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Introduction

Each State and Territory in Australia and the Commonwealth Government, have enacted workplace health and safety legislation, which places a legal obligation on all workers and their employer to ensure a healthy and safe workplace. Workplace health and safety legislation consists of the Acts, Regulations and Codes of Practice.

In this topic, you will learn about workplace health and safety principles and the objectives of the legislation, the roles and responsibilities of employers, employees and workplace health and safety inspectors, and the functions of health and safety committees and representatives.

You will also learn about 'housekeeping' and the potential hazards associated with poor housekeeping practices, and the types of personal protective equipment (PPE) commonly required to carry out typical electrotechnology work tasks.

Underlying Principles

The fundamental principle of workplace health and safety (WHS/OHS) is to protect the health and safety of people in the workplace. Essentially, this revolves around:

- ensuring that workplaces are safe
- ensuring that workers are able to work safely
- reducing accidents and injuries in the workplace
- promoting good health and hygiene

Legislation and Regulations

Each State and Territory of Australia is responsible for implementing a legal framework for health and safety in the workplace. Therefore, each State and Territory has its own associated WHS/OHS legislation and regulations.

The following diagram shows the Workplace Health and Safety Regulatory Bodies in each Australian State and Territory:

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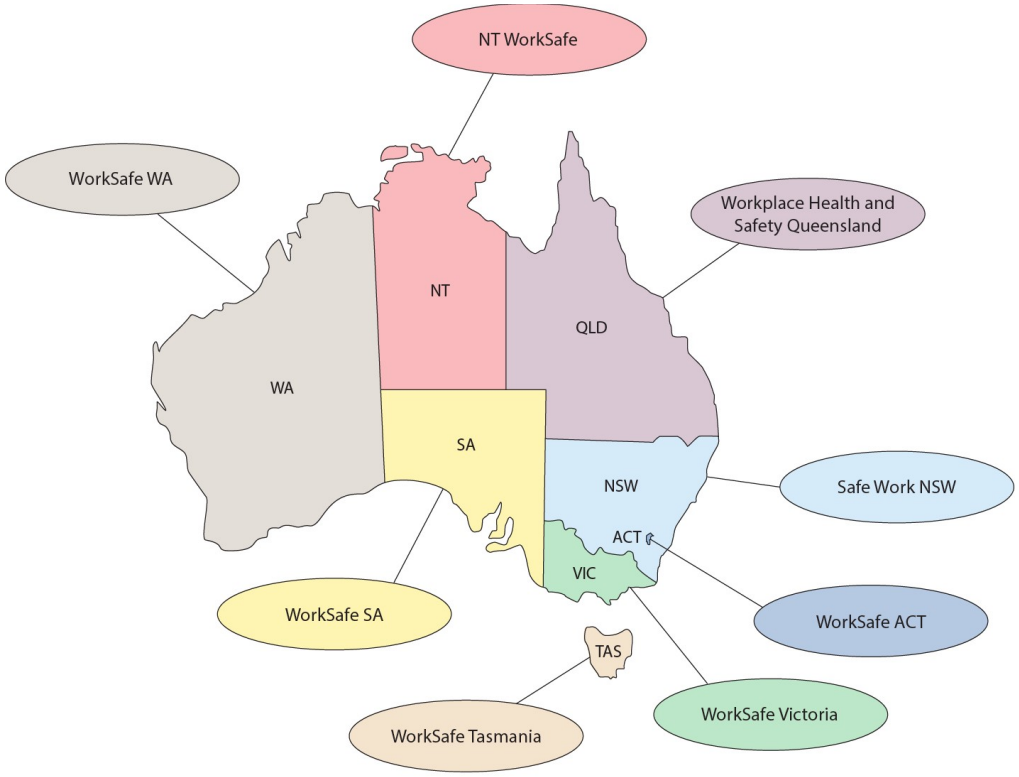

Australian Workplace Health & Safety Authorities

The role of WHS/OHS regulators is to ensure compliance with the applicable legislation and regulations in their jurisdiction. This typically involves activities such as:

- providing advice and assistance
- carrying out workplace safety inspections
- investigating workplace safety incidents
- administering licenses and registrations for hazardous work or occupations

Safe Work Australia is the national body overseeing WHS/OHS in Australia. The role of Safe Work Australia is to:

- work towards harmonizing WHS/OHS policy
- provide information and guidance
- conduct research
- publish documents including the Model WHS Act, Model WHS Regulations and Model Codes of Practice

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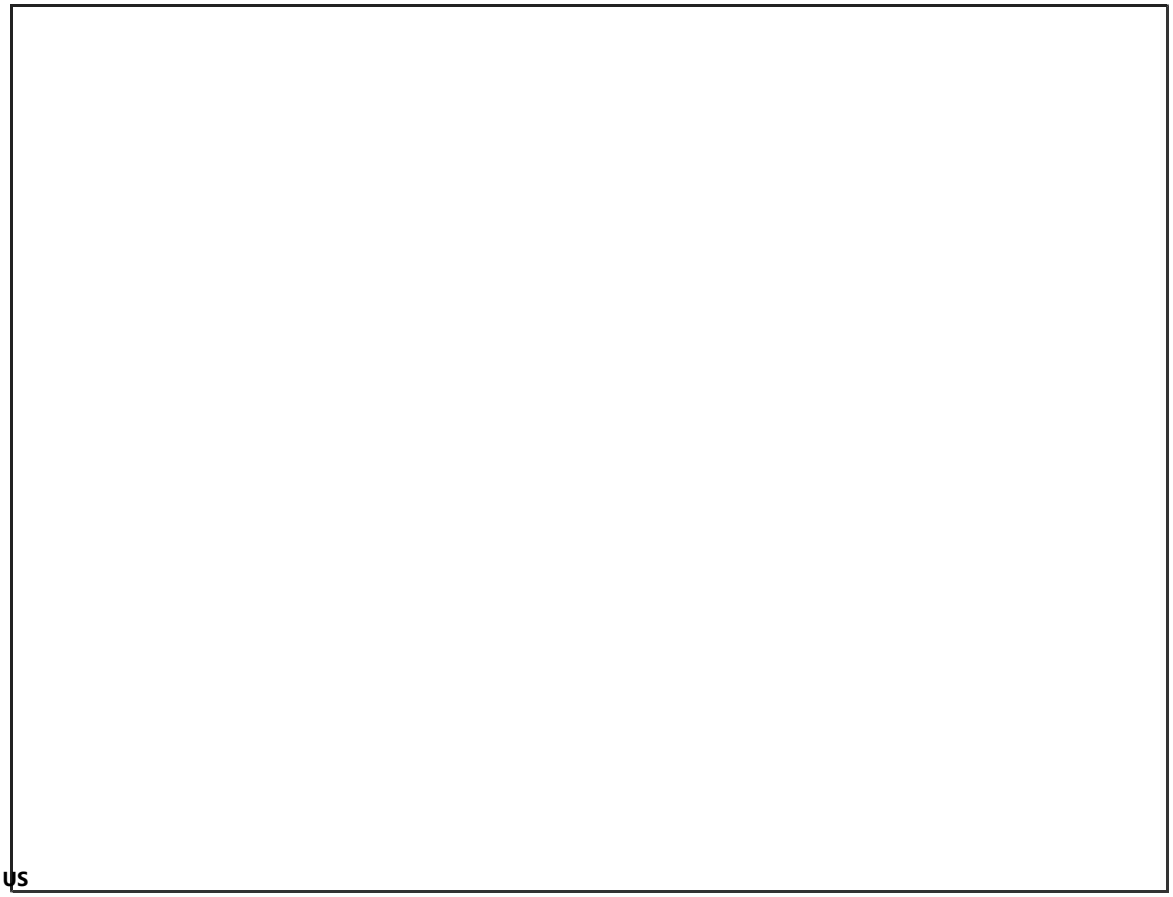
Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity



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This learning activity consists of 2 parts designed to develop your understanding of the underlying principles and objectives of workplace health and safety in Australia.

Topic 1.1 Learning Activity

Last modified: Tuesday, 5 January 2021, 11:40 AM

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View

Workplace Health and Safety Obligations

It is important to understand workplace health and safety, as both workers and employers have a number of legal responsibilities under the applicable Acts and Regulations.

Workplace Health and Safety – Responsibilities	
Worker Responsibilities	**Employer Responsibilities**
• To take reasonable care for their own health and safety at work. • To take reasonable care for the health and safety of others in the workplace. • To cooperate with workplace health and safety policies and procedures provided by the employer. • To comply with all reasonable instructions from the employer relating to health and safety.	• To take reasonable care to ensure the safety of workers. • To provide workers with safe systems of work. • To provide workers with safe plant and equipment. • To provide workers with adequate facilities. • To provide any required information, training, instruction and supervision to allow workers to work safely. • To monitor and maintain the conditions of the workplace.

Workplace Health and Safety Committee

A workplace Health and Safety Committee (HSC) consists of representatives from the workplace, each of which represents a group of workers.

The main roles of a workplace health and safety committee are to:

- review and improve workplace health and safety procedures
- act as liaison between the workers and the employer in matters relating to health and safety in the workplace

Workplace Health and Safety Inspectors

State and Territory WHS/OHS regulators appoint health and safety inspectors whose job it is to help enforce the applicable regulations. Under WHS/OHS legislation and regulations, workplace health and safety inspectors have the power to:

- enter and search a workplace
- conduct interviews and make inquiries
- gather information, examine and copy documents and take photographs or samples
- issue directions and on-the-spot fines for breaches of the legislation
- issue improvement, prohibition and non-disturbance notices

It is an offence to obstruct, impersonate, intimidate or threaten or insult a WHS/OHS inspector, and significant fines can apply for failing to cor with a WHS/OHS notice. ?

Notice Type	Why are they issued?	What are the consequences?
Improvement Notice	When an inspector believes that a person has not met their obligations under the applicable WHS/OHS legislation and regulations.	Can require the person to: • Stop performing a work activity in a certain way. • Follow directions to reduce the risk to health and safety within a given timeframe.
Prohibition Notice	When an inspector believes that there is a serious and immediate risk to health and safety at a workplace.	Can require the person to: • Immediately cease a certain work activity. • Immediately cease working in a certain area. • Follow directions to reduce the risk associated with the work activity or work area.
Non-disturbance Notice	Issued to the person in control of a workplace, generally to facilitate an investigation and to prevent evidence from being removed or tampered with.	Requires the person to: • Preserve the workplace in its current state. • Ensure the workplace is not disturbed for a given timeframe.

This learning activity consists of 4 parts designed to develop your understanding of the roles and responsibilities of workers, employers and inspectors under current health and safety legislation.

Topic 1.2 Learning Activity

Last modified: Thursday, 17 December 2020, 2:04 PM

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Housekeeping

The term “housekeeping” refers to keeping the workplace clean, tidy, and in a safe and proper condition.

Housekeeping		
Types of Hazards	**Examples**	**Control Measures**
Trip hazard	Extension leads run across the floor	Use approved lead stands to keep leads off the ground
	Offcuts of materials lying all over the floor	Sweep up and store or dispose of offcuts appropriately
Falling objects	Materials balanced precariously on a top shelf	Store tools and materials correctly
	Tools balanced on the top step of a ladder	Use a tool belt and don’t leave tools where they can fall off
Contamination	Chemicals stored without lids and caps fastened	Store chemicals correctly
	Food scraps left on the floor	Sweep up and dispose of food scraps appropriately
Limited access/egress	Ladder left in a doorway	Store tools and equipment in designated areas
	Materials stored in a fire escape	Store materials in designated areas

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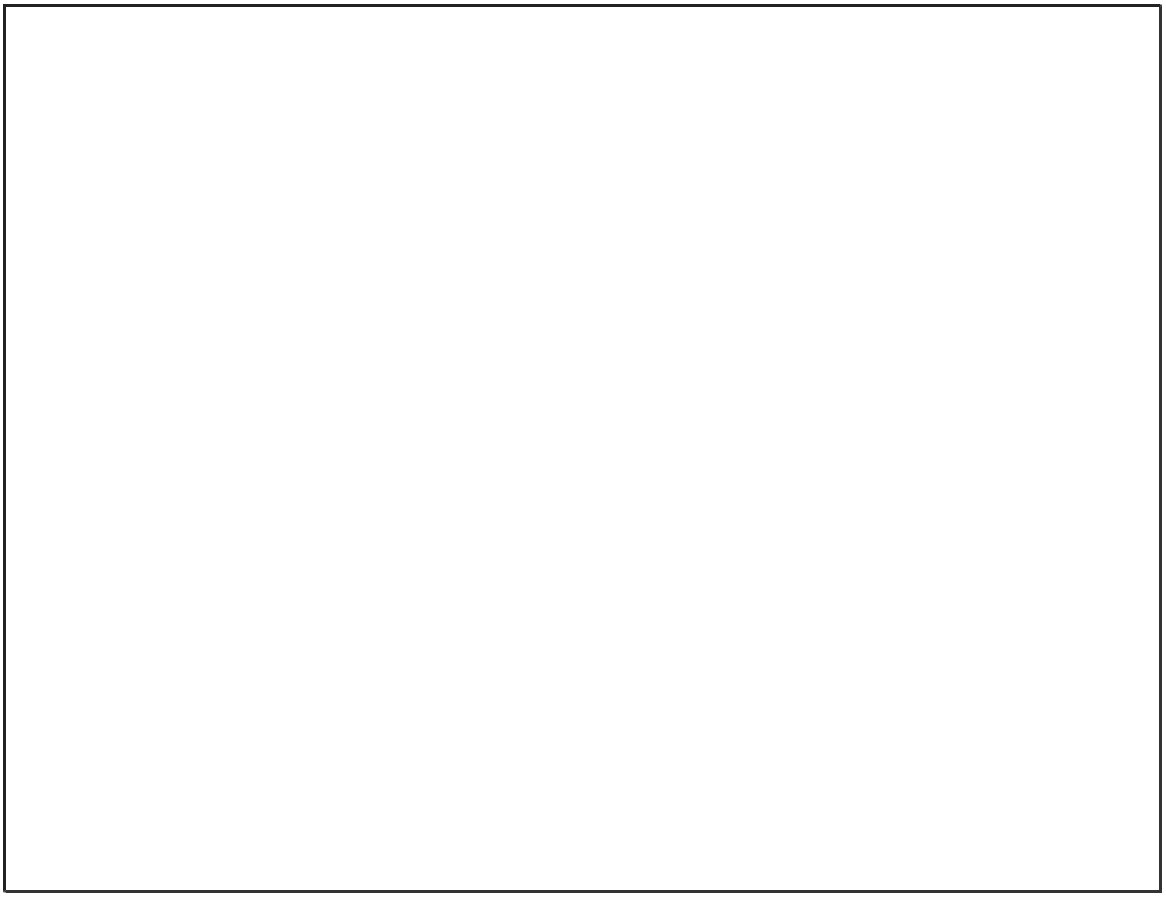
Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity



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This learning activity consists of 3 parts designed to develop your understanding of housekeeping hazards and practices.

Topic 1.3 Learning Activity

Last modified: Tuesday, 5 January 2021, 11:47 AM

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Personal Protective Equipment

The following table provides details of personal protective equipment (PPE) commonly used in electrotechnology work.

Personal Protective Equipment (PPE)			
Protection	**Types of PPE**	**Function**	**Typical Application**
Eye Protection	• Safety glasses. • Goggles. • Face shield.	Protects the eyes from projectiles or sparks.	• Using power tools. • Welding.
Hearing Protection	• Ear muffs. • Ear plugs.	Protects the ears from excessive noise.	• General use. • Using power tools.
Head Protection	• Hard hat.	Protects the head from falling objects and hard or sharp edges.	• General use on construction sites.
Foot Protection	• Safety boots.	Protects the feet and toes from falling objects.	• General use on all job sites.
Hand Protection	• Leather gloves. • Insulated electrical gloves.	Protects the hands against cuts, burns or contact with energised electrical equipment or wiring.	• Using a knife. • Using PVC conduit cement. • Electrical testing.
Body Protection	• Long sleeves. • Long pants.	Protects the torso, arms and legs from, scratches and burns.	• General use on job sites.
Respiratory Protection	• Dust mask. • Respirators.	Protects lungs from foreign bodies.	• Drilling or cutting bricks and concrete.
UV Protection	• Sunscreen. • Wide-brim hat. • Sunglasses.	Protects the skin and eyes against UV radiation.	• Outdoor job sites.

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Other	• High visibility vest.	Makes a person more visible to others.	• General use. • Particularly important around mobile plant.

This learning activity consists of 1 part designed to develop your understanding of PPE, including types and applications.

Topic 1.4 Learning Activity

In this skills practice, you are required to select and identify various types of personal protective equipment (PPE) to carry out electrotechnology work tasks. You will be shown various items of PPE, and for each item you must determine the protective purpose they serve.

Topic 1.4 Skills Practice

Undertaking this Topic Content Quiz will help confirm your understanding of the principles and objectives of workplace health and safety laws; the roles and responsibilities of workers, employers, health and safety committees and and the powers of workplace inspectors; the meaning of 'housekeeping'; and the types of PPE worn by workers.

Topic 1 Content Quiz

Last modified: Wednesday, 27 January 2021, 9:31 AM

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View

Introduction

Every work environment has hazards that present risks to workers and others. Hazards are anything in the workplace with the potential to cause illness or injury to people. To reduce the risks to health and safety, hazards must be identified, and measures put in place to 'control' (i.e. reduce) the risk as far as possible.

Typical Hazards and Control Methods

The following table lists typical hazards encountered on electrotechnology worksites, and the methods used to control the associated risks.

Hazard	Example	Risk	Control Measures
Electricity	Working on a switchboard	Electric shock and burns	Safe isolation procedures
Manual handling	Unloading materials from a delivery truck	Sprains and strains	Correct lifting and handling techniques
Working at heights	Working on roofs, scaffolds and elevated work platforms (EWPs)	Falling from heights resulting in serious injuries or death	Specific training and use of a tethered safety harnesses
Moving / rotating machinery	Conveyor belts, hoists and exhaust fans	Entanglement, cuts, lacerations, and crush or impact injuries	Specific equipment training, shut-down, exclusion zones
Mobile Plant	Forklifts and cars	Cuts, lacerations, and crush or impact injuries	Warning signs, exclusion zones and high visibility vests
Radiation	Working near some radio transmitters or medical equipment	Burns and poisoning	Warning signs, exclusion zones and protective clothing
Industrial noise	Working on a construction site	Hearing loss and tinnitus	Use of ear plugs and ear muffs, and limiting time of exposure
Vibration	Using a jackhammer or large hammer drill	Musculoskeletal disorder	Use of gloves and limiting time of exposure
Industrial chemicals	Using adhesives and solvents	Headaches, respiratory distress, skin and eye irritations, burns, fire and explosions	Correct storage and handling procedures
Asbestos	Renovations in older buildings	Respiratory disease	Safe removal by an approved contractor

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Harassment	Being bullied in the workplace	Stress, anxiety and physical illness	Training, workplace policies and counselling

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 4 parts designed to develop your understanding of the general hazards, risks and control measures in electrotechnology workplaces.

Topic 2.1 Learning Activity

Last modified: Tuesday, 5 January 2021, 1:13 PM

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View

The following table explains the meanings of the terms 'hazard', 'risk' and 'control measure', in relation to risk management.

Risk Management Terms		
Term	**Definition**	**Example**
Hazard	Anything with the potential to cause harm to a person	Offcuts of materials lying around on the floor
Risk	The potential harmful consequences of a hazard	Trips, slips, sprains and strains
Control Measure	Methods used to reduce the potential severity and likelihood of harm	Sweep up and dispose of offcuts (housekeeping)

Risk Management

All workplaces are required to maintain a system of risk management in an effort to promote a safe work environment and reduce workplace illness and injuries.

Risk management consists of four main steps:

1) Identifying hazards
2) Assessing risks
3) Controlling risks
4) Monitoring and review

Identifying hazards

Hazards can be identified by:

- using common sense – simply thinking about what might be harmful when work is carried out
- walking through the work area and using your senses – you might see, hear or smell a hazard
- talking with other workers – they might have noticed hazards that you haven't

Assessing the Risks

There are two main factors that are considered when assessing the risks posed by a hazard:

- the likelihood that the hazard will cause harm
- the severity of the harm that could be caused

A 'risk matrix', as shown below, is used to rank the risk posed by a hazard.

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Severity \ Likelihood	Likely	Possible	Unlikely
Death or permanent disability	1	1	2
Serious injury or chronic illness	1	2	3
Minor injury requiring first aid	2	3	4

1 = Extreme risk
2 = High risk
3 = Medium risk
4 = Low risk

Controlling the Risks

Controlling the risk posed by a hazard involves choosing and implementing methods of reducing the risk to an acceptable level.

The Hierarchy of Controls ranks the methods of risk control from the most preferred method (elimination) to the 'last resort' (personal protective equipment), as shown below:

Hierarchy of Controls		
Rank	**Control Measure**	**Description**
1	Elimination	The hazard, and therefore the risk, is removed entirely. This is the most effective method of risk control. Examples include: • removing a dangerous machine from a workplace • backfilling an open trench
2	Substitution	Hazardous equipment, substances or working practices are replaced with ones that are less hazardous, thereby reducing the risk. Examples include: • replacing a damaged extension cord with a new one • using a non-toxic glue instead of a toxic one
3	Isolation	Workers and others at risk of harm are prevented from coming into contact with the hazard. Examples include: • restricting access to a dangerous area • placing an 'out of service' tag on a faulty piece of equipment
4	Engineering Controls	Installing or using parts that are designed to reduce the level of risk associated with a piece of equipment or activity. Examples include: • safety railings at edges • safety guards on power tools
5	Administrative Controls	Training, instruction and guidelines that reduce the risk are set out for the worker to follow. Examples include: • undergoing a company or site induction • using standard work procedures (SWPs)

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6	Personal Protective Equipment (PPE)	The last resort in risk control, PPE is used to reduce risk by offering some protection to various parts of the body that may be harmed as a result of the hazard. Examples include: • wearing a hard-hat and safety boots whilst on a construction site • using safety glasses and ear plugs whilst operating a power drill

Typically, combinations of these control measures are used to reduce the risks posed by hazards in the workplace.

Monitoring and Review

Monitoring and review of risk management is an ongoing process of analysis and discussion for the purposes of:

- identifying new hazards
- checking that the level of risk posed by hazards has not changed
- evaluating the effectiveness of control measures
- improving the system of risk management

Required Documentation

All risk assessment activities should be documented to clearly indicate:

- the location and date
- who carried out the risk assessment
- the hazards that were identified
- the risks posed by each hazard
- how each risk is to be controlled
- who is responsible for implementing risk controls

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

For more detailed information on risk management, try searching the Safe Work Australia website for the Model Code of Practice: 'How to Manage Work Health and Safety Risks'. You can also try searching the website of your State/Territory Regulator using keywords such as 'risk management'.

This learning activity consists of 3 parts designed to develop your understanding of risk management, including the hierarchy of controls and risk assessment documentation

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Topic 2.2 Learning Activity

In this skills practice, you are required to complete a risk assessment for a given electrotechnology work task. For the given task, you will identify the hazards that could cause illness or injury to workers, assesses the risks and list the control measures to eliminate or reduce the risk as low as possible.

Topic 2.2 Skills Practice

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Last modified: Wednesday, 27 January 2021, 9:32 AM

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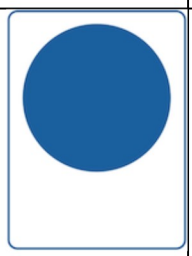
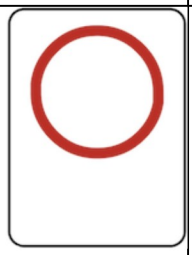
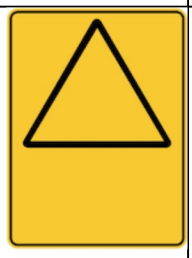
Workplace Safety Signs

Workplace safety signs are used on worksites to identify specific risks, hazards or other safety information.

Signs warn people about dangerous substances such as acid, and point out safety features such as fire exits. They can also give information and instructions about personal protective equipment (PPE) that must be worn in designated areas.

Workplace Safety Signs			
Appearance	**Type**	**Example**	**Meaning**
	MANDATORY – must do		Safety helmet must be worn in this area
	PROHIBITION – must not		Item of equipment must not be operated
	RESTRICTION – must not exceed		Forklifts must not go faster than 5 km/h
	WARNING – hazard		Hazardous levels of noise are present in this area

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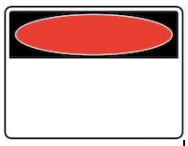	DANGER – life-threatening hazard		Energised parts pose the risk of death
	EMERGENCY – information		First Aid station located here
	FIRE – information		Fire extinguisher located here

Workplace Emergencies

It is very important to be familiar with the emergency evacuation procedures at your workplace. Emergencies usually occur unexpectedly, and can pose serious risks to the health and safety of people in the workplace. Types of workplace emergencies that typically result in the need to evacuate a workplace include:

- Fires
- Explosions
- Structural collapse
- Flooding
- Gas leaks
- Chemical spills
- Bomb threats

Emergency Evacuation Procedures

It is essential that all construction workers are familiar with the designated fire and emergency exits and evacuation procedures for the site. A basic example of generic evacuation procedures is shown below:

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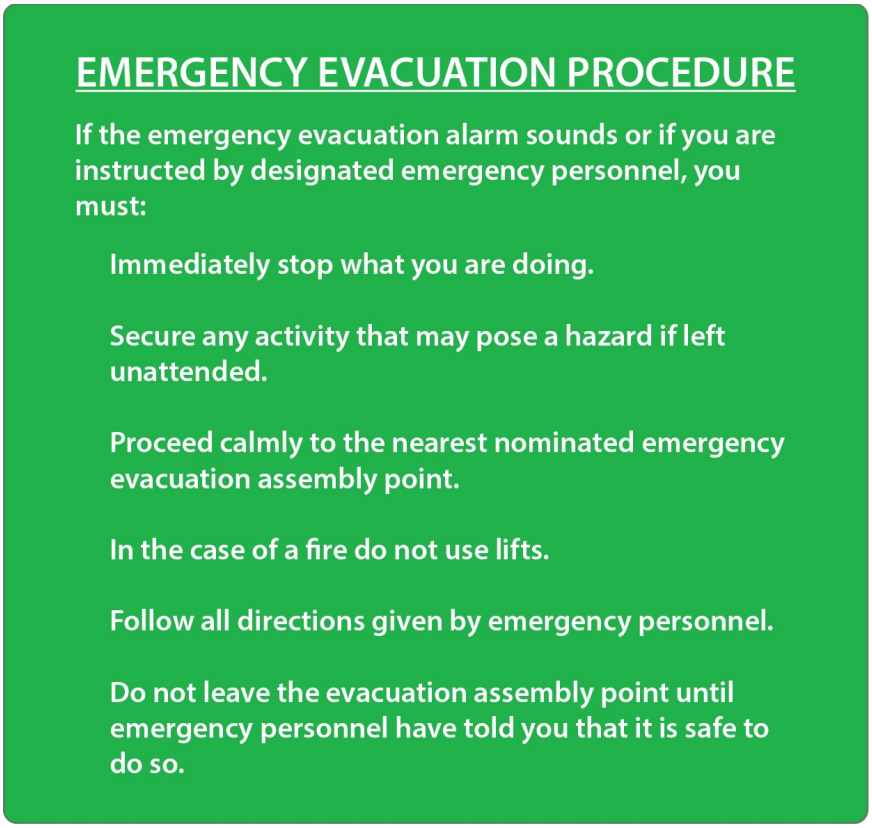

Emergency evacuation procedures are specific to the location, so they will vary from site to site. They are explained to workers during their 'site induction', which occurs prior to being permitted to work on the site. Points that will be covered include:

- How to tell if there is an emergency (e.g. types of sirens)
- What to do in an emergency (e.g. evacuation routes and assembly points)
- Who the emergency control personnel are for the site

On a typical construction site, the emergency evacuation procedures are likely to be practiced approximately once every 6 to 12 months.

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

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This learning activity consists of 5 parts designed to develop your understanding of workplace safety signs and emergencies.

Topic 2.3 Learning Activity

Last modified: Tuesday, 5 January 2021, 2:17 PM

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View

Standard work procedures (SWPs)

Standard work procedures (SWPs) are written descriptions of how to safely perform a work task. They can be used as a basis for training and to confirm that implemented hazard controls are working.

SWPs contains the following information:

- the sequence of steps required to perform the task
- control measures required to prevent injuries
- equipment and tools required to do the job
- warnings, information and training required

Under workplace health and safety legislation, it is the employer's responsibility to provide workers with safe ways of performing the required work. One way that employer's achieve this is by providing workers with SWPs.

Benefits of SWPs

In addition to providing a safe system of work, SWPs provide the following benefits to an organisation:

- Ensures consistent work outcomes
- Increases work efficiency
- Ease of training new employees
- Facilitates continuous improvement

SWPs are generic, and so they don't take specific hazards into account that may be presented by a specific work environment. Therefore it's always important to undertake a risk assessment that is tailored to the specific work environment.

This learning activity consists of 2 parts designed to develop your understanding of standard work procedures.

Topic 2.4 Learning Activity

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Last modified: Monday, 7 December 2020, 3:34 PM

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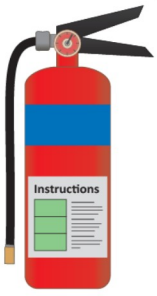
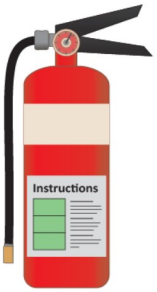
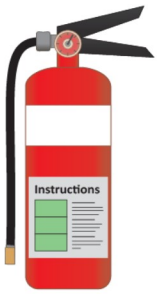
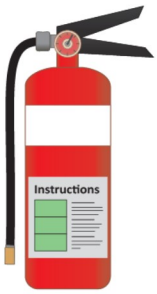
Extinguisher Identification & Selection

Different types of fire extinguishers are designed to extinguish different types of fires. Using the wrong type of extinguisher on a fire can actually spread the fire, or even result in electric shock!

It is therefore highly important to be able to identify the different types of extinguishers, as well as the different types of fires for which they're suitable.

The following chart shows how different fire extinguishers are identified, and which types of fires they can be used on.

	Electrically Conductive			Electrically Non-conductive			
	Water	Foam	Wet Chemical	Dry Chemical Powder		Carbon Dioxide	Vap Li
				ABE	BE		
Identification	 Red	 Blue	 Oatmeal	 White	 White	 Black	 Ye
Class A **Ordinary combustibles** (wood, paper, plastic)	**YES**	**YES**	**YES**	**YES**	**NO**	**LIMITED**	
Class B **Flammable liquids**	**NO**	**YES**	**NO**	**YES**	**YES**	**LIMITED**	**LIM**
Class C **Flammable gases**	**NO**	**NO**	**NO**	**YES**	**YES**	**NO**	**LIM**
Class E **Electrical fires**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**?**

Class F **Cooking oils and fats**	**NO**	**LIMITED**	**YES**	**NO**	**YES**	**NO**	**I**

In Case of Fire…

If you notice a fire, follow these four simple steps to stay safe:

1) Remain calm – don't panic!
2) Take a quick look around to see if anybody is in immediate danger (including yourself!), and provide assistance if it's safe to do so
3) Raise the alarm – activate a fire alarm, notify your supervisor, and ring 000 to report the fire
4) Lastly, if you are adequately trained and it's safe to do so, attempt to fight the fire using a portable fire extinguisher, otherwise, follow the building evacuation procedures

Using a Portable Fire Extinguisher

The "PASS" acronym is a simple way of remembering the procedure for using a portable fire extinguisher:

- **P**ull out the safety pin
- **A**im the nozzle at the base of the fire
- **S**queeze the trigger
- **S**weep from side to side

Using a Fire Blanket

Fire blankets are inexpensive and very easy to use. They are ideal for fighting cooking fat fires and wrapping around people if their clothes catch alight. To use a fire blanket:

- Pull the tabs to open the blanket.
- Place (don't throw) the fire blanket over the fire, keeping your hands and face protected behind it.
- If possible, turn off the heat source (e.g. a hotplate), and leave the blanket over the burnt area until the heat has dissipated.

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 7 parts designed to develop your understanding of portable fire extinguishers, including types, suitability for use on different fires, Australian Standards and requirements, and the basic procedures in the event of a fire.

Topic 2.5 Learning Activity

Undertaking this topic quiz will help confirm your understanding of the typical hazards found in the workplace, their risk assessment, management and control methods, the concept of standard work procedures, and the selection and use of fire extinguishers for different classes of fire.

Topic 2 Content Quiz

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Last modified: Wednesday, 27 January 2021, 9:25 AM

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Introduction

Manual handling is a common cause of injury in the workplace. Manual handling injuries can occur as a result of lifting, carrying, pulling, pushing, holding or restraining any objects, both large and small, such as equipment, tools and other items used in the workplace.

Manual handling injuries can be reduced by paying attention to posture and lifting techniques, by redesigning the way work is carried out and by using mechanical aids to assist with the work.

Manual Handling

Manual Handling can be defined as any activity that requires a person to lift, lower, push, pull, carry or otherwise move, hold or restrain an object.

Some examples of manual handling tasks that are typical in electrotechnology work include:

- pulling in cables
- fastening nuts, bolts and screws
- using power tools such as drills and grinders
- carrying tools, materials and equipment

Manual Handling Injuries

Around a quarter of all workplace injuries are caused by manual handling techniques. Common types of injuries include:

- muscle sprains and strains
- lacerations
- muscle fatigue
- injuries to ligaments and tendons
- nerve damage
- abdominal hernias

The severity of these injuries can vary from momentary discomfort to chronic and debilitating pain. They can be caused by a single bad movement, or be the result of months or years of repeated movements.

Parts of the body that are commonly affected by manual handling injuries are:

- back and neck
- wrists
- arms
- shoulders
- legs

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 2 parts designed to develop your understanding of what manual handling is, and the types of injuries that can be caused by incorrect manual handling techniques.

Topic 3.1 Learning Activity

Last Modified: Tuesday, 22 February 2022, 9:45 AM

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To avoid injury, correct manual handling techniques should be used **at all times**. The first step is to assess both the load and the work environment:

- How heavy is the load?
- Is the load an awkward shape?
- Can the load be broken into smaller and lighter parts?
- How can the need for bending, twisting and reaching movements be reduced?
- Are there any particular slip or trip hazards that need to be removed?
- Is a team lift required?
- Is a mechanical lifting aid required (e.g. trolley, pallet jack)?

Manual Lifting

When you are ready to lift an object:

1) Face the load and set your feet apart for balance
2) Bend your knees to lower your body
3) Get a firm grip on the load
4) Use your legs to lift the load, keep your back straight and don't twist your body

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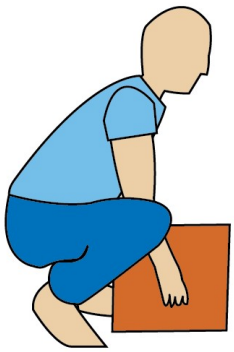
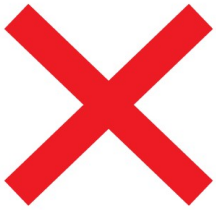
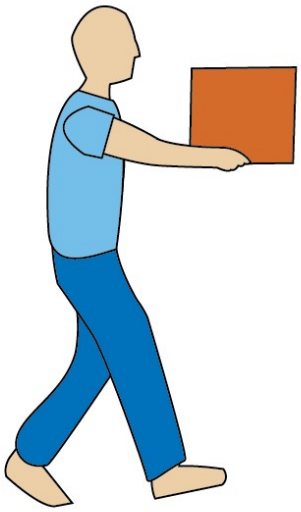


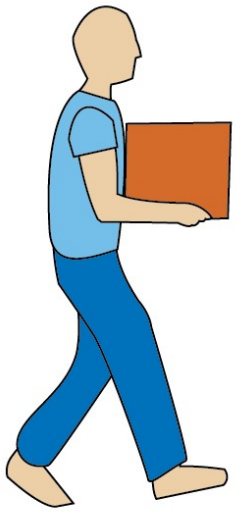


Manual Carrying

When carrying an object:

1) Keep the load close to your body
2) Don't twist your body
3) Watch where you're going





Mechanical Aids

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Sometimes, risks posed by moving an object can be significantly reduced simply by using a mechanical aid to do the work. It should be remembered however, that the act of pushing and pulling trolleys and pallet jacks also poses manual handling risks.

For more detailed information on safe manual handling in the workplace, try searching the Safe Work Australia website for the Model Code of Practice for 'Manual Handling'.

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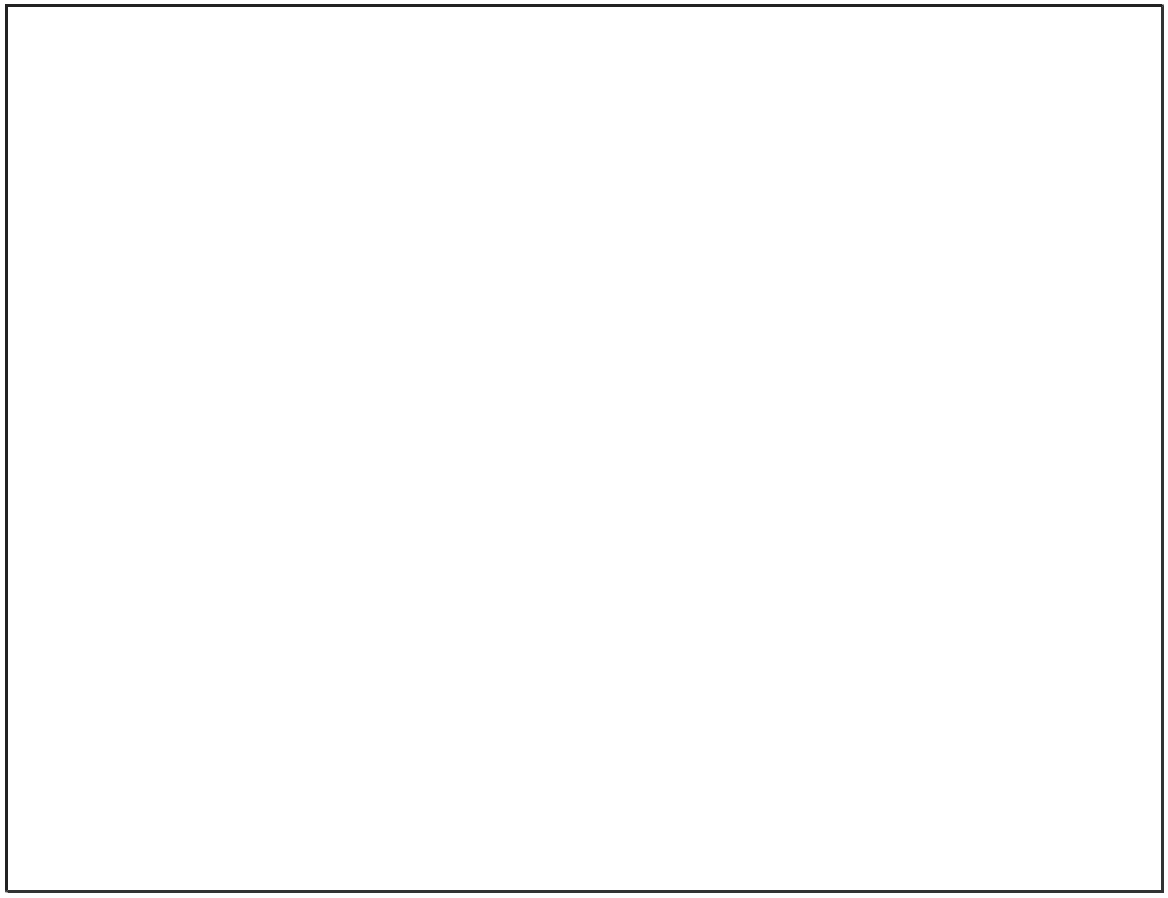
Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity



This learning activity consists of 4 parts designed to develop your understanding of correct manual lifting and carrying techniques.

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Topic 3.2 Learning Activity

In this skills practice, you are required to complete a manual handling risk assessment for correctly lifting a heavy item from the floor to a bench. You must also demonstrate the correct manual handling techniques to lift the same item from the floor to the bench.

Topic 3.2 Skills Practice

Undertaking this topic quiz will help confirm your understanding of manual handling hazards and the correct manual handling techniques that will reduce your risk of injury when carrying out a manual handling task.

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Topic 3 Content Quiz



Last modified: Tuesday, 5 January 2021, 3:19 PM

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View

Introduction

A wide variety of chemicals are used in the Electrotechnology industry. Most chemicals when used in the recommended amounts are safe, however all chemicals and substances must be treated as a hazard in the workplace and the appropriate control measures put in place. This includes storing, handling and managing chemicals correctly to reduce the harm to people, property and the environment.

Chemicals in the Workplace

A variety of chemical substances are commonly found in the workplace either as a result of their direct use or because of previous use. Chemicals are classified based on their potential to cause harm to your health and/or immediate physical injury, e.g. due to an explosion.

	Classification	Examples
Hazardous Substances	Substances with the potential to cause immediate or long-term harm to your health	Silica dust, asbestos, glues, paints and solvents
Dangerous Goods	Substances with the potential to cause serious damage or injury due to immediate physical or chemical effects	Pesticides, acids, butane, acetylene, methylated spirits, petrol

Not all hazardous substances are classified as dangerous goods, but most dangerous goods will also be classified as hazardous substances.

Identification of Hazardous Substances

Hazardous substances are required to be labelled providing the following information in English:

- Product identifier number/code
- Australian contact details of the manufacturer or importer
- Chemical ingredients and proportions
- Date of expiry (if applicable)
- Any applicable hazard pictograms
- Signal words e.g. 'Warning', 'Poison'
- Risk phrases e.g. 'Harmful if swallowed', 'flammable'
- Safety phrases e.g. 'Keep container dry', 'Keep away from heat'
- Directions for use
- Emergency and First aid procedures

Identification of Dangerous Goods

Dangerous goods are identified using a standard set of diamond shape pictograms, as shown in the following table.

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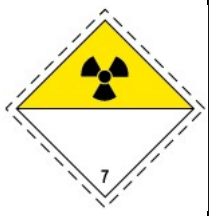
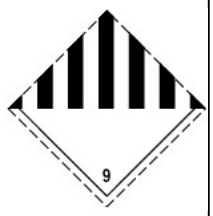
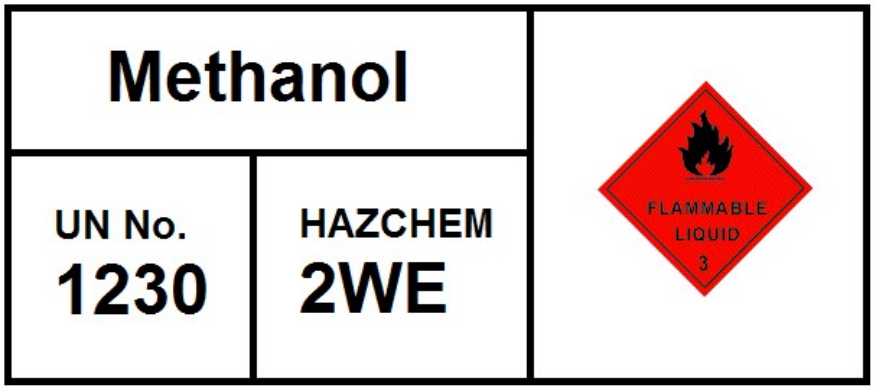
Dangerous Goods Pictograms				
				
Explosive	Toxic	Flammable Liquid	Flammable Solid	Spontaneously Combustible
				
Oxidising Agent	Infectious	Radioactive	Corrosive	Miscellaneous Dangerous Goods



Dangerous Goods Label – Example

Hazchem Code

The Hazchem emergency action code indicates the appropriate initial response to an emergency situation involving a particular chemical, such as a spill or a fire. These codes are primarily intended for trained emergency response personnel.

- The first character indicates the method of fire fighting, e.g. the '2' in 2WE indicates 'fine water spray'.
- The second character indicates the required PPE, e.g. the 'W' in 2WE indicates 'liquid-tight chemical protective clothing and breathing apparatus'.
- An 'E' can be added as a third character, which indicates that a public safety hazard may arise outside the immediate area of the incident.

Further details of the Hazchem code system can be found in the Australian Dangerous Goods Code.

For more information, try searching the Safe Work Australia website, or the website of your State/Territory Regulator for 'labelling of hazardous chemicals'.

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 5 parts designed to develop your understanding of hazardous substances and dangerous goods classifications and labeling.

Topic 4.1 Learning Activity

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Last modified: Tuesday, 8 November 2022, 12:15 PM

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Handling Workplace Chemicals

Always familiarise yourself with the safe handling procedures for a given chemical before use. Follow the manufacturers' instructions and wear protective items such as masks, gloves, eyewear and clothing as required. Make sure you know what to do, and how to treat any potential accidents before they arise, not during or after the event.

Keep in mind that chemicals can enter the body:

- by inhalation
- by ingestion
- though the skin
- through the eyes
- through mucus membranes

Chemicals must always be disposed of properly (e.g. at a council hazardous waste disposal site) and never left at customer premises.

Storage of Workplace Chemicals

Dangerous chemical should be stored in appropriate containers and housed in storage cupboards. Lids and caps should be fastened securely to prevent leakage, and chemicals that can react together should be housed separately.

In general, chemicals should be stored in cool, dry locations, away from heat sources, including direct sunlight. The Safety Data Sheet (SDS) should be reviewed to find the specific storage requirements for each chemical.

Safety Data Sheet (SDS)

A Safety Data Sheet (SDS) is an informative document detailing the safety information for a given material. Before working with a hazardous material, the associated safety data sheet should be reviewed as part of the risk assessment process.

A safety data sheet contains the following sections:

- Identification of Substance / Preparation / Company
- Composition / Information on Ingredients
- Hazard Identification
- First Aid Measures
- Firefighting Measures
- Accidental Release Measures
- Handling and Storage

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- Exposure Controls / Personal Protection
- Physical and Chemical Properties
- Stability and Reactivity
- Toxicology Information
- Ecological Information
- Disposal Considerations
- Transport Information
- Regulatory Information

For more information, try searching the Safe Work Australia website for the Model Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace. You can also try searching the website of your State/Territory Regulator using keywords such as 'hazardous chemicals', 'dangerous goods' and 'safety data sheet'.

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 3 parts designed to develop your understanding of workplace chemicals including SDS, handling and storage.

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Topic 4.2 Learning Activity

In this skills practice, you are required to interpret and extract information from a Safety Data Sheet (SDS).

Topic 4.2 Skills Practice

Undertaking this Topic Content Quiz will help confirm your understanding of the classification and identification of chemicals use in the workplace, the correct handling and storage of chemicals, and the information provided by a Safety Data Sheet (SDS).

Topic 4 Content Quiz



Last modified: Wednesday, 27 January 2021, 9:33 AM

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View

Introduction

Falls are a major cause of death and serious injury in Australian workplaces. Falls can occur at ground level, such as falling into a pit, or from heights, for example falling from a ladder or scaffolding. Deadly falls can also occur from roofs or from an exposed edge on a multistory construction project.

Before working in a situation where a fall hazard exists, you must first identify the hazard, assess the risks, and put the necessary control measures in place.

Working at Heights

The term "working at heights" refers to any situation where a person is working from a step or platform that is elevated above the ground. It also applies to working on roofs or near edges where the risk of falling exists.

Working at Heights		
Examples	**Risks**	**Controls**
Work performed: • from a step ladder • from a scaffold • from an elevated work platform (EWP), such as a scissor lift or a boom lift • whilst on a roof • near the edge of a drop	Falling from heights, which could result in: • sprains and strains • cuts and lacerations • concussion and unconsciousness • broken bones • internal bleeding • impalement • death	Fall prevention: • training • guard rails Fall arrest systems: • anchored safety harness • safety nets

People working at heights are also a hazard to those working at ground level in the area. The risk is that falling objects can result in impact injuries to those below.

For more information, try searching the Safe Work Australia website for the Model Code of Practice - Managing the Risk of Falls at Workplaces. You can also try searching the website of your State/Territory Regulator using keywords such as 'working at heights'.

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 3 parts designed to develop your understanding of the hazards and risks posed by working at heights, or when working underneath others.

Topic 5.1 Learning Activity

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Last modified: Tuesday, 5 January 2021, 4:04 PM

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View

Selecting Ladders

Ladders are commonly used throughout the electrotechnology industry. Step ladders, and increasingly platform ladders, are used to install wiring, appliances and light fittings. Extension ladders are often used to access elevated areas such as roofs.

The main factors to consider when selecting a ladder for a job are:

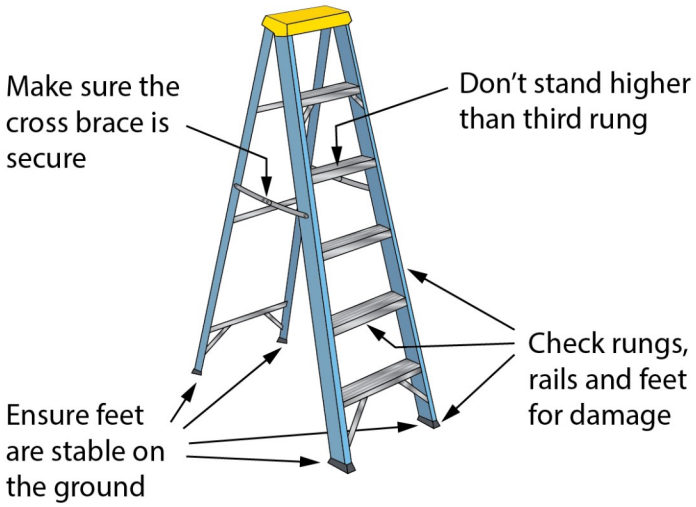
- whether or not it is absolutely necessary to use a ladder for the work
- the load that the ladder will be required to support
- the required working height
- the presence of electrical hazards

In general, only non-conductive ladders, such as fiberglass (preferred) or wood, should be used for electrotechnology work.

Setting up a Ladder

Prior to using a ladder, time should be spent to ensure that the ladder is safe to use. In order to safely set up a ladder:

- check that the ladder meets Australian Standards and has a current safety tag
- clean any dirt away from the treads to reduce the chance of slipping and allow proper inspection
- inspect the rungs, rails and feet of a ladder for cracks and other damage, and check that all nuts and bolts are secure
- position the ladder so that you will be within arm's reach of the work
- make sure the cross brace or any other locking device is secure and the feet are placed solidly on level ground
- if the ladder is in a public thoroughfare, set up barricades to keep people at a safe distance



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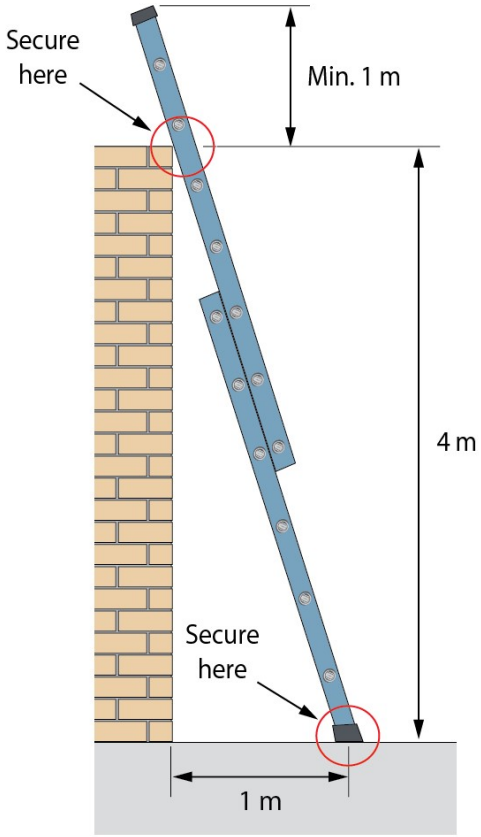
When setting up an extension ladder for access to an elevated area such as a roof:

- make sure the slope of the ladder does not exceed the 4:1 ratio
- ensure it's secured in place at the top and bottom, and that the top extends at least one metre above the top platform
- take care to maintain a suitable distance from any electrical wires in the vicinity



Using a Ladder

The following safety practices should be observed whilst using a ladder:

- Only one person at a time should use or work from a ladder
- Always face the ladder when ascending or descending it
- Maintain 'three points of contact' on the ladder at any one time, i.e. both hands and one foot or both feet and one hand
- Carry tools in a tool belt, pouch or holster, not in your hands, so you can keep hold of the ladder
- Do not climb higher than the third rung from the top of the ladder
- If you need to place a ladder in front of a door, either lock the door, secure the door open, or have a second person guard the doorway on the other side
- Never "walk" a ladder whilst standing on it. Get down off the ladder and carry it to the desired location

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 5 parts designed to develop your understanding of ladders used for electrotechnology work, including types, selection and safe use.

Topic 5.2 Learning Activity

In this skills practice, you are required to perform a risk assessment for a task requiring the use of a ladder, select a ladder and perform a pre-work safety check on the ladder.

Topic 5.2 Skills Practice

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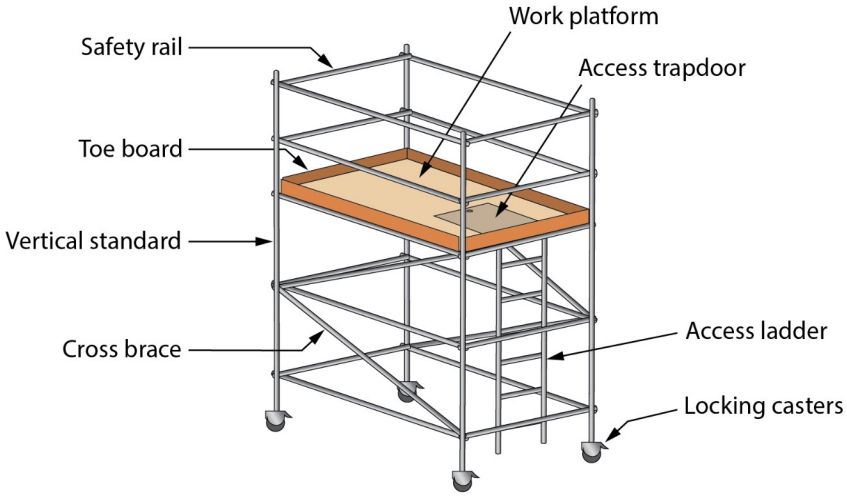
Scaffolds

In many cases, the risks posed by using a ladder make the use of a scaffold the preferred option.



Scaffolding should only be erected by personnel who've had sufficient training in how to construct them safely.

When working from a scaffold, the following safety procedures should be observed:

- The casters should be locked when a person is on any part of the scaffold
- The work platform should only be accessed via the ladder and trapdoor provided
- Toe boards should be used to reduce the chance of objects falling from the work platform
- Handrails and kickboards must be used on all working platforms more than two metres high
- Only perform work that is within arm's reach of the scaffold – don't over extend
- Never step on the toe boards or safety rails of the scaffold to gain extra height

Elevated Work Platforms

Specific safety training is required before a worker is permitted to operate an elevated work platform (EWP) such as a scissor lift or boom lift.

General safety procedures associated with EWPs include:

- a pre-work safety inspection
- use of an anchored safety harness

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When working from an EWP:

- never stand on the guard rails
- never climb in or out of the platform while the EWP is elevated

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 2 parts designed to develop your understanding of mobile scaffolding and associated safe work practices.

Topic 5.3 Learning Activity

In this skills practice, you are required to complete a risk assessment for the use of a mobile scaffold. You must also correctly fit a safety harness to your body.

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Topic 5.3 Skills Practice

Undertaking this content quiz will help confirm your understanding of the hazards and risks of working at heights, especially working from ladders, scaffolds and elevated work platforms.

Topic 5 Content Quiz



Last modified: Wednesday, 27 January 2021, 9:35 AM

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View

Introduction

Working within a confined space in the workplace can pose serious health and safety risks to workers. Every year a number of workers die from the hazards associated with work in confined spaces. Most worker deaths in a confined space are due to asphyxiation caused by the the near-zero oxygen concentration within the confined space. Unfortunately, the situation can quickly become worse when co-workers also become victims whilst attempting to rescue a casualty from a confined space.

To protect yourself from the risks associated with confined spaces, you must be able to identify confined spaces, and then carryout the necessary risk assessments and implement the required control measures before carrying out work within a confined space.

Confined Spaces

A confined space is defined as an enclosed or partly enclosed area which is not intended to be a regular place of work.

Confined spaces are generally characterized by having limited access and ventilation. Examples of confined spaces can include:

- Ceiling spaces
- Cable tunnels
- Boilers
- Silos
- Cool rooms
- Trenches and pits
- Pipes and ducts
- Septic tanks
- Sewers
- Crawl spaces

Electrotechnology workers typically enter confined spaces to install, inspect and maintain electrical equipment, such as sump pump motors, sensors and wiring.

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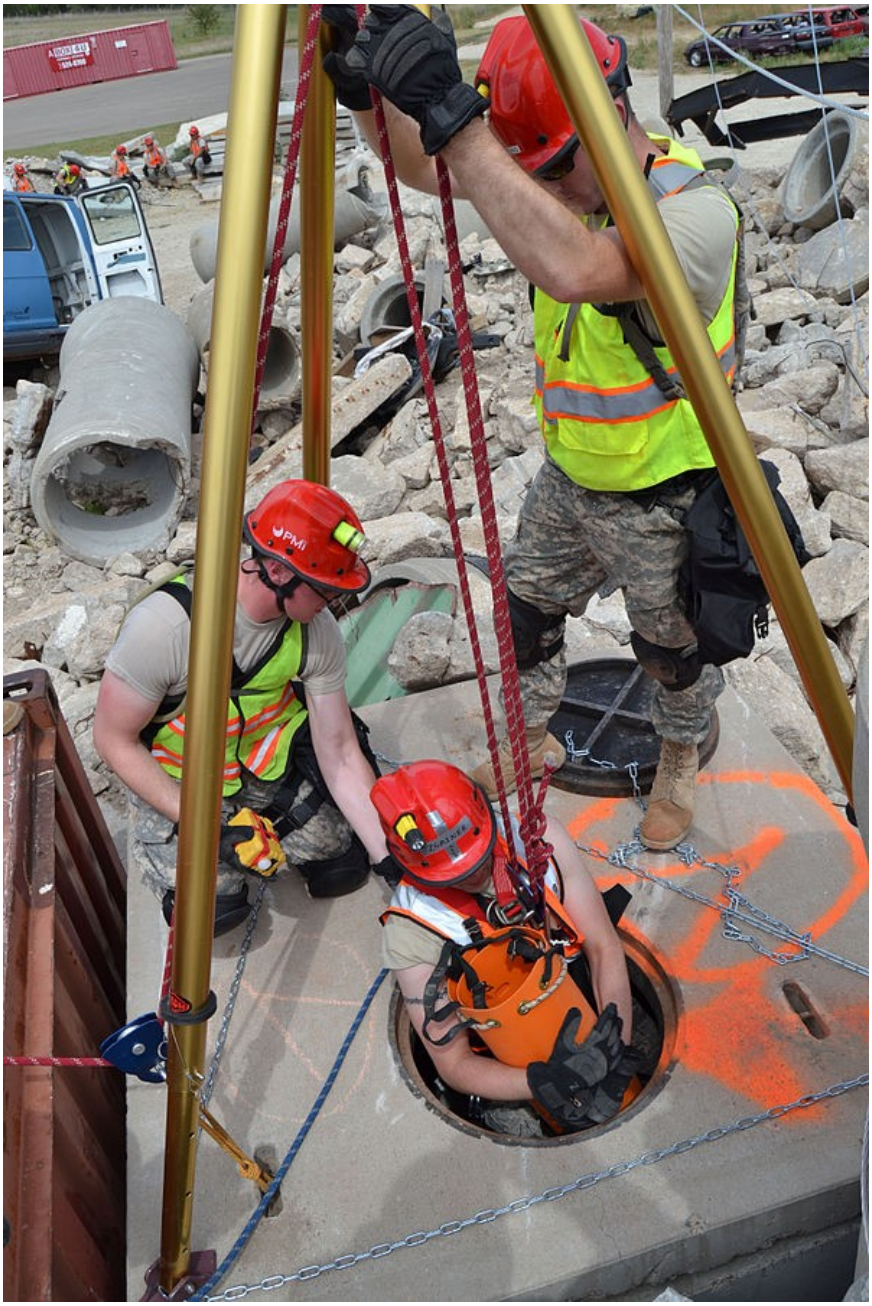

Entry into a Confined Space

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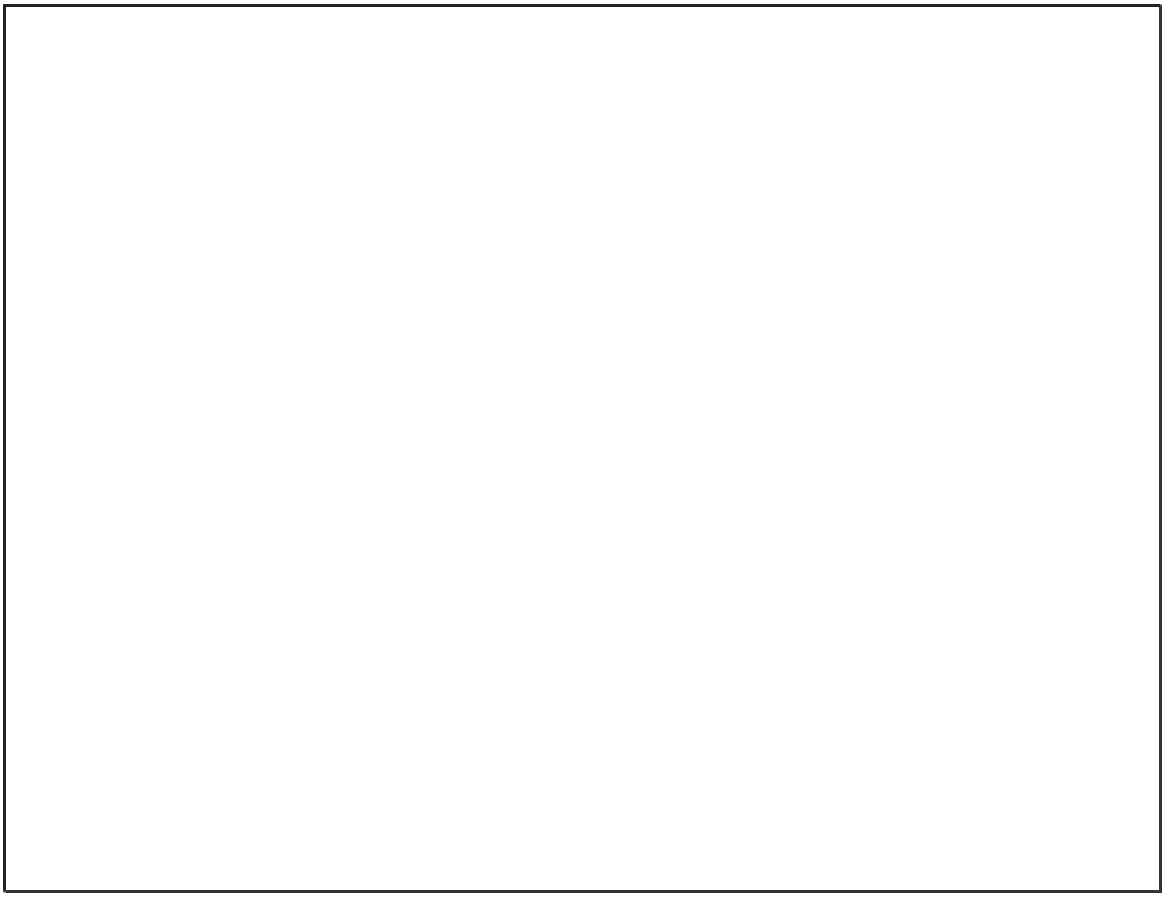
Load the Activity



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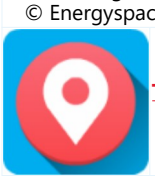
This learning activity consists of 2 parts designed to develop your understanding of confined spaces, including characteristics and typical types.



Topic 6.1 Learning Activity

Last modified: Wednesday, 6 January 2021, 8:21 AM

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View

Confined Space Hazards

Normally, confined spaces have a restricted opening for entry and have atmospheres that include poisonous or flammable gases. Alternatively, inert gases can displace the oxygen atmosphere resulting in suffocation.

Confined spaces are required to be identified by appropriate warning signage. Workers must undergo specific safety training and obtain a work permit before they can enter a confined space.

The main hazards, risks and control measures associated with working in confined spaces are detailed in the following table.

Confined Spaces		
Hazard	**Risk**	**Controls**
Limited access and egress	Entrapment, difficulty rescuing an injured worker	Safety observer, emergency rescue equipment
Flooding/engulfment (e.g. by water or grain)	Drowning, suffocation	Safety observer, emergency rescue equipment
Limited ventilation	Displacement of oxygen (causing suffocation), build-up of toxic, flammable or explosive gases (causing poisoning, explosion or fire)	Gas detectors, respirators, portable ventilation equipment
Limited lighting	Injury due to low visibility	Portable lighting equipment
Contaminants	Infections	Protective clothing, respirators, eye protection
Temperature extremes	Hypothermia, hyperthermia, dehydration	Regular breaks, worker rotation, drinking water
Noise	Hearing loss, tinnitus	Ear plugs and/or muffs
Awkward working space	Sprains, strains, cuts, lacerations, abrasions	Housekeeping, specific tools, safe working procedures

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For more information, try searching the Safe Work Australia website, or the website of your State/Territory Regulator using the keywords ‘confined

space'.

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 3 parts designed to develop your understanding of the general hazards, risks and control measures needed for working in confined spaces.

Topic 6.2 Learning Activity

In this skills practice, you are required to develop a JHA for working in a confined space.

Topic 6.2 Skills Practice

Undertaking this Topic Content Quiz will help confirm your understanding of the definition of a confined space, the hazards and risks associat ? th working within a confined space, and the control measures to reduce the risk to workers' health and safety.

Topic 6 Content Quiz



Last modified: Wednesday, 27 January 2021, 9:35 AM

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View

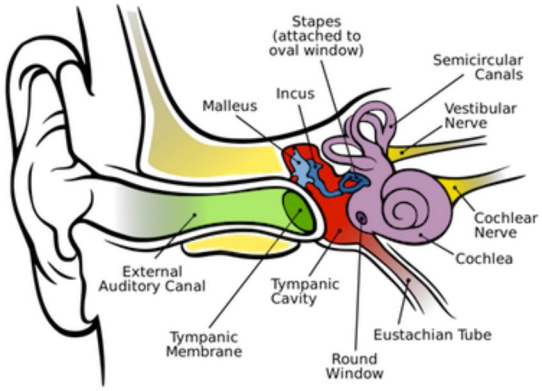
Introduction

Workplace hazards can be classified as 'physical hazards' or 'psychological hazards'. Put simply, physical hazards mainly affect the body, and psychological hazards mainly affect the mind. Some examples of physical hazards include electricity, noise and vibrating machinery. Examples of psychological hazards include fatigue, stress and harassment.

In this topic, you will learn about the various physical and physiological hazards that can lead to illness, injury, low morale and reduced productivity in the electrotechnology industry.

Industrial Noise

Noise is one of the most widespread and underestimated of workplace hazards. The human ear is made up of several delicate parts that can be permanently damaged when placed under excessive pressure.



The Human Ear

The severity of ear damage depends on the level of noise and the duration of exposure. Some examples of noise levels, in decibels (dB), are provided in the following table, as well as the maximum durations for exposure before damage occurs.

Exposure to Noise		
Scenario	**Noise Level**	**Max. Exposure**
Normal conversation	60 dB	N/A
Using a welder	85 dB	8 hrs
Using a lawn mower	91 dB	2 hrs
Using a hammer drill	94 dB	1 hr
At a live concert	100 dB	15 min
Using a jackhammer	120 dB	10 sec

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Industrial Noise		
Risks	**Controls**	**Common Risk Areas**
• Hearing loss • Tinnitus (ringing in the ear) • Stress and irritability	• Limiting the noise at the source • Sound-absorbent walls or curtains • Ear plugs and/or ear muffs	• Construction sites • Manufacturing plants • Industrial process plants

Vibration

Excessive vibration can result from poorly maintained vehicles or tools, or from performing tasks that involve inherent vibration such as hammer drilling or jack hammering.

Vibration		
Risks	**Controls**	**Common Risk Areas**
• Musculoskeletal disorder • Swelling and stiffness • Loss of dexterity • Loss of sensation in extremities • Carpal tunnel syndrome • Vibration white finger	• Gloves • Worker/job rotation • Minimum grip on equipment • Proper tool maintenance to minimise vibration	• Using hammer drills and jackhammers • Using poorly maintained tools • In poorly maintained vehicles

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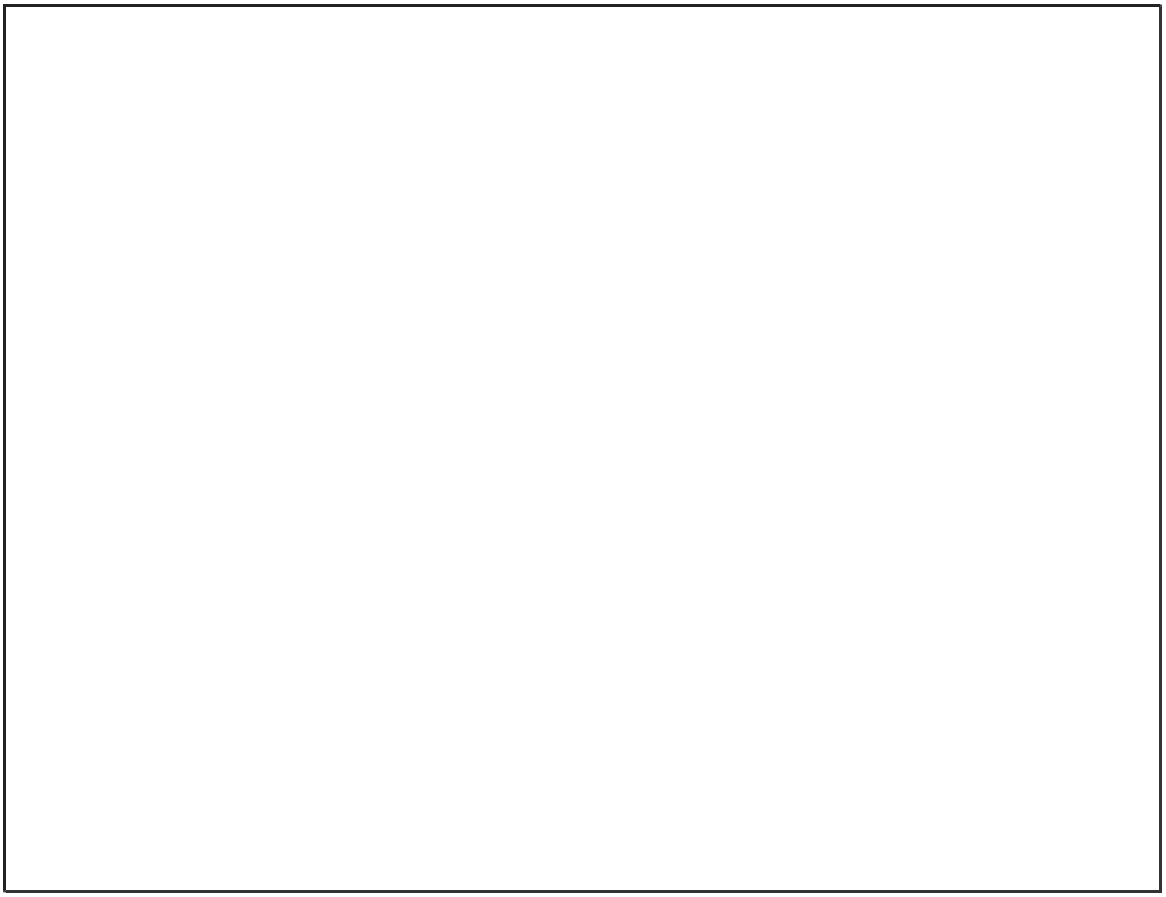
Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity



Heat stress

Heat stress (hyperthermia) occurs when the body is unable to dissipate excess heat, causing the core temperature to rise above the healthy level of around 37 ^{0}C. As body temperature rises above 40.5 ^{0}C, the body's internal systems begin shutting down and organ functioning becomes impaired.

Heat Stress		
Risks	**Controls**	**Common Risk Areas**
• Fatigue • Fainting • Dehydration • Nausea • Delirium • Organ damage • Seizures • Coma • Death	• Safety observer • Ventilation equipment • Shades or heat shields • Light and breathable clothing • Taking regular breaks in a cool environment • Worker/job rotation • Regular fluid replacement (drinking water)	• Outdoors in hot climates • In roofs and crawl spaces • In plant rooms • In industrial process plants

Cold stress

Cold stress (hypothermia) occurs when the body loses heat at such a rate that it cannot maintain a healthy body temperature. Cold stress occurs when the body's temperature falls below 35°C.

Cold Stress		
Risks	**Controls**	**Common Risk Areas**
• Inability to concentrate • Loss of sensation in extremities • Drowsiness and confusion • Slurred speech and lack of coordination • Slowed breathing • Coma • Death	• Safety observer • Heating equipment • Warm clothing • Taking regular breaks in a warm environment • Worker/job rotation • Warm drinks	• Outdoors in cold climates • In refrigeration rooms

Ultraviolet (UV) Radiation

Ultraviolet (UV) radiation is emitted by the sun, and is a significant hazard associated with working outdoors. UV levels vary over the course of the day and are present regardless of cloud cover. The severity of UV exposure depends on geographic location, but the most extreme UV levels generally always occur each day between 11 am and 2 pm.

Ultraviolet (UV) Radiation		
Risks	**Controls**	**Common Risk Areas**
• Burns • Eye damage • Skin cancer • Heat stress	• Sunscreen • Protective clothing • Wide-brim hat • Sunglasses	• Working outdoors in the sun

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

Laser Operated Equipment

A laser is an intense and highly directional beam of light. The potential harm that can be caused by a laser depends on the power rating and the point of exposure. For example, a 0.5 W laser could cause permanent blindness if shined into the eyes, whilst a 1 W laser could easily burn through flesh. The following warning pictogram is used to indicate the presence of lasers:

Laser Operated Equipment		
Risks	**Controls**	**Common Risk Areas**

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• Permanent eye damage • Blind spots • Burns	• Warning signs • Shields • Safety glasses • Protective clothing	• Working with in-service optical cables • Using laser-equipped tools • Servicing electromedical equipment

Occupational Overuse Syndrome (OOS)

Overuse injuries are injuries sustained from a repetitive action, such as playing tennis, typing or using pliers. Over time, repeated movements can place excessive strain on particular muscles, ligaments and tendons, resulting in inflammation and impaired movement.

Occupational Overuse Syndrome (OOS)		
Risks	**Controls**	**Common Risk Areas**
• Swelling • Aches and pains • Hot or cold feelings • Muscle spasms • Numbness and tingling • Impaired range and function • Carpal tunnel syndrome	• Ergonomic tools and equipment • Frequent breaks from repetitive tasks • Worker/job rotation • Stretching	• Using a screwdriver to tighten and loosen screws • Using pliers to grip and cut

For more information, try searching the Safe Work Australia website, or the website of your State/Territory Regulator using keywords such as:

- 'Vibration'
- 'Noise'
- 'Heat stress'
- 'Cold stress'
- 'Lasers'
- 'Radiation'

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 6 parts designed to develop your understanding of common physical hazards found in electrotechnology workplaces, and the associated risks and control measures.

Topic 7.1 Learning Activity

Last modified: Wednesday, 6 January 2021, 9:11 AM

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View

Asbestos-Containing Materials (ACMs)

The possibility of encountering asbestos-containing materials (ACMs) whilst working in the electrotechnology industry is high. ACMs were used widely in Australia as building materials until the government and the public became aware of the health effects. ACMs began to be phased out in the 1980s and were finally banned in 2003.

This means that any building that was constructed prior to 2003 may contain asbestos.

Building constructed prior to the mid-1980s are highly likely to contain asbestos

ACMs were very effective building materials, as they were highly resistant to water and fire, and produced high tensile strength when added to cement. Common types of ACMs include:

- Fibro-cement sheeting
- Drainage pipes
- Roofing and guttering
- Loose-fibre insulation

Dangers of Asbestos

When an ACM is cut, drilled, cracked or broken, asbestos fibres are released into the air. When inhaled, these fibres lodge in the lungs causing scar tissue to form around them. This scar tissue prevents that portion of the lungs from transferring oxygen to the body. In turn, this can lead to lung cancer, including mesothelioma, which is a rare fast-growing type that is almost exclusively associated with asbestos.

If your workplace (or home) contains ACMs, it is important to avoid disturbing them in any way that may release fibres. Loose-fibre insulation, sometimes found in residential roof spaces, is particularly hazardous as simply moving the material can send fibres into the air.

Identification and Reporting

Any workplace that was constructed before 31st of December 2003 is required to have an asbestos register that details all the known or assume[?] ACMs that are present, including:

- Location of the ACM
- Type and condition
- Date of identification

Warning signs are typically used to identify asbestos hazards – some examples are provided below:

Examples of Asbestos Signage	
	
Danger Sign (asbestos removal in progress)	Warning Sign (presence of asbestos)

If you identify or suspect the presence of asbestos, notify your supervisor immediately and don't disturb the material.

Asbestos Risks and Controls

The following table outlines the basic risks and control measures for asbestos.

Asbestos Risks and Controls	
Risks	**Control Measures**
• Asbestosis • Pleural plaque • Lung cancer • Mesothelioma	• Identify and report the presence of asbestos • Do not disturb • Safe removal by a certified contractor

?

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

Silica Dust

Crystalline silica is a naturally occurring mineral found in a wide variety of rocks and soils. Similarly to asbestos, airborne particles of crystalline silica dust can accumulate in the lungs when inhaled, resulting in serious damage, including bronchitis, emphysema and silicosis. It can also cause kidney damage and various autoimmune conditions.

Some common building materials containing crystalline silica include:

- Stone benchtops
- Bricks and mortar
- Concrete
- Paving stones

When these materials are cut, drilled, chiseled or otherwise broken open, silica dust is released into the air.

The person in charge of a particular worksite has a duty of care to ensure the maximum workplace exposure standard (WES) is not exceeded. For silica dust, the WES is 0.05 mg/m^3 over an 8 hour period.

Silica Dust Risks and Controls

The following table outlines the basic risks and control measures for crystalline silica.

Silica Dust Risks and Controls	
Risks	**Control Measures**

?

• Respiratory disease
• Chronic bronchitis
• Emphysema
• Lung cancer
• Silicosis
• Kidney damage
• Autoimmune diseases including:
  • Scleroderma
  • Rheumatoid arthritis
  • SLE
  • Sarcoidosis
	• Water sprays
	• Exhaust fans, ventilation
	• Vacuuming, proper housekeeping
	• Limiting time of exposure
	• PPE – glasses, dust masks, respirators

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

Hazardous Gases and Vapours

There are various hazardous gases and vapours that can be present in electrotechnology workplaces, for example:

- Gas torches (butane, oxy-acetylene) contain flammable pressurised gases.
- Refrigerants can give off toxic fumes and can be highly flammable.

?

The following table outlines the basic risks and control measures for hazardous gases.

Gases and Vapours Risks and Controls		
Hazards	**Risks**	**Control Measures**
Flammable gases	• Fires • Burns	• Safety data sheets • Safety and warning signage • Ventilation • Correct storage and identification • Safety training and safe work methods • PPE – respirators, gloves, safety glasses, protective aprons
Pressurised gases	• Explosions • Physical injuries	
Toxic fumes	• Displacement of oxygen • Respiratory damage • Nausea, unconsciousness and asphyxiation	

For more information, try searching the Safe Work Australia website, or the website of your State/Territory Regulator using keywords such as 'asbestos', 'crystalline silica' and 'gas'.

This learner activity consists of 8 parts designed to develop your understanding of the risks of harmful airborne materials including asbestos fibres, silica dust and hazardous gases.

Topic 7.2 Learning Activity

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Last modified: Wednesday, 6 January 2021, 9:37 AM

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View

Asbestos-Containing Materials (ACMs)

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

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  • Sarcoidosis
	• Water sprays
	• Exhaust fans, ventilation
	• Vacuuming, proper housekeeping
	• Limiting time of exposure
	• PPE – glasses, dust masks, respirators

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

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For more information, try searching the Safe Work Australia website, or the website of your State/Territory Regulator using keywords such as 'asbestos', 'crystalline silica' and 'gas'.

This learner activity consists of 8 parts designed to develop your understanding of the risks of harmful airborne materials including asbestos fibres, silica dust and hazardous gases.

Topic 7.2 Learning Activity

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Last modified: Wednesday, 6 January 2021, 9:37 AM

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View

Workplace Stress

Stress is a common occurrence in the modern workplace, and derives from specific workplace conditions, including:

- Long working hours or increased workload
- Shiftwork, particularly rotating shifts
- Organisational change e.g. downsizing, restructuring, redeployment or relocation
- Breakdowns in communication
- Interpersonal conflicts i.e. not getting on with others
- Discrimination, bullying or harassment
- Poor management practices
- Unsafe workplace conditions
- Personal or family problems

Effects of Workplace Stress	
Psychological Effects	**Physiological Effects**
• Anxiety • Irritability and frustration • Aggression/passive aggression • Forgetfulness • Insomnia and fatigue • Depression • Abuse of alcohol or other drugs	• Headaches • Increased blood pressure • Lowered immune system • Indigestion • Constipation or diarrhoea • Stomach ulcers • Weight loss or gain

Managing Workplace Stress

It is likely that you will experience some degree of stress from time to time. The following points can help you manage stress in the workplace:

- Don't try to take on more than you can handle.
- Let people know if you need assistance.
- Discuss problems with your co-workers and supervisor.
- Don't be negative or aggressive when communicating with others.
- If necessary, seek counselling from a trained professional.

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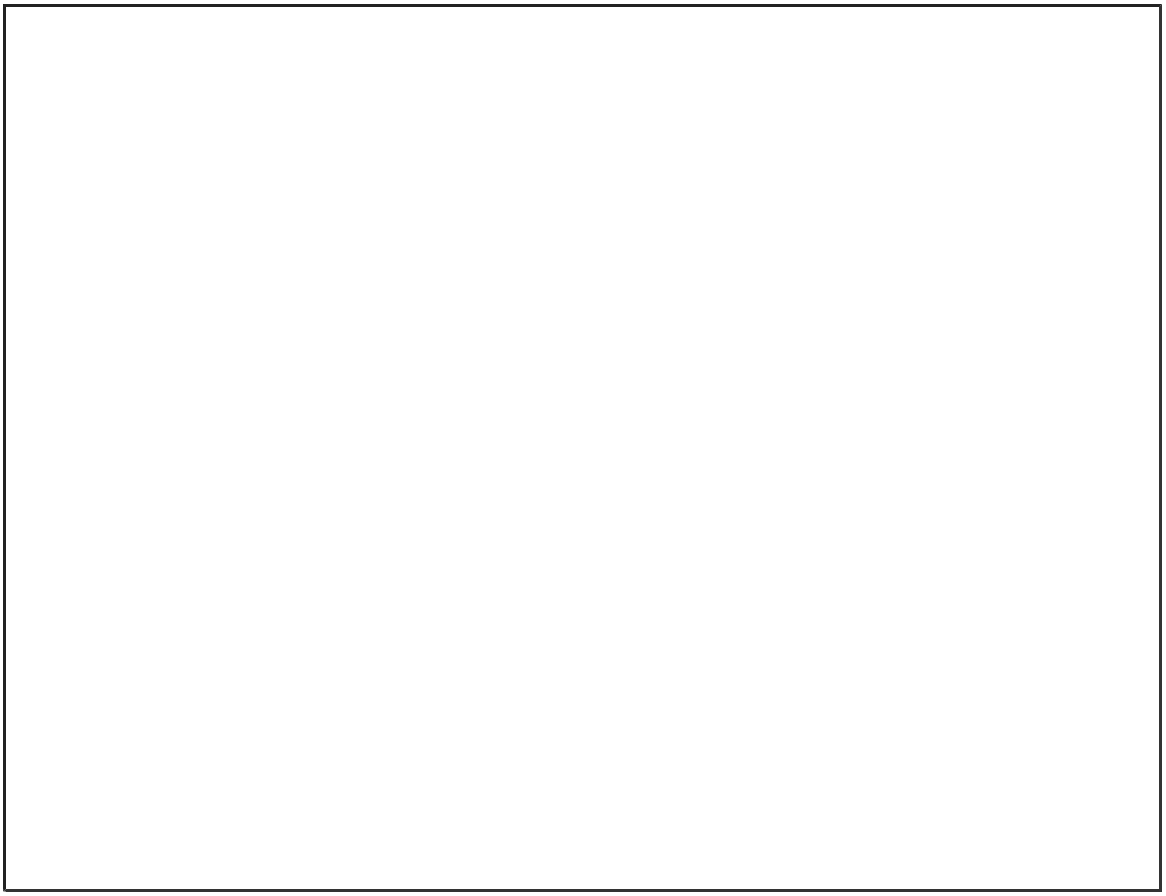
- Maintain healthy eating and exercise habits.
- Try to think positive!

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity



Drugs and Alcohol

The use of drugs and alcohol in the workplace results in increased absenteeism and lost production, and significantly increases the risk of accidents and injuries. In turn this results in worker's compensation claims and the need for rehabilitation.

The Australian Drug Foundation estimates the direct cost to industry through injury, sickness, absenteeism and death from drug and alcohol abuse is around $5.2 billion per year.

Detrimental effects of drug and alcohol abuse can include:

- Lack of coordination
- Blurred vision
- Irritability and aggression
- Poor concentration
- Slurred speech
- Tiredness and fatigue

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- Poor personal hygiene
- Headaches
- Nausea
- Addiction

Any person who is under the influence of drugs and/or alcohol in the workplace is a serious health and safety hazard to all those around them. Generally, if a person is found to be affected by drugs or alcohol at work they will be sent home and offered counselling. However, repeated offenses will usually result in dismissal.

For more information, try searching the Safe Work Australia website, or the website of your State/Territory Regulator using keywords such as ‘stress’ and ‘drugs and alcohol’.

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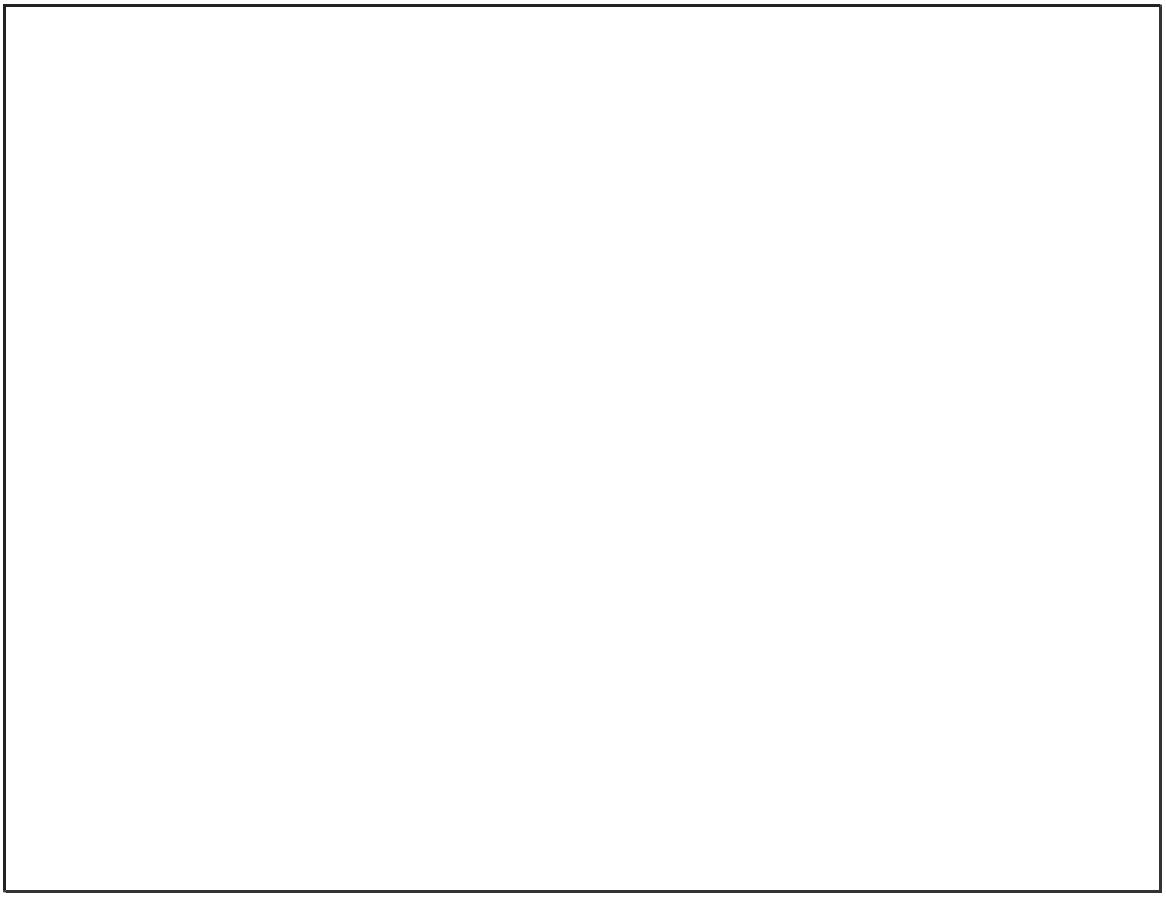
Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity



This learning activity consists of 5 parts designed to develop your understanding of psychological hazards, risks and control measures, including stress, and the consequences of drugs and alcohol use in the workplace..

Topic 7.3 Learning Activity

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Undertaking this Topic Content Quiz will help confirm your understanding of the many physical and psychological hazards found in the workplace, and the control measures taken to reduce their risks to as low as reasonably practicable.

Topic 7 Content Quiz

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Last modified: Wednesday, 6 January 2021, 9:48 AM

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View

Introduction

Electrical hazards in the workplace pose one of the greatest risks for electrotechnology workers. They have the potential to cause serious injury or death. Contact with live electrical equipment can cause fatal or non-fatal electric shocks. Fatal electric shocks are called 'electrocution'. Non-fatal electric shocks can cause severe injuries or illness such as burns, internal tissue damage, muscle spasms, palpitations, nausea, vomiting, collapse and unconsciousness. Non-fatal electric shocks can quickly lead to a fatality, for example when a worker on a ladder, scaffolding or elevated work platform, reacts to an electric shock by pulling back, causing them to fall from the structure.

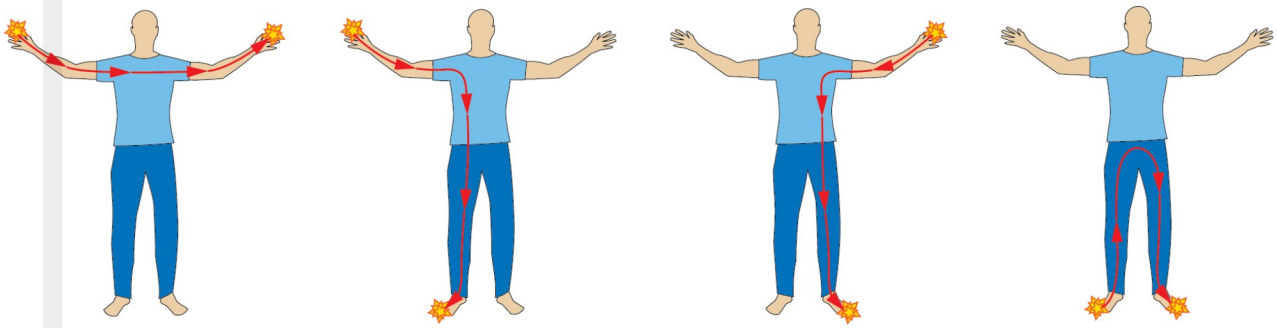
Electrical workers are not the only ones at risk, poor electrical installation work and faulty or damaged electrical equipment can lead to electric shocks and electrical fires.

Effects of Electric Shock

The effects and severity of an electric shock depends on a number of factors, including:

- The magnitude of the shock current
- The 'path' of the shock current through the body
- The duration of the shock
- Whether the shock current is alternating (a.c.) or direct (d.c.)

In general, the higher the shock current and the longer the duration of the shock, the more serious the injuries will be. An electric shock is also more likely to be fatal if the shock current passes through the heart.



Examples of Shock Current Paths

A general guide to the physiological effects of current is provided in the following chart.

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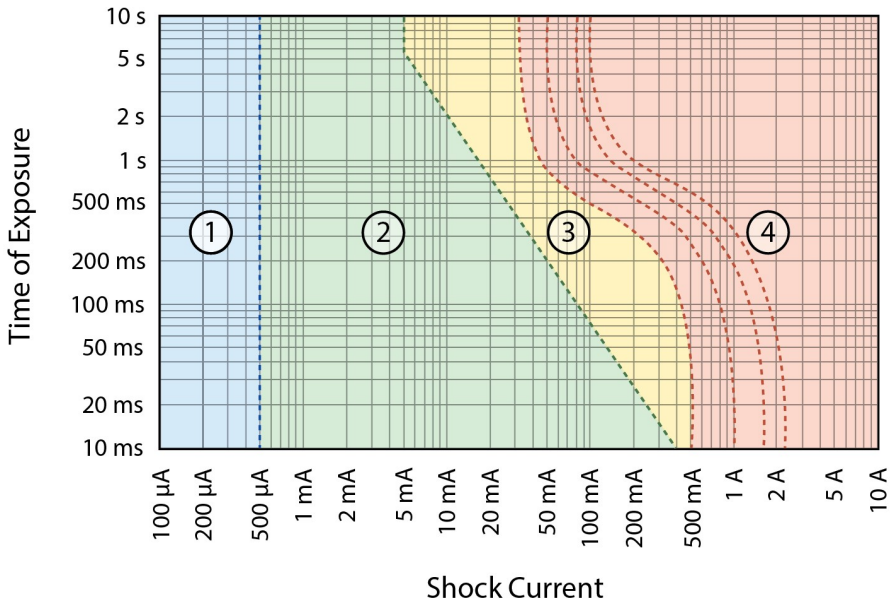

Zone	Typical Physiological Effects
1 (blue)	• Usually below the level of perception • No noticeable physiological effects on the body
2 (green)	• May startle a person causing them to pull away • Minor discomfort • No serious physiological effects on the body
3 (yellow)	• Muscular tensing and the inability to let go • Increased discomfort to severe pain • Difficulty breathing • Disturbance to heart rhythms • Burns
4 (red)	• Cardiac arrest • Asphyxiation • Ventricular fibrillation • Severe burns

Causes of Electric Shock

Common causes of electrical accidents include:

- Poor understanding of how electricity behaves
- Overconfidence
- Carelessness
- Unsafe work practices
- Stress and fatigue
- Performing electrical tasks in a rush
- Damaged insulation on electrical cables and equipment
- Dodgy (non-compliant) electrical work

For more information, try searching the Safe Work Australia website for the Model Code of Practice - Managing Electrical Risks in the Workpla ? u can also try searching the website of your State/Territory Regulator using keywords such as 'electricity' or 'electrical hazard'.

Watch the following ESV video.

This learning activity consists of 4 parts designed to develop your understanding of the effects of electric shock, factors affecting severity of a shock, and common causes of electrical accidents.

Topic 8.1 Learning Activity

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Last modified: Wednesday, 6 January 2021, 10:21 AM

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View

Protection Against Electrical Shock

There are various protective methods incorporated into electrical installations for the purpose of preventing electric shock.

These methods include:

- the use of an extra-low voltage (ELV) supply
- the provision of protection devices (fuses, circuit breakers and residual current devices)
- the provision of a protective earthing system

Extra-Low Voltage (ELV)

Extra-low voltage (ELV) is defined as any voltage that does not exceed 50 V a.c. or 120 V ripple-free d.c. These voltages do not pose a significant shock risk, and ELV circuits are arranged to ensure that the voltage cannot rise above these levels. It should be kept in mind however that ELV circuits are not 100% safe; caution and safe work procedures should be observed when working around any circuit.

ELV is not suitable for all applications, but is commonly used to supply:

- Lighting
- Alarm systems
- Sensors
- Control circuits

Fuses

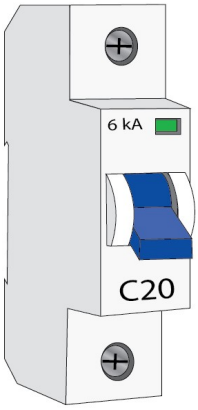
Fuses are used to protect electrical wiring and equipment against excessive currents that could result in a fire.

They consist of a piece of wire encased in a capsule with a terminal at each end. The increase in temperature caused by excessive current flow causes the fuse wire to melt, thereby disconnecting the circuit.

A fuse has the ability to disconnect very large fault currents in a very short time, but once a fuse has blown, it can't be re-used, it needs to be replaced.

Circuit Breakers

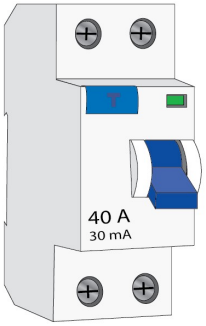
Circuit breakers are also used to protect equipment against excessive currents.



Various types exist that use thermal and/or magnetic tripping mechanisms that disconnects the circuit when excessive current flows. One benefit of a circuit breaker when comparted to a fuse is that it can be re-set after each time it operates.

Residual Current Devices (RCDs)

The purpose of **a** residual current device (RCD) is to protect people from receiving a fatal electric shock.



RCDs consist of a sensing coil and tripping mechanism. The sensing coil activates the tripping mechanism when an imbalance is detected in the outgoing and returning current of the circuit.

An imbalance in current can be caused when part of the circuit current flows through a person instead of returning to the supply. This is called “earth leakage”, as some of the current is leaking out of the circuit.

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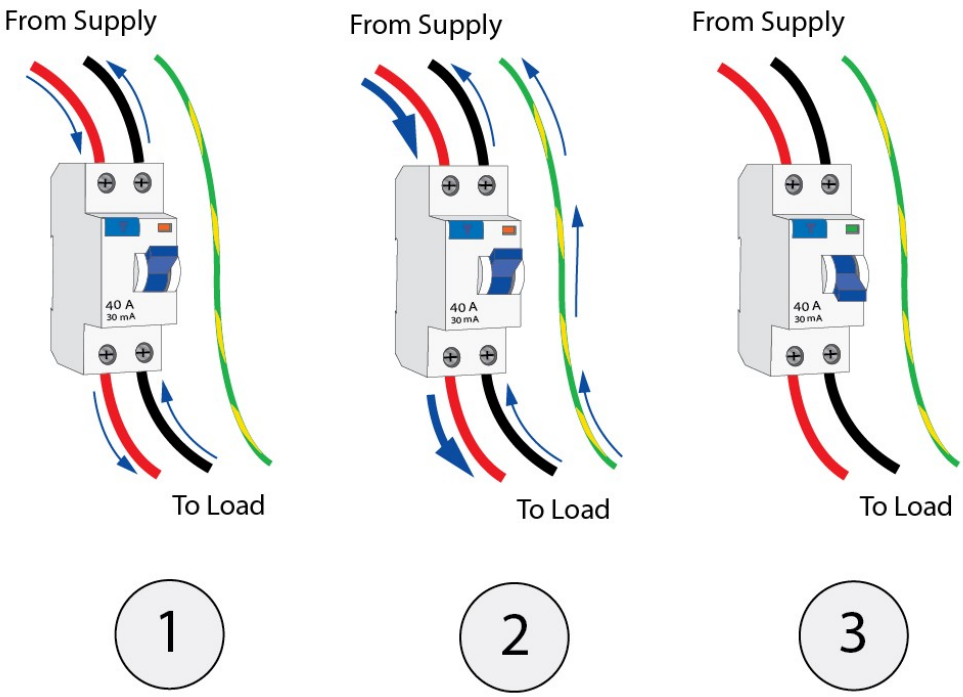


In the diagram above:

- Illustration 1 shows a normally functioning circuit where the current flowing out through the red (active) wire is the same as the current flowing back through black (neutral) wire
- Illustration 2 shows the same circuit where some of the current is leaking to earth, therefore the outgoing current is larger than the returning current
- Illustration 3 shows that the circuit has been automatically disconnected due to the imbalance

An RCD will not prevent an electric shock, but is designed to respond very quickly (within 0.3 seconds), to prevent an electric shock from becoming fatal.

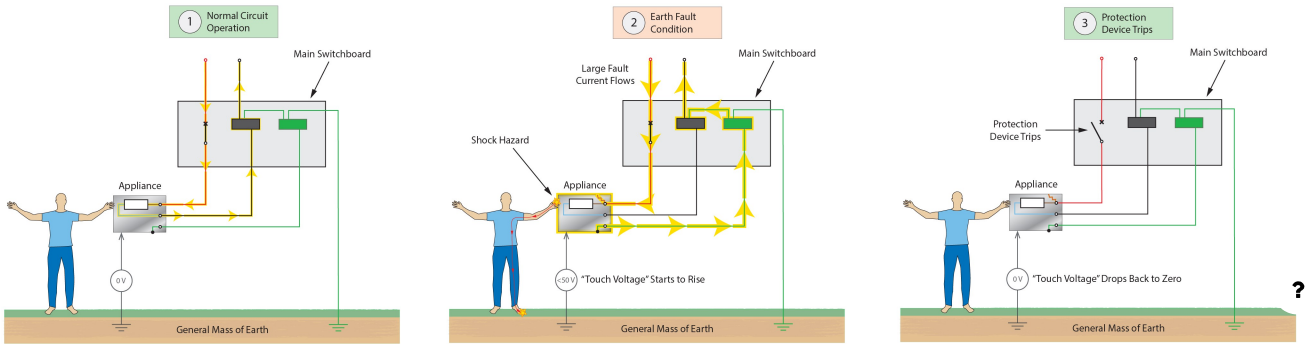
Earthing system

An earthing system is a fundamental part of both the electricity supply network and a consumer's electrical installation. The role of an earthing system is to:

- ensure voltage stability
- ensure that protection devices function correctly
- eliminate the chance of voltages appearing between exposed conductive parts

The earthing system is a network of conductors that connect exposed conductive parts of an installation to a common point, which is then connected to the main neutral supply conductor and to the ground via an earth electrode.

The operation of the system is shown below:



Safe Isolation Procedures

Prior to carrying out work on low voltage equipment, the equipment supply should be isolated and tested to verify isolation. This is of extreme importance in order to reduce the risk of receiving an electric shock.

The only circumstances under which 'live' work is permitted, is when the risk to health and safety will be greater if the equipment is isolated.

The procedure for safe isolation of a circuit is to:

1) Perform a job safety analysis
2) Identify the isolation points
3) Notify the relevant personnel of your intent to isolate
4) Isolate, lock-off and tag isolation points
5) Test to verify isolation
6) Test your tester on a known live source to verify correct operation

<table>
<tr><th colspan="2">Electrical Safety Tags</th></tr>
<tr><th>Front and Back</th><th>Application</th></tr>
<tr><td> 

Personal Danger Tag</td><td>A personal danger tag is used to indicate that a circuit has been isolated so that work can be carried out on the connected equipment. This means that ignoring the tag and energising the circuit is likely to result in a fatal electric shock.

Only the person who affixed the tag has the authority to remove it, or they can authorise another person to do so.

These types of tags are typically affixed to control and protection devices such as isolation switches, circuit breakers and fuse holders.</td></tr>
<tr><td> 

Out of Service Tag</td><td>An out of service tag is used to identify equipment that is damaged, faulty, or should not be used for some other reason. It is intended to ensure that a person does not attempt to operate the equipment.

The person responsible for verifying the serviceability of the equipment removes the tag after any repairs or maintenance has been completed.

It may commonly be seen affixed to faulty appliances such as power tools and machinery, but can be used on any item that is not fit for service.</td></tr>
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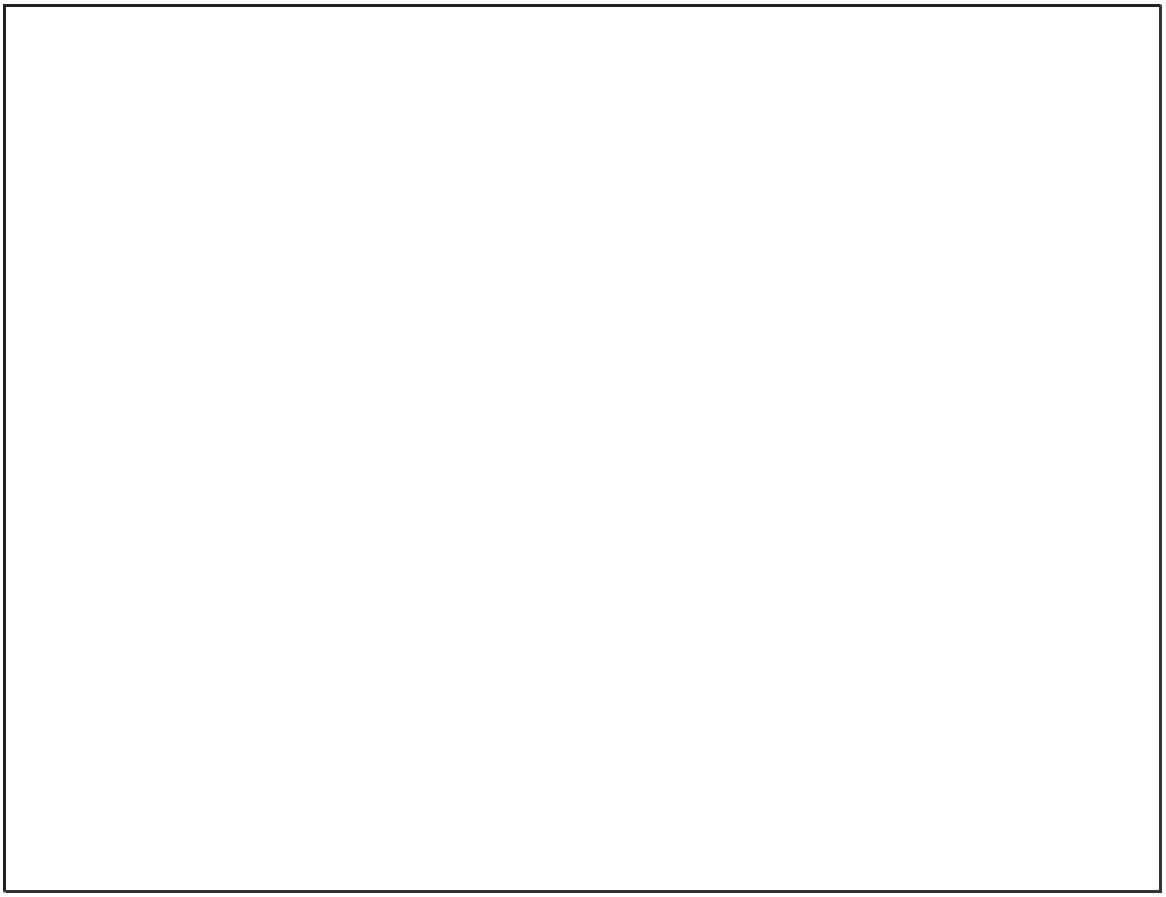
Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity



CONTACT US

This learning activity consists of 4 parts designed to develop your understanding of the precautions taken to minimise electrical risks, protection devices, operation of RCDs and safe isolation procedures.

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Topic 8.2 Learning Activity

In this skills practice, you are required to plan and demonstrate the safe isolation procedures for an electrical circuit or apparatus.

Topic 8.2 Skills Practice

Last modified: Wednesday, 6 January 2021, 10:29 AM

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View

When a person is in contact with live, low voltage electrical equipment it is important to rescue them as quickly as possible, using the correct and safe electric shock rescue procedures.

The basic procedure for rescuing a person in contact with live low voltage electrical equipment is:

1) Assess the situation for danger to yourself and others
2) Isolate the supply to the equipment if possible
3) Where isolation is not possible, use an insulated item, preferably an approved rescue hook, to remove the victim from contact with live parts
4) Administer First Aid to the victim

Electric Shock Rescue Kit

Electric shock rescue kits contain various items specifically for the rescue of persons in contact with energised parts. It is essential to have a recue kit close to hand when undertaking work on or near any energised conductors. The following items would typically be found in a standard low voltage live rescue kit:

- An insulated rescue hook
- Insulated gloves
- A trauma dressing
- A fire blanket
- A torch

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

This learning activity consists of 1 part designed to develop your understanding of electric shock rescue procedures.

Topic 8.3 Learning Activity

In this skills practice, you are required to demonstrate the method for safely removing an electric shock victim from a live electrical situation.

Topic 8.3 Skills Practice

Undertaking this content quiz will help confirm your understanding of the factors affecting the severity of an electric shock, the causes of electrical accidents, the types of protection measures taken to reduce the risks of receiving an electric shock and the safe methods for rescuing a person in contact with live, low voltage electrical equipment.

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Topic 8 Content Quiz

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Last modified: Wednesday, 6 January 2021, 11:01 AM

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View

Introduction

When a person is unconscious, ill or injured in the workplace, it is vital that they receive life saving first aid as quickly as possible. Emergency situations such as heart attacks, choking, drowning, electric shocks or other traumatic injury can occur at any time. Having the knowledge and skill to administer first aid and CPR in the workplace can make all the difference in saving someone's life.

First Aid

First Aid is defined as:

"the initial care of the ill or injured until such a time that a health care professional can reach the scene"

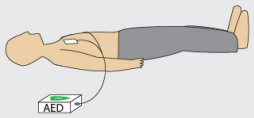
The primary responsibilities of the First Aider are to:

- preserve life
- prevent further injury
- assist recovery
- provide comfort

First Aid Procedures

The First Aid procedures that should be followed at the scene of an accident can be remembered by the acronym DRSABCD (Doctors A-B-C-D), as illustrated below:

?

D	check for **danger** to yourself and others	
R	check for a **response** from the casualty	
S	**send** for help by calling triple zero (000)	
A	check the casualty's **airway** for blockages	
B	check to see if the casualty is **breathing**	
C	perform **cardiopulmonary resuscitation**	
D	use an emergency **defibrillator**	

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Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

CONTACT US

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For more information, try searching the websites provided on this page using keywords such as 'First Aid' or 'DRSABCD'.

This learning activity consists of 3 parts designed to develop your understanding of basic First Aid, including definitions, responsibilities and DRSABCD procedures.

Topic 9.1 Learning Activity



Last modified: Tuesday, 8 March 2022, 12:26 PM

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View

Duty of Care

A duty of care is a legal obligation to provide reasonable care while carrying out a task that could foreseeably cause harm to others.

When a person arrives at the scene of an accident, they have no legal obligation to provide First Aid. Once a decision is made to commence First Aid, however, the First Aider has a duty of care to provide assistance until either another First Aider or a more qualified person takes over.

Consent

Consent from the casualty must be obtained before administering First Aid. If a First Aider proceeds to treat a casualty against their will, they will be vulnerable to legal action from the casualty. If the casualty is unconscious or otherwise unable to communicate their consent, then their consent is assumed under the law.

If the casualty is under 18 years of age, then they are unable to give legal consent. Consent can be obtained from a legal guardian, but if this is not possible, it is acceptable to administer First Aid to preserve life or prevent further injury.

Negligence

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A First Aider can be found to be negligent in the eyes of the law if:

- a duty of care was owed and not met
- the First Aider overreached their abilities

It is important that a First Aider does not attempt to provide care that is beyond their level of training, i.e. obtaining a First Aid Certificate does not give you permission to attempt complex medical procedures.

Records

After administering First Aid at the scene of an accident, it's best to make a brief written record of everything that occurred. This way, if any legal issues arise, you will not need to rely solely on memory, which is a notoriously unreliable source.

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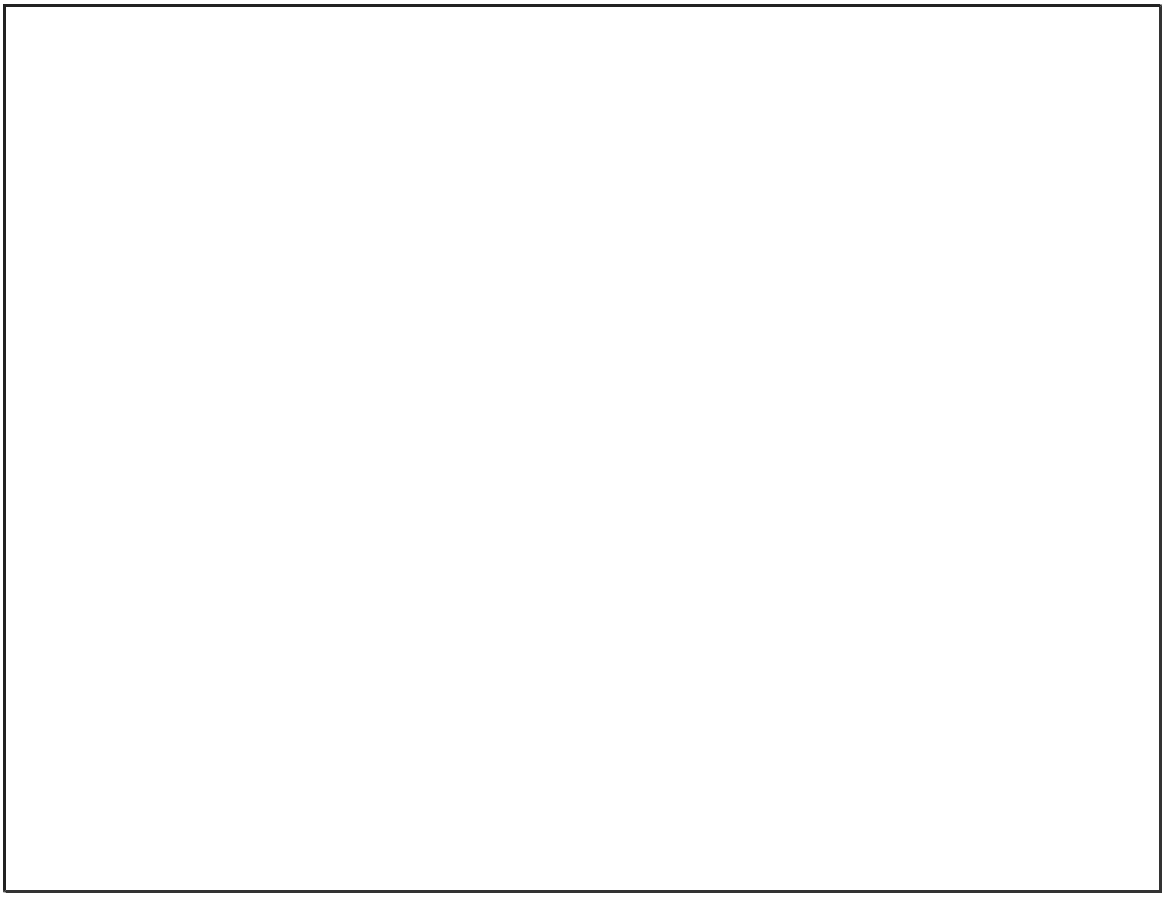
Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity



For more information, try searching the websites provided on this page using keywords such as 'legal' or 'ethical'.

This learning activity consists of 4 parts designed to develop your understanding of the legal and ethical issues surrounding First Aid, including duty of care, consent, and negligence.

Topic 9.2 Learning Activity

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View

Danger

It is highly likely that the scene of an accident may pose risks to the safety of those in the vicinity. Before racing in to provide help, take a look around the area to check for things that could cause harm.

Some types of hazards to look out for include:

- Fire
- Hazardous liquids or gases
- Unstable structures
- Electrical conductors

If a situation poses too high a risk to your own safety, then stay away. Your concern should extend to your own safety first, then to the safety of other bystanders, and then to that of the casualty.

Response

Try to get a response from the casualty by squeezing their shoulders and hands, asking things like:

- "Can you hear me?"
- "What's your name?"
- "Can you feel anything?"

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- "Where does it hurt?"

Make a quick assessment of the casualty's condition, looking for any visual signs of bleeding, burns or broken bones. Try to avoid moving the casualty if spine or neck injuries are suspected (refer to Factsheet from further learning resource table). Where multiple injuries exist, you will need to prioritize treatment based on the risk posed by each; the most life threatening condition should always be treated first.

Levels of Consciousness	
Conscious	Casualty is responsive and can answer basic questions accurately
Semi-conscious	Casualty is delirious, confused and only partially responsive to physical stimulus
Unconscious	Casualty is entirely unresponsive to verbal and physical stimulus

Send for Help

If it is apparent that the casualty requires professional medical attention, call triple zero (000) and request an ambulance. Try to remain calm on the phone and take note of your location so that you can tell the emergency services where to go.

Medical Shock

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Medical shock is a life-threatening condition in which an insufficient supply of blood, and therefore oxygen, is supplied to the body.	
Signs and Symptoms	**Treatment**
• Pale complexion • Cold clammy skin • Disorientation and confusion • Anxiety or irritability • Nausea or vomiting • Thirst and dehydration • Weak and rapid pulse	• Reassure the casualty by telling them they will be ok • Have the patient lay down with their legs raised slightly Note: this should not be done if spinal injuries or snake bite are suspected • Try to control any bleeding by applying compression to the wound • Do not give the casualty any food or drink

Airways

If the casualty is unresponsive, or is having obvious trouble breathing, open the mouth and look for blockages. This might include vomit or foreign bodies that have become lodged in the throat.

If it appears that an object is obstructing breathing, place the casualty in the 'recovery position' and try to dislodge the object with your fingers. If possible, it's a good idea to use disposable gloves to prevent infection and cross-contamination.

Don't leave your fingers in the casualty's mouth any longer than necessary. A fit or seizure could result in contraction of the jaw muscles.

Breathing

When you are satisfied that the casualty's airway is clear, check to see if the patient is breathing. This can be achieved by:

- Looking to see if the casualty's chest is rising and falling
- Listening near the casualty's mouth and nose
- Feeling for air coming from the casualty's mouth or nose

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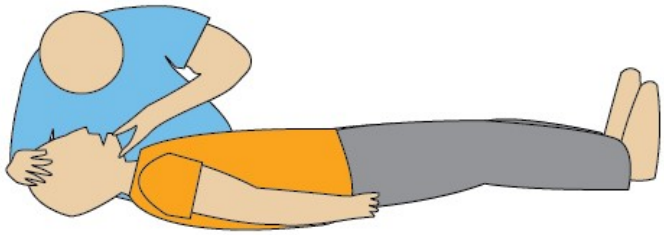


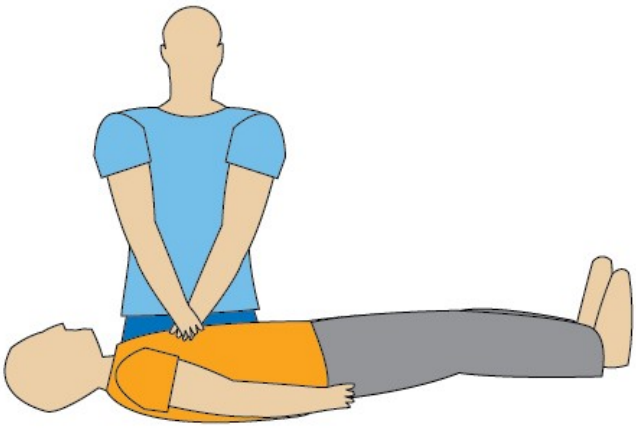
If the casualty is not breathing, cardiopulmonary resuscitation (CPR) should be commenced immediately.

Cardiopulmonary Resuscitation (CPR)

When a person's heart stops pumping blood through the body, they are said to be in cardiopulmonary arrest. When this occurs, the body becomes starved of oxygen and begins shutting down.

Cardiopulmonary resuscitation (CPR) is a process of manually pumping blood around the body of an incapacitated person. The process of CPR involves cycles of:

- Pressing hard, at regular intervals, on the person's chest
- Breathing air directly into the person's mouth



One cycle of CPR consists of **30 compressions followed by 2 breaths**. Note: compressions should be at a rate of approximately 100 per minute.

This is repeated until either:

- The person starts breathing
- Another person arrives to take over
- You become physically unable to continue

It should be noted that performing CPR can be physically taxing, especially for sustained periods. If a second person with adequate training is available, taking turns can provide regular rest intervals for each person.

Defibrillation

An automated external defibrillator (AED) should only be used on a person who is experiencing 'ventricular fibrillation', and can actually be fatal if used in the wrong circumstances. Ventricular fibrillation is when the heart spasms uncontrollably at a fast rate, resulting in ineffectual pumping of blood. Electric shock poses a high risk of ventricular fibrillation.

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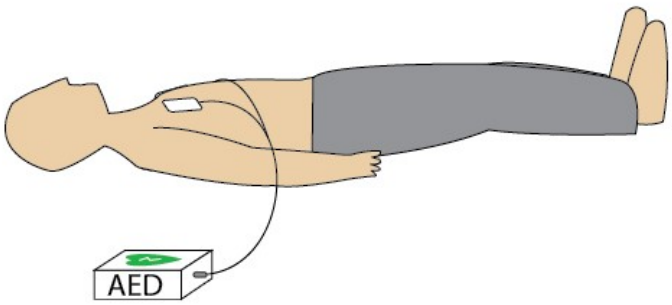

The AED applies a d.c. voltage pulse across two pads or paddles. This actually stops the casualty's heart, after which (hopefully) the natural body regulation of heart rhythms will 're-set' and the heart will start beating normally again.

Check your understanding of the content by clicking the link below then undertaking the activity.

Load the Activity

General Guidance on Treating Injuries

The following table provides some general guidance on the initial treatment of injuries such as lacerations, burns, sprains/strains and fractures.

General Guidance – Treating Injuries		
Type of Injury	**First Aid**	**?**

Burns	• Remove the cause of the burn, if necessary, e.g., extinguish a fire, remove the casualty from contact with the hot object, etc. • Place the burnt area under cool running water for 10 to 15 minutes. • After running under water, placing a sterile gauze over the burn can help to prevent infection until the casualty can receive professional care.
Lacerations	• The first priority is to stop the bleeding, which is done by applying steady pressure to the wound. • When the bleeding is stopped, the wound can be cleaned with antiseptic and covered with a sterile gauze/bandage to prevent infection until the casualty can receive professional care.
Sprains/Strains	• Make sure no further weight is put on the sprain/strain, e.g., don't walk on a sprained ankle. • Apply an ice pack and a compression bandage. The bandage should be firm, but not so tight that it will cut off circulation. • Elevate the injured limb, if possible, ideally above the level of the heart. • The injured limb may need to be rested from several days to weeks depending on the severity of the sprain/strain.
Fractures	• The first step is to immobilise the affected area – it may help to use a sling or splint. • Apply an ice pack and elevate the injured limb if possible. • Get the casualty to a hospital as soon as possible so that the severity of the break can be properly evaluated.

As discussed earlier in this topic, it's important not to attempt to provide a level of care that exceeds your ability. Further guidance on providing first aid can be found in relevant Codes of Practice.

This learning activity consists of 4 parts designed to develop your understanding of the signs and symptoms of various types of injury and illness, as well as approved First Aid and CPR procedures and techniques.

Topic 9.3 Learning Activity

In this skills practice, you are required to demonstrate applying emergency first aid on a person who has suffered an injury and is unconscious.

Topic 9.3 Skills Practice

Undertaking this content quiz will help confirm your understanding of first aid, the legal and ethical issues of providing first aid and the procedures to follow when applying emergency first aid to a person who is ill or injured.

Topic 9 Content Quiz

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