b)

15. If employers design or modify their workplace, including any plant used, they may also take on additional duties under the OHS Act. It is therefore recommended that employers read Part 2 of the Code which applies to designers, manufacturers and suppliers. OHS Act s27–30

16. **A self-employed person** must also ensure, so far as is reasonably practicable, that persons are not exposed to risks to their health or safety arising from the business activities of the self-employed person. OHS Act s24 and OHS Regulations r11

17. **A person who has management and control** has a general duty to ensure that the workplace and the means of entering and leaving it are safe and without risks to health, so far as reasonably practicable. This duty only applies in relation to matters over which the person has management or control. OHS Act s26

Part 1 – Introduction

18. **Employees**, while at work, must take reasonable care for their own health and safety and that of others who may be affected by their acts or omissions in the workplace. Employees must also co-operate with their employer's actions to make the workplace safe (eg by following any information, instruction or training provided). OHS Act s25(1)

19. **A person who installs, erects or commissions plant** who knows, or ought reasonably to know, that it is to be used at a workplace must ensure that nothing about the way in which the plant is installed, erected or commissioned makes its use unsafe or a risk to health, so far as reasonably practicable. OHS Act s31

20. **Designers, manufacturers and suppliers of plant to be used at a workplace**, have a duty to ensure, so far as is reasonably practicable, that any plant they design, manufacture or supply is safe and without risks to health and safety if used for a purpose for which it was designed, manufactured and supplied. OHS Act s27, s29 and s30

The best time to control hazards and associated risks is in the design and planning stage, when they can be 'designed out' before they are introduced in the workplace.

The risk management process

21. This Code outlines a **risk management process** (see diagram 1) to help employers comply with their duties under the OHS Act and OHS Regulations. The risk management process involves the following steps:

- **Identifying** hazards associated with plant (see Part 3.1 of this Code)
- **Assessing**, where necessary, any associated risks (if unsure of appropriate risk controls) (see Part 3.2 of this Code)
- **Controlling** risks associated with plant (see Parts 3.3 to 3.6 of this Code), and
- **Monitoring**, **reviewing**, and where necessary, **revising** risk control measures

Note: there are certain circumstances where each step of the risk management process needs to occur. See Parts 2 and 3 of this Code for further information.

Diagram 1 – The risk management process

Consultation

22. Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. This duty to consult extends to independent contractors (including any employees of the independent contractor) engaged by the employer in relation to matters over which the employer has control. OHS Act s35

Note: The characteristics of the workplace will have an impact on the way consultation is undertaken. For example, consider:

- the size and structure of the business
- the nature of the work
- work arrangements (such as shift work)
- characteristics of employees (such as language or literacy).

See **worksafe.vic.gov.au** for more information on consultation.

23. An employer has a duty to consult with employees (including HSRs) when identifying or assessing hazards or risks to health or safety at the workplace, making decisions about measures to control such risks and proposing changes that may affect the health or safety of employees at the workplace. OHS Act s35

24. It is important to consult with employees as early as possible when planning to:
    - introduce new work or change existing work
    - select new plant
    - refurbish, renovate or redesign existing workplaces
    - carry out work in new environments.

25. Employers who are required to consult on a matter must share information about the matter with employees, including relevant contractors and HSRs, give them a reasonable opportunity to express their views, and take those views into account before making a decision. If employees are represented by an HSR, the consultation must involve that HSR (with or without the involvement of the employees directly). If the employer and the employees have agreed to procedures for undertaking consultation, the consultation must be undertaken in accordance with those procedures. OHS Act s35

26. Employers also need to encourage employees and contractors to report any problems immediately so that risks can be managed before an injury occurs. Employees and contractors may have practical suggestions or potential solutions that may be implemented.

Information, instruction, training and supervision

27. Employers must provide employees with any necessary information, instruction, training or supervision to enable them to perform their work in a way that is safe and without risks to health. This duty also extends to independent contractors (including any employees of the independent contractor) engaged by the employer in relation to matters over which the employer has control. OHS Act s21(2)(e)

28. The mix of information, instruction, training and supervision required will depend on the frequency and type of hazards in the workplace, and how much employees already know about the risks and necessary risk control measures.

29. Information, instruction and training must cover the nature of hazards associated with plant, including the need for risk control measures, and how to properly use them. For example, ensuring employees understand the hazards associated with plant, including how to follow safety procedures and use risk control measures implemented for their protection.

30. Employers must provide supervision where such supervision is necessary for safe work. OHS Act s21(2)(e) For example, employers need to provide supervision to employees using new plant in the workplace. This is particularly important with employees who are more vulnerable in their work areas, such as new, inexperienced or young employees.

31. Where the employees undertaking the work are new and inexperienced, such as young workers, it is often necessary to provide additional supervision.

32. If a hazard associated with plant and its associated system of work is identified, an employer must ensure that employees and contractors likely to be exposed to the risk, and any person supervising them, are trained and provided with information and instruction on:

    - the processes used for hazard identification and control of risk
    - the safety procedures associated with the use of plant at the workplace, and
    - the use, fit, testing and storage of personal protective equipment (PPE), if used as a risk control. OHS Regulations r122(2)

33. The employer must also ensure that any person involved in a plant activity is provided with information which is available to the employer on how the activity can be carried out safely, so as to ensure, so far as is reasonably practicable, the health and safety of the person. Plant activity includes:

    - commissioning or installing plant
    - testing plant
    - decommissioning, dismantling or disposal of plant, or
    - inspection and maintenance of plant. OHS Regulations r123

34. When providing information and instruction to employees and contractors in relation to safe systems of work it is important to include information about:

    - the correct implementation of isolation procedures (eg lock out/tag out)
    - the correct use of guarding and other risk controls
    - how to safely access and operate plant
    - who can use an item of plant (eg only authorised or licensed operators), how to carry out inspections, shut-down, cleaning, repair and maintenance, and
    - traffic rules, rights of way, clearances and no-go areas for mobile plant, and emergency procedures.

35. Training programs should be practical and 'hands on'. The structure, content and delivery of the training needs to take into account any special requirements of the employees and independent contractors being trained (eg specific skills or experience, disability, language, literacy and age).

36. Employers need to review their training program regularly and also when:

- there is change to work processes, plant or equipment
- there is an incident
- new control measures are implemented
- there is a request by an HSR
- changes are made to relevant legislation, or
- any other issues impact on the way the work is performed.

Employers should also keep records of induction and training given to employees.

37. Refresher training needs to be provided as appropriate for a particular workplace. The frequency of refresher training is determined having regard to the frequency with which employees and independent contractors are required to carry out tasks associated with plant.

Part 2 – Duties of designers, manufacturers and suppliers

Part 2.1 Designers

38. The safe design of plant can play a critical role in workplace safety. For instance, when a designer identifies hazards and controls any associated risks at the initial design stage of an item of plant, this can increase workplace safety in relation its use, maintenance, cleaning and disposal (including decommissioning and dismantling).

39. A person who designs plant who knows, or ought to reasonably know, that the plant is to be used at a workplace must:

- ensure, so far as is reasonably practicable, that it is designed to be safe and without risks to health if it is used for a purpose for which it was designed
- carry out, or arrange for, any testing and examination needed to ensure that the plant design is safe and without risks to health if it is used for a purpose for which it was designed, and
- provide adequate information on the following to any person to whom the designer gives the design and who is to give effect to it (eg the manufacturer):
  - purpose(s) for which the plant was designed
  - results of any testing or examination
  - any conditions necessary to ensure that the plant is safe and without risk to health if it is used for a purpose for which it was designed, and
  - on request, give such information to a person who uses or is to use the plant. OHS Act s27

40. All phases of the life of plant, from design and use to decommissioning, dismantling and disposal, need to be considered when designing plant.

41. The obligation to provide adequate information is intended to ensure that any hazards that cannot be eliminated at the design stage are understood by other duty holders and appropriate risk controls can be put in place before the plant is used.

42. Designers of plant need to ensure that the design:

- accommodates a range of physical characteristics of potential users (eg height, reach and weight) and applies appropriate ergonomic design principles
- facilitates safe use by considering the skill levels of users, complexity of functions, location of information and signs, layout of cabins and controls and safety features for emergency and contingency requirements
- accommodates any reasonably foreseeable misuse
- reduces the risks associated with human error such as forgetfulness, fatigue, poor decision making and level of training by using appropriate engineering controls where reasonably practicable
- reduces hazards created by the range of physical, environmental and operational conditions to which the plant could be exposed during its life cycle
- controls the risks associated with the erection and installation of the plant, and
- allows for maintenance and cleaning of the plant to be undertaken safely.

Part 2 – Duties of designers, manufacturers and suppliers

Hazard identification

43. A designer of plant must, so far as is reasonably practicable, identify all hazards associated with use of the plant when designing the plant. OHS Regulations r76

44. Hazard identification needs to be done as early as possible in the concept development and design phases. This involves finding the things and situations that could potentially cause harm to people throughout the plant's lifecycle and the reasonably foreseeable hazards associated with each activity.

45. Further information on hazard identification can be found at **worksafe.vic.gov.au**.

Note: It might also be useful for designers to read the information for employers on hazard identification and assessing risk in Parts 3.1 and 3.2 of this Code.

Controlling risk

46. In addition to the general duty to control risks, designers have specific obligations under the OHS Regulations if they use any of the following risk controls in their designs:

- guarding
- operator controls
- emergency stop controls
- warning devices (including when they must be included on powered mobile plant).

Note: It may also be useful for designers to read the information for employers on controlling risks in Parts 3.3, 3.4, 3.5 and 3.6 of this Code.

Guarding

47. A designer of plant who uses guarding as a risk control must, so far as is reasonably practicable, ensure that it will prevent access to the danger area of the plant. OHS Regulations r77(2)

48. Different types of guarding systems are available to guard dangerous parts of plant to prevent access or contact by any person or body part. The designer, who uses guarding as a measure to control risk associated with plant, must ensure that:

- if access to the area of the plant requiring guarding is not necessary during operation, maintenance or cleaning of the plant, the guarding is a ***permanently fixed physical barrier***
- if access to the area of the plant requiring guarding is necessary during operation, maintenance or cleaning of the plant, the guarding is an ***interlocked physical barrier*** that allows access to the area being guarded at times when the area does not present a risk and prevents access to the area at any other time
- if it is not reasonably practicable to use guarding referred to above, the guarding used is a ***physical barrier that can only be altered or removed by the use of tools***, or
- if none of the above is reasonably practicable, the design includes a ***presence-sensing safeguarding system*** that eliminates any risk arising from the area of the plant requiring guarding while a person or any part of a person is in the area being guarded. OHS Regulations r77(3)

49. As a designer moves down the guarding hierarchy in paragraph 48, they need to consider what other risk controls may be needed in conjunction with the guarding control to prevent access to the danger areas of the plant.

Part 2 – Duties of designers, manufacturers and suppliers

50. A designer of plant who uses guarding as a risk control must ensure that the guarding is designed so that it:
    - makes by-passing or disabling of the guarding, whether deliberately or by accident, as difficult as is reasonably possible, and
    - does not create a risk in itself.

    OHS Regulations r77(4)

51. A designer using guarding as a risk control in relation to plant that contains moving parts that may break or cause work pieces to be ejected from the plant must ensure, so far as is reasonably practicable, that the guarding will control any risk from those broken or ejected parts or work pieces. OHS Regulations r77(5)

52. Despite what is stated above, any guarding a designer of plant uses as a measure to control risk associated with plant should be of a kind that is able to be removed to allow convenient repair, servicing, maintenance and cleaning of the plant when it is not in normal operation. OHS Regulations r77(6)

53. For further information on guarding see paragraphs 173–207 of this Code. Also see **worksafe.vic.gov.au**.

Operator controls

54. If a designer of plant includes operator controls in the design for plant, the operator controls must be:
    - suitably identified on the plant to indicate their nature and function
    - located so they can be readily and conveniently operated by each person using the plant
    - located or guarded to prevent unintentional activation, and
    - able to be locked into the 'off' position to enable the disconnection of all motive power. OHS Regulations r78(1)

55. If the need for plant to be operated during maintenance or cleaning cannot be eliminated, the designer of the plant must provide in the design for operator controls that:
    - permit operation of the plant while a person is undertaking the maintenance or cleaning of the plant
    - prevent operation by any person other than the person who is carrying out the maintenance or cleaning of the plant, and
    - allows operation of the plant in such a way that any risk associated with the activities to any person who is carrying out the maintenance or cleaning is controlled.

    OHS Regulations r78(2)

56. These requirements do not apply to an emergency stop device. OHS Regulations r78(3)

57. Operator controls need to:
    - enable the plant to be 'fail safe' (eg when hand pressure is released on a lever controlling up and down movement, the lever will return to the neutral position and movement will stop)
    - be within easy access of the operator and take ergonomic design principles into account
    - ensure the intended function can be easily read and understood, especially in the case of dials and gauges
    - ensure the movement of the control is consistent with established convention (eg anticlockwise to open, clockwise to close)
    - ensure the desired effect can only occur by intentional operation of a control (eg provision of a starting control)
    - withstand the rigours of normal use, undue forces and environmental conditions
    - be located outside danger zones, and
    - be readily accessible for maintenance.

Part 2 – Duties of designers, manufacturers and suppliers

In this Code, '**fail safe**' means a state or condition where, if any component or function of the plant fails, a system exists to prevent any increase in the risks.

58. It should only be possible to start plant by deliberately actioning a control provided for that purpose. The same applies when re-starting the plant after any stoppage. Each item of plant needs to be designed to accommodate a control so the plant or its relevant components can be brought to a complete stop safely and prevented from unintentional starting.

Emergency stop devices

An **emergency stop device** means a device that immediately stops, or effectively isolates the hazardous operation of, an item of plant and requires manual resetting (but does not include an operational stop control). OHS Regulations r5

59. If plant is designed to be operated or attended by more than one person and to have more than one emergency stop device fitted, the designer must ensure that the design provides for the emergency stop device to be of the type that ensures that, if an emergency stop device has been used, the plant can be restarted only if:
    - that emergency stop device is manually reset, and
    - the start function manually activated. OHS Regulations r79(1)

60. If a designer of plant includes an emergency stop device (see Figure 1) in the design of the plant, the design must provide:
    - for the device to be prominent, clearly and durably marked and immediately accessible to each operator of the plant
    - for any handle, bar or push button associated with the device to be coloured red, and
    - that the device cannot be adversely affected by electrical or electronic circuit malfunction. OHS Regulations r79(2)

Figure 1 – Emergency stop button

61. Once engaged, the emergency stop device needs to remain that way. It should only be possible to disengage the emergency stop device by a deliberate action. Disengaging the emergency stop device should not restart the plant. It should only allow the normal starting sequence to be activated.

Part 2 – Duties of designers, manufacturers and suppliers

62. In the case of plant or parts of plant designed to work together, stop controls (including the emergency stop devices) need to be capable of stopping the plant itself as well as all the equipment interrelated to its operation, where continued operation of any related equipment may be dangerous.

63. Emergency stop devices should not be the only method of controlling risks. They should be designed as a back-up to other risk controls.

Warning devices

64. If the design of plant includes an emergency warning device in the design, the designer must ensure that the design provides for the device to be positioned on the plant to ensure that the device works to best effect (eg flashing lights are positioned so they are easily seen). OHS Regulations r80(1) For further information on warning devices see paragraphs 231–243 of this Code and **worksafe.vic.gov.au**.

Powered mobile plant

65. If there is a likelihood of powered mobile plant colliding with pedestrians or other powered mobile plant, the designer must ensure that the design includes a warning device that will warn any person who might be at risk from the movement of the plant. OHS Regulations r80(2)

66. In carrying out their duty, designers should consider:

- the types of workplaces in which the plant will be used
- the type of plant, and
- whether a combination of warning devices is required.

67. Examples of the types of warning devices that could be considered are described in paragraphs 233–243 of this Code.

Testing and examination of plant

68. A designer of plant must carry out, or arrange for the carrying out, of any testing and examination as may be necessary to ensure that the design is safe. OHS Act s27(1)(b) The results of such tests and examinations must be provided to each person to whom the designer gives the design to and who is to give it effect (typically, the manufacturer of the plant). OHS Act s27(1)(c)(ii) and OHS Regulations r81(c)

69. Testing and examination can be carried out when developing a prototype and during the manufacturing stage. Designers should consider:

- simulation of the normal range of operational capabilities
- testing of design features incorporated to ensure 'fail safe' operation
- measurement of imposed stresses on critical components to ensure maximum design stresses are not exceeded
- testing of critical features such as over-speed and over-pressure devices under both normal and adverse operational conditions, and
- development of overload testing procedures to ensure plant safety during foreseeable misuse conditions.

Providing information

70. A designer of plant must provide adequate information to each person to whom the designer gives the design to and who is to give it effect (typically, the manufacturer) about the purpose(s) of the plant and any conditions necessary to ensure that the plant is safe and without risks to health if it is used for a purpose(s) for which it was designed. OHS Act s27(1)(c)(i),(iii)

Part 2 – Duties of designers, manufacturers and suppliers

71. A designer of plant must, when providing the design to the manufacturer of the plant, give the manufacturer adequate information to enable the plant to be manufactured in accordance with the design specifications. If applicable, information must be provided about:
    - the installation, commissioning, decommissioning, use, transport, storage of the plant
    - dismantling of the plant, if the plant is capable of being dismantled
    - the hazards and any risks associated with the use of the plant identified by the designer
    - testing or inspections to be carried out on the plant
    - the systems of work and competency of the operators that are necessary for the safe use of the plant, and
    - emergency procedures (if any) required to be implemented if there is a malfunction of the plant. OHS Regulations r81

72. If the manufacturer informs the designer of the plant that there is a hazard in the design for which the designer has not provided a risk control, the designer must revise the information originally supplied and give it to the manufacturer to ensure that the risk is controlled (being eliminated, or if not reasonably practicable to eliminate, reduced so far as is reasonably practicable). If the designer considers that it is not necessary to revise the information originally supplied to the manufacturer, the designer must inform the manufacturer of that opinion in writing. OHS Regulations r82

Record keeping

73. A designer of plant must record any published technical standard (including any part of a published technical standard) which was used in designing the plant. Where the designer of plant does not use published technical standards, the designer must record the engineering principles used in designing the plant. OHS Regulations r84(1) and (2)

74. A designer of plant must keep any record of published technical standards or engineering principles available for inspection by WorkSafe or the person who verified the design of the plant for seven years after the date on which the design or information about the design is given to a manufacturer or, if applicable, the date on which the revised information is given to the manufacturer. OHS Regulations r84(3)

75. Records of the following information in relation to technical standards and engineering principles should be maintained (as appropriate):
    - unique identification of the plant being designed
    - identification of all the major assemblies and items that have been designed to the published technical standard or specific engineering principles
    - title of the published technical standard(s) used
    - where the entire published technical standard is not used, identification of either the clauses that are used or not used, whichever is more appropriate in the circumstances, and
    - identification of any engineering principles used.

Part 2 – Duties of designers, manufacturers and suppliers

76. Records outlining engineering principles need to contain sufficient information to establish that the engineering principles have adequately addressed the issues of use, strength, stability, durability and safety features required to ensure the safe operation of the plant under normal and foreseeable emergency conditions.

77. If the design of plant is required to be registered, the designer of that plant must record the method used to determine the risk controls for the plant (eg risk assessment) and the risk controls resulting from the determination. OHS Regulations r83

78. A designer of plant must keep any record made under regulation 83 of the OHS Regulations available for inspection by WorkSafe for seven years after the date of registration of the design of the plant.

Technical standards

79. Plant needs to be designed by a competent person (eg a qualified engineer) in accordance with acceptable engineering principles and relevant technical standards. Engineering principles include, for example, mathematical or scientific procedures outlined in an engineering reference or standard.

80. A list of relevant published technical standards that designers may use as guidance is included at **Appendix C**. The list is not exhaustive and designers may consider using other technical standards when designing plant.

Design registration

81. Certain plant must be design registered before it can be used in the workplace. OHS Act s40 and OHS Regulation 125 A list of plant that must be design registered is contained in Schedule 2 of the OHS Regulations and provided at **Appendix B**. A designer may register the design before having it manufactured. If the design is registered by the designer of the plant they should provide the design registration number to the manufacturer.

82. More information about plant design registration, the design registration process and design verification can be found in Part 4 of this Code.

Part 2 – Duties of designers, manufacturers and suppliers

Part 2.2 – Manufacturers

83. A person who manufactures plant who knows, or ought reasonably to know, that the plant is to be used at a workplace must:

- ensure, so far as is reasonably practicable, that it is manufactured to be safe and without risks to health if it is used for a purpose for which it was manufactured
- carry out, or arrange the carrying out of, any testing and examination necessary for the performance of the duty to ensure the plant is safe and without risks to health if it is used for a purpose for which it was manufactured,
- provide adequate information to each person they provide the plant to concerning:
  - the purpose or purposes for which the plant was manufactured
  - the results of any testing or examination
  - any conditions necessary to ensure that the plant is safe and without risks to health if it is used for a purpose for which it was manufactured, and
  - on request, give such information to a person who uses or is going to use the plant. OHS Act s29

Identifying and controlling risks

84. A manufacturer of plant must also:

- ensure that plant is manufactured and inspected having regard to the information given to the manufacturer by the designer of the plant
- if the plant is required to be tested, ensure that the plant is tested in accordance with the information given to the manufacturer by the designer of the plant
- ensure that if, during the manufacturing process, any hazard is identified in the design of the plant for which the designer has not provided a risk control measure:
  - the hazard is not incorporated into the manufacture of the plant
  - the designer of the plant is informed in writing of the hazard as soon as reasonably possible, and
  - all reasonable steps are taken to consult with the designer of the plant in relation to the alteration of the design to rectify the hazard, and
- if it is not possible to inform the designer of the hazard, ensure that the risk is controlled (by being eliminated, or if not reasonably practicable to eliminate, reduced so far as is reasonably practicable). OHS Regulations r85(1)(d)

85. A manufacturer who has advised the designer of a hazard for which the designer has not provided a risk control must not manufacture the plant until the designer:

- gives the manufacturer revised information on controlling the risks, in accordance with regulation 82(a), or
- advises the manufacturer in writing that they are of the opinion that this is not necessary, in accordance with regulation 82(b). OHS Regulations r85(2)

86. If a designer gives a manufacturer of plant written information in accordance with regulation 82(b), the manufacturer may proceed in accordance with the designer's original information. OHS Regulations r85(3)

87. All modifications or alterations to the design of the plant or a component of plant should be undertaken by the original designer. If the manufacturer or any other person modifies the design of the plant or component of plant without that alteration or modification being designed by the original designer, that manufacturer or person will take on the duties of the designer. This also includes the provision of information and record keeping duties detailed in paragraphs 70–78 of this Code.

Part 2 – Duties of designers, manufacturers and suppliers

88. It may also be useful for manufacturers to read the information for employers on controlling risks in Parts 3.3, 3.4, 3.5 and 3.6 of this Code.

Testing and examination

89. A person who manufactures plant must carry out, or arrange for the carrying out of, any testing and inspections in accordance with the information provided by the designer of the plant. OHS Regulations r85(1)(b)

90. Typical testing specified by a designer should include, but is not limited to:

- electrical testing (eg input current, safety contractor current, leakage current, protective earth continuity, dielectric strength test, and insulation resistance)
- safety function testing (eg safety circuit operation times, appropriate installation distances, use of appropriate components and reliability design)
- temperature rise tests (eg for exposed temperature hazards and to confirm components are used within their specification)
- pressure, stability, mechanical or structural testing to the levels required by the design specification, and
- abnormal condition tests (eg foreseeable component failures, unexpected start up, hazards following interruption, restoration of power sources).

91. Tests and inspections should include (as appropriate):

- all critical components (including safety and/or warning devices)
- the suitability of selected components
- mechanical devices
- pneumatic devices
- hydraulic devices
- sources of emissions (eg lasers)
- guarding and interlocking arrangements
- structural integrity, and
- material types and properties.

Providing information

92. A manufacturer of plant must ensure when they supply plant to another person it is supplied with information in relation to:

- the purpose or purposes for which the plant was designed
- any conditions necessary to ensure that the plant is safe and without risks to health if it is used for a purpose for which it was designed
- information relating to the installation, commissioning, decommissioning, use, transport, storage and, if the plant is capable of being dismantled, dismantling of the plant
- the hazards and any risks associated with the plant that were identified by the designer
- testing or inspections to be carried out on the plant
- information on the systems of work and competency of the operators that are necessary for the safe use of the plant, and
- information on emergency procedures (if any) that are required to be implemented if there is a malfunction of the plant. OHS Act s27(1)(c)(i) and (ii) and OHS Regulations r86(a)

Part 2 – Duties of designers, manufacturers and suppliers

93. If the manufacturer has advised the designer about hazards they have identified for which the designer has not provided a risk control and the designer has consequently:

- revised the information originally provided to the manufacturer (see paragraph 70), or
- provided new information to the manufacturer (see paragraph 71),

this revised or new information must also be passed on the person to whom the plant is supplied. OHS Act s27(1)(c)(i) and (ii), and OHS Regulations r86(b)

Record keeping

94. A manufacturer of plant must keep:

- a record of any published technical standard, including any part of a published technical standard, used to manufacture the plant, and
- any information in relation to the plant given to the manufacturer by the designer.

A manufacturer of plant must keep the records and information available for inspection by WorkSafe for seven years after the date of manufacture of the plant. OHS Regulations r87

95. Records of the following information in relation to technical standards and engineering principles need to be maintained (as appropriate):

- unique identification of the plant being manufactured
- identification of all the major assemblies and all the items manufactured to a published technical standard
- title of the published technical standard(s) used
- engineering principles used if not captured within the published technical standard used, and
- where the entire published technical standard is not used, identification of either the clauses that are used or not used.

Design registration

96. Certain plant must be design registered before it can be used in the workplace. OHS Act s40 and OHS Regulations r125 A list of plant that must be design registered is contained in Schedule 2 of the Regulations and provided at **Appendix B**. A designer may register the design before having it manufactured. If the design is registered by the designer of the plant they should provide the design registration number to the manufacturer.

97. If the plant has not been design registered by the designer, the manufacturer may register the plant design.

98. The manufacturer should pass on the design registration number to the person being supplied with the design registered plant.

99. If the manufacturing process has involved modifying an already registered plant design in such a way that it requires new risk controls, the altered design must be registered before the plant can be used in the workplace. OHS Regulations r126, OHS Act s40(2)

100. For more information regarding plant design registration, the design registration process and design verification, go to Part 4 of this Code.

Part 2 – Duties of designers, manufacturers and suppliers

Part 2.3 – Suppliers

101. A person who supplies plant who knows, or ought reasonably to know, that the plant is to be used at a workplace (whether by the person to whom it is supplied or someone else) must:
    - ensure, so far as is reasonably practicable, that it is safe and without risks to health if it is used for a purpose for which it was designed, manufactured or supplied, and
    - give the following information to each person to whom they supply the plant:
        - the purpose or purposes for which the plant was designed, manufactured or supplied, and
        - any conditions necessary to ensure that the plant is safe and without risk to health if it is used for a purpose for which it was designed, manufactured or supplied. OHS Act s30(1)
102. These supplier duties apply to new, used or hire plant (regardless if the plant is sold or hired on a 'one-off' basis or is part of the suppliers day-to-day business operations).

Supply includes supply and resupply by way of sale, exchange, lease, hire or hire-purchase, whether as principal or agent. OHS Act s5

Identifying and controlling risks

103. A supplier can ensure that plant is safe and without risk to health by reviewing documentation provided from the manufacturer, importer or previous owner of the plant. This information may confirm that the risks associated with the plant have been controlled. Useful documents include documents associated with the safe operation of the plant, such as service and operations manuals.
104. Where a supplier of plant for use at a workplace has concerns that the risks associated with the plant have not been controlled so far as is reasonably practicable, they need to discuss this with the manufacturer and/or designer to ensure that any risks are controlled.
105. Used plant is more likely to have outdated or missing safety features. Suppliers of used plant should consider retrofitting or modifying the plant to improve its safety, having regard to improvements to that type of plant since its manufacture.
106. The supplier needs to identify any components of the plant that are unserviceable and could constitute a hazard during operation. Where plant is identified as not fully serviceable, the supplier needs to inform the person to whom the plant is being supplied that the plant should not be used until it is fully serviceable. It is recommended that this information is provided in writing.
107. If the supplier is unable to obtain sufficient information from the manufacturer, importer or previous owner to be satisfied that hazards have been sufficiently identified and risks controlled, they must ensure that any risks are controlled, so far as is reasonably practicable. OHS Act s30(1)(a)
108. All modifications or alterations to the design of the plant or a component of plant should be undertaken by the original designer. If the supplier or any other person modifies the design of the plant or component of plant without that alteration or modification being designed by the original designer, that person will take on the duties of a designer. This also includes the provision of information and record keeping duties detailed in paragraphs 70–78 of this Code.

Part 2 – Duties of designers, manufacturers and suppliers

109. If the supplier or any other person manufacturers the modifications or alterations to the plant or component of plant, that person will take on the duties of the manufacturer. This also includes the provision of information and record keeping duties detailed in paragraphs 92–95 of this Code.

110. It may also be useful for suppliers to read the information for employers on controlling risks in Parts 3.3, 3.4, 3.5 and 3.6 of this Code.

Providing information

111. A supplier of ***both new and used*** plant must, at the time of supplying the plant, give the person receiving the plant information:

- about the purpose or purposes for which the plant was designed and manufactured
- about any conditions necessary to ensure that the plant is safe and without risk to health if it is used for a purpose for which it was designed and manufactured
- relating to the installation, commissioning, decommissioning, use, transport, storage and, if the plant is capable of being dismantled, dismantling of the plant
- about any hazards and risks associated with the plant which were identified by the designer
- about the systems of work and competency of the operators that are necessary for the safe use of the plant
- about testing and inspections to be carried out on the plant
- about emergency procedures (if any) that are required to be implemented if there is a malfunction of the plant, and
- given to the manufacturer by the designer in response to the manufacturer advising the designer that a hazard in the design does not have a risk control. (see paragraphs 92–93) OHS Act s29(1)(c)(i) and (ii) and OHS Regulations r89(1) and r90(1)(a)

112. In addition to the above information, a supplier of ***used plant*** must also give the person receiving the plant any records which are required to be kept by a previous owner, which are in the possession of the supplier. OHS Regulations r90(1)(b) This information could include data sheets, test certificates, operations and service manuals, reports and safety manuals.

113. If the supplier has additional information relating to safe use of the plant (eg alerts, procedures, information from relevant industry associations or such sources), these need to be passed on to the person to whom the plant is being supplied.

114. If a supplier of new or used plant does not possess all or any of the information detailed in paragraphs 111–112 they must inform the person to whom the plant is being supplied, in writing, that the plant is being supplied without the information required and that it should not be used as plant without that information. OHS Regulations r89(2) and r90(2)

115. If a supplier cannot provide all or any of the information they should inform the person to whom they supply the plant that the information they require may be obtained from a suitably qualified person (eg a person with the knowledge, skills and experience to provide the required information and/or advice).

116. A supplier of plant who supplies plant under a hire purchase agreement or hire purchase contract does not have a duty to provide such information. OHS Regulations r89(3) and r90(3)

Part 2 – Duties of designers, manufacturers and suppliers

117. A **hire purchase agreement** can be a substitute to a business loan whereby the party hiring the equipment pays the financier rent. The financier will continue to own the goods until the hirer makes the final payment. Typically, hire purchase agreements have fixed regular payments. When such arrangements are in place, **the financier of the hire purchase arrangement** does not have duties to provide the information under regulations 89(3) and 90(3) of the OHS Regulations. These duties remain with the person who provides the plant to the customer for use.

118. A supplier of plant that is to be used as scrap material must, when supplying that plant to a person, advise the person in writing that the plant is intended for use as scrap material. Scrap material does not include spare parts. OHS Regulations r91

Supply of tractors and roll-over protection

Tractor means a powered vehicle, primarily designed to haul and provide power for agricultural or horticultural machinery or implements, by way of a power take-off rotating shaft or other mechanical means, but does not include earthmoving machinery or a passenger vehicle. OHS Regulations r5

119. A supplier of plant must not supply a tractor manufactured in, or imported into Victoria on or after 1 July 1981 unless it is fitted with roll- over protection. This prohibition only applies to a tractor that conveys its power directly to the ground by wheels, but does not apply to:

- a tractor supplied for use at a workplace in circumstances where there is no likelihood of the tractor overturning
- a tractor weighing less than 560 kilograms (the weight is based on the tractor being taken in the lightest form in which the tractor is normally available for retail sale when new and without water, fuel or lubricating oil), or
- a tractor that the supplier intends to be used for parts or scrap material. OHS Regulations r92

120. In the vast majority of circumstances, in relation to post-1981 tractors, roll-over protection will need to be fitted prior to sale. There may be occasions where a supplier would know that there is no likelihood of a tractor overturning (eg where a tractor is being supplied to perform exclusively as a stationary power source). However, it is clear from accident statistics that in many conditions any tractor may overturn, even on level terrain. For example, a tractor may overturn if used: on sloping terrain; on rough, slick or muddy surfaces; near concealed objects, holes, ditches or embankments; or to tow or pull objects. Refer to **Appendix C** for Australian Standards relevant to roll-over protection for tractors.

Hiring and leasing plant

121. A supplier of plant who hires or leases plant must ensure that it is inspected and maintained to ensure that any risk arising from its use is controlled so far as is reasonably practicable between any hiring or leasing of the plant. OHS Regulations r93

Between any hiring or leasing does not include an extension to the hiring or leasing period for the same user (that is, hiree or lessee). The supplier may consider an extension to the period of contract as being an extended lease provided that appropriate mechanisms are put in place to ensure adequate inspection and maintenance is carried out during the lease.

Part 2 – Duties of designers, manufacturers and suppliers

Inspection and maintenance

122. As part of the duty to inspect and maintain plant under regulation 93 of the OHS Regulations, the supplier needs to ensure that any excessive wear or damage to the plant is identified and rectified. The supplier should follow the designer's or manufacturer's specifications for inspection and maintenance.

123. Measures to achieve compliance should include developing a regular inspection process so that any new or increased risk is identified. This can be done by implementing a program of regular testing of the plant. The assessment should consider factors such as how often the plant is used and the operating and environmental conditions during the period.

124. Where plant is to be transferred between hirees or lessees without being returned to the supplier's depot, the supplier must ensure the plant is inspected and maintained before transfer. For example, this may be done 'on-site' without returning the plant to the depot.

125. Where the plant is hired or leased for an extended period of time, the supplier should make arrangements with the hiree or lessee to have the plant inspected and maintained, giving proper regard to the designer's or manufacturer's specifications for inspection and maintenance.

126. If a person who operates the plant is supplied with the hired or leased plant, the supplier should prepare a comprehensive checklist and authorise the operator to carry out these checks between hirings and leasings. In this case, the supplier needs to ensure the operator is competent to apply the checks and conduct, or arrange to have conducted, the maintenance identified by the checklist.

127. If agreement is reached that the hiree or lessee undertake the necessary inspections and maintenance, the supplier needs to ensure that either during the hire or lease of the plant or at the conclusion of the hire or lease, all outstanding records associated with inspections and maintenance of the plant are obtained from the hiree or lessee.

Record keeping

128. A supplier who hires or leases plant must make a record of any inspection or maintenance carried out on the plant. A supplier of plant who hires or leases plant must keep the record while the supplier has management or control of the plant. OHS Regulation 94

Agents who sell plant

129. A person supplying plant (including plant supplied for use as scrap material) is considered to be an agent if that person has not taken possession of the plant or has taken possession of it solely for the purpose of passing possession on to a purchaser.

130. A person who sells plant as an agent of a supplier (eg an auctioneer) must obtain the information or records (as the case may be) that are required to be given by a supplier from the person engaging the agent before conducting the sale and pass it on to the person who purchases the plant on completion of the sale (see paragraphs 111–116). OHS Regulations r95 An agent does not have the same information provision requirements as a supplier and does not have duties in relation to roll-over protection of tractors.

Part 2 – Duties of designers, manufacturers and suppliers

Design registration

131. Certain plant must be design registered before it can be used in the workplace. OHS Act s40 and OHS Regulations r125 A list of the type of plant that must be design registered is contained in Schedule 2 of the OHS Regulations and provided at **Appendix B**. A designer or manufacturer may register the design before it is made available for supply. If the design has been registered the design registration number needs to be provided to the supplier.

132. If the plant has not been design registered by the designer or manufacturer, then the supplier needs to register the plant design.

133. The supplier should pass on the design registration number to the person who is being supplied with the design registered plant.

134. If the supplier, agent or any other person modifies plant that has already been design registered in such a way that it requires new risk controls, the altered design must be registered before the plant can be used in the workplace. OHS Regulations r126, OHS Act s40(2)

135. For more information regarding plant design registration, the design registration process and design verification go to Part 4 of this Code.

Part 3 – Duties of employers

Part 3.1 – Hazard identification

136. Employers must, so far as is reasonably practicable, identify all hazards associated with the installation, erection, commissioning, decommissioning, dismantling and use of plant at the workplace where it is used and the systems of work associated with the plant. This is the first step in the risk management process. OHS Regulations r97

137. There are three broad sources of hazards relevant to plant. They are:

- ***materials or items being processed or internal sources of energy*** (eg drawing in or trapping, entanglement, shearing, cutting, impact hazards, crushing, stabbing and puncturing, friction, wearing, ejection, hot or cold hazards, other contact hazards, noise and release of hazardous substances)
- ***location of the plant*** (eg its stability, including whether it could roll or fall over, the environment it operates in, and its proximity to other structures), and
- ***systems of work*** related to plant (eg manual handling injuries caused when putting material into an item of plant).

Appendix D provides some examples of the hazards and sources of hazards that should be considered during hazard identification.

138. 'Systems of work' describes a wide range of activities which can contribute to safe work. Systems of work should include, as applicable:

- policies and procedures for purchasing plant
- the definition and allocation of roles, responsibility and accountability within the workplace
- the arrangements or systems in place to ensure quality of instruction, competency assessment and/or supervision
- systems of communication while performing a task or within the organisation generally
- the organisation of work including (as applicable):
  - the speed of the process line
  - traffic around the plant (people and vehicles)
  - time spent on repetitive tasks
  - the amount and type of manual handling required
  - shift work arrangements
  - any production incentives that may affect health and safety
- the arrangements or systems in place to ensure skill and experience of the employees and contractors allocated to particular tasks, and
- work practices and procedures including maintenance and repair schedules and emergency procedures (eg first aid and evacuation).

Part 3 – Duties of employers

How to identify hazards

139. When identifying hazards, employers need to consider all the activities that may be carried out during the life of the plant. Inspect each item of plant in the workplace and observe how it is used.

140. The following factors should be considered when identifying plant hazards:

- tasks undertaken such as operating, clearing blockages, cleaning, adjusting, maintaining, repairing or working on plant
- location such as proximity to other work processes and other fixed or portable plant
- installation of the plant so it is safe and has been done correctly
- production processes such as forming and finishing
- walkways and pedestrian access in the vicinity of plant, including access for routing, operating and maintenance activities
- safe transportation of mobile plant, and
- individual factors such as age, background, knowledge, experience and self-management skills of those who might be operating or come into contact with plant and levels of instruction, training and supervision that might be required.

141. Employers should not limit themselves to situations they have experienced. They need to try to anticipate all possible hazards associated with the plant, including taking into account the current state of knowledge. This must involve consultation with employees and contractors who use or will use the plant, and HSRs, as they can provide vital information on the dangers associated with each item of plant. OHS Act s35 See paragraphs 22 to 26 for more information on consultation. Employers should also consider information from sources such as designers, manufacturers, suppliers, WorkSafe and technical publications.

142. Hazards associated with plant may be identified by walking through the workplace and observing how employees and contractors use the plant, especially if:

- there have been changes in the environment in which the plant is used
- the plant is damaged
- the plant is not working properly or is difficult to use, or
- the plant is not being used as it is supposed to be used.

143. Reviewing information may also help identify which plant is hazardous and how it may cause harm. Employers should look at records of injuries, incidents and absenteeism, OHS or hazard inspection reports, and compensation claims made in relation to injuries caused by plant.

Part 3 – Duties of employers

Hazard identification for similar plant

144. Where an employer is responsible for similar plant in a number of different work areas or workplaces, a single (or generic) hazard identification may be undertaken for a class of plant rather than each individual item of plant if:
    - all the plant in the class have similar functions and productive capacity; and
    - the identification carried out for the class of plant does not result in any person being subject to a greater, additional or different risk to health or safety than if the identification were carried out for each individual item. OHS Regulations r75

145. For example, where multiple items of plant of the same design are used in similar circumstances (eg same systems of work and environment), a single hazard identification in respect of one or a representative sample of items of plant in that class is sufficient, provided that the risk to a person is no different than if the processes were applied to each item of plant individually. This avoids the requirement to unnecessarily duplicate the process.

146. An employer must not undertake hazard identification for a class of plant in circumstances where any person will be subject to a greater, additional or different risk to their health or safety for example where the is a range of physical attributes that could change the level of risk (eg height variations). OHS Regulations r75(2)(b)

Part 3.2 – Assessing risks

147. Once the hazards associated with plant used in the workplace have been identified, the employer needs to ensure that the risks associated with those hazards are assessed to determine the best way to control the risks.

148. A formal **risk assessment** is unnecessary if knowledge and understanding about the risk and how to control it already exists. However, if an employer is unsure how to control a risk associated with an item of plant, a risk assessment can help. For example, it is not necessary to undertake an assessment if an employer is aware of a known risk control to address the risk of plant drawing in or trapping body parts (eg isolation or guarding) and the risk can be controlled immediately using that control.

How to assess risks

149. A risk assessment involves examining the hazards associated with plant in more detail to assess whether they give rise to a risk and therefore have the potential to cause injury. A risk assessment helps determine what must be controlled and how this can be done. Employers must consult with employees, contractors and HSRs when undertaking a risk assessment. OHS Act s35

150. A risk assessment can assist in determining:
    - how critical the risk is
    - whether existing risk controls are effective
    - what action is required to control the risk, and
    - how urgently action needs to be taken.

Part 3 – Duties of employers

151. To assess the level of risk for a plant hazard, the following needs to be considered:
    - the likelihood of the event occurring
    - the frequency that employees and contractors are exposed to the hazard – eg, if plant is used constantly, the risk could increase compared to the occasional use
    - the circumstances that could increase the severity of an injury or incident, and
    - the current state of knowledge.
152. Each of the identified risks associated with a hazard should be analysed to develop an understanding of how harm can be caused. Employers should consider:
    - existing health and safety controls
    - how work is actually being carried out rather than relying on written manuals and work procedures
    - abnormal situations, as well as how things are normally meant to occur
    - maintenance and cleaning, as well as breakdowns of equipment and failures of health and safety controls.
    - the type of conditions the plant is used in (eg in a confined space, muddy or dusty environment)
    - the condition of the plant (eg missing safety features found on new plant, reliability or need for maintenance)
    - other people or items of plant in the vicinity
    - the type of access provided during the installation, operation or maintenance of plant and in an emergency
    - the types of work practices and procedures that exist in relation to plant safety (eg isolation to carry out maintenance, emergency shut-down)
    - the type of training, information, instruction and/or supervision provided to employees and contractors who may use or be exposed to plant
    - the competency of the operators, and
    - systems of work, eg:
        - the speed of the process line
        - pedestrian and traffic around the plant
        - time spent on repetitive tasks
        - shift work arrangements, and
        - any production incentives that may affect health and safety.

Part 3 – Duties of employers

Part 3.3 – Controlling risks: general duty

153. Employers must control any risk associated with the use of plant in the workplace so far as reasonably practicable. OHS Act s21(2)(a) and OHS Regulations r98

154. Employers must consult with their employees (including any HSRs and independent contractors) when making decisions about how to control risks. OHS Act s35 Consulting with employees is likely to result in better risk control measures because it gives them the opportunity to contribute ideas, participate in trials and mock-ups for new risk control measures, and is likely to improve the uptake of risk control measures when they are implemented. In some instances, discussions with different people in the supply chain (eg suppliers, customers) could also assist.

155. When investigating options for risk control measures, employers also need to consider whether a risk control measure will introduce additional risks (eg the introduction of a forklift to move heavy stock could introduce a risk to pedestrians).

156. The following hierarchy of control must be followed when controlling risks associated with plant. OHS Regulations r98

Hierarchy of control

157. The ways of controlling risks associated with plant are ranked from the highest level of protection and reliability to the lowest. This ranking is known as the hierarchy of control (see Table 1). The primary duty for an employer is to eliminate any risk associated with the plant, so far as reasonably practicable. OHS Regulations r98(1) Where a risk cannot be eliminated, an employer must work through the hierarchy of control in order to reduce the risks so far as reasonably practicable. OHS Regulations r98(2)

158. If the risk cannot be eliminated, it is important to select the controls that most effectively reduce the risk in the circumstances. This may involve a single risk control or a combination of two or more different controls. For example, protecting employees and contractors from flying debris when using a concrete cutting saw may involve isolating the work area, guarding the blade and using PPE such as face shields.

159. When determining the preferred risk control, employers need to consider the time needed for implementation and whether it is necessary to implement interim risk controls, while the preferred risk control is being prepared. For example, if an entanglement risk is assessed as requiring control, it may take some time to modify the plant to incorporate the necessary guards or safeguarding system. Employers need to immediately implement interim risk controls, such as barricades and safe systems of work until the modifications are complete, if safe to do so. In some circumstances it will be necessary to withdraw the plant from use until new controls are implemented.

Part 3 – Duties of employers

Table 1 – Hierarchy of control

Level	Action
1. Eliminate the risk	***Elimination*** – by replacing existing plant with new plant that has the same function but does not have the hazards that were associated with the old plant. Adoption of purchasing policies that take account of health and safety when buying plant for the workplace can often eliminate risks.
2. Reduce the risk with one or more of the following: ▪ **substitution** ▪ **isolation** ▪ **engineering controls**	***Substitute*** – using a cordless drill instead of an electric drill if the power cord is in danger in being cut, using electric tugs or pedestrian operated industrial lift truck ('walkie' stacker) instead of a forklift. ***Isolate*** – isolation of the plant can be achieved by constructing a booth from which the plant can be operated remotely, or placing the plant behind a separating wall. Using ***engineering controls*** – such as design controls, guarding and barriers.
3. Reduce the risk using administrative controls	***Administrative controls*** – warning signs, use of 'lock-out' systems, providing appropriate information, instruction, training and/or supervision.
4. Reduce the risk using personal protective equipment (PPE)	***PPE*** – includes ear muffs, respirators, face masks, hard hats, gloves, aprons, high visibility vests and protective eye wear.

Elimination of risk

160. Many risks associated with plant can be addressed prior to the introduction of plant into the workplace, at the planning and purchasing stages.

161. The best way to eliminate risk is to remove the plant (including parts of the plant) or discontinue the process involving the plant that gives rise to the risk. Where it is decided to stop using an item of plant, the plant should be decommissioned and removed from the workplace.

162. If it is not reasonably practicable to eliminate the risks associated with the plant, an employer must reduce the risks, so far as is reasonably practicable, by using one or more of the following: OHS Regulations r98(2)

- ***substitution*** – substituting the plant with plant that is safer
- ***isolation*** – separating the risks associated with the plant from people by either distance or physical barrier, or
- ***engineering controls*** – changing the physical characteristics of the plant. These can take the form of:

– design alteration – modifying the design of a piece of plant means a change to the way the plant works or its operating characteristics. If the design is modified, the risk management process should be repeated,

– installation of guarding to prevent employees and contractors getting clothing or body parts caught by a piece of plant, or prevent work pieces being expelled from the plant and striking people (note that there are specific requirements in the OHS Regulations in relation to the use of guarding as a risk control – see Part 3.4 of this Code), and

– risks controls such as enclosures, local exhaust ventilation or pedestrian sensing systems, speed governing mechanisms and interlocked seatbelts.

163. ***Administrative controls and PPE*** are the least effective in controlling risks because they rely on human behavior and supervision. In most cases, administrative controls involve the use of systems of work to control the risk. If PPE is used, the employer must ensure that it is appropriate, fits correctly, and is well maintained. OHS Regulations r18 and r98(4)

164. Employers may use administrative controls and PPE to supplement higher level risk controls or as an interim risk control until a more effective way of controlling risk can be used. Employers should not rely exclusively on administrative controls and PPE when higher level risk controls are reasonably practicable. OHS Regulations r98(3) and r(4)

Maintaining risk controls

165. Employers must ensure that any particular risk control is properly installed (if applicable), used and maintained. OHS Regulations r18 The purpose of maintaining risk controls is to ensure that they perform as originally intended and continue to control risks associated with the use of plant in the workplace.

166. Maintenance of risk controls needs to include:

- frequent inspections of physical controls such as guards and scaffolding
- visual checks to ensure risk controls that rely on human behavior are being properly applied by employees and contractors
- testing of equipment and PPE
- preventative maintenance of engineering controls and PPE, and
- any necessary remedial work to ensure physical controls continue to work effectively.

167. Employers should have a maintenance procedure in place to ensure that any defects in risk controls are detected as early as possible.

168. Employers should always look for ways to improve, extend or replace existing risk controls to ensure they continue to control the risk.

Part 3 – Duties of employers

Review of risk controls

169. An employer must review (and if necessary, revise) any methods implemented to control risks associated with plant or associated systems of work in the following circumstances:
    - before the plant is used for the first time in the workplace
    - before any alteration is made to the plant, any change is made to the way the plant is used or its associated systems of work, including a change in the location of the plant
    - if new or additional information about hazards or risks relating to the plant or its associated systems of work becomes available to the employer
    - after the occurrence of a notifiable incident involving plant or its associated system of work
    - if, for any other reason, the risk controls do not adequately control the risks, or
    - after receiving a request from a HSR.

    OHS Regulations r121

170. A HSR may make a request if they believe on reasonable grounds that:
    - any of the circumstances listed above exist
    - the employer has failed to properly review risk controls, or
    - in conducting a review of, or revising the risk controls, the employer has failed to take into account any of the circumstances listed above (eg the HSR believes that the employer has failed to consider a change to a system of work that may increase risk, during their review of risk controls).

171. For more information about the risk management process and how it can be utilised in relation to specific items of plant, specific industries or in relation to specific hazards see **worksafe.vic.gov.au**.

Part 3.4 – Controlling risks: specific risk controls

172. In addition to the general duty to control risks associated with plant used in the workplace, employers have additional duties when using any of the following specific risk controls.

Guarding

173. If an employer uses guarding as a risk control, they must, so far as is reasonably practicable, ensure that the guarding designed for that purpose will prevent access to the danger area of the plant.

    OHS Regulations r99(2)

For the purposes of this Code, **guarding** is a physical or other barrier that can perform several functions including:

- preventing contact with moving parts or controlling access to dangerous areas of plant
- screening harmful emissions such as radiation
- reducing noise through the application of sound-absorbing materials, and
- preventing ejected parts or off-cuts from striking people.

174. Employers must ensure that guarding used as a risk control is difficult to bypass or disable, whether deliberately or by accident, and does not create a risk in itself.

    OHS Regulations r99(4)

175. If the employer uses guarding as a risk control in relation to plant that contains moving parts that may break or cause work pieces to be ejected from the plant, the employer must ensure, so far as is reasonably practicable, that the guarding will control the risks in relation to those broken and ejected parts or workpieces. OHS Regulations r99(5)

176. Any guarding an employer uses as a risk control associated with plant may be of a type that is able to be removed to allow convenient repair, servicing, maintenance and cleaning of the plant when it is not in normal operation. OHS Regulations r99(6)

Guarding hierarchy

177. Numerous types of guarding systems are available to guard dangerous parts of plant to prevent access by any person or body part. Employers must consider these types of guarding in a priority order, or guarding 'hierarchy of control'. OHS Regulations r99

178. Where guarding is used an employer must ensure that:

- if access to the area of the plant requiring guarding is not necessary during operation, maintenance or cleaning of the plant, the guarding is a ***permanently fixed physical barrier***;
- if access to the area of the plant requiring guarding is necessary during operation, maintenance or cleaning of the plant, the guarding is an ***interlocked physical barrier*** that allows access to the area being guarded at times when that area does not present a risk and prevents access to that area at any other time;
- if it is not reasonably practicable to use guarding referred to above, the guarding used is a ***physical barrier that can only be altered or removed by the use of tools***; or
- if it is not reasonably practicable to use guarding referred to above, a ***presence-sensing safeguarding system*** is used that eliminates any risk arising from the area of the plant requiring guarding while a person or any part of a person is in the area being guarded. OHS Regulations r99(3)

179. As employers assess the practicability of guarding and the hierarchy of control, they also need to consider what other risk controls may be needed in conjunction with the guarding to prevent access to the danger points or areas of the plant (eg training, supervision).

Permanently fixed physical barrier

180. A permanently fixed physical barrier provides the highest level of protection against hazards. Examples of fixed guards of this type would be a steel casing enclosing an electric motor and a casing enclosing the gears or power transmission of an item of plant. Permanently fixed physical barriers are normally used where there is no requirement to access the components being guarded. They cannot be removed without dismantling the plant, therefore removal of fixed barriers makes the plant inoperable. Permanently fixed physical barriers are generally designed to be welded or incorporated into the body of the plant.

181. The risk associated with many hazards can be eliminated with a permanently fixed physical barrier. In Figure 2, the plant's power transmission is not required to be accessed during normal operation, maintenance or cleaning. It is therefore practicable to have the gear arrangements enclosed in a purpose designed gearbox housing to prevent access to moving gears. This eliminates the risk associated with entanglement.

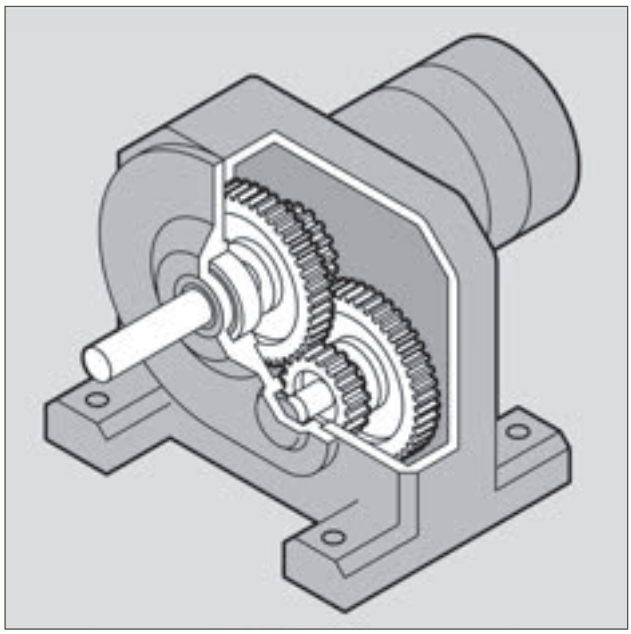


Figure 2 – Cut-away view of a fixed physical barrier encasing the gear assembly and heavy duty electric motor

Interlocked physical guard or barrier

182. An interlocked physical guard or barrier is a guard or barrier which is connected to either the power or control system of the plant. The interlock prevents the plant from operating unless the guard or barrier is closed. The interlocking system could be mechanical, electrical, hydraulic, pneumatic or a combination of these.

183. Interlock guards work with an interlocking device so that, together with the control system of the plant, they can have a number of the following functions:

- the hazardous areas covered by the guard cannot operate until the guard is closed
- if the guard is opened while hazardous plant functions are operating, a stop command is given that will either shut off the power to the area being guarded, or effectively isolate the area being guarded
- the interlocking system incorporates guards that close and lock so that the guard remains locked until the risk associated with the hazardous function covered by the guard has disappeared (this type is recommended when time is needed for moving parts to come to rest), or
- when the guard is closed, the hazardous machine functions covered by the guard can operate, but the closure of the guard does not by itself start the hazardous plant function (in this case the plant is manually restarted via appropriate operator controls).

184. Interlocked guards are ideal for situations where regular operational access to the area requiring guarding is required (eg to clear jammed material, or loading materials into a machine). It is also effective in reducing the risks associated with danger areas of the plant as long as:

- the interlocking system is reliable or has a back-up system
- the interlocking system is designed to be 'fail safe' (ie if there is a failure in the interlocking system, the machine cannot operate), and
- in cases where the danger areas being guarded take a period of time to come to rest after access to the area is sought, the interlocking system prevents access to the danger area until any moving parts have come to rest.

185. Where guards are power operated, the employer needs to consider any hazards introduced by the powered movement of the guard.

186. In Figure 3, the hinged top guard on the food mixer has a positively operating insertion key which automatically cuts off the plant's power when the lid is opened or removed. This allows the blades to come to rest. If the moving parts do not stop immediately once the power is cut off, then a guard should be of the design that it remains closed and locked until the moving parts have stopped.

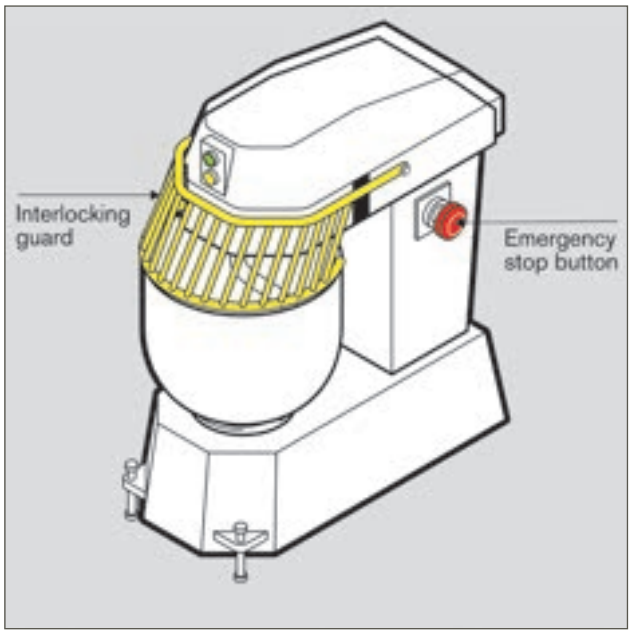


Figure 3 – Food mixer with interlocking guard

Physical barrier

A **fixed guard** is a physical barrier which has no moving parts and offers protection only if it is in the correct position. Fixed guards may be fixed enclosing guards or fixed distance guards.

187. A fixed enclosing guard prevents access to a particular part of plant by enclosure (eg a bolted guard over the inspection port of a gear transmission, or wire mesh guard bolted over belt pulleys).

188. A fixed distance guard does not completely enclose a hazard but prevents access to any dangerous part or area by its size and ability to keep the operator at a safe distance from the hazard. For example, a fixed distance guard for a brake press would allow the operator to introduce the material to be pressed while preventing the operator's fingers from encroaching into the immediate press area. A fixed distance guard can therefore provide protection against accidental access to moving parts and trapping spaces. The openings are wide enough only to feed material to the press. The guard is adjusted to the minimum gap to prevent access to the trapping space.

189. An adjustable guard is generally used for repetitious dedicated work such as punching and shallow folding of material. Although fixed guards offer the next highest level of protection from an interlocked physical barrier, they may not be practicable due to production access requirements or maintenance access requirements. Fixed guards may not be suitable for guarding all areas of the plant during production as they may be visually restrictive.

190. Heavy guards may present a hazard if they need to be regularly removed and replaced by another type of guard. A guard of lighter construction may be considered but it needs to provide an equivalent level of risk control.

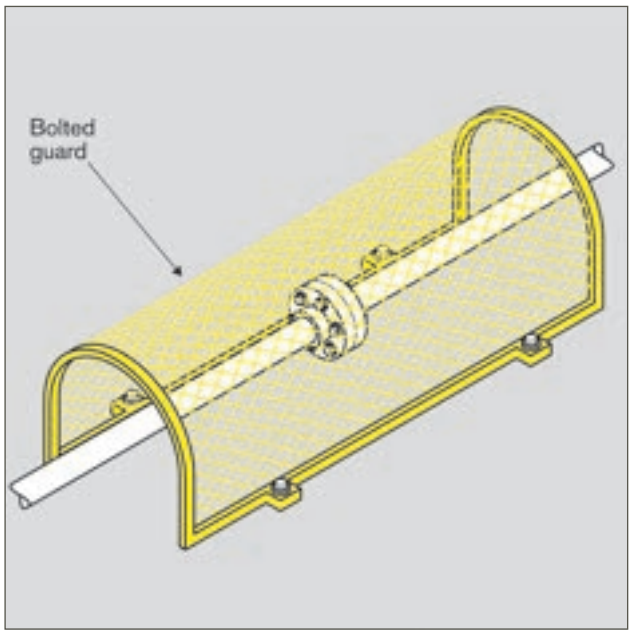


Figure 4 – Bolted guard on rotating shaft or coupling

191. Physical barriers that are secured in position need to be easy to remove and replace, but only with the aid of a tool (eg a spanner, allen key or similar tool), and only when the machine is not in operation (see Figure 4). Guarding with hand adjustable fasteners such as wing nuts or wedge inserts should not be used, as these devices can be easily bypassed and introduce additional hazards if the fastening device becomes stuck.

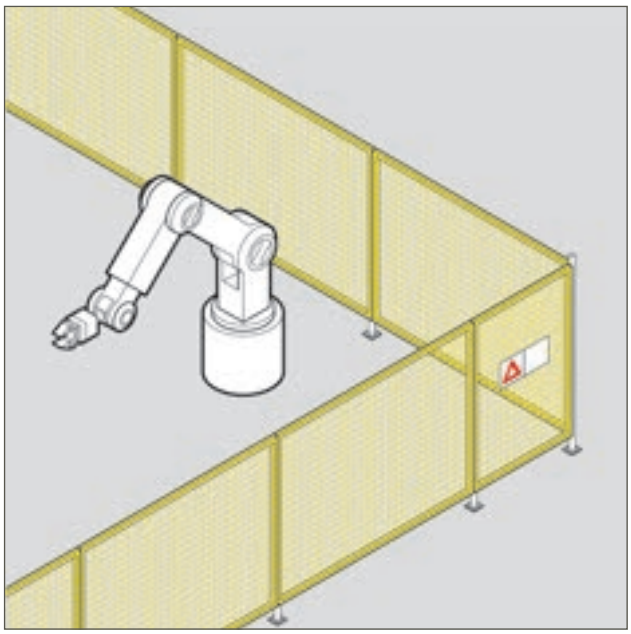


Figure 5 – Perimeter fence guard with fixed panels and interlocking access door

192. Physical barriers such as perimeter fences that are secured in position need to prevent access to dangerous areas. Any access points (eg gates and doors) should incorporate an interlocking system (see Figure 5). Isolation procedures need to be implemented where there is a danger of plant activating while a person is inside the barrier. Full body access areas should use a captive key system or interlock switch (eg when an interlocked door is accidentally closed the machine should not automatically restart).

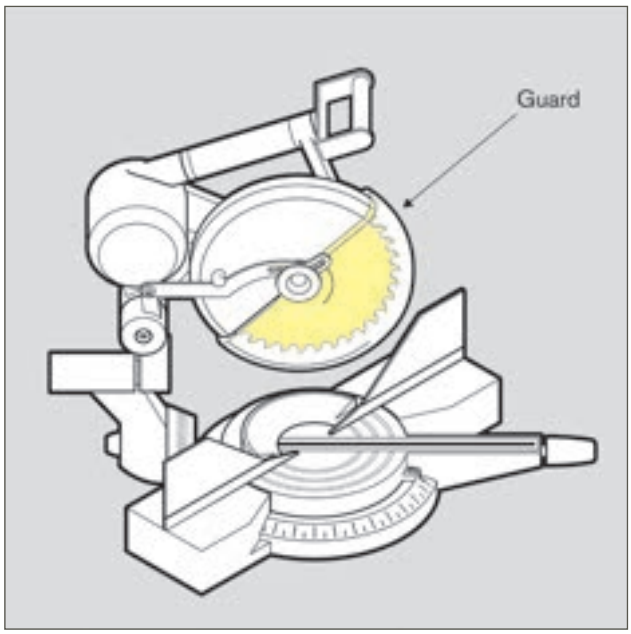


Figure 6 – Self adjusting guard for a drop saw

193. Some physical barriers incorporate movable sections or panels (adjustable components) which allow materials to be fed into the guarded area while still preventing physical contact (see Figure 6).

194. Physical barrier guarding needs to be strong enough to resist normal wear and shock that may arise from failure of the parts or processes being guarded; and to withstand prolonged use with a minimum of maintenance.

Presence sensing safeguarding systems

A **presence-sensing safeguarding system** includes:

- a sensing system that is an electro-sensitive or pressure sensitive system that employs optoelectronic or pressure sensitive devices to perform a sensing and a control function or uses other technologies to perform a sensing and control function,
- the interface between the final switching devices of the sensing system and the machine primary control elements, and
- the machine stopping capabilities, by which the presence of a person or part of a person within the sensing field will cause the dangerous parts of a machine to be brought to a safe state.

195. Presence sensing or proximity sensing guards are protective devices that have a proximity reaction. A switching command is initiated by the variation of optical, electrostatic or other fields. These include electro-optic action (light barriers, light curtains, light screens) and ultrasonic and protective devices with a capacitive or inductive action.

196. A presence sensing device is part of an overall presence sensing safeguarding system. This system comprises a combination of the presence sensing device and the plant's control elements (which include the primary control elements – any clutch, braking system or other arrangements) whereby the dangerous parts of a machine are brought to a safe state when the sensing field is interrupted.

197. These types of guards are very flexible as they allow a wide range of applications. They are able to be used for repetitive and dedicated applications and all facets of plant production.

198. Presence and proximity sensing devices require high levels of integrity and reliability of the guard control system. Generally, specialist skills are required to verify the integrity of the guarding system.

199. Presence sensing safeguarding systems usually are an unseen or light source barrier operating as a trip device. Upon detecting an intrusion of an object into the danger area, such as part of a person's body, the system shuts off power to the plant, and may, depending on the plant, stop the existing motion.

200. Photoelectric light beams, laser scanners and foot pressure mats are examples of these types of guards. They rely on sensitive trip mechanisms and the machine being able to stop quickly, which may be assisted by a brake (see Figures 7 and 8).

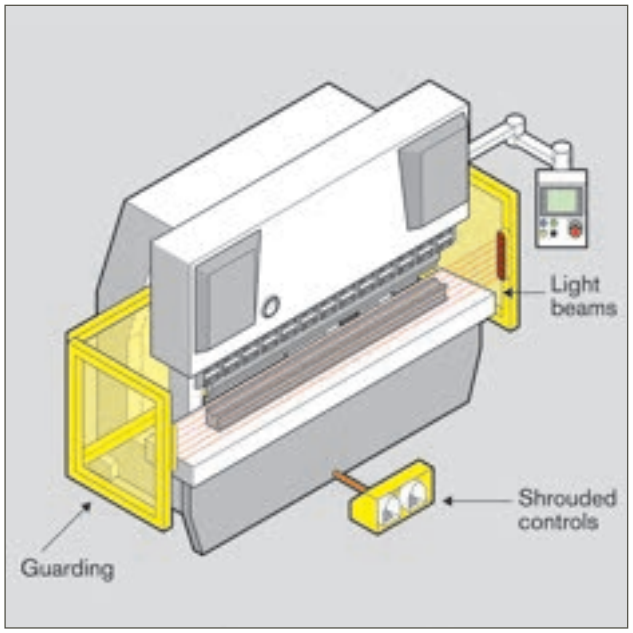


Figure 7 – Paper cutting guillotine with a combination of guards including a photoelectric light curtain

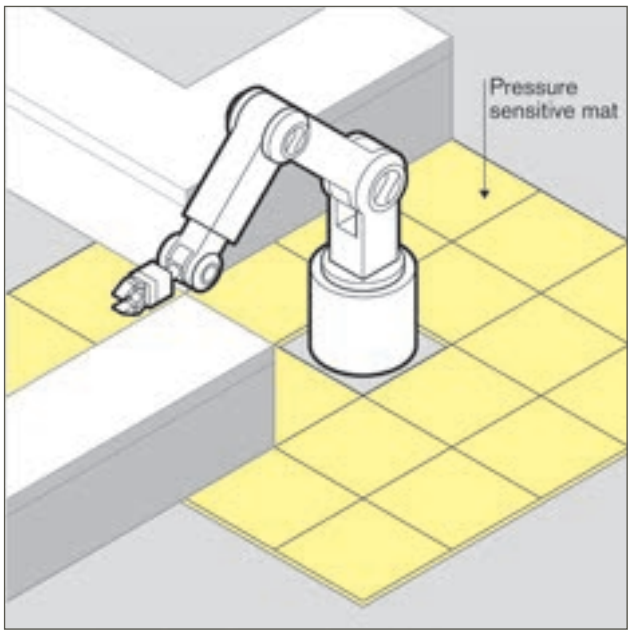


Figure 8 – Pressure sensitive mat

201. Effective presence-sensing safeguard systems require the selection of a trip device appropriate for the work being done, and the correct location of beams with light activated devices, taking into account speed of entry and machine stopping time.

Environmental factors

202. When using a guard, employers need to consider the environment in which it will be used. Some examples of poor guarding selection include: guards on high frequency welders that become electrically charged, heating of guards in hot processes and wire mesh guards on machines emitting splashes.

203. If a guard is likely to be exposed to corrosion, employers need to consider corrosion-resistant materials or surface coatings.

Part 3 – Duties of employers

Colour coding

204. Employers should consider the safety benefits of a colour coding system. For example:

- use high visibility yellow, provided it is different to the plant's colour, so that it can be clearly seen when a guard has been removed or when it is not in its proper place, and
- paint the surfaces behind the guard a contrasting or bright colour so that when the guard is removed, the exposed colour is clearly visible and it is easy to identify that the guard has been removed, alerting employees and contractors to possible danger.

205. For some types of plant, it might be necessary to choose colours that contrast with work pieces, where these need to be visible through the guarding (eg black mesh guarding).

Removal of guarding

206. If any type of guarding is removed for the purpose of maintenance or cleaning, it needs to be replaced before the plant is put back into normal operation. The plant should not be able to restart unless the guarding is in place. When removing guarding, eliminate the energy source by disconnecting the power supply, locking off motive power sources and de-energising the plant.

Guarding and insulation from heat and cold

207. An employer must ensure, so far as is reasonably practicable, that any pipe or other part of plant associated with heat or cold is adequately insulated or guarded to control any risk to health or safety. OHS Regulations r100

Isolating procedures – 'Lock out / tag out'

208. An isolation procedure is a set of predetermined steps that need to be followed to keep plant and its components from being set in motion or being re-energised, in order to protect the safety of employees during plant inspection, repair, maintenance or cleaning activities.

209. To ensure that isolation procedures are effective employers should:

- have the isolation procedure documented and accessible to the relevant employees in the workplace
- ensure information, instruction and training is provided to employees and contractors involved with the plant, and
- appoint a supervisor who ensures the isolation procedures are applied.
- review the isolation procedures and test plant operation controls and systems once the plant has been isolated and de-energised to ensure the isolation is effective.

210. Isolation procedures in each workplace could vary in detail because of the differences in plant, power sources, hazards and processes. However an isolation procedure should include the following:

- shutdown of the plant
- identify all energy sources and other hazards
- identify all isolation points
- isolate all energy sources
- de-energise all stored energy
- lock out all isolation points
- tag machinery controls, energy sources and other hazards, and
- test by trying to reactivate the plant without exposing the tester or others to risk.

211. Failure to reactivate the plant means that the isolation procedure is effective and that all stored energies have dissipated. Further measures may be required to safely release these energies (eg for hydraulic or pneumatic pressure, suspended weight or compressed springs).

212. As lock out/tag out is an administrative guarding system, it should not be used as an alternative to interlocking unless it is not reasonably practicable to use interlocking. Lock out/tag out should be used in conjunction with interlocking systems during maintenance and repair.

213. In order to isolate plant, employers need to use a device that effectively locks out the isolation points. These devices include switches with built-in locks and lock-out circuit breakers, fuses and valves. Other devices include chains, safety lock-out jaws (also known as hasps – see Figure 9) and safety padlocks.

Figure 9 – Example of tagged safety lock-out hasp

214. When isolating an energy source, employers should use a lock that allows one or more padlocks to be fitted. If more than one person is working on the plant at the same time, employers need to ensure that each employee and contractor is able to attach a padlock to the device (see Figure 10). This will prevent access to the energy sources while the work is being carried out.

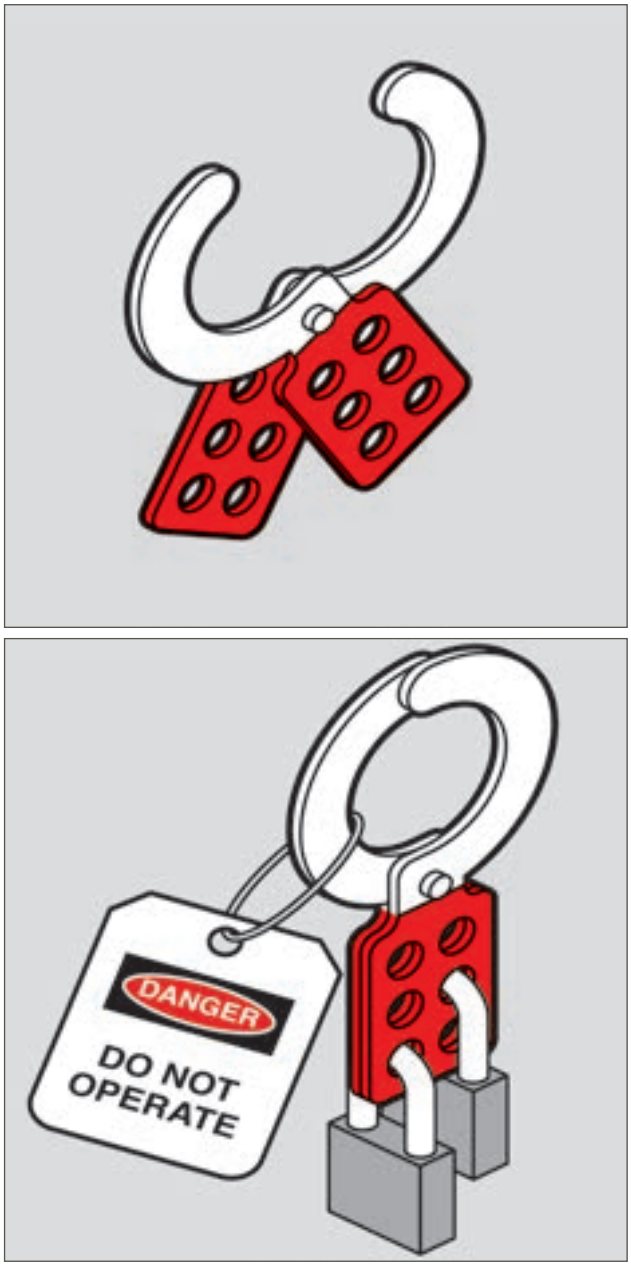


Figure 10 – Lockout tag and padlock

215. Each employee or contractor involved in the maintenance, cleaning or repair of the plant needs to have their own individual lock, key and tag for each isolation point. There should not be a duplicate key for any lock, except a master key that is kept in a secure location and should only be used in an emergency.

216. If more than one energy source is required to be isolated to enable safe shut-down of the plant, the single key to each lock-out device needs to be held by the same person.

217. Tags should only be used as a means of providing information to others at the workplace. A tag should not be used on its own as an isolation device; only a lock is effective at isolating the energy source.

218. For more information about lock out and tagging of plant see **worksafe.vic.gov.au**.

Operator controls

219. The operation of plant could involve the use of various controls (ie operator controls). For example a control for starting the plant, and stopping the plant under normal operating conditions, a control for setting the speed at which the plant performs a function or processes a material (such as the speed that a conveyor belt runs or the speed of a mixer and associated gauges).

Operator controls includes an operational stop control and an emergency stop device. OHS Regulations r5

220. An operational stop control means a device used to stop an item of plant under normal operation, but does not include an emergency stop device.

221. Employers must ensure that any operator controls for the plant are:

- suitably identified on the plant to indicate their nature and function
- located so they can be readily and conveniently operated by each person using the plant
- located or guarded to prevent unintentional activation, and
- able to be locked into the 'off' position to enable the disconnection of all motive power. OHS Regulations r101(1)

222. If there is a need for plant to be operated during maintenance or cleaning, the employer must ensure that the plant is provided with controls that:

- permit operation of the plant while a person is undertaking the maintenance or cleaning of the plant
- cannot be operated by any person other than the person who is carrying out the maintenance or cleaning of the plant, and
- allow operation of the plant in such a way that any risk associated with the activities to any person carrying out maintenance or cleaning is controlled. OHS Regulations r101(2)

223. These requirements do not apply to an emergency stop device. OHS Regulations r101(3)

224. Operator controls should:

- enable the plant to be 'fail safe' (eg when hand pressure is released on a lever controlling up and down movement, the lever will return to the neutral position and movement will stop)
- be within easy reach of the operator
- ensure the intended function can be easily read and understood, especially in the case of dials and gauges

- ensure the movement of the control is consistent with established convention (eg anti-clockwise to open, clockwise to close)
- ensure the desired effect can only occur by intentional operation of a control (eg provision of a starting control)
- withstand the rigours of normal use, undue forces and environmental conditions
- be located outside danger zones, and
- be readily accessible for maintenance.

225. It should only be possible to start plant intentionally (eg by manually activating a control provided for that purpose). The same requirement applies when restarting the plant after any stoppage. Each item of plant needs to be designed to accommodate a control so the plant or its relevant components can be brought to a complete stop safely.

Emergency stop devices

An **emergency stop device** means a device that immediately stops, or effectively isolates the hazardous operation of, an item of plant and requires manual resetting, but does not include an operational stop control. OHS Regulations r5

226. If plant is designed to be operated or attended by more than one person, and more than one emergency stop device is fitted, the employer must ensure that the emergency stop devices are of a type that ensures that the plant can only be restarted if that emergency stop device is manually reset and the start function is manually activated. OHS Regulations r102 (1)

227. If plant includes an emergency stop device (see Figure 1, paragraph 60), the employer must ensure that:
    - the device is prominent, clearly and durably marked and immediately accessible to each operator of the plant
    - any handle, bar or push button associated with the device is coloured red, and
    - the device cannot be adversely affected by electrical or electronic circuit malfunction. OHS Regulations r102(2)

228. Emergency stop devices should not be the only method of controlling risks. They should only be used as a back-up to complement other risk controls.

229. Once engaged, the emergency stop device needs to remain that way. It should only be possible to disengage the emergency stop device by a deliberate action. Disengaging the emergency stop device should not restart the plant. It should only allow the normal starting sequence to be activated.

230. In the case of plant or parts of plant designed to work together, stop controls (including emergency stop devices) should be capable of stopping the plant itself as well as all the equipment interrelated to its operation, where continued operation of any related equipment may be dangerous.

Warning devices

231. If plant has an emergency warning device, the employer must ensure that the device is positioned on the plant to ensure that the device works in the best way (eg flashing lights are located where they will be clearly visible). OHS Regulations r103

Note: Employers have specific obligations in relation to the use of warning devices as a risk control on specific types of plant such as powered mobile plant and industrial lift trucks.

232. For further information go to Part 3.5 of this Code – Controlling risks of specific types of plant.

Automatic audible alarms

233. Automatic audible alarms are usually fitted to warn of forward or reversing movement. These alarms emit an intermittent sound which is activated when the gear or drive lever is engaged.

234. If automatic audible alarms are used, the sound should be distinct and clearly audible only in the hazardous area. If several items of plant are using the same warning device it may be difficult for employees and contractors to be aware of which item of plant is moving or is about to move. It is also possible that employees and contractors will become desensitised to the sound, the working environment may be noisy or employees and contractors may be required to wear PPE such as ear muffs. For this reason it may be more effective to combine audible alarms with other warning devices, such as flashing lights.

Motion sensors

235. Motion sensors also warn with sound. They are sensitive to movement and are activated by motion in the required direction. These devices are suitable for plant that moves suddenly in any direction, such as rollers, bulldozers, excavators, boom lifts, skid steer machines or scissor lifts.

236. Motion sensor alarms usually deactivate after a short time. If a motion sensor alarm is used on plant where the operator has restricted vision, provision should be made to ensure the alarm does not automatically deactivate.

Lights

237. Lights are usually used to warn of forward and reversing movement. These lights are wired to operate continuously or in hazard mode by flashing, usually when reversing. They generally work when the gear or drive lever is engaged.

238. It is important to choose the intensity and colour of the lights appropriate to your workplace to ensure that the moving plant can be seen – eg, an orange warning light may be suitable inside a warehouse but may not be seen in sunlight.

Flashing lights

239. Rotary flashing lights are coloured revolving lights that are usually mounted in a prominent place, such as the top of a vehicle cabin. They should be hard wired so they operate continuously and cannot be turned off by a switch. They are suitable to be used on any plant that moves in the workplace, such as forklifts or skid steer loaders.

240. Flashing lights may not be suitable for plant that:

- is stationary for long periods of time, and
- operates in restricted areas, such as trucks travelling on defined site roads.

Percussion alarms

241. Percussion alarms are mechanical devices that are fitted to an axle or gear shift. When plant moves, a cam raises a hammer that drops repeatedly onto a bell or sounding plate. These alarms are relatively cheap to install, however, they require regular maintenance to ensure they continue functioning effectively.

Radio sensing devices

242. Radio sensing devices activate when the operator selects reverse. A light and alarm sounds inside the cabin to alert the operator if a pedestrian is within a predetermined distance from the rear of the plant.

Air horns

243. Horns are suitable for powered mobile plant with long breaking distances, such as trucks. Some large workplaces or sites may require a truck to 'stop and sound horn before continuing'.

Part 3.5 – Controlling risks of specific types of plant

244. Employers have additional duties to control risk associated with the following specific plant used in the workplace:

- powered mobile plant
- tractors
- industrial lift trucks
- electrical plant and plant exposed to electrical hazards
- plant used to lift or suspend loads
- lifts
- scaffolds
- tower cranes.

Powered mobile plant

Powered mobile plant means plant that is provided with some form of self-propulsion and is ordinarily under the direct control of the operator (eg forklifts, tractors, quad bikes, earth-moving machinery and mobile cranes).

245. Where powered mobile plant is used an employer must, so far as is reasonably practicable, control the risk of:

- the powered mobile plant overturning (see paragraphs 246–249);
- objects falling on the operator of the powered mobile plant (see paragraph 250);
- the operator being ejected from the powered mobile plant (see paragraphs 251–252); or
- powered mobile plant colliding with pedestrians or other powered mobile plant (see paragraphs 253–256).

OHS Regulations r109(1)

Controlling the risk of mobile plant overturning

246. Employers need to consider the type of powered mobile plant being used in the workplace to ensure that it is the most appropriate for the work environment. Operational procedures or processes that reduce the likelihood of roll-over should also be implemented.

247. The risk of mobile plant overturning can be increased by the following factors:

- unstable ground conditions – soft ground that is unable to support the mobile plant's bearing load can cause it to overbalance (**Note**: this could occur along the edge of a road or when the mobile plant is dumping overburden material at a tip head)
- uneven ground – different surface levels can cause an overbalance, such as a tractor being driven in a paddock or on an unsurfaced road
- uneven and unsurfaced roads – mobile plant can lose control while travelling on roads that are uneven or unsurfaced
- loss of vehicle traction on the road surface
- mobile plant failure caused by defective, worn out or poorly maintained components including brakes, steering, tyres or suspension
- collision with other plant or objects
- the type of load – some materials (eg soft, sticky clays) may remain within the body of certain types of mobile plant, potentially causing an overbalance while dumping
- uneven load distribution, and
- poor road signage, traffic management and communication practices.

248. Employers should reduce the risk of a mobile plant overturning by:

- ensuring mobile plant is operated in accordance with manufacturer's recommendations – including load limits and other specific features
- ensuring regular inspections and maintenance are undertaken on essential components such as brakes, steering, tyres (including pressure) and suspension in accordance with the manufacturer's recommendations, or where practicable, by the manufacturer's authorised service provider
- ensuring the surface of any off-loading area is appropriate for the mobile plant's requirements in accordance with the manufacturer's recommendations
- establishing appropriate rules and standards for safe onsite road and travel way use, including speed limits for travel and manoeuvres, taking into account changing environments and conditions
- ensuring any necessary information is obtained from the supplier or manufacturer about its features and design limits, before new or hired plant is used in the workplace
- ensuring appropriate safe systems of work are in place and these are regularly monitored, enforced, reviewed and, if necessary, revised. When reviewing systems of work, consider the mobile plant's design limits (eg speed, load or gradient limits) or technological developments and the availability of the latest operator protective devices (for example, reversing cameras)
- providing employees with training on new or revised systems of work (eg drivers unfamiliar with the make or model of the mobile plant they are expected to operate need to receive training)

- ensuring onsite roads and travel ways are safe and properly maintained, taking into account changing environments and conditions, and
- communicating all necessary information to drivers and others (eg load information for those responsible for loading and driving powered mobile plant) to enable them to perform their work in a way that is safe and without risks to health.

249. Employers have specific duties under the OHS Regulations in relation to the fitting of operator protective devices which can reduce the severity of injury if a roll-over occurs (see paragraphs 257–261 of this Code for further information).

Controlling the risk of exposure to falling objects

250. Powered mobile plant may be used in a range of working environments, some of which may expose the operator to falling objects (eg tree branches and stacked objects). To control the risk of an operator being exposed to falling objects, employers should consider the following risk controls:
    - substituting the work procedure with another process that eliminates the risk to the operator of falling objects;
    - only allowing use of the powered mobile plant in environments where the operator is not exposed to falling objects; and
    - fitting operator protective devices such as a falling object protective structure (FOPS) cabin to protect the operator against falling objects.

Controlling the risk of operator ejection

251. Powered mobile plant can be used in environments that put the operator at risk of being ejected from the plant. To control the risk of operator ejection, employers should consider the following risk controls:
    - substitute the work procedure with another process where the likelihood of ejection is eliminated
    - ensure the design of the operator seating is such that the operator will not be ejected
    - ensure that appropriate operator restraints are fitted (eg seatbelts) and used, and
    - ensure appropriate operator protective devices are fitted such as roll-over protection structures (ROPS) to reduce the risk of injury if ejection occurs.

252. Employers have specific duties under the OHS Regulations in relation to the fitting of operator protective devices (see paragraphs 257–261 of this Code for further information).

Controlling the risk of collisions

253. Powered mobile plant may be used in environments (eg warehouses) where there is a risk of powered mobile colliding with pedestrians or other powered mobile plant. To control the risk of collisions, employers need to consider the following risk controls:
    - warehouse planning
    - isolating pedestrians by barriers, distance and time
    - presence sensing systems
    - traffic management systems
    - spotters
    - personal protective equipment (eg reflective vests).

Part 3 – Duties of employers

Warning devices on powered mobile plant

254. An employer must ensure that powered mobile plant that has the likelihood of colliding with pedestrians or other powered mobile plant is fitted with a warning device that will warn people who may be at risk from the movement of the plant. OHS Regulations r110

255. In carrying out this duty, employers should consider:

- the circumstances of the workplace layout and environment;
- the type of powered mobile plant; and
- whether a combination of devices is required such as acoustic and visual.

256. Examples of the types of warning devices which could be considered are described in paragraphs 233–243 of this Code.

Operator protective devices

257. An employer must ensure, so far as is reasonably practicable, that an appropriate combination of operator protective devices is provided, maintained and used for powered mobile plant to reduce, so far as is reasonably practicable, the risk of the plant overturning, objects falling on the operator or the operator being ejected from the plant. OHS Regulations r109(2)

258. Examples of operator protective devices include roll-over protective structures (ROPS), falling object protective structures (FOPS), and operator restraining devices such as seatbelts. Employers should consider sourcing operator protective devices that account for human behaviour, such as sequentially interlocking seatbelts that do not let the plant move until the operator is seated and the seatbelt fastened.

259. ROPS need to be fitted to quad bikes where there is a risk of roll-over.

260. There are different duties that apply in relation to the fitting of roll over protection on tractors (see paragraphs 269–273 of this Code).

261. For further information on powered mobile plant see **worksafe.vic.gov.au**.

Controlling risks to passengers

262. An employer must ensure, so far as is reasonably practicable, that a person, other than the operator, does not ride on powered mobile plant unless the person is afforded a level of protection from exposure to any risk that is equivalent to that provided to the operator (eg a designated passenger seat and seatbelt within the ROPS protective parameter). OHS Regulations r109(4)

263. For example, passengers need to be provided with equivalent roll-over protection, protection from falling objects and ejection from the mobile plant as provided to the operators.

Blind spots for operators of powered mobile plant

264. Operators of powered mobile plant can often have restricted visibility of nearby employees or pedestrians, particularly those close to the plant.

265. An effective system of communication based on two-way acknowledgement between mobile plant operators and ground employees needs to be established before work commences. Employees need to be trained in the procedures involved prior to the work commencing. Employees should not approach mobile plant until the operator has signalled that they are aware of the person approaching. Operators should not move plant closer than a set distance from ground employees until they have signalled to the operator that they are aware of the proposed movement.

266. Mobile plant operators and ground employees need to be familiar with the blind spots of particular items of plant being used. Induction training programs should emphasise the dangers of working in close proximity to mobile plant, and adequate supervision needs to be provided.

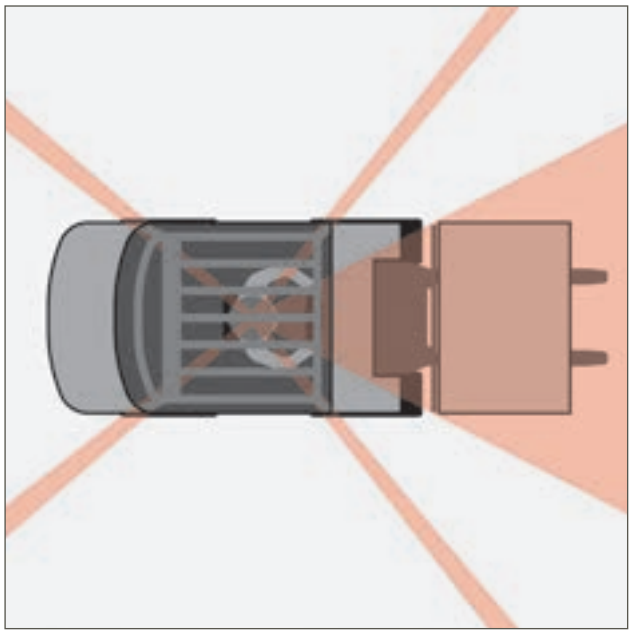


Figure 11 – Common blind spots for forklift operators

267. Employers also have specific duties in relation to certain types of powered mobile plant such as tractors (see paragraphs 269–273) and industrial lift trucks (eg forklifts, see paragraphs 274–286).

268. For further information on powered mobile plant see **worksafe.vic.gov.au**.

Roll-over protection on tractors

Tractor means a powered vehicle, primarily designed to haul and provide power for agricultural or horticultural machinery or implements, by way of a power take-off rotating shaft or other mechanical means, but does not include earthmoving machinery or a passenger vehicle. OHS Regulations r5

269. An employer must not use or allow a tractor to be used at the workplace unless it is fitted with roll-over protection. This only applies to a tractor that conveys its power directly to the ground by wheels and does not apply to:

- a tractor manufactured in, or imported into, Victoria before 1 July 1981 if it is not reasonably practicable to fit roll-over protection to the tractor, or
- a tractor used at a workplace in circumstances in which there is no likelihood of the tractor overturning (see paragraphs 246–249 for more information on overturning), or
- a tractor that is fitted with roll-over protection that has been temporarily removed or lowered for the period during which it is being used under a tree or other vegetation or in another place where there is insufficient space for the tractor to operate effectively while the roll-over protection is fitted, or
- a tractor weighing less than 560 kilograms (the weight being taken in the lightest form in which the tractor is normally available for retail sale when new and without water, fuel or lubricating oil).

OHS Regulations r111

270. Where a tractor does not have roll-over protection, in the event of a roll-over, the severity of the injury could be extremely high, involving the potential for death or serious injury.

271. It would be reasonably practicable to have a roll-over protection installed on an older tractor, where appropriate roll-over protection is commercially available or can be manufactured.

272. If the roll-over protection has been temporarily removed or lowered for the period during which it is being used under a tree or other vegetation, or in another place where there is insufficient space for the tractor to operate effectively with roll-over protection, the roll-over protection needs to be reinstated as soon as the tractor is being used in a place that has sufficient space.

273. There is further information in relation to the design of roll-over protection within relevant Australian Standards, see **Appendix C.** For further information on powered mobile plant see **worksafe.vic.gov.au**.

Industrial lift trucks

Industrial lift truck means powered mobile plant (other than a crane or earthmoving machinery) comprising a mast with an elevating carriage to which a pair of fork arms or other load holding attachment is attached including:

- an industrial lift truck on which the operator is raised with the attachment for order picking, and
- an industrial lift truck where the frame and lift unit straddle, raise, lower, move or stack the load OHS Regulations r5

The most common type of industrial lift truck is a counterbalance forklift.

274. In addition to the duties that apply to powered mobile plant generally (see paragraphs 245–268), employers have specific duties in relation to industrial lift trucks.

275. An employer must ensure that an industrial lift truck is:

- equipped with lifting attachments that are appropriate to the load to be lifted or moved by the truck, and
- used in a manner that ensures that any risk to the operator of the truck that arises from systems of work and the environment in which the truck is used is controlled. OHS Regulations r112(1)

Use of appropriate lifting attachments

276. An employer needs to ensure that the truck is appropriately rated and identified for the attachment.

277. The attachment needs to have a load rating and appropriate counter-balancing ratios for the industrial lift truck lifting the load and be securely connected to the industrial lift truck prior to operation to prevent it from separating.

278. Many specialised attachments are available for industrial lift trucks including slippers, bin lifters, carpet spikes, jibs, spreaders and drum handlers (see Figures 12 and 13).

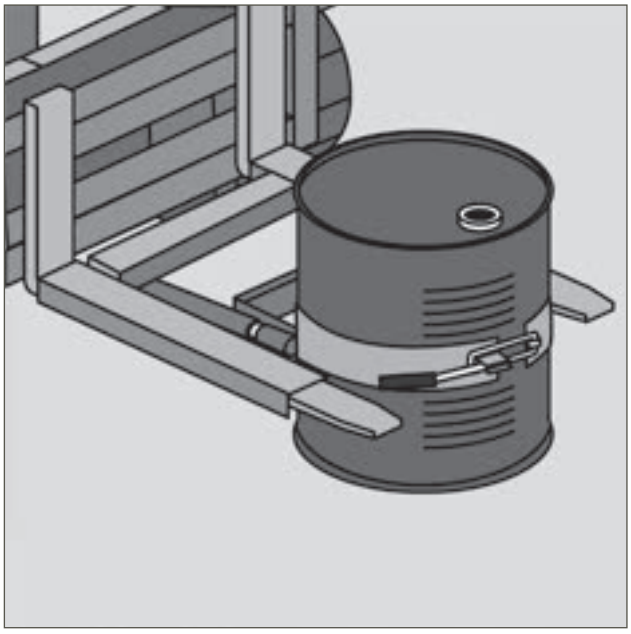


Figure 12 – Drum handler

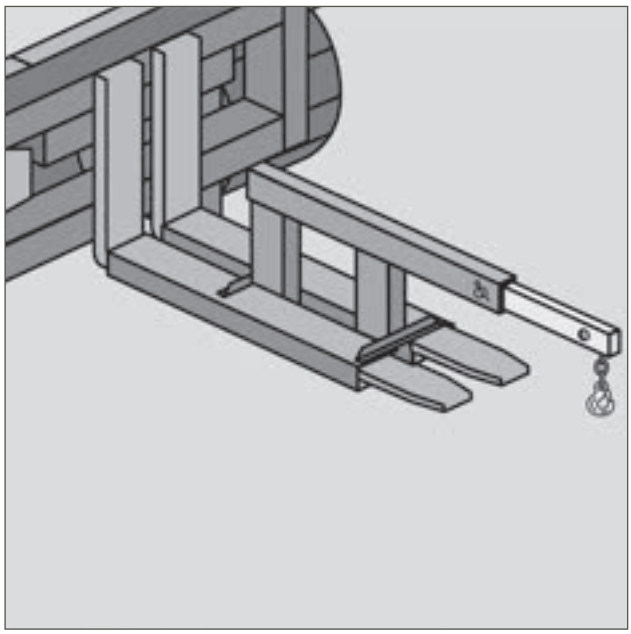


Figure 13 – Jib attachment

279. When choosing an attachment, the employer should check with the manufacturer or supplier of the industrial lift truck in order to ascertain whether it can be used safely with the particular industrial lift truck. Specific training and supervision in the use of an attachment should be provided by the employer to its employees.

280. When an attachment is fitted to an industrial lift truck the centre of gravity will change, which will require re-rating the lift truck capacity and potentially restricting some operating controls. Re-rating should be undertaken by the industrial lift truck manufacturer. The load rating for the combination of the industrial lift truck and the attachment depends on the rating and configuration of the attachment and capacity of the lift truck. This means the industrial lift truck specification plate needs to identify the attachment and show the corresponding capacity of the lift truck when using the attachment.

281. If an attachment is fitted to an industrial lift truck, the employer needs to ensure access to information on the re-rated capacity of the industrial lift truck is provided to relevant employees. Holes should not be drilled or cut through fork arms as this can weaken and destroy the integrity of the fork arms. Modifications should not be carried out unless they have been specified by a suitably qualified person (eg a person with the knowledge, skills and experience to provide the required information and/or advice such as the manufacturer).

Controlling risks to the operator

282. Industrial lift trucks should be operated according to the manufacturer's instructions and within the design parameters.

283. Operators need to:

- look in the direction of travel and keep a clear view of the way ahead
- if vision is obscured (eg by the load), seek help from others to direct them, or drive in reverse
- keep all body parts within the industrial lift truck while in operation
- avoid engaging in distracting behaviour while operating an industrial lift truck (eg using a mobile phone)
- where no traffic signs or signals exist to control industrial lift truck operation, give clear indications of their intentions to others (eg sound the horn to alert other mobile plant and pedestrians in the vicinity)
- when approaching crossings in aisles or gangways, slow down and take appropriate site-specific actions (eg sound the horn, and if vision is obstructed, keep well over to the correct side of the aisle)
- avoid crossing railway lines at a right angle
- be aware of other mobile plant and people when approaching and crossing intersections

- drive at a safe speed consistent with site speed restrictions, the load and current weather and road conditions
- drive slowly and without changing direction suddenly, especially on wet, slippery or loose surfaces (in these conditions industrial lift trucks can slide and overturn even at low speeds)
- whether with or without a load, drive with the fork arms as close to the ground as possible, with the tips of the fork arms tilted slightly upwards and away from the ground
- take into account the operating surface, weather conditions, physical layout of the operating area and any other hazards that may exist, like water
- stop before doorways and take appropriate site specific actions (eg sound the horn and proceed slowly, but only if clear to do so)
- avoid rapid acceleration, deceleration and turning quickly
- ensure they can bring the industrial lift truck to a safe stop at any time, particularly on wet, slippery or loose surfaces, and
- drive slowly if there is a requirement to reverse.

Controlling risks to passengers

284. An employer must ensure that any person, other than the operator, who rides on an industrial lift truck, is seated in a seat that is:
    - specifically designed for carrying a passenger
    - fitted with appropriate seat restraints, and
    - located within the zone of protection that is provided by the operator protective device required to be fitted to the industrial lift truck. OHS Regulations r112(2)

Warning devices on industrial lift trucks

285. An employer must ensure that an industrial lift truck is fitted with warning devices that are appropriate to effectively warn people who may be at risk from the movement of the industrial lift truck. OHS Regulations r113
286. For further information regarding warning devices see paragraphs 233–243.

Electrical plant and plant exposed to electrical hazards

287. In relation to electrical plant and plant exposed to an electrical hazard, an employer must ensure that:
    - if damage to plant presents an electrical hazard, the plant is disconnected from the power supply and is not used until the damaged part is repaired or replaced
    - electrical plant or plant that is exposed to an electrical hazard is not used under conditions that are likely to give rise to electrical hazards, and
    - appropriate permit to work systems are provided to avoid inadvertent energising of plant that has been isolated but not physically disconnected from the electrical supply. OHS Regulations r114
288. Appropriate risk controls should include:
    - isolating the plant from the power supply source, by operation of interlock systems
    - where interlocking systems are not reasonably practicable, employing lock-out/tag-out systems of work to minimise the risk that persons inadvertently energise the plant.
289. For further information on guarding see paragraphs 173–207 of this Code, and for lock-out/tag-out see paragraphs 208–218 of this Code.

Plant used to lift or suspend loads

290. An employer must ensure, so far as is reasonably practicable, that plant which is used to lift or suspend loads (people, equipment or materials) is specifically designed to lift or suspend the load. OHS Regulations r115(2)

291. These duties do not apply to plant used in connection with:

- the performance of stunt work
- the performance of acrobatics, or
- a theatrical performance. OHS Regulations r115(1)

Theatrical performance means acting, singing, playing a musical instrument, dancing, or otherwise performing literary or artistic works or expressions of folklore. OHS Regulations r5

292. An employer must ensure when using plant to lift or suspend people, equipment or materials (such as cranes, scissor lifts, forklifts, elevating work platforms):

- all lifting or suspending is carried out:
  - with lifting attachments that are appropriate to the load to be lifted or suspended, and
  - within the safe working limits of the plant, and
- so far as reasonably practicable, no loads are suspended over, or travel over, a person. **Note**: this duty does not apply to plant that is an amusement structure.
- loads are lifted or suspended in a way that ensures the load remains under control during the activity, and
- so far as is reasonably practicable, no load is lifted simultaneously by more than one piece of plant. OHS Regulations r115(3)

293. Plant used to lift loads needs to have hose burst protection valves fitted on critical hydraulic cylinders if the equipment has a rated capacity of over one tonne. Earthmoving equipment (eg excavators) used to lift loads of less than one tonne (eg pipes) should also have hose burst protection fitted.

294. Loads should only be suspended from the designated closed-eye lift points on the boom or the boom-side of the quick hitch, as provided by the manufacturer or suitably qualified person (eg a person with the knowledge, skills and experience to provide the required information and/or advice). The rated capacity of the earthmoving machinery needs to be permanently displayed in a prominent position near the lifting point. The load chart should be located inside the cabin. For information on using earthmoving equipment such as a crane go to **worksafe.vic.gov.au**.

295. If it is not reasonably practicable to use plant specifically designed to lift or suspend loads, the employer must ensure that:

- the plant used to lift or suspend the load does not cause a greater risk than if specifically designed plant were to be used, and
- if the plant is lifting or suspending people:
  - the people are lifted or suspended in a work box or other device for carrying people that is securely attached to the plant
  - the people in the work box or other device substantially remain within the confines of the work box or device while they are being lifted or suspended

– if there is a risk of a person falling from height, a safety harness is provided and worn by the person in order to prevent, so far as is reasonably practicable, injury to the person as a result of the fall, and

– means are provided by which the people being lifted or suspended can safely exit from the plant in the event of a failure in the normal operation of the plant. OHS Regulations r115(4)

296. Fall arrest safety harnesses need to be worn correctly and attached to a rated anchorage system in order to reduce the risk of injury in the event of a fall.

297. Using plant that lifts people or materials involves a high level of risk. The following factors should be considered before using this type of plant:

- the nature of the load and weight being lifted
- the frequency of use
- the systems of work
- movement of the lifting mechanism
- supporting areas and structures
- the stability of the plant and the terrain it is used on
- communication systems
- emergency evacuation of people from the plant
- protective equipment and safety gear
- periodic structural checks.

298. As an example, an employer may require a person to be suspended from a crane in a work box to allow a visual inspection of a chimney or cooling tower that is not otherwise accessible by an elevating work platform or other means. Due to access limits the crane boom may need to be fully extended and include a fly jib. Where the item of plant is not designed to lift or suspend people the employer must ensure that the plant used to lift or suspend the load does not cause greater risk, for example, appropriate safe working limits for the crane and fly jib must be applied when suspending persons from a crane. OHS Act s21 and OHS Regulations r98 and r115(4)(a) The employer must ensure the crane has been designed to enable the safe suspension of people in a work box. OHS Act s21 and OHS Regulations r98 and r115(4)(a) The design should include such features as the ability to safely retrieve the work box in the event of power failure and also needs to ensure the safety of the persons in the work box in the event of primary brake failure. The employer must also ensure that the operator is properly trained and instructed in the safe use of the auxiliary power unit and the circumstances under which it can be used. OHS Act s21(2)(e)

299. Further information about the duties relating to the prevention of falls can be found in Part 3.3 of the OHS Regulations and at **worksafe.vic.gov.au**.

Part 3 – Duties of employers

Lifts

Lift means permanent plant, or plant intended to be permanently installed, in or attached to a building or structure in which people, goods or materials may be raised or lowered within a car or cage, or on a platform and the movement of which is restricted by a guide or guides and includes an escalator, moving walk and stairway lift. OHS Regulations r5

300. An employer who has management or control over a lift or its maintenance has the following specific duties.

301. If there is a risk of a person falling down a lift well, an employer must provide:

- secure barriers to prevent access to the lift shaft by a person other than a
- secure working platforms or equivalent arrangements for a person who is working in the lift well to prevent a fall from height. OHS Regulations r116(2)(a)

302. If there is a risk of objects falling on a person working in a lift well, an employer must provide a secure barrier to prevent, so far as is reasonably practicable, falling objects from striking the person or otherwise causing a risk. OHS Regulations r116(2)(b)

303. If there is a risk to a person working in a lift shaft as a result of movement of a lift car, an employer must take steps to ensure that the risks are controlled so far as is reasonably practicable (eg by disabling the lift operating in the lift well where work is being undertaken and preventing unauthorised and unnecessary access). OHS Regulations r116(2)(c)

Notice of rated capacity of lift

304. An employer must ensure that a legible notice is fixed in a conspicuous place in the lift, which states the rated capacity of the lift specified in the design of the lift. OHS Regulations r117

Scaffolds

305. An employer must ensure, that:

- no work, other than the work of erecting or dismantling the scaffold, is performed from a scaffold unless the scaffold, or the relevant part of the scaffold, is complete
- the scaffold is secure and capable of supporting the work to be performed on the scaffold
- on becoming aware that the scaffold or its supporting structure is in an unsafe condition, appropriate repairs, alterations or additions are carried out before the relevant part of the scaffold is used, and
- if the scaffold is left unattended, persons who would not ordinarily be using the scaffold are prevented, so far as is reasonably practicable, from gaining access to the scaffold. OHS Regulations r118

Scaffold means a temporary structure specifically erected to support access or working platforms (eg prefabricated scaffolds, swing stages, tube and coupler scaffolds, trestle scaffolds, bracket scaffolds and ladder bracket scaffolds). OHS Regulations r5

Suspended scaffold means a scaffold incorporating a suspended platform that is capable of being raised or lowered when in use. OHS Regulations r5

306. Light duty prefabricated aluminium scaffolds should not be selected for stacking heavy materials (such as bricks) on, without additional design considerations. These types of loads may exceed the generalised light duty loading intended by the designers.

Part 3 – Duties of employers

307. Employers need to be aware that scaffolds that are erected to be secure and capable of supporting the work to be carried out may not stay in that condition. A scaffold that was secure when erected may, as a result of damage or interference, become a risk to health and safety. Employees and contractors may periodically remove components of scaffolding to facilitate work. For example, window fitters and glaziers often remove ties and may do so without appreciating the likely effect on the scaffold's stability. A health or safety risk may arise from this action, so the employer should regularly monitor and maintain scaffolds to control and quickly rectify any such interference.

308. As another example, prefabricated mobile scaffolds inside buildings are often height adjusted to suit varying ceiling protrusions or components (eg braces, toe-boards and access ladders) are removed and the scaffold no longer conforms to the designer's, manufacturer's or supplier's specifications.

309. To prevent interference with scaffolds, the employer needs to ensure that training of employees and contractors required to work on scaffolds covers the importance of:

- not removing ties, rakers or other stabilising devices
- not weakening or overloading the supporting structure of a scaffold, and
- not removing or interfering with any identification attached to the scaffold.

310. Scaffolds that are required to be left standing for long periods may become unsafe and require repair before being used again (eg scaffolds left standing for long periods can obstruct subsequent work to be performed by other trades people). These people may then alter the scaffold to facilitate their work, thereby causing the scaffold to become unsafe for further use.

311. The employer needs to ensure that scaffolds left standing and unused for long periods are inspected prior to being used again to determine whether they are in a safe condition for use.

312. When a scaffold is left unattended, there is a greater chance of unauthorised access to the scaffold. That is, the unattended scaffold is more easily accessed by members of the public, or by other employees not required or intended to have access. As set out in paragraph 305, the employer must prevent such access, so far as is reasonably practicable. OHS Regulations r118

313. The employer needs to consider placing hoarding around scaffolds on street pavements to prevent members of the public gaining access to the scaffold.

314. Where erection of a scaffold is incomplete, the employer needs to ensure that employees and contractors (other than those involved in the erection of the scaffold) are prevented from gaining access to it. Such risk controls could include the posting of signs at all obvious entry and exit points to warn that the scaffold is incomplete.

Tower cranes

315. An employer must ensure that a tower crane is erected on a supporting structure or foundation that has been designed:

- by an engineer with relevant knowledge and experience
- for the specific ground conditions at the location, and
- taking into account the configurations and forces that were provided for the tower crane when its design was registered. OHS Regulations r119(1)

316. An employer must ensure that the placement of any crane ties fitted to the tower crane have been designed:
    - by an engineer with relevant knowledge and experience, and
    - take into account the configurations and forces that were provided for the tower crane when its design was registered. OHS Regulations r119 (2)
317. The employer must keep the design information concerning the supporting structure or foundation on which the tower crane is erected and the placement of any crane ties available for inspection by WorkSafe while the tower crane is erected on that supporting structure or foundation. OHS Regulations r120

Part 3.6 – From purchase to disposal

318. This part of the Code provides information for employers about what should be considered at various stages throughout the life of plant being used in the workplace to ensure that risks to health and safety are controlled.

Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. The duty to consult applies, for example, when making decisions about risk control measures and proposing changes that may affect the health or safety of employees at the workplace. OHS Act s35
See page 9 of this Code.

Purchasing new plant

319. Many injuries and illnesses associated with plant occur due to a failure to select the right plant for the job. Before an employer purchases plant for the workplace, they need to check that it is suitable for the intended use, including the working environment it will be used in, and consult with the employees or contractors likely to be using it.
320. Employers should discuss their needs with the plant supplier, who are required to provide information about:
    - the purpose for which the plant was designed or manufactured, and
    - any conditions necessary for the safe use of the plant.

321. If the supplier is unable to provide the person to which the plant is being supplied with the information referred to in paragraph 320, they must inform that person in writing that the plant is being supplied without the information and that the plant should not be used as plant without that information. OHS Regulations r89 and r90

322. For further information about the suppliers duties in relation to the provision of information see paragraphs 111–118 of this Code.

323. Before purchasing, hiring or leasing plant employers should determine:

- the hazards and risks associated with installation, commissioning, operation, inspection, maintenance, repair, transport, storage and dismantling of the plant
- the risk controls needed to control any risks
- the manufacturer's recommendations in relation to the frequency and type of inspection and maintenance needed
- any special skills required for people who operate the plant or carry out inspection and maintenance
- any special conditions or equipment required to protect the health and safety of people carrying out activities such as installation, operation and maintenance, and
- any alterations or modifications may need to be made to the plant.

324. Employers need to check whether the plant has the following features:

- contact with or access to dangerous parts is prevented (eg by using guards)
- it is of sturdy construction and has tamper-proof design
- there are no obstructions to the plant operator
- it has fail safe operation (eg appropriate operator stop and emergency stop controls)
- it is easy to inspect, maintain and clean
- it does not introduce other workplace hazards (eg hazardous manual handling or excessive noise), and
- it incorporates measures to reduce risks during use (eg low noise).

Purchasing used plant

325. Employers should also consider the information contained in paragraphs 231–243 when purchasing used plant. Employers should take into account that used plant is more likely to have outdated or missing safety features. While suppliers must do what is reasonably practicable to supply equipment that is safe for use in the workplace (eg retrofitting or modifying plant to improve its safety having regard to improvements made since its manufacture), employers also must ensure that the plant is safe, so far as is reasonably practicable (eg confirming the plant has all necessary safety features before bringing it into service). OHS Act s30(1)(a) and s21(2)(a)

326. In addition to the information detailed in paragraph 320, a supplier of used plant must also provide the person to which the plant is supplied with all available records of the plant that were kept by the previous owner in the possession of the supplier. OHS Regulations r90(1)(b) This information may include data sheets, test certificates, reports, operations and service and safety manuals.

327. For further information on supplier duties go to Part 2.3 of this Code – Suppliers.

Hiring or leasing plant

328. When plant is hired or leased for use in the workplace, the person who supplies the plant must ensure that between any hiring or leasing of the plant (ie from one hire agreement/lease to the next), the plant is inspected and maintained as necessary to ensure that any risks arising from the use of the plant is controlled. OHS Regulations r93

329. During the time that the hired or leased plant is in an employer's possession they may have control over the way the plant is used in the workplace. If so, the employer must provide and maintain plant and associated systems of work that are, so far as is reasonably practicable, safe and without risk to health. OHS Act s21(2)(a)

330. Before an employer hires plant, they need to assess whether the plant is suitable for its intended use. They should also check that the plant has been inspected and maintained by the supplier according to the manufacturer's specifications. This should involve checking the log book or maintenance manual.

331. Employers should also ensure that the supplier provides them with information about the purpose of the plant and its proper use. If the plant is to be hired for an extended period of time, the employer needs to ensure that there will be continued inspection and maintenance of the plant.

332. For further information on supplier duties go to Part 2.3 of this Code.

Transportation of plant

333. Before transporting plant, employers need to check the plant is secured and ensure risks to health and safety are controlled. The employer needs to ensure that the employee moving the plant (eg loading or unloading an elevated work platform onto a truck) has the relevant high risk work license to operate the plant. The risk of plant contacting overhead structures such as bridges and electrical lines during transportation needs to be determined by the employer. Road and traffic authorities may also have requirements to be met when travelling on a public road (eg over-width permits).

Installation, erection and commissioning of plant

334. An employer must ensure that:

- plant is installed or erected to provide sufficient clear working area around the plant to allow the plant to be used in a manner that controls risk so far as is reasonably practicable
- so far as is reasonably practicable, the layout of the plant in the workplace does not affect entry and exit from the workplace to the extent that it presents a risk
- the plant is not commissioned unless the employer has established, so far as is reasonably practicable, that it is safe to commission the plant
- the plant is not decommissioned unless the employer has established, so far as is reasonably practicable, that it is safe to decommission the plant, and

- the installation, erection, commissioning, decommissioning and dismantling processes include inspections that will ensure that the risk associated with these activities is monitored. OHS Regulations r104

335. A person who installs, erects or commissions plant who knows, or ought reasonably to know, that the plant is to be used at a workplace must ensure, so far as is reasonably practicable, that nothing about the way in which the plant is installed, erected or commissioned makes it unsafe or a risk to health. OHS Act s31

336. If a hazard associated with plant or associated systems of work is identified in accordance with regulation 97, the employer must ensure that an employee (and any person supervising the employee) involved in the installation, commissioning, decommissioning, dismantling, of plant is provided with information available to the employer on how the activity can be carried out so as to ensure, so far as is reasonably practicable, the health and safety of the person (see paragraphs 33–34). OHS Regulations r123

337. Employers, installers, erectors or commissioners of plant should consider the use of the following risk controls during installation, erection and/or commissioning of plant:

- barricades and guarding to prevent access to the site
- warning signs to identify dangers
- walkways, elevated work platforms and scaffolds for access by people involved in the above activities
- positioning of plant on the site to allow adequate clear space around the plant for people requiring access
- a workplace layout that provides safe access to, and exit from the plant
- interim safeguarding during testing and start-up if a final means of safeguarding is not in place and it is not reasonably practicable to do so
- plant is erected or installed having regard to the manufacturer's instructions including ensuring that specialised tools, jigs and appliances necessary to reduce any risk of injury during installation are used
- access to and exit from plant complies with relevant standards or suitable alternative methods are implemented
- plant is stable during installation
- the interaction of plant with people, work processes and other plant is considered, and
- environmental factors affecting installation and use (eg wet conditions) are considered.

338. Such methods should take into consideration the information provided by the designer via the manufacturer, importer and/or supplier.

339. The installer, erector or commissioner of the plant needs to notify the employer of any new risks identified during the installation, erection or commissioning of the plant so that the employer can control these risks.

Positioning plant in the workplace

340. Plant should be positioned so that:

- risks from hot plant (such as friction, molten material, hot gases) are controlled through regulated access, guarding or insulation
- there is sufficient space (suggested 600mm, the minimum width of a walkway) for safe access to the plant for operation, cleaning, maintenance, inspection and emergency evacuation

- the plant does not obstruct doorways, emergency exits and walkways
- the proximity to other plant does not hinder the operation of the plant or work processes
- the plant rests on a suitable foundation where required (eg on a concrete floor or other support that ensures the plant is stable and secure)
- ventilation is adequate and suitably directed to deal with the nature and volume of any emissions from the plant, and
- employees, contractors and others are not exposed to noise levels greater than those stated in the exposure standard for noise under the OHS Regulations.

341. For further information on noise see the Noise Compliance Code at **worksafe.vic.gov.au**.

Commissioning plant

342. Commissioning plant involves performing the necessary adjustments, tests and inspections to ensure plant is working within specified requirements before the plant becomes operational.

343. A person who commissions plant needs to ensure that:

- the commissioning sequence is in accordance with the design specifications, and
- tests, such as trial and full functionality runs, are carried out to check that the plant will perform within the design specifications.

Using plant in the workplace

344. An employer must ensure that plant is inspected to the extent necessary to ensure that any risks associated with the use of the plant is monitored and take steps to prevent interference with the plant or alterations to the plant that have not been permitted by the employer. OHS Regulations r105

345. Employees who operate plant must be provided with necessary training and supervision to enable them to perform their work in a way that is safe and without risks to health. OHS Act s21(2)(e) It is important that employers retain all operating and maintenance manuals and instructional material provided by the manufacturer/supplier in order to correctly operate and maintain the plant once it is in the workplace.

346. Employers should consider and address the risks that could arise from:

- operator fitness for work (eg fatigue)
- carrying out routine or repetitive tasks, and
- local conditions and working procedures (eg ground and weather conditions).

347. Employers need to ensure that safety features or warning devices incorporated into the plant are used as intended, and maintained and tested. The employer needs to ensure that employees do not work between fixed and moving parts of the plant where there is a risk to health and safety.

348. Under Part 3.6 of the OHS Regulations, certain types of plant, such as lift trucks, and some types of cranes, require the operator to have a high risk work (HRW) licence before they can operate the plant with the following exceptions:

- a person undertaking training for the purpose of obtaining a HRW licence
- a person authorised to work under regulation 138, being a person waiting for their application or renewal to be processed, subject to the prescribed timeframes
- a holder of a rigging licence who is operating a crane or hoist for the purpose of setting up or dismantling the crane or hoist – that licence holder need not also hold a HRW licence for the operation of the crane or hoist
- a person working under the terms of an exemption by WorkSafe, and
- a person performing high risk work solely for the purpose of testing, installing, commissioning, maintaining or repairing that plant (this exception does not apply to scaffolding, dogging or rigging work. It also does not include operating the plant in order to load or unload the plant from a vehicle). OHS Regulations r128–130

349. Schedule 3 of the OHS Regulations sets out the classes of HRW licences and the types of plant that require HRW licences. Further information about training, competency and application requirements can be found at **worksafe.vic.gov.au**.

350. For further details about controlling risks of plant used in the workplace go to Parts 3.3, 3.4 and 3.5 of this Code.

Making changes to how plant is used in the workplace

351. Where changes are to be made to the way plant is used in the workplace or a system of work associated with the plant is changed, employers must review (and if necessary, revise) any measures in place to control any risks. OHS Regulations r121 For further information go to Parts 3.1, 3.2, 3.3, 3.4 and 3.5 of this Code.

Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. The duty to consult applies, for example, when making decisions about risk control measures and proposing changes that may affect the health or safety of employees at the workplace. OHS Act s35 See page 9 of this Code.

352. The risks associated with the new way the plant is proposed to be used need to be assessed by a suitably qualified person (eg a person with the knowledge, skills and experience to provide the required information and/or advice). For example, if an employer uses an attachment on a forklift, the employer needs to ensure the attachment is appropriate for the load to be lifted or moved, and all hazards and risks associated with the use of the attachment needs to be identified and the appropriate risk controls implemented. As part of this process, the employer should check with the manufacturer or supplier of the forklift if the attachment is safe to use for that forklift (see paragraphs 276–281).

353. Any assessment needs to take into consideration:
    - all aspects of the new proposed task/s
    - any reasons the item of plant cannot be used for the proposed task, such as the impracticality of using it or additional risks that using plant for those particular tasks would generate
    - the recommendations of the designer, manufacturer and supplier of the plant, to determine if the new proposed use is within the plant's capabilities
    - the differences between the item of plant and one that is purpose-designed for the task, and what measures will be used to control the risks that arise from those differences, and
    - amendments that are required to be made to any relevant documentation (eg operator and maintenance manuals) and signage to ensure any identified risks are controlled.

354. If a suitably qualified person determines that the plant is unsafe or not suitable for a proposed task, it should not be used until the risk is controlled.

Altering plant

355. All modifications or alterations to the design of the plant or a component of plant should be undertaken by the original designer. If the employer or any other person modifies the design of the plant or component of plant without that alteration or modification being designed by the original designer, that person will take on the duties of the designer. This also includes the record keeping duties detailed in paragraphs 73-78. Design registration may also be required for the altered plant (see Part 4 of this Code).

356. If the supplier or any other person manufactures the modifications or alterations to the plant or component of plant, that person will take on the duties of the manufacturer. This also includes the provision of information and record keeping duties detailed in paragraphs 94–95.

357. A person who takes steps to alter or modify the plant should take into consideration the information from the designer, manufacturer and any relevant published technical standards.

358. When the plant is altered and before the plant is returned to service it needs to be inspected to ensure that:
    - the plant has been tested, having regard to the altered design specifications and relevant technical standards
    - risk controls have been put in place to control any risks created by the alteration in accordance with the hierarchy of control. (see paragraphs 157–171), and
    - employees and contractors are provided with the necessary information, instruction, training and/or supervision to enable them to perform their work safely.

359. If plant that is design registered is altered to the extent that the plant is subject to new measures to control risk, the altered plant design must be registered. OHS Regulations r126

360. For further information on plant design registration see Part 4 of this Code.

Inspection, cleaning and maintenance of plant

361. Plant should be inspected, maintained and cleaned according to the recommendations and information provided by the designer and manufacturer. In the absence of information from the designer or manufacturer, plant needs to be inspected, maintained and cleaned in accordance with specifications developed by a suitably qualified person (eg a person with the knowledge, skills and experience to provide the required information or advice).

362. The employer must ensure that any person involved in the inspection and maintenance of plant is provided with information, which is available to the employer, on how the activity can be carried out so as to ensure, so far as is reasonably practicable, the health and safety of the person (see paragraphs 33–34. OHS Regulations r123

363. The plant needs to be stopped and should be de-energised before maintenance, cleaning or repairs are commenced. The plant should be interlocked as a means to stop and de-energise before inspection, maintenance or cleaning. Where interlocking is not reasonably practicable, lock-out and isolation devices need to be used. Permit-to-work systems also need to be used.

364. Where it is not reasonably practicable to de- energise the plant when carrying out inspection, cleaning or maintenance, an effective means of preventing inadvertent operation needs to be implemented. The employer should consider the use of the following methods:

- fitting operational controls which permit controlled movement of the plant, and
- initiating safe systems of work (eg interlocks and lock-out/tag-out).

365. An employer must keep a record of any inspection and maintenance carried out on certain categories of plant for the period that the employer has management or control of the plant (see paragraphs 394–396). OHS Regulations r106

Inspecting plant

366. An employer needs to inspect plant regularly to identify any:

- potential problems that were not anticipated during plant design or task analysis
- deficiencies in plant or the equipment associated with use of plant (eg wearing, corrosion, cracking and damaged plant parts)
- adverse effects of changes in processes or materials associated with plant, and
- inadequacies in risk controls that have been previously implemented.

367. Employers should keep an up-to-date register of the items of plant requiring regular inspection and maintenance. It should include information on:

- allocated responsibilities for people dealing with inspections
- standards against which plant is to be inspected
- the frequency of inspections
- critical safety instructions to be followed during inspection (eg the isolation procedures)
- the procedures for particular types of inspections including:
- periodic inspections
- specific tests
- repaired or modified plant, and
- any variations from normal operation or dangerous occurrences and any trends that might be occurring.

368. Any guards that are removed need to be replaced correctly to prevent access to the hazardous part of the plant before the plant is returned to operation.

Conducting inspections, maintenance and cleaning

369. Operating plant during the cleaning and maintenance processes should only occur when it is necessary and safe to do so.

370. Risk controls must be implemented to ensure the health and safety of the person conducting the inspection, maintenance or cleaning. OHS Regulations r98 Plant needs to be stopped and should be de-energised before inspection, maintenance or cleaning, and isolation procedures such as lock out/tag out (see paragraphs 208–218 of this Code) and where necessary permit-to-work systems used.

371. Isolated or disengaged plant should:

- not unsafely hinder or interfere with the operation of any other plant
- have guards in place where risk of injury is identified, and
- not obstruct access.

372. If plant is required to be operated during inspection, maintenance or cleaning the employer must ensure that the plant is provided with controls that:

- permit operation of the plant while a person is undertaking the maintenance or cleaning of the plant, and
- cannot be operated by any person other than the person who is carrying out the maintenance or cleaning of the plant, and
- allow the operation of plant in such a way that any risk associated with the activities to any person carrying out the maintenance or cleaning is controlled OHS Regulations r101(2)

373. An employer should consider the use of the following methods:

- fitting operational controls which permit controlled movement and immediate stopping of the plant, and
- initiating safe systems of work (eg interlocks and lock-out/tag-out).

Damaged plant

374. For damaged plant, the employer needs to ensure that an assessment of the damage is carried out. The assessment needs to identify the nature of the damage, whether the damage can be repaired, and what repairs are necessary. The repair, inspection and any necessary testing of the plant should be carried out while ensuring that the plant remains within its design limits.

375. If the employer assesses that the function and condition of plant is impaired or damaged and it presents an immediate risk to health and safety, the plant needs to be rendered inoperable and tagged out until:

- the risk is controlled
- the plant is repaired, or
- the plant is decommissioned, dismantled and removed if unable to be repaired.

Plant not in use

376. An employer must ensure, so far as is reasonably practicable, when plant is not in use it is left in a state that does not create a risk for any person. OHS Regulations r107

377. Where plant is to be placed in storage, an employer should ensure any relevant health and safety information supplied by the designer, manufacturer or supplier is provided to the person who is to store the plant.

378. Before plant is used after an extended period of storage, the plant should be recommissioned by carrying out the same level of testing and inspection when it was first commissioned.

379. Plant that has been taken offline would constitute plant not in use. For example, an automatic robot on a welding line is taken offline due to a design modification no longer requiring the use of the robot for the particular product. The robot is therefore still fully functional but is no longer in use. As the robot is able to be powered up and become operational, the employer must ensure that the plant is not left in a state that presents a risk to health or safety. OHS Regulations r107 This should be done by isolating the work station from the power supply, employing lockout/ tag-out systems and providing physical stops to prevent movement in the event of accidental powering of the plant. For more information on lock out/ tag-out systems, see paragraphs 208–218 of this Code.

380. Powered mobile plant may present a risk if measures are not taken to prevent the plant moving of its own accord (eg rolling down a sloping surface), or to prevent unauthorised operation. For example, an industrial lift truck may be frequently not in use or unattended for short periods of time. The employer needs to ensure that the operator of the truck understands the safety procedures in place when leaving the truck unattended (which should include ensuring that the truck has been parked on a firm, level surface with the handbrake applied, the motor switched off and the key removed).

381. For more information about powered mobile plant, see Part 3.5 this Code.

Decommissioning, dismantling and disposing of plant

382. An employer must ensure that:

- plant is not decommissioned unless the employer has established, so far as is reasonably practicable, that it is safe to decommission the plant, and
- the decommissioning and dismantling processes include inspections that will ensure that the risk associated with these activities is monitored. OHS Regulations r104(d) and r104(e)

383. The employer must ensure that any person involved in the decommissioning, dismantling or disposal of plant is provided with information, which is available to the employer, on how the activity can be carried out so as to ensure, so far as is reasonably practicable, the health and safety of the person (see paragraphs 33–34). OHS Regulations r123

Decommissioning and dismantling

384. Employers must identify any hazards inherent in the process of decommissioning and dismantling plant (eg exposure to hazardous substances). OHS Regulations r97 Where plant is to be dismantled, the employer should ensure that any relevant information provided by the designer, manufacturer or supplier is given to the person who is to dismantle the plant.

Employers must, so far as is reasonably practicable, consult with employees and HSRs, if any, on matters related to health or safety that directly affect, or are likely to directly affect them. The duty to consult applies, for example, when making decisions about risk control measures and proposing changes that may affect the health or safety of employees at the workplace. OHS Act s35 See page 9 of this Code.

385. Plant may require dismantling due to fatigue, corrosion or wear causing the plant to become unstable and thereby creating a hazard of collapse. Due to this alteration in the plant's physical characteristics, the employer needs to consider risks associated with the dismantling process in addition to those identified in any information or recommendations provided by the designer, manufacturer or supplier. Before dismantling plant, the employer needs to assess for any fatigue, cracking, corrosion, wear and other known hazards, to aid identification of structural weaknesses and assist development of safe dismantling procedures.

386. For example, water tube boilers slung from overhead supports at the end of their service life will generally have been subject to repairs and replacement of the water tubes. They may exhibit corrosion or pitting in the boiler with a possible significant deterioration of the boiler's structural strength. The person dismantling a boiler in this condition needs to take into consideration the means for supporting the boiler during dismantling, to ensure that no inadvertent collapse occurs due to weakened sections being subjected to excessive stress loading.

Disposing of plant

387. Where plant to be disposed of contains unsafe materials (eg asbestos, hazards chemicals and substances), the employer needs to ensure that appropriate risk controls are put in place.

388. The person disposing of the plant needs to be provided with all the relevant information about the plant and the materials it contains and be provided with any appropriate PPE. Any other training, information and instruction must also be provided so that the disposal can be carried out in a manner that controls the risk to the health and safety of the person disposing of the material, and any other person. OHS Act s21(2)(e) The employer needs to ensure that the person is competent in the disposal of such plant.

389. Disposing of plant may include reselling (in full or part) or scrapping (waste disposal and/or recycling). If the plant is to be resold for use at a workplace, the seller will take on the duties of a person that supplies plant (see Part 2.3, especially paragraphs 111–118, of this Code). The seller needs to ensure that the plant is safe to load, transport, unload and store. OHS Regulations r89, r90 and r91

390. If the plant is to be scrapped, employers should consult with any relevant waste disposal authorities or organisations so that the plant is safe to load, transport, unload and dispose.

391. If the plant is to be used for scrap material, a supplier must inform the receiver of the plant that it is intended for use as scrap material. This must be done in writing. OHS Regulations r91

392 . For further information on supplier duties, see Part 2.3 of this Code.

393. Further information about managing and removing asbestos in the workplace can be found in Part 4.4 of the OHS Regulations and at **worksafe.vic.gov.au**.

Part 3 – Duties of employers

Record keeping

394. An employer must keep a record of any inspection and maintenance carried out on certain categories of plant for a period that the employer has management or control of the plant. OHS Regulations r106

395. Such plant includes:

- specific types of pressure vessels
- tower cranes
- self-erecting tower cranes
- lifts
- building maintenance units
- specific types of amusement structures
- mobile cranes with a rated capacity of greater than 10 tonnes (other than reach stackers)
- certain types of boilers
- concrete-placing units (truck-mounted with boom).

396. While employers must keep records associated with these types of plant, it is good practice to also keep records for other types of plant used in the workplace. Keeping records of identified hazards, associated risk controls and review and maintenance schedules can help to demonstrate compliance with the OHS Act and OHS Regulations. It also helps when undertaking risk assessments, if required.

Plant design registration

397. Certain plant must be design registered before it can be used in the workplace. OHS Act s40 and OHS Regulations r125
A list of plant that must be design registered in contained in Schedule 2 of the OHS Regulations and provided at **Appendix B**.
A designer, manufacturer or supplier may register the design before the plant is made available to the purchaser. If the design has been registered the design registration number should be provided with the plant.

398. If the plant has not been design registered, the employer must register the plant design before the plant can be used in the workplace. OHS Act s40 and OHS Regulations r125

399. If an employer modifies plant that has already been design registered in such a way that it requires new risk controls, the altered design must be registered before the plant can be used in the workplace. OHS Regulations r126

Part 4 – Plant design registration

Plant design registration

400. The design of certain types of plant must be design registered with WorkSafe. OHS Act s40 and OHS Regulations r125 The types of plant that must be registered are listed in Schedule 2 of the OHS Regulations and can be found in **Appendix B** of this Code. OHS Regulations r125(1) This does not apply to a design if work preparing the design started before 1 July 1995. OHS Regulations r125(2)

401. Plant design registration involves registering a design from which any number of individual items can be manufactured to that same design.

402. A person must not use plant in a workplace which requires design registration and has not been registered. OHS Act s40(2)

Registration of altered plant designs

403. If an item of plant is required to be registered with WorkSafe and the design of that plant is altered to an extent that new risk controls would be required to control risks, the altered design must be registered with WorkSafe. OHS Regulations r126(1)

404. An altered design of an item of plant must also be registered with WorkSafe if:

- the design of the item of plant before it was altered was not required to be registered because it was started before 1 July 1995 or it was registered by another corresponding Authority with equivalent statutory requirements, and
- the design is altered to an extent that new risk controls would be required to control risks, and
- the altered design has not been registered by the corresponding Authority that registered the original plant design. OHS Regulations r126(2)

Recognition of interstate designs

405. A design of an item of plant is not required to be registered with WorkSafe if the design has been registered (includes confirmation and approval) by a corresponding Authority with equivalent statutory requirements. OHS Regulations r127(1)

Corresponding Authority means a Government department or a statutory authority of the Commonwealth Government, or of the Government of another State or of a Territory, that is responsible for administering law corresponding to the OHS Act, the *Dangerous Goods Act 1985* or the *Equipment (Public Safety) Act 1994* (for example SafeWork NSW).

406. If an item of plant has been registered by a corresponding Authority with equivalent statutory requirements and the design of that plant is altered, it is not required to be registered with WorkSafe if that altered design has been registered by the corresponding Authority that registered the original plant design. OHS Regulations r127(2)

407. The above does not apply to a registration by a corresponding Authority if WorkSafe determines that it does not apply to that class of registration. OHS Regulations r127 (3)

Part 4 – Plant design registration

Making a design registration application

408. An application for registration of a plant design must:

- include a design verification statement OHS Regulations r509(1)(a)
- include a representational drawing of the plant design OHS Regulations r509(1)(c)
- include any information about the design that may be required by WorkSafe such as:
  - the date of the commencement and completion of the design
  - whether the design is for an alteration to an existing plant
  - whether the registration is the first registration of the design of the plant
  - the intended primary use and performance capacity of the plant
  - if known, the intended manufacturers name and address
  - the types and model number (if applicable) of the plant
  - a description of controls, safety devices, supporting system and communication system for the plant (if applicable)
  - the hazard level of pressure equipment and the type of fluid to be used in the pressure equipment (if applicable). OHS Regulations r509(1)(d), r509(2) and r509(3)
- include any evidence or proof of identity of the applicant required by WorkSafe. OHS Regulations r508(b)
- be accompanied by a fee of 20 fee units. OHS Regulations r508(c)

409. Any additional information relating to the design of plant that WorkSafe requires to be included with the application may be information applicable generally to all plant designs, or a type of plant design, or it may be specific to an individual plant design. OHS Regulation 509(4)

410. Forms for use when registering a plant design or alteration of a plant design are available at **worksafe.vic.gov.au**.

Design verification

411. The design verification statement is prepared by a design verifier stating that the design has been produced in accordance with the referenced technical standards and engineering principles. It must be in writing and signed by the design verifier. The statement must include the name, business address and qualifications of the person who produced the design verification statement, and if applicable, the name and business address of the organisation employing the design verifier. OHS Regulations r509(1)(b)

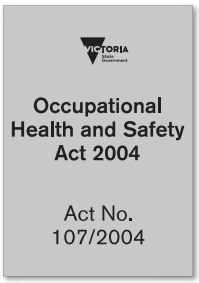
412. The person who applies for registration of a plant design must ensure that the design verification statement was made by a design verifier who:

- did not participate in preparing the plant design that is subject of the statement
- has an appropriate level of skill and knowledge to be able to verify the design, and
- has checked the design to ensure that it has been prepared according to the technical standards or engineering principles recorded by the designer in respect of the design of the plant. OHS Regulations r510(1)

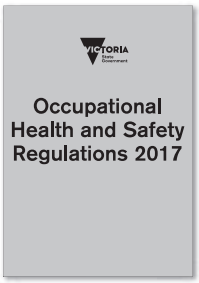
413. A person who has participated in preparing a plant design must not knowingly act as a design verifier for that plant design. OHS Regulations r510(2)

414. For more information about plant design registration and the plant design registration process see **worksafe.vic.gov.au**.

Appendix A – The compliance framework

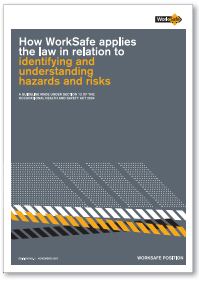


The Occupational Health and Safety Act 2004 (OHS Act) sets out the key principles, duties and rights in relation to occupational health and safety.

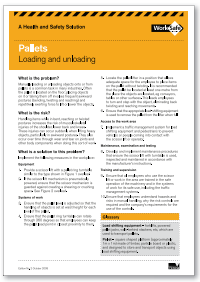


The Occupational Health and Safety Regulations 2017 (OHS Regulations) specify the way in which a duty imposed by the OHS Act must be performed, or prescribe procedural or administrative matters to support the OHS Act (eg requiring licences for specific activities, the keeping of records or giving notice).

Compliance codes provide practical guidance to duty holders. If a person complies with a provision of a compliance code, they are deemed to comply with the OHS legislative duty covered by the code provision. However, compliance codes are not mandatory, and a duty holder may choose to use some other way to achieve compliance.



WorkSafe positions are guidelines made under section 12 of the OHS Act that state how WorkSafe will apply the OHS Act or OHS Regulations or exercise discretion under a provision of the OHS Act or OHS Regulations. WorkSafe positions are intended to provide certainty to duty holders and other affected parties.



Non-statutory guidance includes information published by WorkSafe aimed at building people's knowledge and awareness of OHS issues, risks to health and safety, and the disciplines and techniques that can be applied to manage and control risks. Non-statutory guidance is not mandatory, nor does it provide any *deemed* to *comply* outcomes for duty holders. This guidance does, however, form part of the *state* of *knowledge* about OHS.

Appendix B – Plant requiring registration of design

1.1 Schedule 2 of the OHS Regulations 2017 states which plant designs must be registered. These items are listed below. Refer to regulations 106, 125 and 126 of the OHS Regulations and pages 70 and 71 of this Code for more detail in relation to the requirements associated with registration of plant design.

1.2 Pressure equipment, other than the following—

(a) pressure piping

(b) miniature boilers designed in accordance with the AMBSC Code

(c) gas cylinders or fired heaters with a hazard level equivalent to hazard level E as set out in AS 4343 Pressure equipment—Hazard levels.

1.3 Tower cranes, other than the foundations or supporting structure and the crane ties of the tower crane.

1.4 Self-erecting tower cranes.

1.5 Lifts, other than—

(a) platforms for raising or lowering stage performers and associated equipment

(b) plant designed only to store vehicles in a designated parking facility, and

(c) lifts designed to transport goods only, which do not have any operational controls within the lift car, including dumb waiters.

1.6 Building maintenance units.

1.7 Hoists with a platform movement of more than of 2·4 metres, designed to lift persons.

1.8 Work boxes suspended from cranes.

1.9 Amusement structures to which AS 3533.1— Amusement rides and devices—Part 1: Design and construction applies, other than the following—

(a) amusement structures determined by AS 3533.1 to be class 1

(b) amusement structures that are, or are intended to be, permanently installed and operated in playgrounds

(c) water slides on which water facilitates users sliding easily, predominantly under gravity, along a static structure

(d) water wave generators that prevent users from coming into contact with the machinery used to generate the waves

(e) inflatable devices, unless they have a platform height (the height of the highest part of the device designed to support users) of at least 3 metres and rely on a supply of continuously blown air to maintain their shape

(f) amusement structures that are specifically designed for a sporting, professional stunt, theatrical or acrobatic purpose or activity, including canoes operating on artificial currents

(g) rides or devices that are primarily designed as a form of transport or motor sport, including hovercrafts, quad bikes and snow mobiles

(h) jet packs and hover boards

(h) go-karts

(i) parasailing equipment

(j) coin or token operated devices that are intended to be ridden, at the same time, by not more than 4 children who must be below the age of 10 years.

Appendix B – Plant requiring registration of design

1.10 Prefabricated scaffolding, being an integrated system of prefabricated components manufactured in such a way that the possible geometry of assembled scaffolds is pre determined by the designer.

1.11 Boom-type elevating work platforms.

1.12 Gantry cranes with a rated capacity greater than 5 tonnes or bridge cranes with a rated capacity greater than 10 tonnes, and a gantry crane or a bridge crane which is designed to handle molten metal or dangerous goods.

1.13 Vehicle hoists.

1.14 Mast climbing work platforms.

1.15 Mobile cranes with a rated capacity greater than 10 tonnes, other than reach stackers.

1.16 Chairlifts.

1.17 Concrete-placing booms.

Appendix C – Documents associated with this Code

The references listed below are not incorporated into this Code. This means that they do not form part of this Code, although they could have regulatory status in their own right. They are included only to provide an indication of sources of further information.

Machinery

- AS 4024 – Safety of machinery
- AS/NZS IEC 60947.3 – Low voltage, switchgear and control gear, switches, disconnectors, switch disconnectors and fuse-combination units
- AS 61508 – Functional safety of safety related systems
- AS 62061 – Safety of machinery: Functional safety of safety-related electrical, electronic and programmable electronic control systems
- BS 6491 – Electro-sensitive safety systems for individual machines

All cranes including hoists and winches

- AS 1418 – Cranes, hoists and winches
- AS 2550 – Cranes, hoists and winches – Safe use

All conveyors except moving walks

- AS/NZS 4024.3610 to 4024.3614 – Safety of machinery: Conveyors – general requirements

Powered industrial trucks (including forklift trucks)

- AS 2359 – Powered industrial trucks

Lifts

- AS 1735 – Lifts, escalators and moving walks

Pressure equipment

- AS/NZS 1200– Pressure Equipment
- AS 1210 – Pressure Vessels
- AS 2593 – Boilers – Safety management and supervision systems
- AS 2971 – Serially produced pressure vessels
- AS/NZS 3788 – Pressure equipment – In service inspection
- AS 3873 – Pressure equipment – Operation and maintenance
- AS 3920 – Pressure equipment – Conformity assessment
- AS 1228 – Pressure equipment – Boilers
- AS 3892 – Pressure equipment – Installation
- AS 1271 – Safety valves, other valves, liquid level gauges, and other fittings for boilers and unfired pressure vessels
- ASME I – Power Boilers
- ASME II – Materials
- ASME V – Non-destructive examination
- ASME VII – Rules for construction of pressure vessels
- ASME VIII-2 – Pressure Vessels – alternative rules
- ASME VIII-3 – Alternative rules for construction of high pressure vessels
- ASME IX – Welding and brazing qualifications
- PD 5500 – Specification for unfired fusion welded pressure vessels

Appendix C – Documents associated with this Code

Miniature boilers

- AMBSC Code – Part 1 – Copper Boilers
- AMBSC Code – Part 2 – Steel Boilers
- AMBSC Code – Part 3 – Sub-Miniature Boilers
- AMBSC Code – Part 4 – Duplex Boilers

Gas cylinders

- AS 2030 – Gas cylinders – General requirements
- AS 2337 – Gas cylinder test stations
- AS/NZS 3509 – LP Gas fuel vessels for automotive use

Pressure piping

- AS 4041 - Pressure Piping

Tractors

- AS 1121- Agricultural tractor power take-offs – Rear mounted power take offs 1,2 and 3
- AS 1636 – Agricultural wheeled tractors – Roll-over protective structures criteria and tests
- SAE J167 – Overhead protection for agricultural tractors – Test procedures and performance requirements

Earthmoving machinery

- AS 2294 – Earth-moving machinery – protective structures – general
- AS 2958 – Earth-moving machinery – Safety
- ISO 6165 – Earth-moving machinery – Basic types – identification and terms and definitions
- ISO 6746-1 Earth-moving machinery – Definitions of dimensions and codes – Part 1: Base machine
- ISO 6746-2 Earth-moving machinery – Definitions of dimensions and codes – Part 2: Equipment and attachments
- ISO 7133 – Earth- moving machinery – Scrapers – Terminology and commercial specifications
- AS 4772 Earth-moving machinery – Quickhitches for excavators and backhoe loaders

Lasers

- AS/NZS IEC 60825.1 – Safety of laser products – Equipment classification and requirements
- AS/NZS ISO 11553 Safety of Machinery – Laser processing machines – Safety Requirements
- AS 2397 – Safe use of lasers in the building and construction industry
- BS EN 608251 – Safety of laser products – Equipment classification and requirements

Scaffolding

- AS/NZS 4576 – Guidelines for scaffolding
- AS/NZS 1576 – Scaffolding
- AS/NZS 1577 – Scaffold decking components

Temporary access equipment

- AS/NZS 1891 – Industrial fall arrest systems and devices
- IS EN 1263 – Temporary works equipment – Safety nets
- IS EN 1263-1 – Temporary works equipment – Safety nets: Safety requirements, test methods
- AS 5532 – Manufacturing requirements for single-point anchor device used for harness-based work at height
- AS 4488 – Industrial rope access systems
- AS/NZS 4949 – Temporary edge protection

Turbines

- API 612 – Petroleum, Petrochemical and Natural Gas Industries – Steam Turbines –Special-purpose Applications

Amusement structures

- AS 3533 Amusement rides and devices

Appendix C – Documents associated with this Code

Electrical installations

- AS 3000 – Electrical installations (known as the Australian/New Zealand Wiring Rules)
- AS/IEC 60204.1 – Safety of machinery: Electrical equipment of machines – General requirements

General

- AS 1657 – Fixed platforms, walkways, stairways and ladders – Design, constructions and installation
- AS/IEC 61511 – Functional safety – Safety instrumented system for the process industry sector

Machinery guarding

- AS 4024 - Safety of machinery
- ISO 12100 – Safety of machinery – General principles for design – Risk assessment and risk reduction

Ladders

- AS 1892 – Portable ladders

Appendix D – Examples of hazards

Hazards could include, but are not limited to, those shown in the following pages.

That items of plant are shown in their unguarded state to demonstrate the hazards and danger zones.

Drawing in or trapping hazards

Injuries can be caused when a part of the body is drawn into a 'nip-point', formed by:

- in-running nips between two counter-rotating parts (eg meshing gears, rolling mills, mixing rolls and press rolls)
- in-running nips between a rotating surface and a tangentially moving surface (eg a power transmission belt and its pulley, a chain and its chain wheel, and a rack and its pinion)
- running nips between a rotating surface and a tangentially moving surface where material (eg metal, paper, cable or rope, runs onto a reel, drum or shaft), and
- nips between rotating and fixed parts, which create a shearing, crushing or abrading action, as in spoked handwheels, flywheels and screw conveyors.

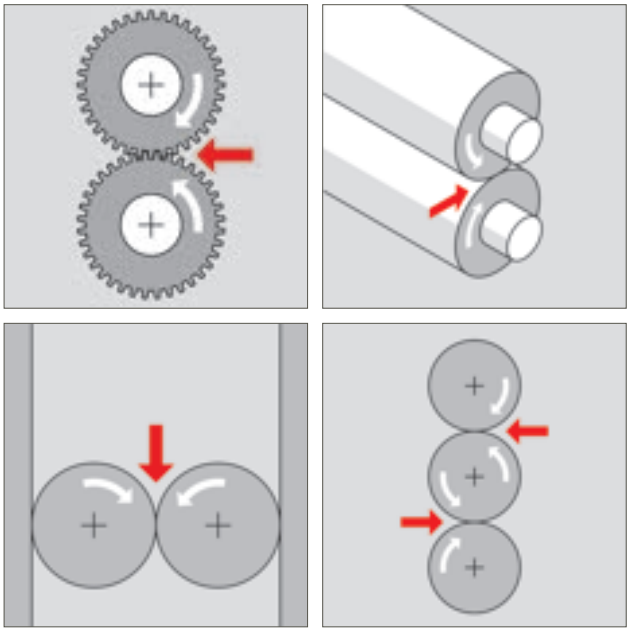


Illustration 1 – Drawing-in hazards between counter-rotating parts.

Solid red arrows = where a part of the body could be drawn into a 'nip-point'. White arrows = movement of machine parts.

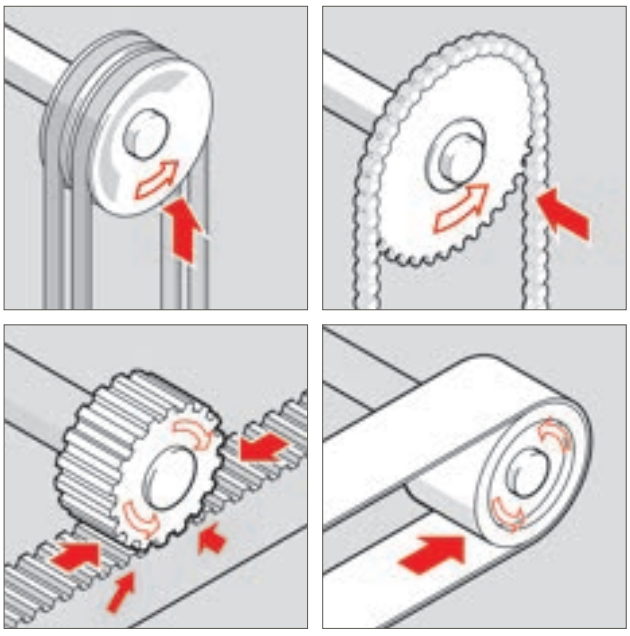


Illustration 2 – 'Nip-points' (drawing in hazards).

Solid red arrows = 'nip-points'.
White arrows = movement of machine parts.

Appendix D – Examples of hazards

Entanglement hazards

Entanglement involves being caught in a machine by loose items such as clothing, gloves, ties, jewellery, long hair, cleaning rags, bandages or rough material being fed into an item of plant.

The types of body contact that may lead to entanglement include:

- *contact with a single rotating surface* (eg plain shafting, couplings, spindles, chucks, leadscrews, mandrels or rotating work pieces including plain bar material)
- *being caught on projections or in gaps*. Belt fasteners and other projecting items, such as keys, set screws and cotter pins, are typical projection hazards. Fan blades, spoked wheels such as pulleys, sprockets, gear wheels and flywheels, mixer and beater arms and spiked cylinders are gap related hazards
- *contact with materials in motion* (eg in centrifuges, tumble driers and dough mixers or swarf from machining operations)
- contact between counter rotating parts (eg gear wheels or rolling mills)
- *contact between rotating and tangentially moving parts* (eg a power transmission belt and its pulley, a chain and chain wheel, a rack and pinion, a conveyor belt and any of its pulleys and a rope and its storage reel), and
- *contact between rotating and fixed parts* (eg spoked handwheels or flywheels and the machinery bed, screw or worm conveyors and their casings, revolving mixer and mincing mechanisms in casings having unprotected openings, mixers, extruder screw and barrel or the periphery of an abrasive wheel and an incorrectly adjusted work rest).

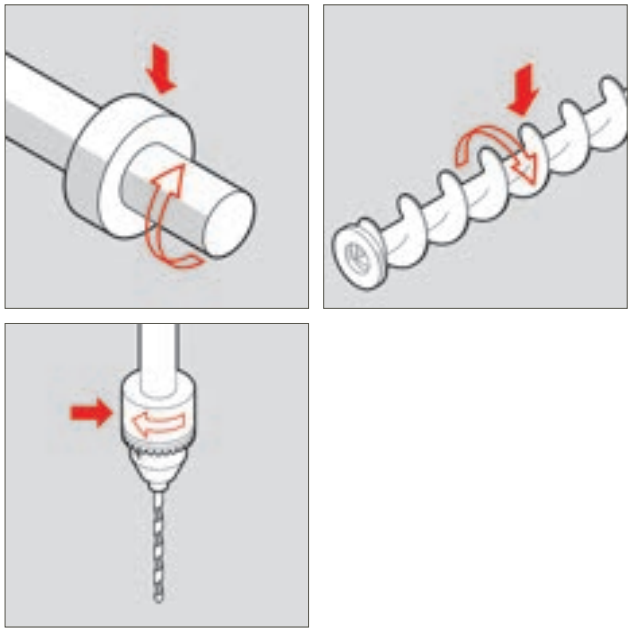


Illustration 3 – Contact with single rotating surface.

Solid red arrows = where entanglement can occur.
White arrows = movement of machine parts.

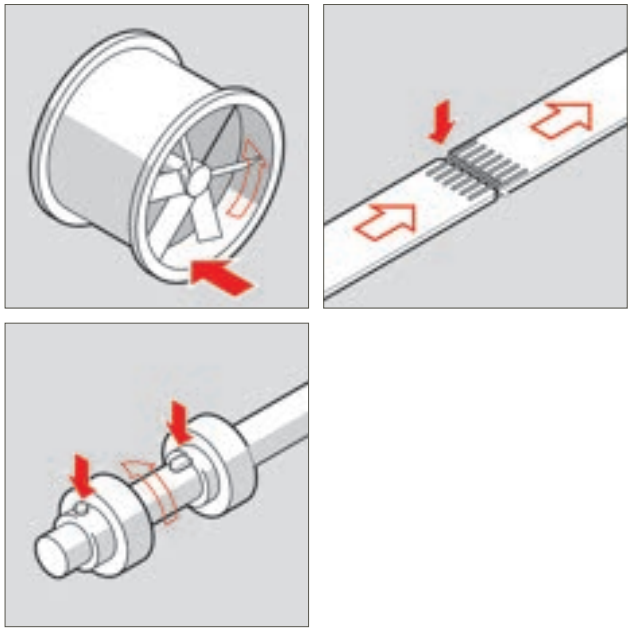


Illustration 4 – Catching on projections or gaps.

Solid red arrows = where entanglement can occur.
White arrows = movement of machine parts..

Appendix D – Examples of hazards

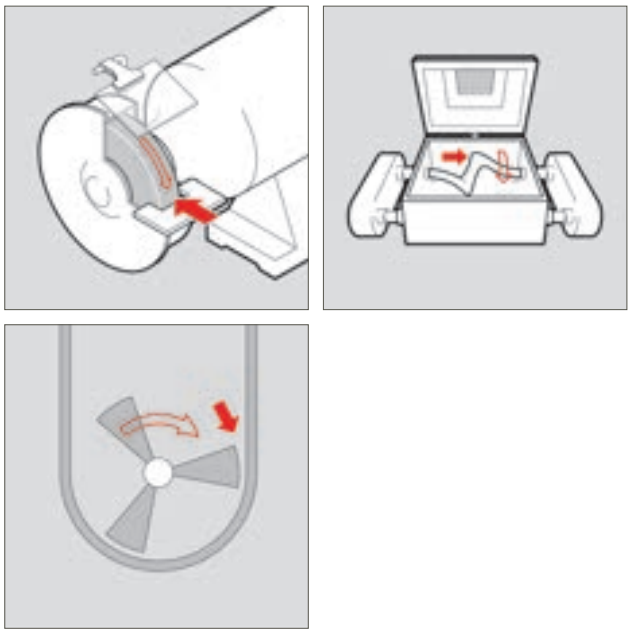


Illustration 5 – Catching between rotating and fixed parts.

Solid red arrows = where entanglement can occur.
White arrows = movement of machine parts.

Shearing hazards

Shearing action involves applying power to a slide or knife in order to trim or shear metal or other materials. Shear points occur where stock is actually inserted, held and withdrawn.

Parts of the human body can be sheared:

- between two plant parts (eg the table of a metal planing machine (shaper) and its bed, the table and blade of a guillotine or power press, nip points between connecting rods or links and rotating wheels or between parts that oscillate), and
- between a plant part and a work piece (eg the tool of a broaching machine and the part being broached).

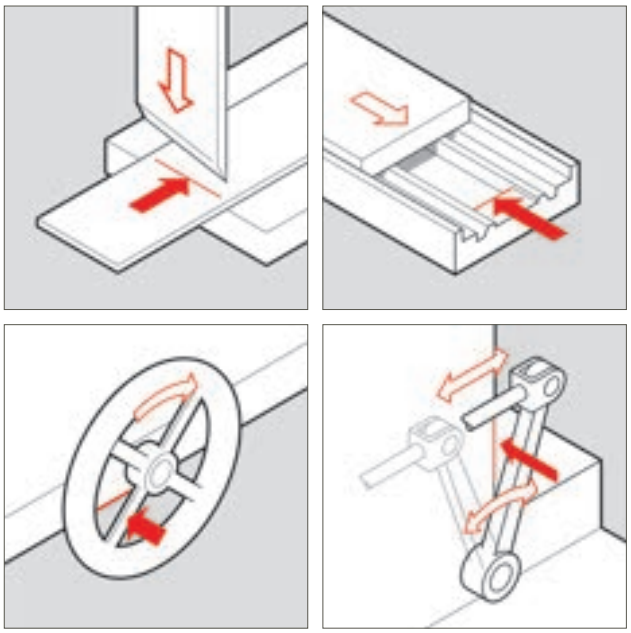


Illustration 6 – Shear hazards between two machine parts.

Solid red arrows = where parts of the body could be sheared.
White arrows = movement of machinery part.

Appendix D – Examples of hazards

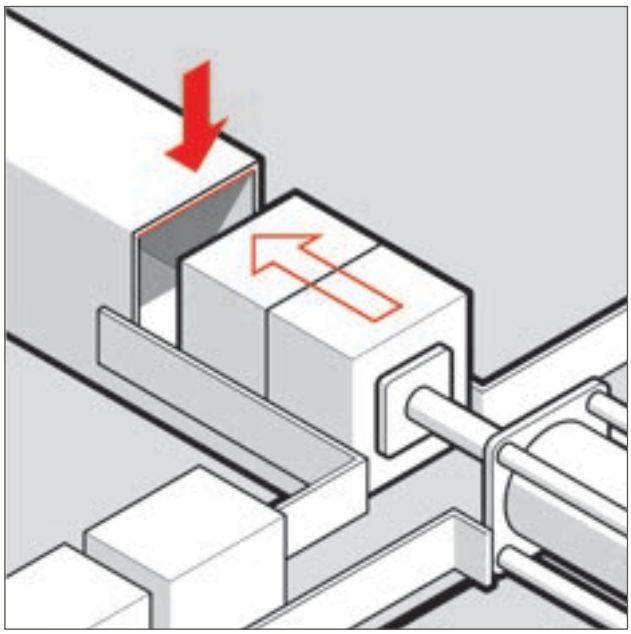


Illustration 7 – Shear hazards between a machinery part and a workpiece.

Solid red arrows = where parts of the body could be sheared.
White arrows = movement of machinery part.

Cutting hazards

Cutting hazards are present at the point of operation in cutting wood, metal, or other materials. Examples of mechanisms involving cutting hazards are all kinds of cutting tools, band and circular saws, boring or drilling machines, planing and tenoning machines, milling machines, water jet cutting, high energy lasers or moving sheet material in a machine.

Cutting hazards may involve rotating, reciprocating, or transverse motion. The danger of cutting action exists at the point of operation where finger, arm and body injuries can occur and where flying chips or scrap material can strike the head, particularly in the area of the eyes or face. The cutting effect may be aggravated by the body being unable to move away from the cutter.

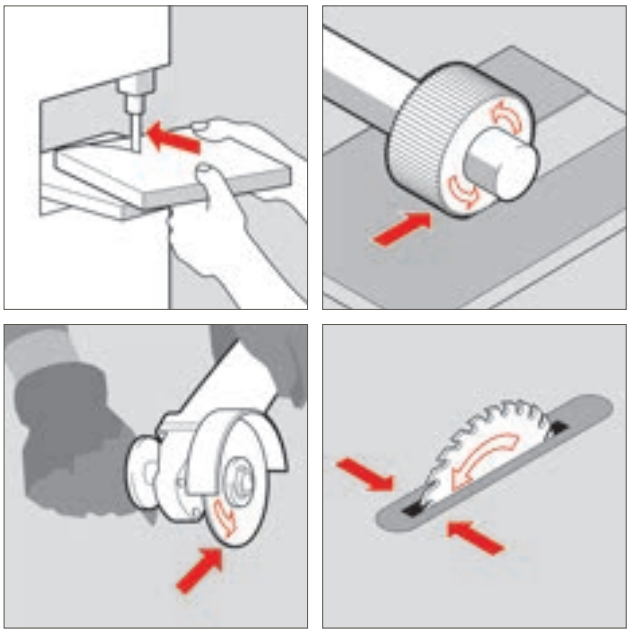


Illustration 8 – Typical cutting hazards.

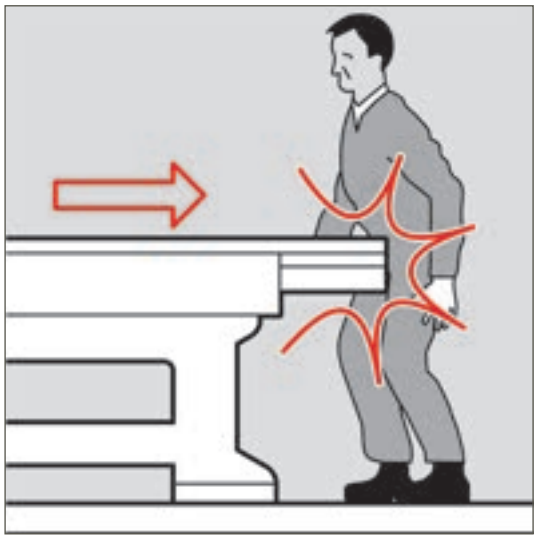
Solid red arrows = where parts of the body could be cut.
White arrows = movement of machinery part.

Appendix D – Examples of hazards

Impact hazards

Impact hazards relate to objects that strike the human body, but do not penetrate it. Examples include the rotating arm of a robot, the reciprocating bed of a metal planing machine and the pendulum movement of the arms of a wool scouring machine.

Impact hazards are different to crush hazards although the plant involved may be the same. Impact hazards operate against the inertia of the body whereas crush hazards involve the trapping of the body between two plant parts or between a plant part and a fixed structure.



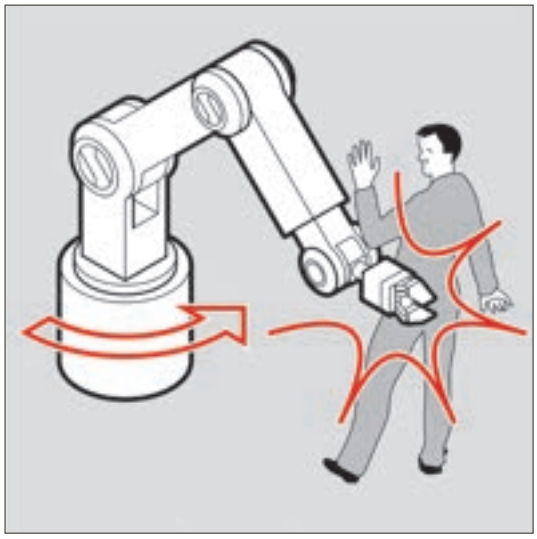


Illustration 9 – Impact hazards.

Solid white arrows = movement of machine part

Crushing hazards

Crushing occurs when a part of the body is caught:

- between a fixed and moving part of an item of plant such as the bed and tool of a power press
- between two moving parts on plant such as the support arms of a scissor lift platform; and
- between a moving part of plant and a fixed structure such as a counterweight and the floor.

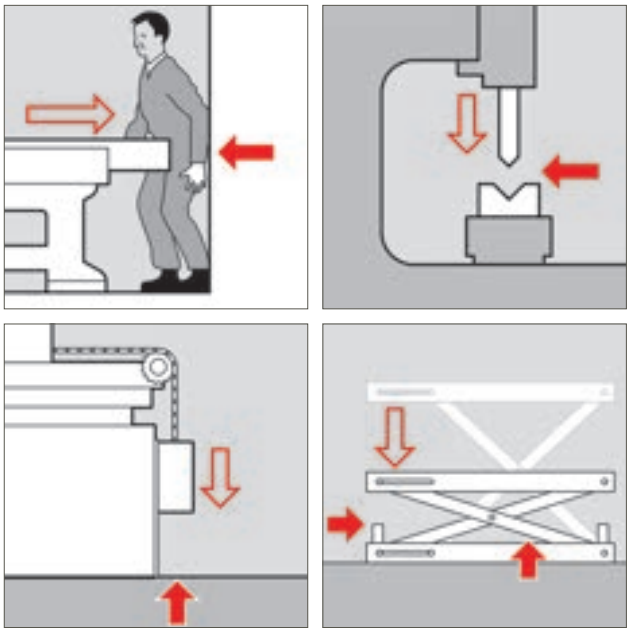


Illustration 10 – Crushing hazards.

Solid red arrows = where a part of the body could be crushed.
White arrows = movement of machine part.

Appendix D – Examples of hazards

Stabbing and puncturing hazards

The human body can be penetrated by:

- flying objects such as:
  - parts of an item of plant (eg a loose tool in a lathe, broken tooling on a press or the breaking up of an abrasive wheel)
  - material ejected from an item of plant (eg swarf, timber from a bench saw, a work piece, molten metal from a die casting machine, sparks from a welding process, a bolt from an explosive powered tool or debris thrown by rotary mowers and hedgecutters). Injection of fluids through the skin can cause tissue damage similar to crushing
- rapidly moving parts of plant or pieces of material (the needle of a sewing machine, the drill of a drilling machine or the arm of a robot).

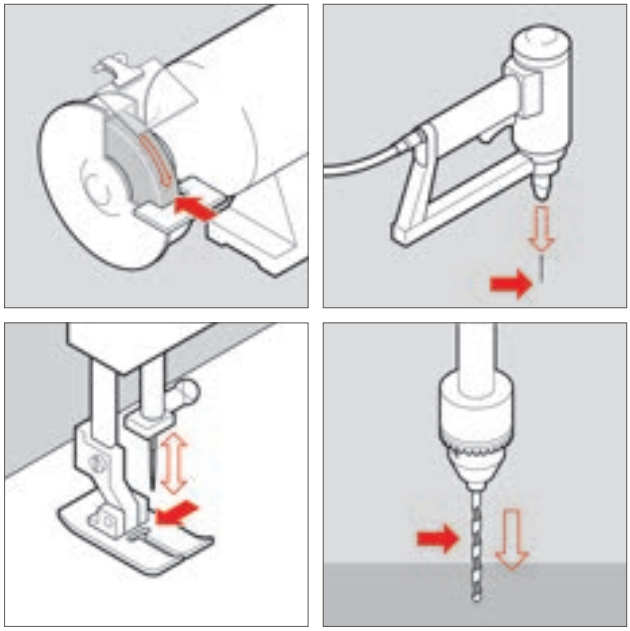


Illustration 11 – Stabbing and puncture by flying objects or moving parts of machinery.

Solid red arrows = items that could penetrate the body.
White arrows = movement of objects or machine part.

Friction and wearing hazards

Friction burns can be caused by smooth parts operating at high speed. Other examples of friction or wearing hazards include the sides of a grinding wheel, the belt of a belt sanding machine, material running onto a reel or shaft, a conveyor belt and its drums, and pulleys and fast-moving ropes or belts.

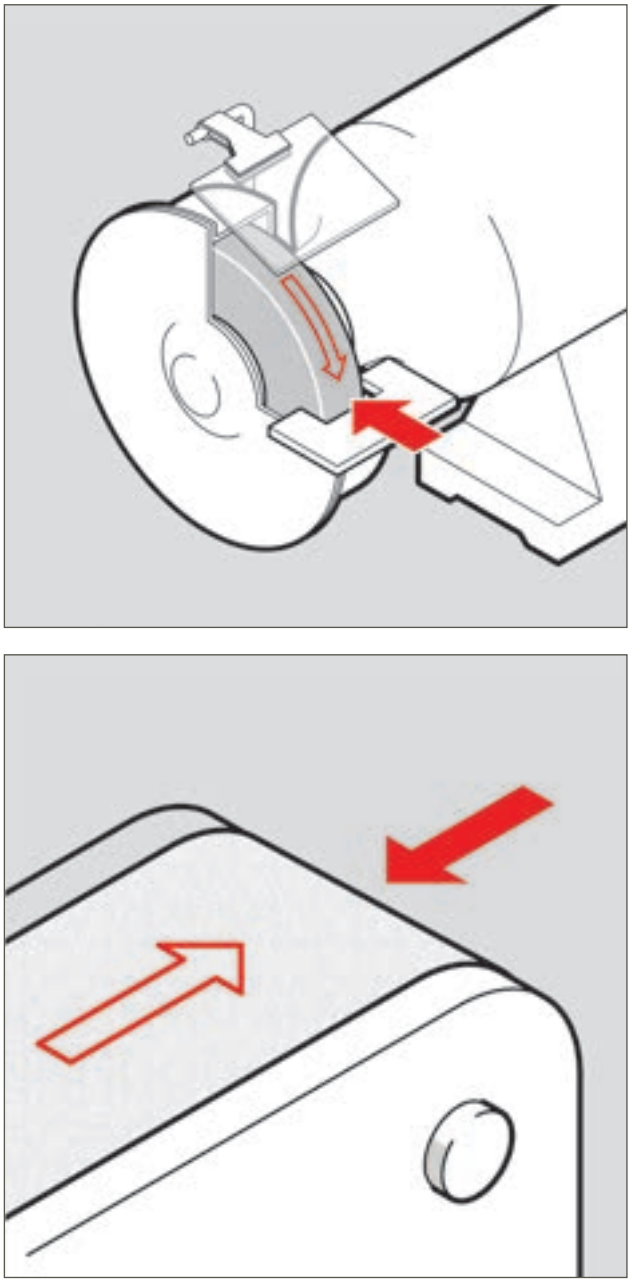


Illustration 12 – Friction and abrasion hazards.

Solid red arrows = where a body part may be injured.
White arrows = movement of machine part.

Appendix D – Examples of hazards

Hot or cold hazards

There are a range of hot or cold hazards that should be considered including:

- incidents that might occur if people are required to constantly work where the temperature is outside a comfortable range
- extreme heat or extreme cold, which could affect plant operations, and
- injuries that might occur if there is contact with hot or cold parts.

Appendix E – Hazard checklist

Description of plant:

Activities (eg use, cleaning and maintenance):

Assessed by:

Date:

'Yes' to any of the following indicates the need to implement appropriate control measures

Entanglement	YES	NO
Can a person's hair, clothing, gloves, necktie, jewellery, cleaning brush or rag become entangled with moving parts of the plant?	☐	☐
Crushing	YES	NO
Can anyone be crushed due to: ▪ material falling off the plant?	☐	☐
▪ uncontrolled or unexpected movement of the plant?	☐	☐
▪ lack of capacity for the plant to be slowed, stopped or immobilised?	☐	☐
Assessed by:		
▪ the plant tipping or rolling over?	☐	☐
▪ other factors not mentioned?	☐	☐
▪ parts of the plant collapsing?	☐	☐
▪ coming into contact with moving parts of the plant during testing, inspection, operation, maintenance, cleaning or repair?	☐	☐
▪ being thrown off or under plant?	☐	☐
▪ being trapped between the plant and materials or fixed structures?	☐	☐

Appendix E – Hazard checklist

Cutting, Stabbing or Puncturing	YES	NO
Can anyone be stabbed or punctured due to: ▪ coming in contact with sharp or flying objects?	☐	☐
▪ coming in contact with moving parts during testing, inspection, operation, maintenance, cleaning or repair?	☐	☐
▪ the plant, parts of the plant or work pieces disintegrating?	☐	☐
▪ work pieces being ejected?	☐	☐
▪ the mobility of the plant?	☐	☐
▪ uncontrolled or unexpected movement of the plant?	☐	☐
▪ other factors not mentioned?	☐	☐
Shearing	YES	NO
Can anyone's body parts be sheared between two parts of the plant, or between a part of the plant and a work piece or structure?	☐	☐
Striking	YES	NO
Can anyone be struck by moving objects due to: ▪ uncontrolled or unexpected movement of the plant or material handled by the plant?	☐	☐
▪ the plant, parts of the plant or work pieces disintegrating?	☐	☐
▪ work pieces being ejected?	☐	☐
▪ mobility of the plant?	☐	☐
▪ other factors not mentioned?	☐	☐
High Pressure Fluid	YES	NO
Can anyone come into contact with fluids under high pressure, due to plant failure or misuse of the plant?	☐	☐
Electrical	YES	NO
Can anyone be injured by electrical shock or burnt due to: ▪ the plant contacting live electrical conductors?	☐	☐
▪ the plant working in close proximity to electrical conductors?	☐	☐
▪ overload of electrical circuits?	☐	☐
▪ damaged or poorly maintained electrical leads and cables?	☐	☐

Appendix E – Hazard checklist

▪ damaged electrical switches?	☐	☐
▪ water near electrical equipment?	☐	☐
▪ lack of isolation procedures?	☐	☐
▪ other factors not mentioned?	☐	☐
Explosion	YES	NO
Can anyone be injured by explosion of gases, vapours, liquids, dusts or other substances, triggered by the operation of the plant or by material handled by the plant?	☐	☐
Slipping, Tripping and Falling	YES	NO
Can anyone using the plant, or in the vicinity of the plant, slip, trip or fall due to: ▪ uneven or slippery work surfaces?	☐	☐
▪ poor housekeeping e.g. offcuts, cables, hoses obstructing walkways, spills not cleaned up?	☐	☐
▪ obstacles being placed in the vicinity of the plant?	☐	☐
▪ other factors not mentioned?	☐	☐
Can anyone fall from a height due to: ▪ lack of a proper work platform?	☐	☐
▪ lack of proper stairs or ladders?	☐	☐
▪ lack of guardrails or other suitable edge protection?	☐	☐
▪ unprotected holes, penetrations or gaps?	☐	☐
▪ poor floor or walking surfaces, such as the lack of a slip-resistant surface?	☐	☐
▪ steep walking surfaces?	☐	☐
▪ other factors not mentioned?	☐	☐
▪ collapse of the supporting structure?	☐	☐
Ergonomic	YES	NO
Can anyone be injured due to: ▪ poorly designed seating?	☐	☐
▪ poorly designed operator controls?	☐	☐

Appendix E – Hazard checklist

▪ high forces?	☐	☐
▪ repetitive movements?	☐	☐
▪ awkward body posture or the need for excessive effort?	☐	☐
▪ vibration?	☐	☐
▪ other factors not mentioned?	☐	☐
Combination of hazards	YES	NO
Can anyone be injured due to unexpected start-up, unexpected over-run/over-speed (or similar malfunction) from: ▪ failure/disorder of the control system, for example a hydraulic system?	☐	☐
▪ restoration of energy supply after an interruption?	☐	☐
▪ restoration of energy supply after an interruption?	☐	☐
▪ other environmental factors (gravity, wind, etc.)?	☐	☐
▪ errors in the software?	☐	☐
▪ errors made by the operator?	☐	☐
Other hazards	YES	NO
Can anyone be injured due to: ▪ noise?	☐	☐
▪ inadequate or poorly placed lighting?	☐	☐
▪ entry into any confined spaces of the plant?	☐	☐
▪ failure to select plant that is suitable for its intended use?	☐	☐
▪ contact with hot or cold parts of plant?	☐	☐
▪ exposure to hazardous chemicals, radiation or other emissions released by the plant?	☐	☐
▪ lack of operator competency?	☐	☐
▪ other factors not mentioned?	☐	☐

This document is intended for general guidance purposes only. The Code provides practical guidance for those who have duties or obligations in relation to the *Occupational Health and Safety Act 2004* and the Occupational Health and Safety Regulations 2017. Employers and employees should always check the legislation and make their own assessment about what action they need to take to ensure compliance with the law.

WorkSafe Victoria

WorkSafe Agents
Agent contact details are all available at
worksafe.vic.gov.au/agents

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Phone (03) 4243 7000
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Website worksafe.vic.gov.au

Information in your language
For information about WorkSafe in your own language, call our Translating and Interpreting Service (TIS National) on **131 450**.

WorkSafe Victoria is a trading name of the Victorian WorkCover Authority
WSV016/03/05.19