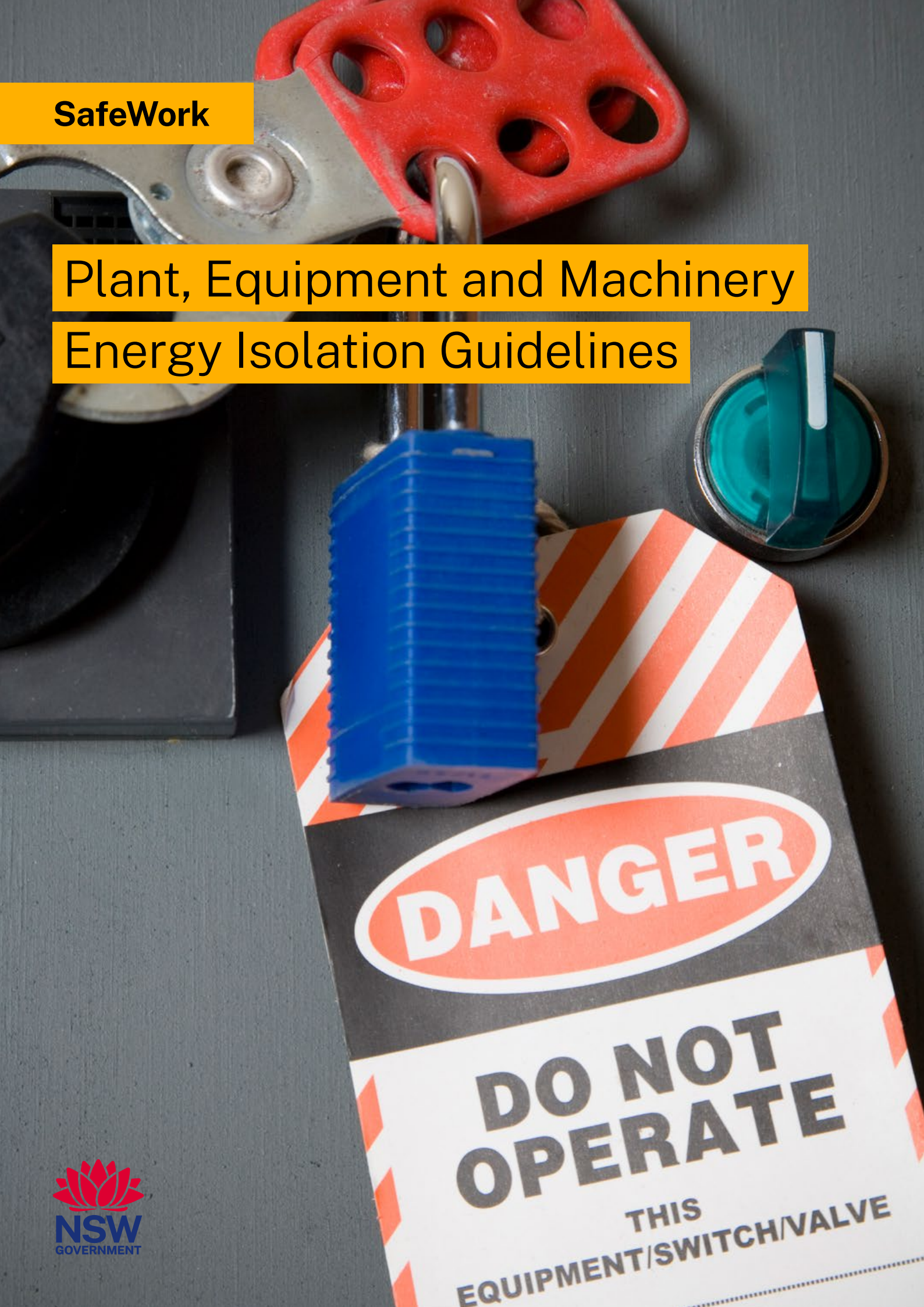
SafeWork

Plant, Equipment and Machinery Energy Isolation Guidelines



NSW GOVERNMENT

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1. Introduction

Most workplaces use powered plant and equipment to assist with manufacturing and provision of goods and services. Powered plant and equipment can be defined as:

Any equipment, appliances, implements and components or anything fitted or connected to things that are powered by an independent source of energy such as electricity or fossil fuels. Examples of plant include lifts, cranes, computers, machinery, conveyors, forklifts, augers, vehicles, power tools and amusement devices.

The NSW Work Health and Safety Regulations require persons with management and control of plant at a workplace to manage the health and safety risks associated with plant.

Isolating energy to the plant and equipment when undertaking cleaning, servicing, repairing, or alteration is a very important part of this.

Plant machinery and equipment often require maintenance or repairs when breakdowns occur and involve people working on components that would ordinarily be in motion and protected by guards or other controls to prevent people from being injured or killed.

For this reason, it is critical that all workplaces have a process to ensure energy to plant and equipment is fully isolated before any maintenance or repair work commences to prevent accidental start-ups which could cause injury or death.

a. Purpose

The purpose of these Guidance Notes is to provide information for:

- Isolating
- De-energising
- Locking out; and,
- Tagging-out plant and equipment.

It is intended to help workplaces design and implement their own safe energy isolation procedures to reduce the risk of injury or death during plant inspections, repairs, maintenance, and or cleaning. Each section in these Guidance Notes contains information that could be included in an energy isolation procedure for your workplace.

The Appendix section includes Risk Assessment, Procedure and On-the-job assessment templates. These templates can be tailored to suit your workplace. The content in these templates should not be regarded as exhaustive, and you may want to add other sections and information that is not covered. You will need to consult workers and management in your workplace to determine what should be included.

After reading each section in these Guidance Notes, you can return to the template/s and populate the relevant heading. This Guide should also be used in conjunction with the Simple and Complex Isolation videos which can be found at: https://www.safework.nsw.gov.au/hazards-a-z/machinery-and-equipment

b. Scope

The information contained in these Guidance Notes explains why you need to isolate, de-energise, lockout and tag-out plant and equipment. It considers the specific legislative duties applying to:

- Persons Conducting a Business or Undertaking (PCBU) which is any organisation that engages people to perform work
- Officers of the PCBU; and,
- Managers, Supervisors and Workers.

c. Definitions

I. Types of Energy Sources

- Gravity
- Motion
- Mechanical
- Electrical (mains, solar and by generator)
- Pressure (pneumatic pressure - compressed air, fluids under pressure, such as water or hydraulic oil)
- Sound
- Radiation
- Biological
- Chemical such as gases, fuels
- Temperature/heat; and,
- Energy storing devices, such as batteries, springs, flywheels, accumulators, and capacitors.

II. Lock Out

Where an energy isolator e.g., electrical power switch is turned to the OFF position and secured in the OFF position by having a physical block fitted such as a padlock and key removed, etc. This stops the plant or equipment from being turned on accidentally or in an unplanned circumstance.

III. Danger Tags

Danger tags are prominently marked ‘Danger - Do Not Operate’. Danger tags are to be placed only for the protection of personnel working on plant; they are not to be left on after that person completes their work or finishes their shift. Danger tags should:

- Be durable and securely fixed to the point of isolation
- Clearly state the warning, including any warning about the specific hazards relating to the isolation
- Be dated and signed by the worker or workers involved in the carrying out of the work or, where appropriate, by the supervisor in charge of the workers; and,
- Be attached in a prominent position on each isolation point (or one of many points used to isolate) the machine.
- When work is finally completed, the tags may only be removed by the signatories to the tag. If unavailable and unable to return, measures must be put in place to manage risk associated with removing the tag.

iv. Out-of-service Tags

Out of Service Tags are used to identify plant that is not safe to use or fit for purpose. They are placed for the protection of the operators, maintenance personnel, the general public or plant and are to be left attached to the device until the defect listed is remedied. Out of Service or Caution Tags should be durable and securely attached, clearly state the nature of the defect or reason the plant is unsafe and be attached on a prominent position on each isolation point. Once the defect is remedied, the Isolating Person / Isolation Co-ordinator (Refer to Roles and Responsibilities table) may remove the tag, returning the device to service, or replace it with a danger tag in preparation to work on the plant. The tag must only be removed by the signatories to the tag. Any person may fit an out-of-service tag.

v. Mechanical Isolation

Isolation and de-pressurisation of hydraulic or pneumatic energy, immobilisation of all equipment that has the potential to move. This includes hydraulic arms, fan blades and rollers.

vi. Isolation

The disconnection and separation of all energy (including stored) from equipment to prevent the possibility of inadvertent energising of the whole or specified section of that equipment. The de-energising must also prevent the introduction of contaminants or unsafe conditions through equipment such as piping, ducts, vents, drains, conveyors, service pipes and fire protection equipment, into working areas

vii. Quarantine

The separation and or segregation of faulty or damaged plant and equipment or faulty or rejected goods through a process or designated area.

viii. Simple isolation

Where equipment can effectively be isolated using not more than two isolators and two or less energy sources.

ix. Complex / Group isolation

Machines that have multiple isolation points with multiple people working on the machine at the same time.

x. Personal locks

A personal lock is a lock provided by a PCBU for use by a worker to ensure personal lockout protection so that each lock, when applied, is operable only by a key in the worker's possession, and by a key under the control of the supervisor / manager in charge.

xi. Zero energy state

Zero energy state is a condition in which plant / equipment is rendered incapable of spontaneous or unexpected action or otherwise releasing mechanical energy. Simply put, it is the point at which plant / equipment has no energy flowing to or from it.

xii. Standard operating procedure

A Standard Operating Procedure (SOP) is a document that provides step-by-step instructions on how to perform a particular task or activity with the appropriate application of risk controls to prevent injury or illness to a person.

xiii. Isolation plan

An isolation plan includes (but is not limited to) what plant / equipment is being isolated, the workers involved, their roles and responsibilities, a list of actions required to isolate the specific plant / equipment and sign off for each action.

d. Roles & Responsibilities

PCBU's are responsible for ensuring that persons isolating plant and equipment have been formally assessed as competent and know their roles and responsibilities.

Below are some examples of possible roles which could be used in your workplace.

Position	Definition	Responsibility
Affected personnel	Any person who through their work may be impacted by isolation and activities associated with locking and tagging out of plant and equipment	• Recognize when Isolation procedures are being used • Understand the purpose of Isolation procedures • Understand the critical importance of not attempting to start up or use equipment that is isolated • Cooperate with the provisions of the isolation procedures to ensure the equipment is not restarted
Isolating Person / Isolation Co-ordinator	Personnel who have been specifically trained in the approved energy isolation methodology and program, and formally assessed as competent to perform a specified task documented in the isolation procedure Personnel who have a thorough understanding of the process and equipment and appropriately trained and certified as Isolating Person / Isolation Co-ordinator to oversee Complex Isolations (see Isolation Methods below). They must be capable of analysing tasks and the energy sources present to prepare and undertake effective de-energisation and isolation.	• Supervise contractors and other Affected Personnel for simple and complex isolations • Oversee and co-ordinate complex isolations and have thorough plant and equipment knowledge • Confirm that correct isolator(s) have been identified and placed in a safe position • Ensure that plant/equipment is de-energised or re-energised by following the appropriate steps outlined in the procedure • Isolates, secures and verifies isolation and returns equipment to service • Ensure that handover processes are followed if the work is not completed at the end of a shift
Workers (Employee, Team Member)	Personnel in the workplace who may be involved with using the plant and equipment being isolated	• Comply with isolation procedure • Verify that all isolations have been implemented and are effective before commencing a work activity under the control of an isolation plan

Position	Definition	Responsibility
Site/Functional Manager/ Supervisors/People Leaders	Managers responsible for overseeing all work activities at a particular site	• Manage and monitor workers performing work activities under the control of an Isolating Person / Isolation Co-ordinator and facilitate the provision of appropriate information, instruction, training, and supervision with workers in relation to the implementation of the procedure • Ensure sufficient resources are provided to enable the isolation system to be properly implemented. • Supervision of contractors, including their inductions and ensuring relevant work permits are in place
HSE Personnel	Personnel with Health and Safety Co-ordination activities	• Ensure the Isolation Procedure is implemented in their area of responsibility
Contractors	Any external personnel who belong to a separate organisation engaged to perform work	• Comply with the isolation procedure • If the contractor has their own work instruction, they may adopt these measures with approval from the Site/ Functional Manager/ Supervisors/ People Leaders HSE Personnel providing they do not undermine or contradict organisational procedures
Business Unit Group General Managers / Presidents	Heads of the organisation	• Ensure that an isolation process is fully implemented in areas within their control including providing adequate resources, conducting compliance assurance activities, and developing gap closure plans as appropriate

2. What are my legal obligations?

a. Work Health and Safety (WHS) Legislation

i. What is plant?

Plant includes machinery, equipment, appliances, containers, implements, tools and any components or anything fitted or connected to those things. Plant includes items as diverse as lifts, cranes, computers, machinery, conveyors, forklifts, vehicles, power tools, quad bikes, mobile plant etc.

The general duty of care under the WHS Act applies to this type of plant. Plant that relies exclusively on manual power for its operation and is designed to be primarily supported by hand, for example a screwdriver, is not covered by the WHS Regulation.

Plant is a major cause of work-related death and injury in Australian workplaces. There are significant risks associated with using plant and severe injuries can result from the unsafe use of plant including:

- Limbs amputated by unguarded moving parts of machines
- Crush injuries caused by mobile plant
- Fractures from falls while accessing, operating, or maintaining plant
- Degloving injuries arising from access to the moving parts of machines
- Electric shock from plant that is not adequately protected or isolated, and,
- Burns or scalds due to contact with hot surfaces, or exposure to flames or hot fluids.

Other risks include hearing loss due to noisy plant and musculoskeletal disorders caused by manually handling or operating poorly designed plant.

ii. Who has health and safety duties for plant at the workplace?

There are a number of duty holders who have a role in managing the risks of plant in the workplace. These include:

- Persons Conducting a Business or Undertaking (PCBU)
- PCBU involving the management or control of fixtures, fittings, or plant
- Designers, manufacturers, importers and suppliers of plant, substances, or structures
- Installers, and,
- Officers.

Workers and other persons at the workplace also have duties under the WHS Act, such as the duty to take reasonable care for their own health and safety at the workplace.A person can have more than one duty and more than one person can have the same duty at the same time.

iii. Person conducting a business or undertaking

A PCBU must eliminate risks arising from plant in the workplace, or if that is not reasonably practicable, minimise the risks as far as is reasonably practicable.
WHS Regulations includes more specific requirements for PCBUs to manage the risks of plant, as well as other hazards associated with the workplace.

This duty includes ensuring, as far as is reasonably practicable:

- The provision and maintenance of safe plant, and,
- The safe use, handling, storage, and transport of plant.

PCBUs have a duty to consult workers about work health and safety and may also have duties to consult, cooperate and coordinate with other duty holders.

iv. PCBU management or control of fixtures, fittings, or plant

WHS Regulations require PCBU's to ensure that any operator controls are 'able to be locked into the "off" position' to enable the disconnection of all motive power.

3. How to manage risks associated with stored energy

a. Hazard identification

i. What is a hazard?

The term ‘hazard’ is commonly used when people think and talk about safety. It is defined as:

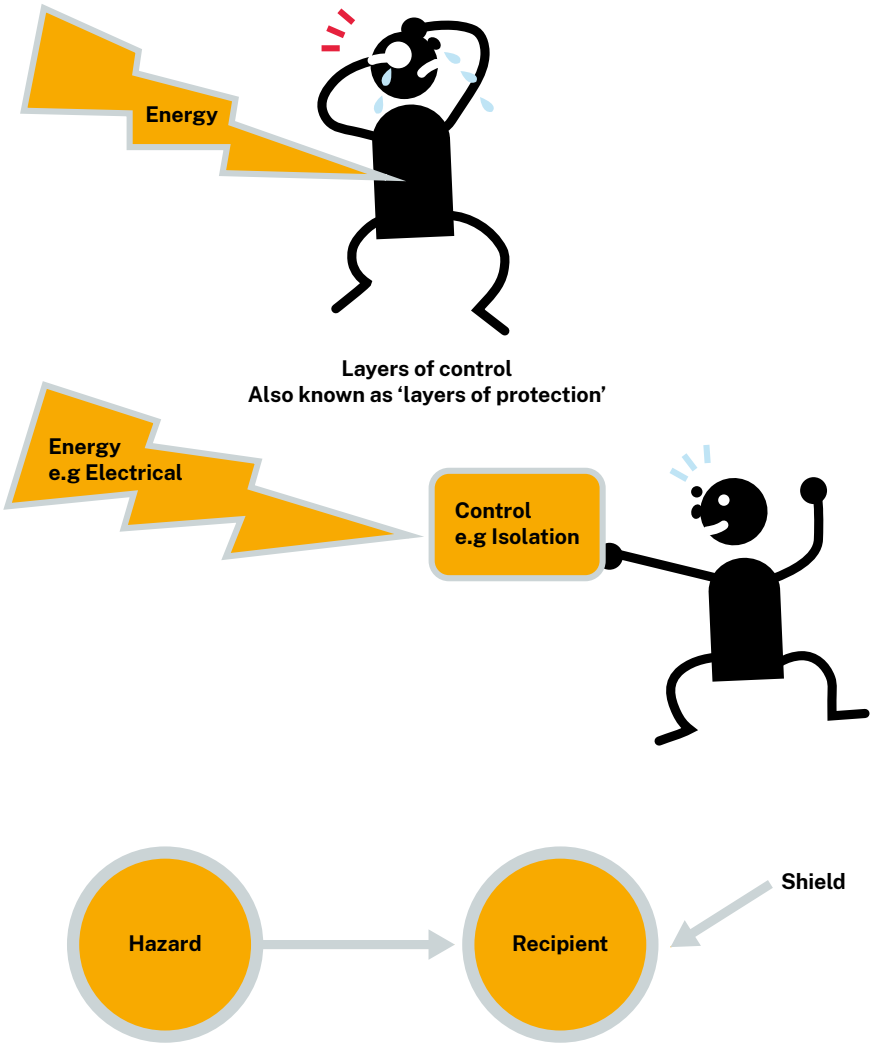
A hazard is a source of potential harm that can cause injury, ill-health, damage to property, the environment, or a combination of these.

To cause harm, you need energy. For example electrical energy can cause electrocution, and mechanical energy such as moving machinery can cause crushing injuries.

To prevent an undesired outcome from these energies you need to put controls in place, for example turning off or releasing sources of energy that powers equipment prior to performing maintenance or repair work.

Hazards can therefore be thought of as sources of uncontrolled energies that have the potential to cause harm. Through the energy isolation process, you are controlling energies.

The diagram of the Energy Damage Model below is an example only.



b. Hazardous energy

Hazardous energy is any electrical, mechanical, hydraulic, pneumatic, chemical, nuclear, thermal, gravitational, or other energy that can harm people.

When it comes to plant and equipment common energy sources include:

- Electricity (mains, solar and by generator)
- Pressure such as:
    - pneumatic e.g., pressurized air lines
    - hydraulic pressure e.g., pressurized lines using oil
    - steam e.g., boilers
- Mechanical e.g., moving parts found in machinery; and,
- Thermal e.g., cold pipes caused by immediate release of gases.

It is therefore important to understand all the types of energy, either stored in or powering plant and equipment then isolate them.

c. Risk control and risk management

I. What is risk?

A risk is the chance of harm being caused by a hazard and is determined by a risk assessment.

Organisations will often use a risk matrix to help them determine the risk level of a hazard. (Appendix A has an example of a risk matrix and a risk assessment template).

It applies a numerical calculation to the intersection between consequence of hazard and the likelihood of the hazard causing harm. The greater the likelihood and the degree of harm, the higher the risk score.

When it comes to plant and equipment repairs and maintenance work, think about the chances of accidental startup of machinery whilst people are working on the machines.

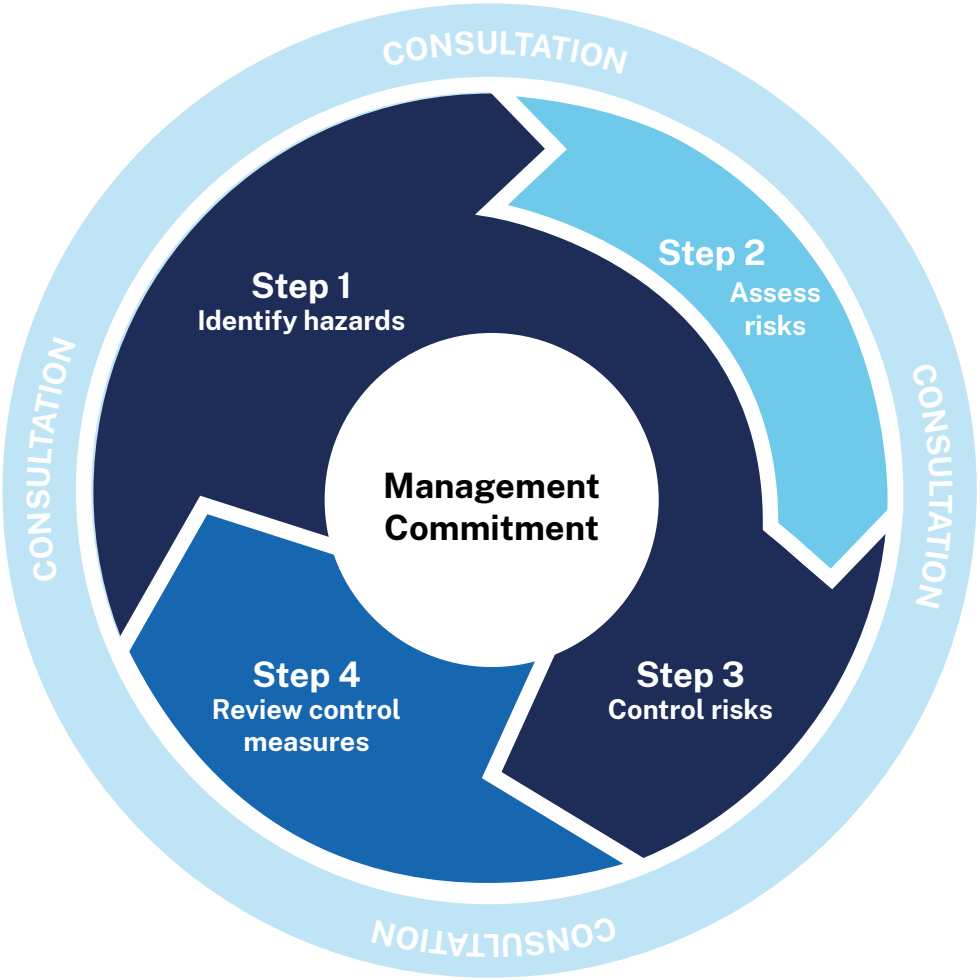
II. What is risk management?

A safe and healthy workplace does not happen by chance or guesswork. You must think about what could go wrong at your workplace and what the consequences could be. Then you must do whatever you can to eliminate or minimise health and safety risks from your business or undertaking.

This process is known as risk management and involves the four steps set out in this Guide (see diagram below).

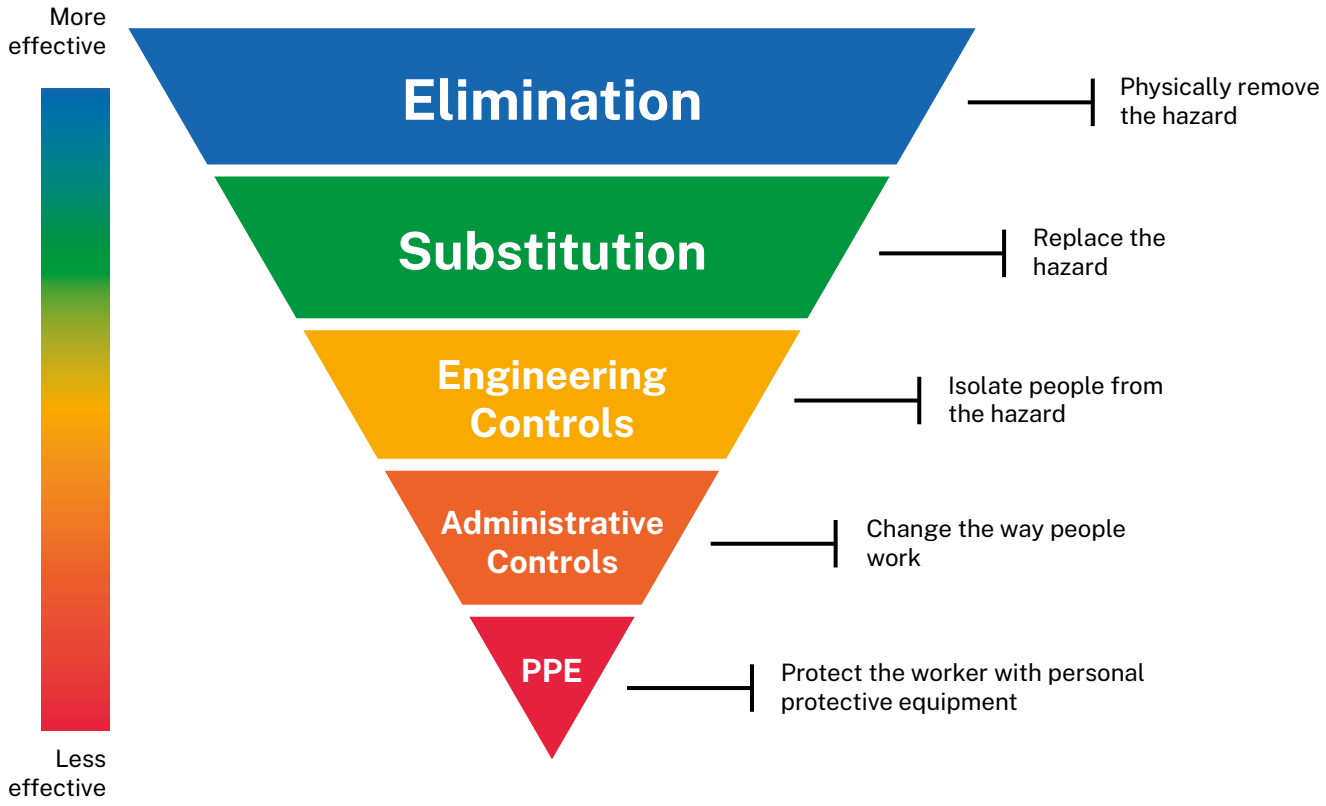
- Identify hazards i.e. find out what could cause harm
- Assess risks if necessary and understand the nature of the harm that could be caused by the hazard and how serious the harm could be and the likelihood of it happening
- Control risks by implementing the most effective control measure that is reasonably practicable in the circumstances; and,
- Review control measures to ensure they are working as planned.

This is demonstrated in the diagram below and should be used when designing the most appropriate isolation methods for your workplace.



III. Hierarchy of controls

When controlling hazards, some methods are more effective than others, therefore it helps to understand them as a "hierarchy of controls". Controls at the top of the pyramid are the most effective and desirable whilst those at the bottom are the least. This is demonstrated in the diagram below and in the Risk Matrix in Appendix A.



Below are some examples of how the hierarchy of controls may apply when performing repairs and maintenance on plant and equipment.

1. **Elimination** - The most effective control measure is to remove the hazard or hazardous work practice associated with the plant. Many hazards can be addressed before introducing plant into your workplace i.e. in the planning and purchasing stages.

   For example, if it possible, obtain plant and equipment that does not require maintenance, thereby eliminating the need to perform possibly hazardous work. If elimination is not possible, you must minimise the risk by substitution.

2. **Substitution** – Substitute the plant (or hazardous parts of it) with plant that is safer.

   For example, substituting a piece of equipment with another to reduce risk such as, using a cordless drill instead of an electric drill if the power cord is at high risk of getting damaged.

3. **Isolation** – minimise the risk by isolating or separating the hazard or hazardous work practice from any person exposed to it.

   For example, using concrete barriers to separate mobile plant from workers.

4. **Engineering controls** – physical control measures to minimise risk, including modifications to tools or equipment.

   For example, interlocked guards on machinery to prevent contact with moving parts of machinery or installing a roll over-protective structure on a tractor.

5. **Administrative controls** – If risk remains, it must be minimised by implementing administrative controls so far as is reasonably practicable.

   For example, installing a tag-out system to ensure workers are aware plant is isolated from its power source and must not be operated while maintenance or cleaning is being done. This may also include providing training, supervision and making sure this is documented in a procedure.

6. **Personal protective equipment (PPE)** – Minimise any remaining risk with suitable PPE.

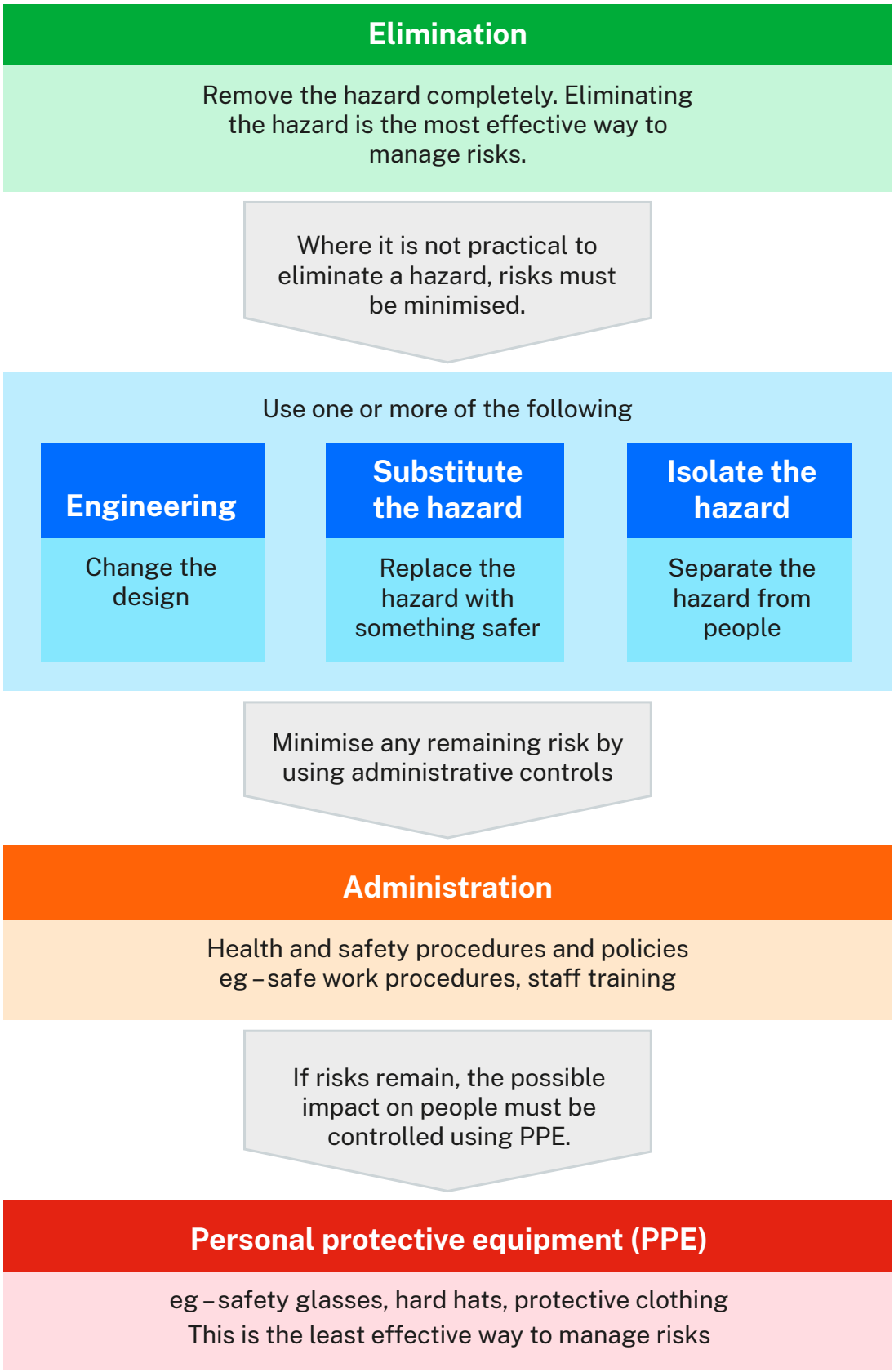
   For example, providing workers with breathing protection, hard hats, gloves, aprons, and protective eyewear.

   Administrative control measures and PPE rely on human behavior and supervision, and used on their own, tend to be least effective in minimising risks.

When it comes to plant or equipment repairs and maintenance, isolation is often the most "practicable" control, however there are various methods of isolation. Some are more effective than others, and this is covered in section 4 – 6.

Control Measures

Use the right controls to eliminate or minimise risks and protect your workers.



IV. Deciding what controls to use

The WHS Regulation requires duty holders to work through a hierarchy of control measures when managing risks to health and safety associated with plant.

The hierarchy ranks control measures from the highest level of protection and reliability to the lowest. Further guidance on the risk management process and the hierarchy of control measures is in the Code of Practice: How to manage work health and safety risks.

Specific controls are required under the WHS Regulation for certain types of plant, including:

- Powered mobile plant
- Plant that lifts or suspends loads
- Plant used in connection with tree lopping
- Industrial robots
- Lasers
- Pressure equipment
- Scaffolds; and,
- Plant with presence-sensing safeguarding systems.

When deciding what controls to use, legislation allows you to apply controls that are "reasonably practicable". So what does this mean?

Reasonably practicable means:

That which is, or was at a particular time, reasonably able to be done to ensure health and safety, considering, and weighing up all relevant matters.

This includes weighing up the following:

a) Likelihood of the hazard causing harm.

b) Degree of harm that might result.

c) Knowledge about the hazard or risk, and ways of minimising or eliminating the risk – this must take into account what the duty holder knows and what a reasonable person in the duty holder's position would reasonably be expected to know.

d) Availability and suitability of ways to eliminate or minimise the risk – requires consideration of what is available and suitable for the elimination or minimisation of risk.

e) Costs associated with the available ways of eliminating or minimising the risk - after assessing the extent of the risk and the available ways of eliminating or minimising the risk, consideration can be given to whether the cost of implementing a control measure is grossly disproportionate to the risk.

In summary, the greater the likelihood of a hazard causing significant harm, the better the controls should be to reduce the risk which therefore justifies additional spend on controls.

The highest level of protection that is reasonably practicable in the circumstances should be provided to eliminate or minimise the hazard or risk and this principal should be applied to energy isolation of plant and equipment.

4. Principles of energy isolation

a. What is energy isolation?

Isolation procedures are often referred to as lock-out, tag-out procedures, representing the actions required when isolating plant and equipment.

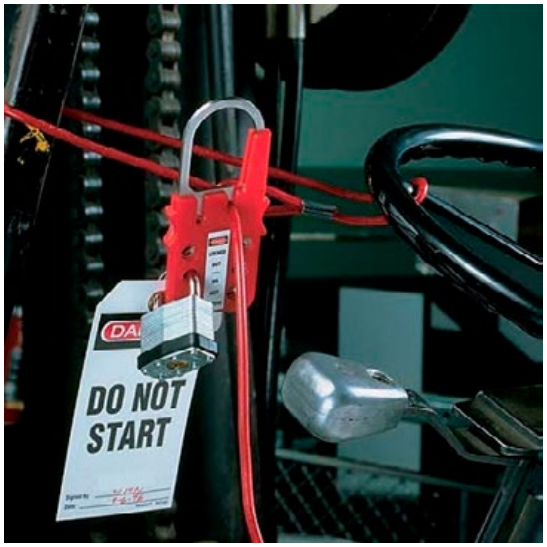
Workers can suffer serious injuries or die when plant is accidentally activated, or stored energy is released. To help keep workers safe, PCBU's must isolate, de-energize, lock-out and tag-out plant and equipment to reduce risk associated with energized plant and equipment.

Isolation procedures are used in two ways. Firstly plant isolation (lock out) involves the removal of the energy source from the plant or equipment to prevent the possibility of inadvertent energization of the equipment. This includes plant and equipment powered by electricity, gas, air pressure, steam, and any other form of stored or transmitted energy. Secondly placing of a tag (tag-out) which is placed on the machine, showing that the machine has been locked out.

b. Isolation and Lock Out & Tag Out (LOTO) general requirement

Energy sources must be isolated whenever there is the potential for uncontrolled energy to be released whilst people are assembling / disassembling or performing repairs and maintenance on plant and equipment. **Isolation may be required in the following situations:**

- Before inspecting, cleaning, repairing, or servicing of plant and equipment
- Before completing any other maintenance activities on plant and equipment
- Installation, commissioning and decommissioning of plant and equipment; and,
- When plant and equipment need to be isolated and placed out of service due to faults.



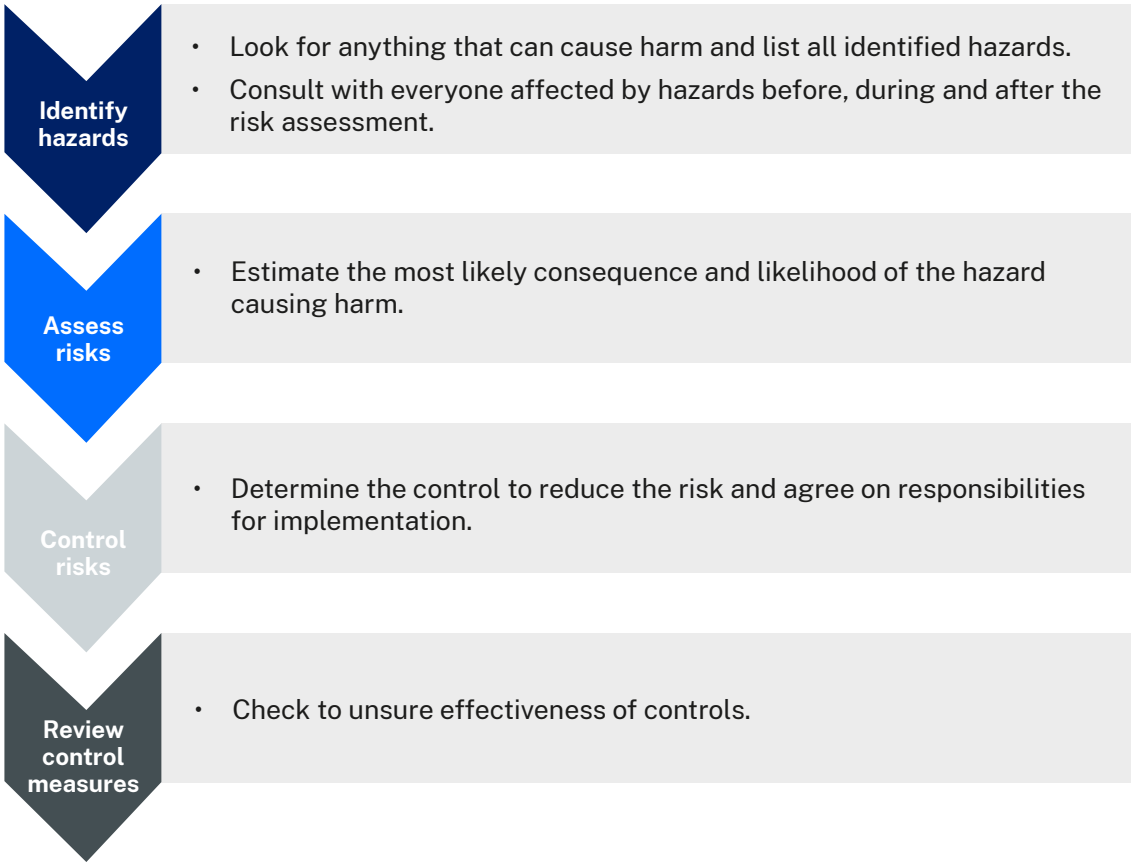
c. Hazardous energy identification and risk assessment

A documented risk assessment (Refer to Appendix A: Risk assessment template) should be conducted to identify all the plant and equipment that requires isolation prior to cleaning, maintenance, and repairs etc and the type of isolation required.

Energy sources for all plant and equipment must be identified and recorded. All work sites must undertake this type of formal analysis to ensure procedures and work instructions can be developed and employees trained in the correct isolation method.

Energy sources may include:

- Gravity
- Motion
- Mechanical
- Electrical (mains, solar and by generator)
- Pressure (pneumatic pressure - compressed air, fluids under pressure, such as water or hydraulic oil)
- Sound
- Radiation
- Biological
- Chemical such as gases, fuels
- Temperature/heat; and,
- Energy storing devices, such as batteries, springs, flywheels, accumulators, and capacitors.



d. If plant isolation is not practicable / Permit to work

There may be some tasks that need to be conducted such as cleaning, maintenance, repairs, or adjustments whilst the plant or equipment is still energised. An example of this might be the testing of electrical circuits to check current levels.

These tasks should be kept to a minimum where possible and require a risk assessment (Refer to Appendix A: Risk assessment template) to identify controls which can then be documented in Safe Operating Procedures to minimise the risk of injury.

For example, controls may include fitting equipment with controls that allow for safe and controlled movements whilst the machinery is energised and being worked on. All persons undertaking work on energised plant and equipment must be trained and competent in the Safe Operating Procedure for that task and the PCBU must ensure these procedures are strictly followed.

e. Change of shift

If your workplace has multiple shifts, then a process for the change of a shift must be developed and communicated to the incoming workers (operators). On the next shift. It is good practice to attach their Lock and/or Danger Tag to the plant and or equipment at the time that the outgoing person removes theirs.

If at the end of the work period or shift the job is not completed, a system must be implemented to ensure that detailed handover information is available to the next shift.

Suitable systems may include a detailed handover sheet outlining the safe re-commissioning process and a Standard Operating Procedure (SOP), Job Safety Analysis (JSA) or Permit to Work process outlining the safe re-commissioning process.

The hand over process must be documented in the site's Lock Out Tag Out procedure.

f. Training and competency

Only competent persons are authorised to perform Lock Out Tag Out.

A system must be implemented to ensure persons have been trained and assessed as competent before they are issued with personal lockout devices to conduct any activities that require isolation and LOTO.

Persons authorised to perform LOTO must be trained and demonstrate competency in:

- Types of hazardous energy sources
- Methods and means necessary for energy isolation and LOTO
- Identification and use of energy isolators
- Selection and use of LOTO devices
- Verification of energy isolation and LOTO
- Site isolation and LOTO work instructions and practices; and,
- Machine specific training.

The system must include a method to verify the person's understanding of the training which includes theory and practical assessments against defined criteria that demonstrates understanding and application of isolation and LOTO principles and practices.

PCBU's must provide the necessary safety information and training to persons who are involved in installing, commissioning, testing, maintaining, or repairing plant, as well as decommissioning, dismantling, or disposing of plant.

This should include information on the types of hazards and risks the plant may pose to the person when they are conducting these activities. This information may be supported with safe work procedures including instructions on:

- The correct use of guarding and other control measures
- How to safely access and operate the plant
- Who may use an item of plant; for example, only authorised or licensed operators
- How to carry out inspections, shut-down, cleaning, repair, and maintenance
- Traffic rules, rights of way, clearances, and no-go areas for mobile plant
- Procedures when plant malfunctions
- Emergency procedures; and,
- The proper use, wearing, storage and maintenance of personal protective equipment (PPE).

Emergency instructions for an item of plant should be clearly displayed on or near it.

Training programs should be practical and 'hands on' and consider the particular needs of workers. For example, literacy levels, work experience and specific skills required for safe use of the plant. Supervisors should take action to correct unsafe work practices associated with plant as soon as possible. Otherwise, workers may think unsafe work practices are acceptable.

g. Auditing

An assurance inspection program should be developed and implemented to ensure hazard identification and risk control mechanisms across the sites have adequately identified potential hazardous energy exposures and adequately controlled them. This includes ensuring plant and equipment isolation procedures are in place and being utilized. This program should include assuring workers capability (including refresher training) against the isolation tasks they carry out.

All assurance audits must be documented and include a register of corrective actions to remedy any non-conformances Corrective actions must follow Section 3a. & b. How to manage risks of associated with stored energy and include the person responsible for the action and an appropriate timeframe for the action to be completed. A process will need to be developed and implemented to ensure all corrective actions are completed in a timely manner, the effectiveness of the implemented control and an escalation process for those actions overdue.

5. Types of isolations

Most workplaces have simple plant and equipment that may only be powered by a single source of energy, for example a plug that inserts into an electricity socket. Other workplaces may have complex machinery powered by several energy sources in multiple locations. Therefore, your isolation procedure needs to reflect this and how energy needs to be isolated depending on the type of plant.

For example, for complex large machines where you may have several people performing maintenance at the one time, you need to make sure that all the multiple sources of energy have been isolated and that a source of energy cannot be accidently reactivated whilst someone is working on the machine.

One way of dealing with this is to have simple and complex isolation method that defines the two types of isolation which can be included in your procedure. The following steps can be incorporated in isolation documentation including work instructions, safe operating procedures, Job Safety Analysis and Safe Work Method Statements etc.

a. Simple isolation steps

Simple isolation could be defined as steps used for:

Machines that can effectively be isolated using not more than two isolators and has two or less energy sources for example one electricity power point and one valve to shut off air pressure.

The following steps could be followed be performed by Isolating Person / Isolation Co-ordinator (see Responsibilities section above).

- Complete isolation plan which should include:
  - What machine
  - When it is to be isolated
  - Who will conduct the work and isolate the machine
  - Notification of people impacted by the shutdown
- Clearing the machine of tools and people
- Driving the machine to its rest position so that parts will not drop under gravity, for example using any chocks, locking pins, etc.
- Applying the isolating device e.g., many power switches are now fitted with locks to stop them from being turned on
- Notifying all affected personnel that work is about to commence
- Releasing any residual energy for example air or hydraulic pressure in lines
- Confirming the machine is completely de-energised by attempting to operate it
- Completing the work
- Clearing the machine of tools and people and notifying people the machine will be turned on
- Removal of all locking devices by the Isolating Person / Isolation Co-ordinator; and,
- Re-energising the machine.

Note: The key to the isolation lock should remain with the Isolating Person / Isolation Co-ordinator and this can also be the same person undertaking the work on the machine.

b. Complex / Group isolation steps

Complex isolation may be defined as steps used for:

Machines that have multiple isolation points with multiple people working on the machine at the same time.

These steps need to be overseen by an Isolating Person / Isolation Co-ordinator (see Responsibilities section above) and will require the machine to have lockable isolators (see Appendix E Further Guidance - Types of locks)

The procedure may include the following steps:

- Complete isolation plan which should include:

  What machine

  When it is to be isolated

  Who will conduct the work and isolate the machine

  Notification of people impacted by the shut down

- Clearing the machine of tools and people
- Isolation Co-ordinator places locks on all isolation points
- Placing the keys to all the locks in a locked box by Isolation Co-ordinator (who keeps the key to the box)
- Isolation Co-ordinator briefs workers performing the work and has them sign on to the isolation plan
- Workers then attach their personal padlocks with their ID attached to the lock box
- Workers complete the work
- Workers sign off on the isolation plan and remove their personal locks from the lock box (Isolation Co-ordinator can now open the box because all workers have removed their personal locks and can be sure that all people and tools are clear from the machine); and,
- Isolation Co-ordinator removes keys from lock box and unlocks all isolation points
- Isolation Co-ordinator re-energises the machine.

  This procedure can be viewed in the video shown in the e-learning module which accompanies these Guidance Notes called; ‘Stay Safe Isolation”.

6. Lock Out Tag Out (LOTO) procedure

a. Planning the work

Before any equipment is locked and tagged out, you must know the following information about the particular plant and equipment (Planning the work):

- Scope and timing of the job
- Resources required to perform the work and the isolation
- Operational impacts
- All stakeholders involved in, or impacted by the work (including internal and external stakeholders and the work environment)
- Location of all the isolation points
- Risk controls required to perform the work (isolation devices, work instructions, isolation procedures, work permits, SWMS/JSA's etc.)
- How long the plant and equipment need to be isolated for; and
- Knowing who the Isolating Person / Isolation Co-ordinator (see Responsibilities section above) is and ensuring they are deemed competent in the Isolation Procedure. They must be provided with all the locks, lock out devices, lock boxes, hasps and tags required to be able to fully isolate the equipment.

For complex isolations (see Types of isolation section above) where a work activity has multiple isolation points with multiple people working on the machine at the same time, an isolation plan should be developed and include the following:

- Identification of the energy sources or hazardous materials directly and indirectly associated with the work to be performed
- Assessment of the hazards
- Procedure for stopping the machine
- Identification of each isolator and its isolation point, and the safe position.
- Method for securing each isolator
- Method for restraining or dissipating any stored or residual energy
- Method for verifying the effectiveness of the isolation
- Procedure for returning to service, including the sequence of de-isolation
- Details of the necessary hardware required to complete the isolation
- Identification of all people who will be working on the machine; and,
- Confirmation that people affected by the isolation have been notified by the Isolation Co-ordinator (see Responsibilities section above) and will require the machine to have lockable isolators (see Appendix E Further Guidance - Types of locks).

All of this may be documented in the Isolation procedure which guides the process.

b. Communication, Isolation and LOTO

It is extremely important workers impacted by isolation activities are identified (as part of the planning process) and consulted.

A process should be put in place to enable effective communication and consultation with affected workers and other persons conducting a business or undertaking to prevent any risk to health and safety before the following:

- Isolation is undertaken
- When the isolation is to be undertaken
- When the plant is safe to be re-energised; or
- if there are any issues arising as part of the re-energising of the plant and or equipment.

c. Shutdown the machinery and equipment

Once these steps are completed, the safe shutting down of plant and equipment can take place, special attention should be given to the following points:

- Shutting down plant may require single or multiple energy sources to be shut down, sometimes in a certain order so the plant should be shut down in accordance with the steps outlined in the site risk assessment or standard operating procedure
- Drive the machine to its rest position so that parts will not drop under gravity and ensure any chocks, locking pins, etc. have been fitted
- The person responsible for the plant, equipment or process is to notify all affected personnel that work is about to commence
- Restrict access to the area while the specific task is being carried out; and,
- When required by the risk assessment, obtain a permit to work from the supervisor.

d. Identify all energy sources and other hazards

A documented risk assessment (Refer to Appendix A: Risk assessment template) should be conducted to identify all the plant and equipment energy sources that requires isolation prior to cleaning, maintenance, and repairs etc and the type of isolation required.

Energy sources for all plant and equipment must be identified and recorded. All work sites must undertake this type of formal analysis to ensure procedures and work instructions can be developed and employees trained in the correct isolation method.

Prior to conducting work on an item of plant or equipment, the appropriate isolations must be in place to minimise the risk of:

- Sudden release of energy
- Inadvertent movement or operation of machinery and materials; and,
- Contact with energy produced, carried and stored by the plant.

e. Identify all isolation points

Isolation points must always be clearly labelled and be part of a preventative maintenance program to ensure their integrity.

Isolation points must meet the following general requirements and comply with any local standards that apply:

- Provide for complete isolation and de-energisation of the associated energy source (i.e. automatic dissipation of stored energy) without requiring operator intervention
- Allow for the attachment of locking devices such as hasps, personal locks and other LOTO devices
- Be uniquely and permanently labelled at all times to identify the circuit or system over which they have direct control; and,
- New or modified equipment must be fitted with lockable isolators where practical.

The risk assessment should identify circumstances which trigger isolation, which may include:

- Daily cleaning programs where you or others may be at risk i.e., not protected by guard interlock devices or presence sensing systems
- Changeovers where the safety of operators may be at risk (where applicable)
- Wherever safety guards are bypassed, removed or inoperative due to the nature and duration of the task
- For major shutdown and or breakdown maintenance, repairs, and cleaning; and,
- For minor plant maintenance, repairs, and cleaning, where the person working on the equipment requires full body access to a guarded area and the machinery can be started up unexpectedly while working in the area.

Risk assessments and Procedures must be developed detailing the specific isolation procedure and associated risks for each piece or section of plant and equipment at the site and in consultation with the plant and equipment operators. (Refer to Appendixes A and B for Risk Assessment and Procedure templates).

f. Isolate all energy sources

Once the previous steps have been undertaken, the Isolating Person / Isolation Co-ordinator is to place their appropriate locking devices on all the energy isolation points ensuring all power sources are isolated and are unable to be switched on or activated accidentally (see Section 5 Types of isolations).

Isolated or disengaged plant should:

- Not hinder or interfere with the operation of any other plant
- Have guards in place where a risk of injury is identified; and,
- Not obstruct access.

g. Control or de-energise all stored energy

To ensure the safety of all workers it is critical to confirm all types of stored energy have been released and to consider the following:

- Energy may still be stored, even after energy sources have been isolated
- Stored energy includes static, kinetic (e.g. rotational motion) and potential (e.g. due to the plant's position). Inspect the plant to make sure all parts have stopped moving
- Stored energy can be released by earthing to the ground, allowing the plant to complete its motion (particularly after breakdown)
- Stored energy can be contained by preventing movement through blocking, wedging, or propping the part. Ensure blocks, wedges or props are designed for this task and can only be removed by a deliberate release action
- Consider negative pressure used to activate some types of plant. This pressure will need to be equalized to prevent hazardous substances being released into the work area. Bleed the lines and leave vent valves open
- Drain process piping systems and close valves to prevent the flow of hazardous material
- Purge reactor tanks and process lines
- Dissipate extreme cold or heat; and,
- If stored energy can re-accumulate, monitor it to make sure it stays below hazardous levels.

h. Lock Out Tag Out (LOTO)

Locking out isolation points prevents them being reactivated. There are various lock out and tag out (LOTO) devices, designed for use on many different items of plant such as circuit breakers, fuses and valves (see Appendix E Further Guidance - Types of locks and tags).

When locking out plant, you should ensure:

- There is one lock fitted for each person performing maintenance or non-production tasks
- If there is more than one isolation point, each person will require sufficient locks to lock out each isolation point
- If there are multiple workers, there is a lock for each worker attached to isolation points that need to be isolated; and,
- Locks are kept on the isolation points until the work is finished or the work is transferred on to another worker.

Multiple locks at each point can be avoided by using a lock box. This means each lockout point has one lock and the master key for the locks is placed in a box. Each person working on the plant places their own lock on the lock box as identification they have acknowledged the lock out and are ready to start working on the machine. This also prevents access to the key to unlock the plant while the lock is still attached to the lock box.

There must only be one key for each lock, apart from a master key that should be given to the responsible person and stored in a secure location for emergencies only.

(Refer to Section 5b for Group and or complex isolation steps)

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 in isolating the energy source. Two types of tags are used:

1. Personal danger tags and out of service tags. Personal danger tags are red and white. They warn workers that someone is working on the plant. These tags should only be attached after the plant has been locked out and must be in clearly visible areas.

2. Out of service tags are yellow and black. They are used when plant is out of operation. If these tags are placed on plant with isolated energy sources, they should only be done when it is locked in the safe (off) position.

These tags are also used on mobile plant such as some forklift types and when locks cannot be physically attached to an isolator.

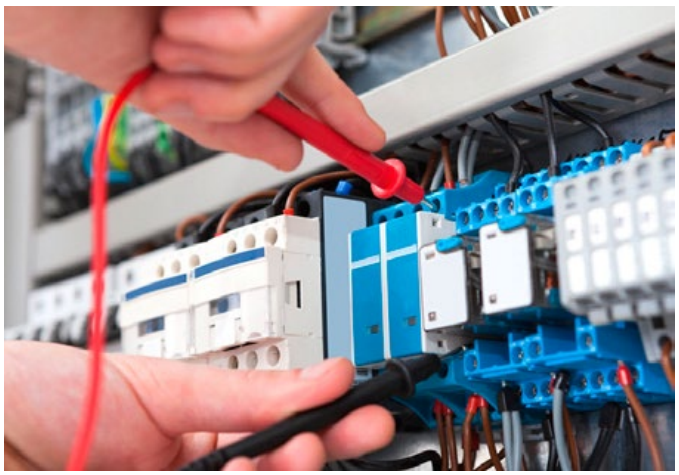
i. Verifying and testing for zero energy state

It is critical for the workers to confirm all isolation steps have been undertaken successfully, the correct component has been isolated and plant and equipment de-energised, including all sources of stored energy have been dissipated, restrained or controlled to minimise the risk that it may give rise to a hazard?

There are many examples where the incorrect component of plant has been isolated and the plant has inadvertently started up whilst workers have been conducting their maintenance, cleaning and repair tasks etc.

A test to confirm all energy sources have been de-energised is critical in ensuring there is no risk of injury or damage to plant or equipment, asset or the environment. Testing to ensure zero energy sources must be undertaken by someone who is suitably qualified and understands the plant and equipment's energy sources and energy principles and procedures.

Different types of energy may require different methods of verifying or confirming that dangerous energy has been dissipated or safely contained. Some examples could be pressing a start button, performing visual observations, performing a test, or checking temperature.



j. Perform the work

The planned works can now be undertaken once the isolation and stored energy verification tasks are complete, and the Isolating Person / Isolation Co-ordinator has confirmed the plant and or equipment is isolated and safe. Once all isolation and LOTO steps have been completed, the Isolating Person / Isolation Co-ordinator may commence work on the plant or equipment in line with the agreed scope of work. If the scope of work changes, the work shall be suspended until the isolation and LOTO has been reviewed and determined if any amendments are required to ensure the plant and equipment remains at zero energy state.

The Isolating Person / Isolation Co-ordinator is to monitor the work being carried out to ensure the isolation and LOTO remains effective.

k. Inspect and restore

The following steps are to be undertaken when re-energising and or recommissioning plant and equipment back into service, once your tasks have been completed:

- All workers have finished their work and are aware the plant is being prepared for energising
- All workers are a safe distance away from any hazardous area of the plant
- Blocks, wedges, and props used to prevent parts from moving are safely removed (this will release energy)
- Any removed guards are replaced
- Locks and tags have been removed by the workers who placed them
- Sensory guarding is reactivated and tested to ensure it is functional
- Emergency devices are reactivated and tested e.g., stop buttons and pedals; and,
- Workers understand the method and the order in which energy will be restored to each isolated point.

Appendix A
Risk Assessment Template

This Risk Assessment template includes the following which can be tailored to suit your workplace.

1. Blank risk assessment template.
2. Risk matrix.
3. Hierarchy of controls diagram and explanation.
4. Risk assessment example.

Risk Assessment Template					
Title of assessment:					
Workplace:					
Name of person conducting assessment:		**Date:**			
Risk Assessment Purpose The purpose of a risk assessment is to identify the risks associated with a task, activity, or process, and put appropriate controls in place to eliminate or reduce those risks. Completing a risk assessment helps ensure that hazards, risks and how to control those risks are documented and communicated to those who will be involved in the task, activity, or process. NB: Residual risk level estimate for each item is dependent on implementation of other related controls listed against other related hazards.					
Hazards identified	**Possible consequences**	**Image**	**Current risk level**	**Recommended controls**	**Residual risk level** (where current controls are not adequately managing the level of risk)

Risk Matrix

1. Consequence - evaluate the consequences of a risk occurring according to the ratings in the Consequence table i.e., low, moderate, high, or extreme.

Descriptor	Level	Definition
Insignificant	1	No injury
Minor	2	Injury/ ill health requiring first aid
Moderate	3	Injury/ill health requiring medical attention
Major	4	Injury/ill health requiring hospital admission
Severe	5	Fatality

2. Likelihood - evaluate the likelihood of an incident occurring according to the ratings in the left-hand column i.e., rare, unlikely, possible, likely, or almost certain.

Descriptor	Level	Definition
Rare	1	May occur somewhere, sometime ("once in a lifetime / once in a hundred years")
Unlikely	2	May occur somewhere within the workplace over an extended period of time
Possible	3	May occur several times across the workplace or a region over a period of time
Likely	4	May be anticipated multiple times over a period of time May occur once every few repetitions of the activity or event
Almost certain	5	Prone to occur regularly It is anticipated for each repetition of the activity of event

3. Risk Matrix - Using the Matrix below, calculate the level of risk by finding the intersection between the likelihood and the consequence

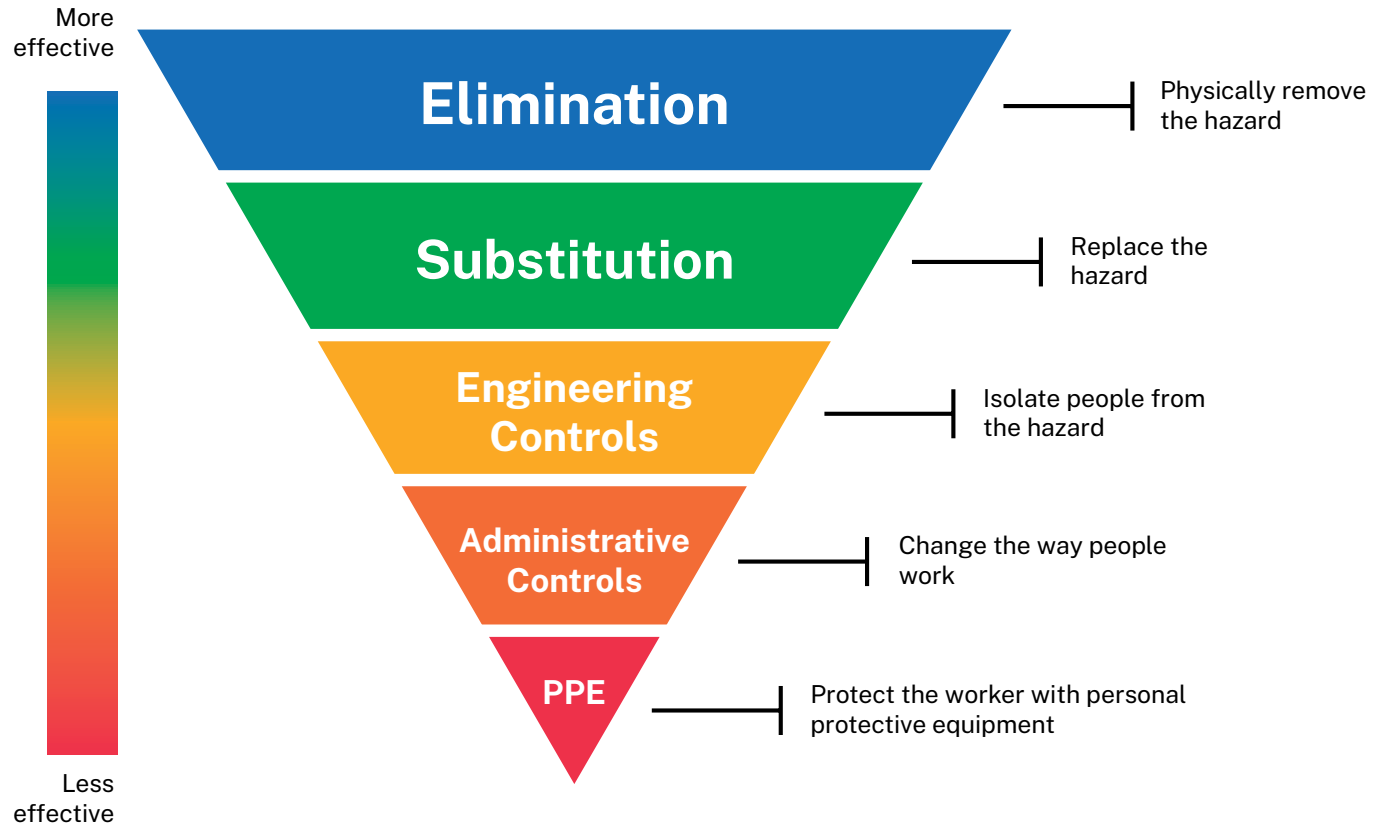
Likelihood	**Consequence**				
	Insignificant	**Minor**	**Moderate**	**Major**	**Severe**
Almost Certain	Moderate	High	Extreme	Extreme	Extreme
Likely	Moderate	Moderate	High	Extreme	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Low	Moderate	Moderate	High
Rare	Low	Low	Low	Moderate	Moderate

4. Risk Level / Rating And Actions	
Descriptor	**Definition**
Extreme>>	Notify workplace manager and/or management OHS nominee immediately. Corrective actions should be taken immediately. Cease associated activity.
High>>	Notify workplace manager and/or management OHS nominee immediately. Corrective actions should be taken within 48 hours of notification.
Moderate>>	Notify nominated worker, HSR / HSC. Nominated worker, OHS representative / HSC is to follow up that corrective action is taken within 7 days.
Low>>	Notify nominated worker, HSR / HSC. Nominated worker, HSR / HSC is to follow up that corrective action is taken within a reasonable time.

Hierarchy Of Controls

Develop Controls in accordance with the hierarchy below (also see diagram on the right):

1. **Elimination –** Removing the hazard from the workplace e.g., removing damaged equipment and removing unwanted chemicals.
2. **Substitution –** Substituting or replacing the hazard with a less hazardous one e.g., using less hazardous chemicals.
3. **Engineering Control –** Engineering out the hazard e.g., using a trolley to move objects.
4. **Administrative Control –** Introducing work practices that reduce the risk e.g., job rotation and safe work procedures.
5. **Personal Protective Equipment** – This is the last control method that should be used e.g., gloves, masks. Staff must be trained to use PPE correctly.



Risk Assessment Example			
Title of assessment:	Plant and equipment risk assessment		
Workplace:	Warehousing Department		
Name of person conducting assessment:	Joe Bloggs	**Date:**	

Risk Assessment Purpose
The purpose of a risk assessment is to identify the risks associated with a task, activity, or process, and put appropriate controls in place to eliminate or reduce those risks. Completing a risk assessment helps ensure that hazards, risks and how to control those risks are documented and communicated to those who will be involved in the task, activity, or process.

NB: Residual risk level estimate for each item is dependent on implementation of other related controls listed against other related hazards.

1. List all the hazards i.e. what could cause harm
2. List the harm that could occur with existing controls
3. If possible, insert an image of the hazard
4. Determine the Risk Score of the listed hazards using the Risk Matrix.
5. Determine the Control Measures required minimising or eliminating the hazards using the Hierarchy of Controls.
6. Determine the Residual Risk Score based on the control measures listed, using the Risk Matrix again.

Hazards identified	**Possible consequences**	**Image**	**Current risk level**	**Recommended controls**	**Residual risk level** (where current controls are not adequately managing the level of risk)
EXAMPLE: Cracked forklift truck tine	Collapse of load causing injury or death		Extreme	1. Immediately isolate forklift truck to ensure it is out of service 2. Replace forklift tine using authorised forklift repairers 3. Confirm forklift tine is repaired and fit for purpose 4. Recommission forklift truck for use	Low

Job Safety Analysis Risk Assessment Example			
Title of assessment:	Changing car tyre		
Workplace:	Warehouse carpark		
Name of person conducting assessment:	Joe Bloggs	**Date:**	

Job Safety Analysis (JSA)
The purpose of this JSA is to identify the risks associated with a job task and put appropriate controls in place to eliminate or reduce those risks. Completing a JSA helps ensure that hazards, risks and control are documented and communicated to those who will be involved in the task.

NB: Residual risk level estimate for each item is dependent on implementation of other related controls listed against other related hazards.

1. Break the task/activity down into sequence of steps (Sequence of Task)
2. List all the hazards i.e., what could cause harm?
3. List the harm that could occur with existing controls
4. Determine the Risk Score of the listed hazards using the Risk Matrix.
5. Determine the Control Measures required minimising or eliminating the hazards using the Hierarchy of Controls.
6. Determine the Residual Risk Score based on the control measures listed, using the Risk Matrix again.

Task steps	**Hazards**	**Possible consequences**	**Current risk level**	**Recommended controls**	**Residual risk level** (where current controls are not adequately managing the level of risk)
NB: The following lists only the first possible 2 tasks steps involved in the job to serve as an example of how a JSA could be completed for the job of changing a car tyre					
1. Remove tyre from boot	Being struck by other vehicles in the car park Manual handling injury due to tyre weight and position	Injury or death from being struck by moving vehicle Musculo skeletal injury caused by incorrect manual handling	High	Isolate the area using reflective triangle or traffic cones Follow correct manual handling procedures including checking weight of tyre by attempting to move it prior to lifting, keep weight as close as possible to the body in accordance with the manual handling procedure. If possible, have a second person assist with the lift	Moderate
2. Place chocks under each front wheel	Being struck by other vehicles in the car park Car rolling forward or back due to uneven ground	Injury or death from being struck by moving vehicle	High	Isolate the area using reflective triangle or traffic cones Ensure the hand break is firmly applied prior to placing chocks on wheels	Moderate

Appendix B
Energy Isolation Procedure Template

1. Purpose

<Insert the purpose of the procedure here> for example:

This procedure defines the process for hazardous energy isolation Lock Out Tag Out (LOTO). The procedure details the steps to be followed to minimise the health and safety risks associated with the uncontrolled release of energy and the inadvertent start up or movement of plant, machinery and materials during operation and servicing, or any other interaction or exposure to, hazardous energy including moving parts and stored energy.

2. Scope

<Insert the purpose of the procedure here> for example:

This procedure applies to all workers and contractors at <insert company name> that are responsible for undertaking tasks involving isolation of energy sources and the use of lockout or isolation devices.

3. Definitions

Term	Definition
<Insert all terms used in the procedure> for example:	**<Insert the definition of each term>** for example:
Types of energy sources	• Gravity • Motion • Mechanical • Electrical (mains, solar and by generator) • Pressure (pneumatic pressure - compressed air, fluids under pressure, such as water or hydraulic oil) • Pressure (pneumatic pressure - compressed air, fluids under pressure, such as water or hydraulic oil) • Sound • Radiation • Biological • Chemical such as gases, fuels • Temperature/heat; and, • Energy storing devices, such as batteries, springs, flywheels, accumulators, and capacitors.
Lock out	Where an energy isolator e.g., electrical power switch is turned to the OFF position and secured in the OFF position by having a physical block fitted such as a padlock with key removed. This stops the plant or equipment from being turned on accidentally or in an unplanned circumstance.
Danger tags	Danger tags are prominently marked 'Danger - Do Not Operate'. Danger tags are to be placed only for the protection of personnel working on plant. They are not to be left on after that person completes their work or finishes their shift. Danger tags should: • Be durable and securely fixed to the point of isolation • Clearly state the warning, including any warning about the specific hazards relating to the isolation • Be dated and signed by the worker/s involved in carrying out the work or, where appropriate, by the supervisor in charge of the workers; and, • Be attached in a prominent position on each isolation point (or one of many points used to isolate) the plant or equipment. When the work is completed, the tags may only be removed by the signatories to the tag. If unavailable and unable to return, measures must be put in place to manage the risk associated with removing the tag.

Term	Definition

4. Responsibilities

Position	Definition	Responsibility
<Insert the job title of each person who has a responsibility within the procedure> for example:	**<Insert the definition for each position/job role>** for example:	**<Explain what each position is responsible for>** for example:
Affected personnel	Any person who through their work, may be impacted by isolation and activities associated with locking and tagging out of plant and equipment.	• Recognize when Isolation procedures are being used • Understand the purpose of Isolation procedures • Understand the critical importance of not attempting to start up or use equipment that is isolated; and, • Cooperate with the provisions of the isolation procedures to ensure the equipment is not restarted.

Position	Definition	Responsibility
Isolating person / Isolation co-ordinator	Personnel who have been specifically trained in the approved workplace energy isolation methodology and program, and formally assessed as competent to perform a specified task documented in the isolation procedure. Personnel who have a thorough understanding of the process and equipment and appropriately trained and certified as Isolating Person / Isolation Co-ordinator to oversee Complex Isolations (see Isolation Methods below). They must be capable of analysing tasks and the energy sources present to prepare and undertake effective de-energisation and isolation.	• Supervise contractors and other Affected Personnel for simple and Complex Isolations • Oversee and co-ordinate Complex Isolations and have thorough plant and equipment knowledge • Confirm that correct isolator(s) have been identified and placed in a safe position • Ensure that plant/equipment is de-energised or re-energised by following the appropriate steps outlined in the procedure • Isolates, secures and verifies isolation and returns equipment to service; and, • Ensure that handover processes are followed if the work is not completed at the end of a shift.

5. Manage risks associated with stored energy

<Describe how to manage risks associated with stored energy here> Include:

a. Hazard identification and what a hazard is.
b. Hazardous energy.
c. Risk control and risk management including explanations of what is risk, what is risk management, the hierarchy of controls, types of control measures and how to decide what controls to use. Images where appropriate would be useful for this point.

6. Principles of energy isolation

<Explain the principles here> Include (images where appropriate would be a useful addition in this section):

a. What energy isolation is.
b. General requirement for isolation and LOTO.
c. Hazardous energy identification and risk assessment.
d. Permit to work requirement if plant / equipment isolation is not practicable.
e. The requirement for change of shift in workplaces that have multiple shifts.
f. Training and competency requirement.
g. Auditing requirements.

7. Types of isolations

<Explain the types of isolation in your workplace here>

8. Lock out tag out (LOTO) process

<Describe the LOTO process in your workplace here> Include explanations of:

a. Planning the work.
b. Communication process.
c. Plant and equipment shutdown requirements.
d. How energy sources and other hazards must be identified.
e. Process to identify all isolation points.
f. How to isolate all energy sources.
g. Requirement for controlling / de-energising all stored energy.
h. LOTO steps, including various LOTO devices (images of devices used in your workplace would be useful).
i. Requirement for verification and testing for zero energy state.
j. Performing the work.
k. Inspecting and restoring the plant / equipment back into service.

9. Documentation

<Explain> that the document has been developed in accordance with current legislation and when the document is due to be reviewed.

Include a list of all Appendixes, for example your workplace's Risk Assessment template.

Appendix C
Work Instruction Template (accessor copy)

Details	
Title (name of machine):	
Description of the task to be performed:	

Photograph of machine

PPE required to be used
   The following types of gloves are to be used to avoid lacerations when using the machine to process materials. Ansell Kevlar cut resistant - Part No.A15302 Seton AU NB: Gloves do not need to be used when using the computer screen.
PPE to be worn:
Assessor competency requirements
The Assessor needs to have a minimum of 3 months experience operating the machine and deemed Competent in this Work Instruction.
Assessor experience required:
Recording and reporting requirements
This Work Instruction needs to be uploaded against the worker's record in the learning management system.
Recording and reporting requirements:
Targt audience
Any person that is required to operate the machine unsupervised must be deemed Competent in this Work Instruction.
Who is the target audience:

How to use this Work Instruction
It is recommended the Assessor first demonstrate the task (where possible) and then observe the worker performing the same task. After all tasks have been performed to the satisfaction of the Assessor, the worker should be supervised operating the machine for a minimum of one shift. Where the worker has any problems reading English, the Assessor must read the required Steps to the Worker. Both the worker and the assessor need to have a copy of this Work Instruction during the assessment.

Start up instructions		
Task Steps	**Worker is competent**	**Photos or Document Reference**
Step 1 a. Before operating machine check cleaning fluid levels b. Operator has been deemed competent in the chemical handling work instruction c. Before operating machine check glue pot levels	Yes ☐ No Yes ☐ No Yes ☐ No	  Figure 1 – Cleaning fluids  Figure 2 – Glue pot
Step 2 a. Turn	Yes ☐ No	

Start up instructions		
Task Steps	**Worker is competent**	**Photos or Document Reference**
Step 2 b. Turn	☐ Yes ☐ No	

Shut down instructions		
Task Steps	**Worker is competent**	**Photos or Document Reference**
Step 1 a. Turn off main isolator	Yes No	 Figure 3 – Main isolator switch

Shut down instructions		
Task Steps	**Worker is competent**	**Photos or Document Reference**
b.	Yes No	
c.	Yes No	

Lock out tag steps		
Task Steps	**Worker is competent**	**Photos or Document Reference**
Step 1 a. Notify all affected workers of isolation	Yes No	

Lock out tag steps		
Task Steps	**Worker is competent**	**Photos or Document Reference**
Step 2 a. Follow steps SHUT DOWN INSTRUCTIONS 1A to 1J b. Place isolation lock on main isolator c. LOTO key to be kept with nominated person	Yes ☐ No Yes ☐ No Yes ☐ No	 Figure 4 – Main isolator switch
Step 3 a. Place tag on machine describing why the machine is isolated nominating LOTO person responsible NB: Refer to Energy Isolation Procedure for full information and guidance relating isolating plant and equipment.	Yes ☐ No	 Figure 5 – LOTO tag

Re-energise steps		
Task Steps	**Worker is competent**	**Photos or Document Reference**
Step 1 a. Nominated LOTO person to Notify all affected workers that plant is being re-energised b. Nominated LOTO person to ensure all persons are clear of plant c. Nominated person to ensure all interlocks are re-engaged so machine can operate d. Nominated person to remove tag and isolation lock from main isolator e. Plant is now ready to operate interlocks are re-engaged so machine can operate f. Nominated person to remove tag and isolation lock from main isolator (if it has been applied in the case of a maintenance contractor) – see Lock Out Tag Out Step 3) g. Plant is now ready to operate	Yes ☐ No Yes ☐ No Yes ☐ No Yes ☐ No Yes ☐ No Yes ☐ No Yes ☐ No	 Figure 6 – LOTO tag  Figure 7 – Main isolator switch

Assessment Questions	
1. When is the machine required to be locked and tagged out?	
	a. Prior to cleaning the machine
☐	b. Prior to repairs and maintenance
☐	c. Prior to going to lunch
2. Which Step below is not a lockout tag out step?	
	a. Notify all workers that the machine is being isolated
☐	b. Machine key is to be kept with the person who has shut down the machine
☐	c. The person working on the machine needs to wear a red vest
3. What personal protective equipment must be used when inspecting the machine cutting blades?	
	a. Eye protection
☐	b. Kevlar cut resistant gloves
☐	c. High visibility vest
4. Prior to using this machine unsupervised you need to ... (there are two correct answers)	
	a. Be deemed Competent in the Work Instruction for the machine
☐	b. Work one shift under supervision and be signed off as competent after the shift
☐	c. Obtain a license to operate the machine
5. Your assessor must have a minimum of 1 month experience prior to being authorised to undertake an assessment	
	True
☐	False
6. Two people are required for lifts over 15 kg	
	True
☐	False

Competency Assessment Record			
Name of machine:			
Date:			
Initial Practical Demonstration:	The operator has demonstrated all the steps detailed in this Work Instruction and has demonstrated competency required to operate the machine safely to the satisfaction of the Assessor		Yes ☐ No – more training required at this stage
Worker name:		**Worker signature:**	
Assessor name:		**Assessor signature:**	
Date:			
Shift 1 machine use	The operator has demonstrated all the steps detailed in this Work Instruction and has demonstrated competency required to operate the machine safely to the satisfaction of the Assessor		Yes ☐ No – more training required at this stage
Worker name:		**Worker signature:**	
Assessor name:		**Assessor signature:**	

Once completed, this Assessment needs to be uploaded against in the Learning Management System against the worker in the Learning Management System.

Emergency contacts	
Name	**Phone**

Appendix D: References and associated documents

Safe Work Australia

Risk assessment:

https://covid19.swa.gov.au/covid-19-information-workplaces/industry-information/general-industry-information/risk-assessment

Managing risks of plant in the workplace:

https://www.safeworkaustralia.gov.au/system/files/documents/1705/mcop-managing-risks-of-plant-in-the-workplace-v1.pdf

How to manage WHS risks

https://www.safeworkaustralia.gov.au/system/files/documents/1702/how_to_manage_whs_risks.pdf

Safe Work NSW

Managing risks of plant in the workplace:

https://www.safework.nsw.gov.au/__data/assets/pdf_file/0019/52156/Managing-the-risks-of-plant-in-the-workplace-COP.pdf

Leading safer manufacturing workplaces:

https://www.safework.nsw.gov.au/your-industry/manufacturing/leading-safer-manufacturing-workplaces

Printable resources machinery:

https://www.safework.nsw.gov.au/resource-library/printable-resources-machinery

Guide to inspecting and maintaining plant:

https://www.safework.nsw.gov.au/__data/assets/pdf_file/0003/600519/Guide-to-Inspecting-and-Maintaining-Plant.pdf

Managing electrical risks in the workplace:

https://www.safework.nsw.gov.au/__data/assets/pdf_file/0010/50230/Managing-electrical-risks-in-the-workplace-COP.pdf

Work Health and Safety Regulation 2017:

https://legislation.nsw.gov.au/view/html/inforce/current/sl-2017-0404

How to manage work health and safety Risks:

https://www.safework.nsw.gov.au/__data/assets/pdf_file/0012/50070/How-to-manage-work-health-and-safety-risks-COP.pdf

Work Health and Safety Act 2011

https://www.legislation.gov.au/Details/C2018C00293

NDS & NSW Government

http://idfnsw.org.au/plant-and-equipment

Relevant Australian Standard.

AS/NSZ 4836:2001 Safe working on or near low -voltage electrical installation and equipment

AS 4024.1603-2006 Safety of machinery – Design of controls, interlocks and guards - Prevention of unexpected start-up

AS/NZS 4024.1201:2014 Safety of machinery, Part 1201: General principles for design - Risk assessment and risk reduction

AS/NZS 3000:2018 Electrical installations “Wiring Rules”

AS 60204.1:2005 Safety of machinery – Electrical equipment of machines

Appendix E: Further guidance

Lock out isolation points without service locks

An **out of service** lock should be applied to plant that will be worked on across **more than one shift** or day.

If out of service locks are used, **a supervisor** or a competent **nominated worker** must be responsible for placing and removing them from all required isolation points.

These locks must be clearly identifiable as out of service locks and remain on until it is safe to remove them, or the work is complete.

Tagging out

Removing another person's lock and or tag

Locks and Danger Tags are only to be removed by the person who placed them there. There are **exceptional** circumstances whereby another person's lock and or tag may be removed.

Circumstances under which a lock or Danger Tag can be **removed** by someone other than the person who placed it there are:

If the person who placed it:

- Is ill or injured
- Has left the job and cannot be located; or
- Has lost their key.

In the above situations, only personnel who are competent and authorised by site or company management may remove the locks and/or Danger Tags. The Isolating Person / Isolation Co-ordinator is to assess and ensure that it is safe to remove the locks and or tags before returning the plant and equipment back to service.

This could be included in the company's LOTO/energy isolation procedure, so it does not become a regular occurrence. The authorized person is only allowed to do this under the approval/after consultation from/with the representative of the management team (i.e. maintenance manager, engineering manager, etc.).

Types of locks

The following are types of locks that can be used to isolate all types of energies. The following are examples commonly used:

The lock out **Padlock** is one of the most common types of lock used to isolate plant and equipment.

The **Hasp** is commonly used when more than a single person is working on plant and equipment and each person will attach their own lock to the isolating plant and equipment. Hasps are commonly made from steel, nylon and aluminium.

The **Valve** type lock out device is used for Ball valves, Rotating Wheel valves, Wheel valves, Butterfly valves and Plug valves most commonly used for fluid and gas isolation type requirements.

Cable Lockouts are used to lock out gate valves, multiple electrical points, steering wheels, levers and electrical switch gear.

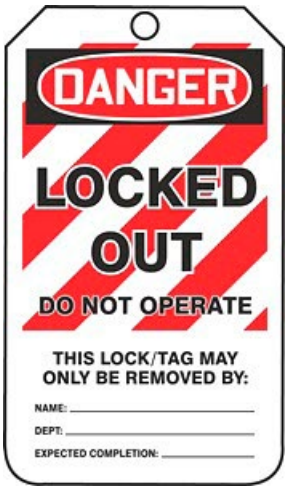
Electrical **circuit breaker** lockout devices including clamp type lockouts are used for isolating circuit breakers in electrical power boards. Circuit breaker locks and fuse holders or carriers are installed to prevent the accidental or deliberate switching off of certain electrical circuits.

Types of LOTO tags

There are numerous types of Isolation (LOTO) tags available. These include but are not limited to the following LOTO Tag type examples:

- Out of Service Tags
- Danger Do Not Operate Tags
- Do Not Start Tags; and,
- Locked Out Tags.

As with locking type devices these are also available with photo ID which is very useful in identifying the person responsible for the isolation.



The following are examples of **Group Lock Out Boxes** which are used to capture multiple isolation locks, used for large equipment. Group lockout boxes minimise the use of hasps and can provide a quick overview of who is working on the equipment at each energy point.