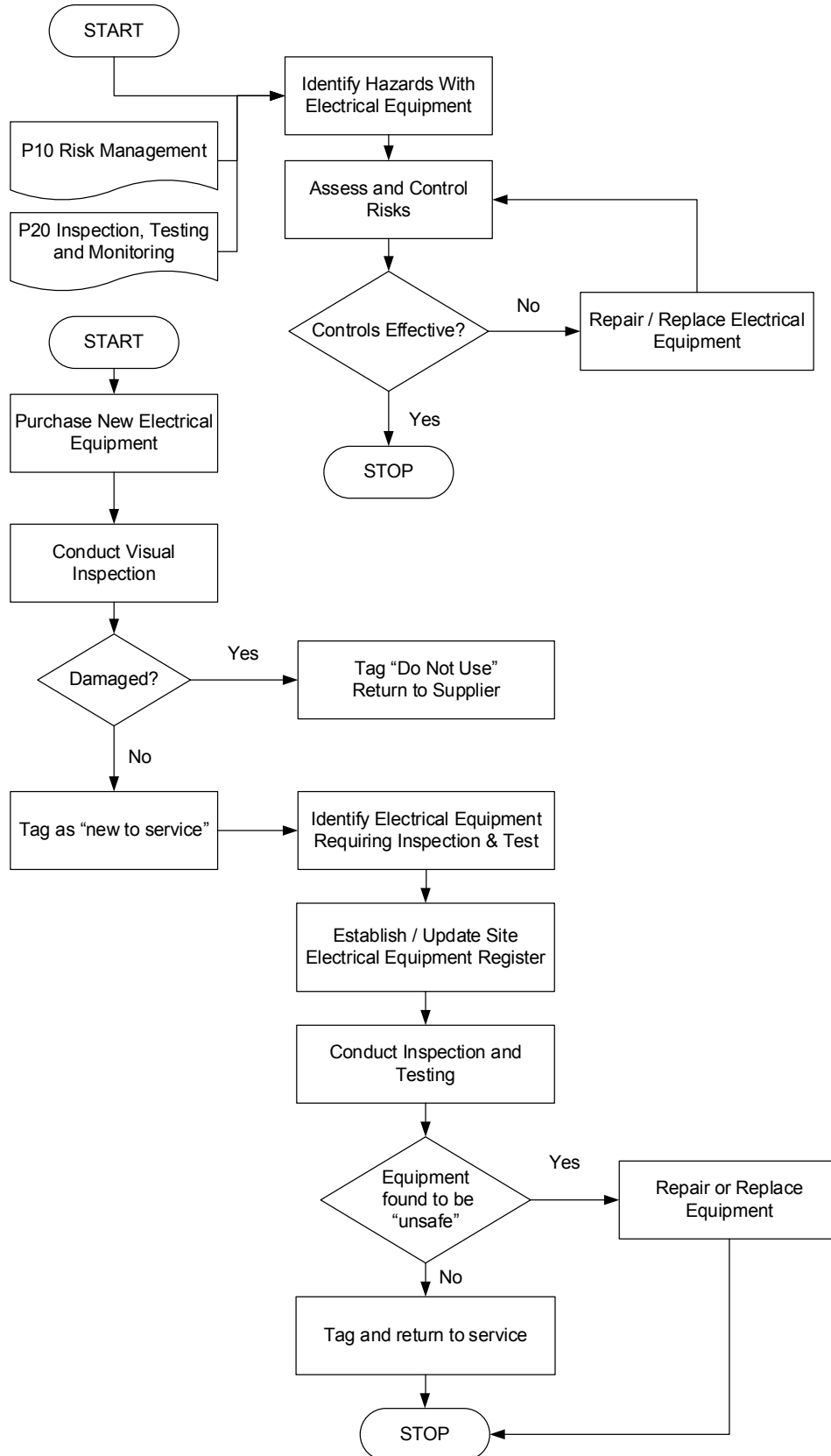


# ELECTRICAL SAFETY

## 1.0 SUMMARY / FLOWCHART



## 2.0 RESPONSIBILITY

Organisational Level	WHS Responsibilities
<b>Level 1</b> ( <i>General Manager, Group Directors</i> )	Ensure, so far as reasonably practicable, that electrical equipment and installations at SCC managed and controlled workplaces are without risks to WHS of workers and others.
	Provide adequate financial, physical and human resources to ensure that any electrical work is undertaken safely, by competent persons, and in accordance with the safe system of work.
	Ensure that appropriate levels of responsibility, authority and accountability are assigned to the relevant personnel necessary for compliance with this procedure.
	Ensure that workers required to undertake electrical work are provided with current and accurate information, instruction and training to carry out this work safely.
	Ensure WHS records generated as a result of the operation of this procedure are maintained.
<b>Level 2</b> ( <i>Section Manager, Unit Manager / Unit Co-ordinator, Project Manager</i> )	Review the effectiveness of any program, procedures and safe systems of work to minimise the risks associated with electrical work.
	Provide adequate financial, physical and human resources to ensure that any electrical work is undertaken safely, by competent persons, and in accordance with the safe system of work.
	Ensure that appropriate levels of responsibility, authority and accountability are assigned to the relevant personnel necessary for compliance with this procedure.
	Ensure that workers required to undertake electrical work are provided with current and accurate information, instruction and training to carry out this work safely.
	Ensure effective Residual Current Devices (RCDs) are used in high risk environments as defined in regulations.
	Ensure WHS records generated as a result of the operation of this procedure are maintained.
	Regularly monitor workers' work activities to ensure compliance with requirements.
	Ensure contractors, volunteers and others are suitably informed of this policy and are trained and qualified to undertake their activities.

<p><b>Level 3</b> (<i>Coordinator within a Unit, Team Leader, Supervisor, Ganger or Leading Hand or Operator</i>)</p>	Ensure this procedure is adhered to in the workplace.
	Ensure that electrical work is undertaken by a Licenced electrician.
	Ensure that workers required to undertake electrical work are provided with current and accurate information, instruction and training to carry out this work safely.
	Ensure WHS records generated as a result of the operation of this procedure are maintained.
	Regularly monitor workers' work activities to ensure compliance with requirements.
	Ensure contractors, volunteers and others are suitably informed of this policy and are trained and qualified to undertake their activities.
<p><b>Level 4</b> (<i>Team Member, Operator Attendant, Trainee, Apprentice</i>)</p>	Consult with Managers / Supervisors prior to bringing personal electrical items into the workplace.
	Visually inspect plug-in type electrical equipment before use and regardless of safety approval tagging, immediately withdraw any faulty equipment or equipment suspected of being faulty, e.g. broken switches, damaged power points, and frayed leads, from service and report it to their Manager / Supervisor to be investigated by an electrician.
	Use an RCD in combination with electrical equipment if the equipment is; <ul style="list-style-type: none"> <li>• Hand held.</li> <li>• Is moved while in operation.</li> <li>• Is moved between operations in circumstances that could result in damage to the article.</li> <li>• Used in construction work.</li> <li>• Exposed to operating conditions that will reduce its expected life span, including exposure to moisture, heat, vibration, mechanical damage, corrosion or dust.</li> </ul>
	If using a RCD always push test before each use (secure tools prior to test).
	Use the correct electrical appliance for the specific task and use only as intended.
	Not use general purpose electrical appliances when wet or in wet areas without suitable safety switches (RCD's).
	Avoid the use of extension leads wherever possible.

	<p>Not use double adaptors or “piggy-back” plugs (an appropriate power board may be used where more than one appliance is required to be connected to a single general power outlet - the load capacity of the general power outlet will not be exceeded).</p>
	<p>Not withdraw a plug from a socket by pulling the cable.</p>
	<p>Do not attempt to replace faulty lamps, tubes or bulbs in light fittings (unless authorised to do so).</p>
<p><b>Level 5</b> (<i>Volunteer, Contractor, Other</i>)</p>	<p>Visually inspect plug-in type electrical equipment before use and regardless of safety approval tagging, immediately withdraw any faulty equipment or equipment suspected of being faulty, e.g. broken switches, damaged power points and leads from service and report it to their Manager / Supervisor to be investigated by an electrician.</p>
	<p>Use an RCD in combination with electrical equipment if the equipment is;</p> <ul style="list-style-type: none"> <li>• Hand held.</li> <li>• Is moved while in operation.</li> <li>• Is moved between operations in circumstances that could result in damage to the article.</li> <li>• Used in construction work.</li> </ul>
	<p>Exposed to operating conditions that will reduce its expected life span, including exposure to moisture, heat, vibration, mechanical damage, corrosion or dust.</p>
	<p>If using a RCD always push test before each use (secure tools prior to test).</p>
	<p>Use the correct electrical appliance for the specific task and use only as intended.</p>
	<p>Avoid the use of extension leads wherever possible.</p>
	<p>Not use double adaptors or “piggy-back” plugs (an appropriate power board may be used where more than one appliance is required to be connected to a single general power outlet - the load capacity of the general power outlet will not be exceeded).</p>
	<p>Not withdraw a plug from a socket by pulling the cable.</p>
	<p>Do not attempt to replace faulty lamps, tubes or bulbs in light fittings (unless authorised to do so).</p>

### 3.0 PURPOSE & SCOPE

#### 3.1 PURPOSE

- 3.1.1 The purpose of this procedure is to provide guidance for the management of the WHS risks associated with electricity in the workplace.

#### 3.2 SCOPE

- 3.2.1 This procedure applies to the following:

- 3.2.1.1 General electrical safety at workplaces under the management and control of SCC.
- 3.2.1.2 Any electrical work carried out in workplaces managed or controlled by SCC.
- 3.2.1.3 Any work undertaken by SCC's workers under or in the vicinity of a network operator's low voltage and / or high voltage power lines.

**Note:** Electrical risks are risks of death, electric shock or other injury caused directly or indirectly by electricity. The most common electrical risks and causes of injury are as follows:

- a) electric shock causing injury or death resulting from direct or indirect contact, tracking through or across a medium, or by arcing. For example, electric shock may result from indirect contact where a conductive part that is not normally energised becomes energised due to a fault, e.g. metal toaster body, fence
- b) arcing, explosion or fire causing burns. The injuries are often suffered because arcing or explosion or both occur when high fault currents are present
- c) electric shock from 'step-and-touch' potentials
- d) toxic gases causing illness or death. Burning and arcing associated with electrical equipment may release various gases and contaminants
- e) fire resulting from an electrical fault.

The risk of electrical fire can arise from situations such as overloaded circuits; loose connections; heating equipment; short circuits; and inappropriate electrical equipment being used in hazardous environments.

Most mains electricity is supplied at 240 volts (50 Hertz). However, some equipment may be powered by a higher voltage (such as 415 volts) or lower (such as 12 volt) systems. Low voltage systems are usually safer by virtue of reducing current flow through the body. Nevertheless, users should be aware that low voltage equipment may still be hazardous in some situations.

## **4.0 PROCEDURE**

### **4.1 GENERAL ELECTRICAL SAFETY IN THE WORKPLACE**

#### **4.1.1 Risk Management**

##### **4.1.1.1 Identification of hazards**

- a) Hazards from electrical equipment arise from:
- b) the design, construction, installation, maintenance and testing of electrical equipment and installations
- c) design change or modification
- d) inadequate or inactive electrical protection
- e) the operation of electrical equipment in an environment likely to cause damage to the equipment
- f) the type of electrical equipment
- g) the age of the electrical equipment or installation
- h) the work undertaken on or near electrical equipment or electrical installations.

4.1.1.2 Hazards are identified in accordance with risk management processes defined within P10 Risk Management and inspection and test processes documented within P20 Inspection, Testing and Monitoring.

4.1.1.3 Hazard identification will be undertaken in consultation with workers and through the following:

- a) regular inspection and testing of electrical equipment and installations by competent personnel
- b) the consideration of the manufacturer's or supplier's instructions
- c) review of incident reports.

4.1.1.4 Assessment of risk associated with the identified hazards

4.1.1.5 The WHS risks associated with electrical equipment and installations will be assessed in accordance with the methodology outlined in P10 Risk Management.

4.1.1.6 The assessment of risk will consider the following:

- a) the severity of the impact of the electrical hazard
- b) how many people may be affected by the hazard
- c) the likelihood of an incident occurring
- d) the frequency of exposure to the hazard
- e) the conditions in which the electrical equipment is used, for example, in wet conditions outdoors or within a confined space
- f) the work practices in place, for example, isolation of electrical equipment prior to maintenance

- g) the capability, skill and experience of relevant workers.
- 4.1.1.7 Control of Risks
- a) Risk control measures will be implemented in accordance with the requirements of P10 Risk Management guided by the “Hierarchy of Controls”, as follows:
- i. Elimination – designing in or designing out certain features, removing the electrical hazard.
  - ii. Substitution - Replacing a hazardous process or material with one that is less hazardous will reduce the hazard, and hence the risk. For example, it may be reasonably practicable to use extra-low voltage electrical equipment such as a battery operated-tool rather than a tool that is plugged into mains electricity.
  - iii. Isolation - Preventing workers from coming into contact with the source of an electrical hazard will reduce the relevant risks.
  - iv. Engineering controls - Use engineering control measures to minimise the risk, for example installing residual current devices to reduce the risk of receiving a fatal electric shock.
  - v. Administrative controls - Administrative controls involve the use of safe work practices to control the risk, for example establishing exclusion zones, use of permits and warning signs.
  - vi. Personal Protective Equipment - PPE includes protective eyewear, insulated gloves, hard hats, aprons and breathing protection. Most forms of PPE are not relevant to minimising electrical risks in workplaces, except in relation to energised electrical work.
  - vii. the implementation and maintenance of risk control measures, including the inspection and testing of electrical equipment, Monitoring and review of risk control measures.
- a) The controls that are put in place to protect WHS will be reviewed regularly to make sure they work effectively.
- b) The following questions will help you evaluate how well you are currently managing electrical risks in your workplace:

- i. Do you talk to your workers about electrical safety?
- ii. Do any relevant new work methods or equipment have the potential to make work safer in your workplace?
- iii. Are procedures for identifying electrical hazards in the workplace effective?
- iv. Are electrical safety procedures followed? Do you encourage your workers to report electrical hazards?
- v. Do you regularly inspect and maintain your electrical equipment to identify safety problems?
- vi. Do you fix or rectify identified electrical hazards in a timely manner?

## **4.2 SPECIFIC HAZARDS AND RISK CONTROLS**

4.2.1 There are a number of things you should do to manage the risks to WHS associated with electrical risks at the workplace including:

4.2.1.1 Ensuring power circuits are protected by the appropriate rated fuse or circuit breaker to prevent overloading.

4.2.1.2 If the circuit keeps overloading, don't increase the fuse rating as this creates a fire risk due to overheating; instead ensure the circuit is not re-energised until the reason for the operation has been determined by a competent person.

4.2.1.3 Arrange electrical leads so they will not be damaged. So far as is reasonably practicable, avoid running leads across the floor or ground, through doorways and over sharp edges, and use lead stands or insulated cable hangers to keep leads off the ground. In many heavy industries, cable protection ramps are used to protect cables.

4.2.1.4 Don't use leads and tools in damp or wet conditions unless they are specially designed for those conditions.

4.2.1.5 Ensure circuits, where portable electrical equipment can be connected, are protected by appropriate RCDs (as required by the WHS Regulations) that are properly tested and maintained.

4.2.1.6 If RCDs, circuit breakers or other over current protective devices including fuses are triggered into operation, ensure circuits are not re-energised until the reason for the operation has been determined by a competent person.

4.2.1.7 Ensure RCDs are effective by regular testing.



### 4.3 USE OF ELECTRICAL EQUIPMENT

- 4.3.1 All users of electrical equipment will ensure:
- 4.3.1.1 Plugs and leads are inspected prior to use.
  - 4.3.1.2 a current test tag is attached to any electrical item used in the workplace.
  - 4.3.1.3 damaged electrical items, equipment suspected of being faulty, or equipment without a current test tag attached are not to be used and:
    - a) a 'Do Not Operate' tag is attached
    - b) the item is removed from service
    - c) arrangements are made to have the item tested and tagged.
  - 4.3.1.4 any electrical equipment that has been tagged with a 'Do Not Operate' tag will not be used and will be removed from service until an appropriately qualified repairer has completed repairs.
  - 4.3.1.5 items requiring testing are available when testing has been scheduled.
  - 4.3.1.6 all low voltage power tools, extension cords, plant and equipment being used are plugged into a portable Residual Current Device (RCD) located as close to the power supply as practicable.  
**Note:** RCD's are to be used when taking supply from a generator.
  - 4.3.1.7 all electrical equipment is visually inspected prior to use.
  - 4.3.1.8 any equipment which fails visual inspection is removed from service, a 'Do Not Operate' tag attached and a supervisor informed to arrange for repair or replacement.

### 4.4 INSPECTION AND TESTING OF ELECTRICAL EQUIPMENT

- 4.4.1 The Section Manager is responsible for ensuring that electrical equipment requiring inspection and testing is identified, inspected and tested by a competent person at a frequency specified within the relevant standards.
- 4.4.2 Electrical items that require testing and tagging are those items of electrical equipment that are used for construction work or used in a hostile operating environment where the safe operation of the electrical equipment could be affected.
- 4.4.3 Controlling officers will ensure that electrical equipment under their control is either:-
- 4.4.3.1 included in SCCs testing and tagging program, or
  - 4.4.3.2 has been assessed as being operated in a non-hostile operating environment.

4.4.4 The following table provides examples of electrical equipment requiring inspection and testing:

Category of equipment	Examples of electrical equipment
Hand held electrical equipment	<ul style="list-style-type: none"> <li>• Hand held power tools</li> <li>• Hairdryers</li> <li>• Commercial kitchen appliances excluding fridges, microwave ovens, and fixed urns in Nowra and Ulladulla Administration tea bays.</li> <li>• Laboratory equipment</li> </ul>
Portable electrical equipment moved while in operation	<ul style="list-style-type: none"> <li>• Floor polishers</li> <li>• Vacuum cleaners</li> <li>• Portable lighting equipment</li> </ul>
Electrical equipment that is moved between operations in such a manner that could damage the flexible power supply lead	<ul style="list-style-type: none"> <li>• Portable electronic whiteboards</li> <li>• Overhead projectors</li> <li>• Laptop computer leads</li> <li>• Welding machines</li> <li>• Power boards</li> </ul>
Electrical equipment that is used in a hostile operating environment where damage to the equipment or the electricity supply to that equipment could occur such as in wet or dusty conditions.	<p>Electrical equipment used in:</p> <ul style="list-style-type: none"> <li>• Wet or dusty areas</li> <li>• Outdoors</li> <li>• Kitchens</li> <li>• Laboratories (damage due to chemicals)</li> <li>• Workshop type environments.</li> </ul>

4.4.5 Electrical equipment requiring inspection and testing is specified within the Work WHS Regulation as being electrical equipment that is:

4.4.5.1 supplied with electricity through an electrical socket outlet, and

4.4.5.2 used in an environment in which normal use of electrical equipment exposes the equipment to operating conditions that are likely to result in damage to the equipment or a reduction in its expected life span, including conditions that involve exposure to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust. These conditions are referred to as a **Hostile Environment**.

4.4.5.3 electrical equipment is moved between different locations in circumstances where damage to the equipment or to a flexible electricity supply cord is reasonably likely,

4.4.5.4 electrical equipment is frequently moved during its normal use,

- 4.4.5.5 electrical equipment forms part of, or is used in connection with, an amusement device.
- 4.4.6 The test and tag program will only apply to items at a height less than 2.5 metres from ground, floor or platforms, and where there is not a reasonable chance of a person coming into contact with the equipment and completing an earth circuit. Both 240V ac single phase and 415V ac poly phase are to be tested.
- 4.4.7 The testing and tagging of electrical equipment will be recorded on a Corporate Electrical Equipment Register.

#### **4.5 TESTING OF NEW ELECTRICAL EQUIPMENT**

- 4.5.1 Electrical equipment will be purchased in accordance with P05 Procurement of Goods. Only Authorised Purchasers are able to purchase and are responsible for ensuring the equipment purchased meets Australian Standards. The supplier will be deemed responsible for the new equipment meeting Australian Standards.
- 4.5.2 New electrical equipment is equipment that has never been put into use (i.e. other than second-hand equipment) does not have to be tested before first use.
- 4.5.3 Brand-new electrical equipment, however, will be visually inspected to ensure that no damage occurred during transport, delivery, installation or commissioning.
- 4.5.4 When the electrical item is received the Authorised Purchaser is responsible for attaching the electrical purchasing tag verifying that the equipment meets Australian Standards and has not been damaged in transit. This tag will allow the item to be used until it is required, if necessary, to be tested. Unless the item will be used in construction work, the initial test should be conducted within 3 months of purchase or within the test frequency of the item.
- 4.5.5 The date the electrical equipment was placed into service is recorded. The electrical equipment may also be fitted with a tag stating:
  - 4.5.5.1 that the equipment is ‘new to service’
  - 4.5.5.2 the date of entry into service
  - 4.5.5.3 the date when the first electrical safety test is due
  - 4.5.5.4 that the equipment has not been tested.
- 4.5.6 A ‘new to service’ tag will be fitted by an appropriately trained in-house person.
- 4.5.7 If the item is to be used in construction work it will be tested and tagged before introduction to service on site.

#### 4.6 PREVIOUSLY TAGGED EQUIPMENT

- 4.6.1 Electrical equipment that is required to be tested, but has not been tested, will not be used.
- 4.6.2 Inspection and testing requirements apply in relation to:
  - 4.6.2.1 certain higher-risk workplaces in which electrical equipment is exposed to operating conditions that are likely to result in damage to the equipment or a reduction in its expected life span
  - 4.6.2.2 construction and demolition sites.
- 4.6.3 These operating environments have the potential to seriously affect the safe operation of electrical equipment. This includes conditions that involve exposing the electrical equipment to moisture, heat, vibration, mechanical damage, corrosive chemicals and dust. Examples include wet or dusty areas, outdoors, workplaces that use corrosive substances, commercial kitchens and manufacturing environments.
- 4.6.4 A risk assessment can help determine whether electrical equipment is being used in any of these operating environments at a particular workplace. A risk assessment may be completed for equipment that has been previously tested and tagged to determine if the frequency of inspection is still relevant.
- 4.6.5 If the risk assessment indicates the item no longer requires on-going testing and tagging, the old tag is to be left on the article and marked with indelible ink, “testing not required - R/A” (Risk Assessment completed). The identification number of the item is to be recorded on the completed risk assessment form which is to be forwarded to the appropriate unit.
- 4.6.6 Testing Intervals for Electrical Equipment
  - 4.6.6.1 Electrical equipment will be inspected and tested at the frequency specified within the following table:

<b>Testing and Inspection Intervals for Electrical Equipment (AS/NZS 3760:2010).</b>					
<b>Type of Environment and or Equipment</b>	<b>Class of Equipment</b>	<b>Residual Current Device (RCDs)</b>			
	<b>Equipment including Class I, Class II equipment, cord sets, cord extension sets and EPOD's (B)</b>	<b>Push- Button test- by User</b>		<b>Operating time and Push Button Test</b>	
		<b>Portable (C)</b>	<b>Fixed (D)</b>	<b>Portable (E)</b>	<b>Fixed (F)</b>
<b>Group 1.</b> Construction and Demolition sites.	Transportable structures, Fixed & construction wiring	Portable Equipment	Daily(or before use)	1 month	3 months
	6 months	3 months			
<b>Group 1.</b> Factories, workshops, places of work or repair, manufacturing, assembly, maintenance or fabrication	6 months	Daily, or before every use, whichever is the longer	6 months	12 months	12 months
<b>Group 2.</b> Environment where the equipment or supply flexible cord is subject to flexing in normal use or is open to abuse or is in a <b>hostile environment</b>	12 months	3months	6 months	12 months	12 months
<b>Group 3.</b> Environment where the equipment or supply cord is NOT subject to flexing in normal use & is not open to abuse & is not a hostile environment	5 years Non hostile environment, no testing required (unless risk assessment indicates otherwise). NSW WHS Regulation Section 150.	3 months	6 months	2 years	2 years
<b>Group 4.</b> Residual type areas of: hotels, residential institutions, motels, boarding houses, halls, hostels accommodation houses, and the like.	2 years	6 months	6 months	2 years	2 years
<b>Group 5.</b> Equipment used for commercial cleaning	6 months	Daily, or before use, whichever is the longer	N/a	6 months	N/a
<b>Group 6.</b> Hire Equipment: a) Inspection b) Test and Tag	Prior To hire	Including push-button test by hirer prior to hire		N/a	N/a
	3 months	N/a		3 months	12 months
<b>Group 7.</b> Repaired, services and second-hand equipment	After repair or service affect electrical safety, or on reintroduction to service, refer to AS/NZS 5762				

#### **4.7 HIRE EQUIPMENT**

- 4.7.1 Persons conducting a business or undertaking hiring out electrical equipment will ensure the equipment is inspected at the commencement of each hire and tested every three months.
- 4.7.2 The person conducting a business or undertaking using the electrical equipment hired out will ensure that, for the period of the hire, the equipment meets all applicable inspection and testing requirements under the WHS Regulations and this Code.

#### **4.8 UNSAFE ELECTRICAL EQUIPMENT**

- 4.8.1 Electrical equipment or an electrical installation identified as being unsafe or believed to be unsafe will be disconnected from the supply of electricity, tagged and isolated in accordance with Isolation procedures P12 Managing Plant. Electrical equipment may be found to be unsafe or suspected of being unsafe during normal operation or as a result of the testing and tagging process.
- 4.8.2 Electrical equipment disconnected from the supply of electricity and isolated will not be reconnected until tested and found to be safe or repaired and verified as safe.
- 4.8.3 Electrical equipment that cannot be repaired will be replaced and/or permanently removed from use.

#### **4.9 USE OF UNTESTED ELECTRICAL EQUIPMENT**

- 4.9.1 Electrical equipment required to be inspected and tested, and has not been inspected and tested by the test due date, will not be used. This equipment will be tagged and isolated until inspected and tested.

#### **4.10 COMPETENCY REQUIREMENTS FOR INSPECTION AND TESTING OF ELECTRICAL EQUIPMENT**

- 4.10.1 SCC will ensure that inspection and testing of electrical equipment is carried out by a person who has acquired, through training, qualification or experience, the knowledge and skills to carry out the task (i.e. be a 'competent person').
- 4.10.2 The person carrying out any testing of electrical equipment will also be competent to interpret the test results of any equipment they use. For example, a person carrying out testing under AS/NZS 3760:2010 will be:
  - 4.10.2.1 a licensed electrician or a person who has successfully completed a structured training course and been deemed competent in the use of a pass-fail type portable appliance tester and the visual inspection of electrical equipment.

- 4.10.2.2 The training should be designed to ensure, so far as is reasonably practicable, that upon completion successful participants:
- a) can use the relevant test equipment safely and effectively
  - b) understand electrical risks and appreciate the role that inspection and testing plays in ensuring electrical safety
  - c) understand AS/NZS 3760:2010 and AS/NZS 3012:2010 (if testing equipment for construction or demolition sites)
  - d) understand the legal requirements relevant to the work.
- 4.10.2.3 Some kinds of electrical testing must only be carried out by a licensed electrician or electrical inspector under local electrical safety laws. For example, testing requiring the dismantling of electrical equipment should only be carried out by a licensed electrician.
- 4.10.2.4 Additional or different competencies may be required for more complex kinds of testing outside the scope of AS/NZS 3760:2010.
- 4.10.2.5 If in doubt, advice should be obtained from a person qualified and experienced in electrical equipment testing, for example an electrician, electrical contractor, electrical inspector, specialist testing provider or relevant regulator.

#### 4.11 WORKING ON ELECTRICAL INSTALLATIONS - SAFETY MEASURES – CERTIFICATE OF COMPLIANCE

- 4.11.1 All electrical installation work will be carried out in accordance with AS/NZS 3000 Electrical installations.
- 4.11.2 Electrical Testing and Fault Finding on or near Live Conductors  
**Note:** Where practicable, fault finding will be undertaken with the energy supply isolated, utilising de-energised testing methods.
- 4.11.2.1 Electrical testing will be conducted in accordance with Code of Practice for Managing Electrical Risks in the Workplace 2015 and AS/NZS 3000 Electrical installations and will satisfy the following specific requirements of the WHS Regulation 2011.
- 4.11.2.2 Managers, Supervisors, SCC's electricians and licensed electrical contractors working on behalf of SCC will ensure that testing and fault finding on an electrical installation, at a place of work, is carried out using a safe system of work.
- 4.11.2.3 Managers, Supervisors, SCC's electricians and licensed electrical contractors working on behalf of SCC will

ensure that if a fault cannot be found with the energy supply isolated and live testing methods have to be used, that the work is undertaken as follows:-

- a) The work is undertaken in accordance with an approved safe work method statement, or similar document, and
- b) Any test equipment, tools and accessories appropriate to do the work have been provided and are properly maintained, and those doing the work make proper use of the equipment, and
- c) The persons doing the work are appropriately qualified and trained in the approved safe work method, including the use of test equipment, tools, accessories, and have the approved personal protective equipment and are instructed in the particular task, and
- d) The work is undertaken in the presence of a safety observer when the Safe Work Method Statement, or similar, requires it.

#### **4.12 REPAIR AND MAINTENANCE OF ELECTRICAL INSTALLATIONS**

**Note:** Managers and Supervisors will ensure that electrical work on electrical installations and apparatus is not carried out while the installation or apparatus is “LIVE”, excluding emergency situations. (i.e. the risk of harm is greater if the system is de-energised.)

- 4.12.1 Before starting work on Electrical Installations and Apparatus Managers, Supervisors, SCC’s electricians or licensed electrical contractors will ensure the electricity supply is isolated.
- 4.12.2 Isolating electrical installations and or apparatus means disconnecting from all possible sources of electrical energy by opening switches, withdrawal of circuit breakers, removal of fuses, connections and being rendered incapable of being unintentionally energised. (Refer to SCC Isolation Requirements).

#### **4.13 LEAVING UNFINISHED ELECTRICAL WORK**

- 4.13.1 Unfinished work will be left in a safe condition in accordance with managing electrical risks in the workplace: Code of practice 2015 and AS/NZS 3000 Electrical installations.
- 4.13.2 If work is left unfinished, the workplace will be left in a safe state including, for example, by:
  - 4.13.2.1 terminating any exposed conductors
  - 4.13.2.2 physically securing any exposed conductors or surrounding metal work
  - 4.13.2.3 tagging, taping off the electrical equipment and the workplace area



- 4.13.2.4 informing affected persons at the workplace the work is not complete and advising of potential hazards
- 4.13.2.5 taking any necessary precautions to ensure that electrical equipment cannot become inadvertently re-energised
- 4.13.2.6 ensuring that the status of switchboards and electrical equipment are clearly and correctly labelled
- 4.13.2.7 handing over adequate information to workers taking up the unfinished work to allow them to continue the work safely.

#### **4.14 EMERGENCY SITUATIONS**

- 4.14.1 Live electrical work on electrical installations will be allowed only when de-energising the circuits and electrical apparatus could pose significant risks, greater than the risks of leaving the system energised. Only in an emergency situation will electrical work on an electrical installation be carried out while the installation's circuits and apparatus are energised and the following measures are implemented:
  - 4.14.1.1 Before starting work, a written risk assessment has been completed in consultation with the persons doing the work , and
  - 4.14.1.2 The work is undertaken in accordance with an approved safe work method statement, and
  - 4.14.1.3 The persons doing the work are appropriately qualified and trained in the approved safe work method, including the use of test equipment, tools, accessories, and have the approved personal protective equipment and been instructed in the particular task, and
  - 4.14.1.4 The correct clothing and personnel protective equipment has been provided and those doing the work make proper use of this clothing and equipment, and
  - 4.14.1.5 Test equipment, tool and accessories appropriate to do the work have been provided, properly maintained, and those doing the work make proper use of the equipment, and
  - 4.14.1.6 The isolation point of the electricity supply for the work has been clearly identified and is able to be operated quickly without the need to climb over or shift obstructions, and
  - 4.14.1.7 The work area is clear of obstructions so as to enable quick and safe entry and egress, and
  - 4.14.1.8 There is appropriate access controls to prevent entry to the work area by unauthorised persons, and
  - 4.14.1.9 The work is undertaken in the presence of a safety observer who is competent in the procedure being

observed and competent in electrical rescue and cardiopulmonary resuscitation.

#### **4.15 MAINTENANCE**

- 4.15.1 Before cleaning or servicing electrically operated equipment, the following isolation procedures will be observed:
  - 4.15.1.1 Switch off and de-energise the equipment; and
  - 4.15.1.2 Switch off at the socket-outlet; and
  - 4.15.1.3 Pull out the plug, as a precaution against switch failure; and
  - 4.15.1.4 Before operating equipment after maintenance, ensure that all flammable/combustible substances are removed cleaning solvents and vapours have been removed from inside the equipment.

#### **4.16 EXCAVATION**

- 4.16.1 If excavation work is to be carried out on SCC managed or controlled workplaces, the Manager / Supervisor will take all reasonable steps to obtain current information regarding the location of underground services.
- 4.16.2 The Manager / Supervisor will make this information available to any worker engaged to carry out the excavation work.

#### **4.17 WORKPLACE IN CLOSE PROXIMITY TO OVERHEAD ELECTRICAL POWER LINES**

- 4.17.1 P18.F01 Working Near Overhead Power Lines – Risk Assessment Checklist
  - 4.17.1.1 A Risk Assessment will be conducted at the planning stage, before commencing work at a work-site with a crane or other plant. The risk assessment will identify the presence of overhead power lines and the potential for contact or encroachment to within specified clearance distances.

Prior to commencing work within 3 metres of overhead power lines, an accredited/ qualified person will complete a P18.F01 Working Near Overhead Power Lines – Risk Assessment Checklist. The Risk Assessment Checklist will be issued by a Certified Person only after all hazards have been identified and associated risks assessed and controlled.
  - 4.17.1.2 P18.F01 Working Near Overhead Power Lines – Risk Assessment Checklist will be completed in consultation with workers and may include representatives of the network operator, if required. This process will determine

the level of risk associated with the identified hazards and establish a priority list for the implementation of controls based on the level of risk.

#### 4.17.2 Assessing Approach Distances

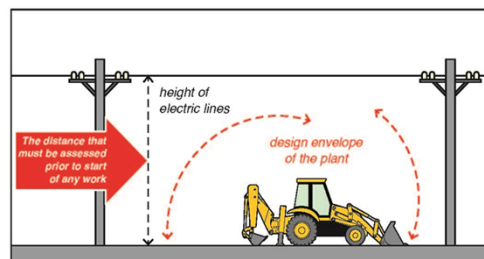
4.17.2.1 Prior to the start of any work near overhead power lines the height and voltage of the overhead power lines (and if applicable the horizontal safety clearance) be assessed at the worksite.

4.17.2.2 The height of overhead power lines is traditionally measured with a height measuring rod or, if available, an appropriate electronic device. This measurement is taken at the lowest sag point of the power lines.

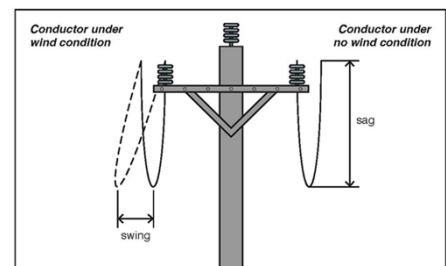
4.17.2.3 The person taking the measurement must be trained, and a trained safety observer must also be present.

4.17.2.4 A number of factors will be taken into account when assessing the relevant approach distances for the work. This includes the possibility of errors in estimating distances, especially at higher voltages, where the approach distance is large. It may be necessary to allow more clearance or to use methods that provide more accurate estimation of distances, for example, an ultrasonic cable height indicator. If the height or voltage of the overhead power lines cannot be accurately determined, consult the network operator.

4.17.2.5 Figure 1 diagrammatically shows the considerations required when accessing clearance distances.



**Figure 1:** Distance that must be assessed for each worksite

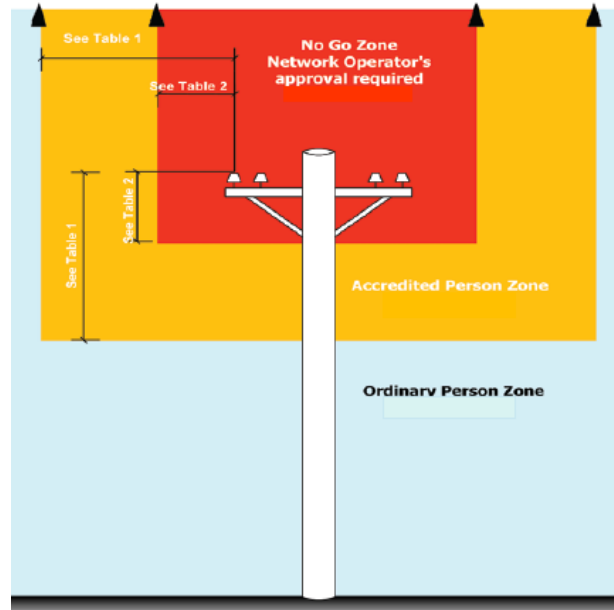


**Figure 2:** Illustration of overhead power line 'sag' or 'swing'

4.17.2.6 Overhead power lines are made of metal and are therefore subject to expansion and contraction when heated and cooled. This is a direct result of high ambient air temperatures and/or excessive electrical load current passing through the conductors. Regardless of the cause, any expansion will result in gravity causing the power lines to sag downwards. Wind will cause the power lines to swing from side to side. For this reason the approach distances will be increased either vertically or horizontally

by the amount of conductor sag or swing at the point of work, as shown in Figure 2.

- 4.17.2.7 Once an assessment has been carried out of the worksite and the overhead power lines, a decision can be made on the approach distance for the proposed work.



**Figure 3:** Approach distances and work zones in the vicinity of overhead power lines.

4.17.2.8 Ordinary Person Zone

- a) Table 1 provides approach distances for:
- i. ordinary persons performing work near overhead power lines (including plant, hand tools, or other equipment held by a person).
  - ii. cranes and their loads and items of mobile plant operated by an ordinary person near overhead power lines.

**Table 1: Approach Distances for Work Performed by Ordinary Persons**

Nominal phase to phase a.c. voltage (volts)	Approach Distance (m)
Up to and including 132,000	3.0
Above 132,000 up to and including 330,000	6.0
Above 330,000	8.0
Nominal pole to earth d.c. voltage (volts)	Approach distance (m)
Up to and including +/- 1500 volts	3.0

**4.17.2.9 Accredited Person Zone**

- a) Table 2 provides approach distances for:
- i. accredited persons, with a safety observer who are performing work near overhead power lines (including plant, hand tools, or other equipment held by a person).
  - ii. cranes and their loads and items of mobile plant operated by accredited persons, with a safety observer who are performing work near overhead power lines.

**Table 2: Approach Distances for work performed by Certified Persons, with a Safety Observer**

<b>Nominal phase to phase a.c. voltage (volts)</b>	<b>Approach Distance (m)</b>
Insulated low voltage cables up to 1000, including LV ABC	0.5
Un-insulated low voltage conductors up to 1000	1.0
Above 1000 up to and including 33,000	1.2
Above 33,000 up to and including 66,000	1.4
Above 66,000 up to and including 132,000	1.8
Above 132,000 up to and including 220,00	2.4
330,000	3.7
500,000	4.6
<b>Nominal pole to earth d.c. voltage (volts)</b>	<b>Approach distance (m)</b>
Up to +/- 1,500	1.0

**4.18 TRAINING REQUIREMENTS FOR WORKERS UNDERTAKING WORK NEAR OVERHEAD POWER LINES**

- 4.18.1 Advice, training and support will be provided to SCC’s Managers, Supervisors, and Workers when required from the Training and Development and the WHS and Risk Units.
- 4.18.2 In order to carry out crane and mobile plant operations as specified Table 2, the following personnel will be accredited with working near overhead power lines training:
- 4.18.2.1 crane operators (including operators of mobile cranes and vehicle loading cranes);
  - 4.18.2.2 mobile plant operators (including truck operators engaged in tipping loads, restraining loads or any other associated work);
  - 4.18.2.3 high load transportation vehicle operators; and safety observers.

- 4.18.3 Managers and Supervisors will ensure that workers, including contractors, are suitably trained when required to work within nominated distances to overhead power lines.
- 4.18.4 The Training and Development Unit will schedule and program relevant Working Near Overhead Power Lines training as requested. Training program content will consider the trade, job tasks and function undertaken by personnel. Programs will be delivered in accordance with P09 Safety Training and be sufficiently detailed to ensure that the employee understands the procedural and safety requirements.
- 4.18.5 Records of all training, refresher training certification, licensing and competency assessments will be maintained by the Training and Development Unit.

#### **4.19 SAFETY OBSERVER**

- 4.19.1 The designated ganger or supervisor will be responsible for appointing a safety observer.
- 4.19.2 The safety observer will:
  - 4.19.2.1 be a person certified in these work practices;
  - 4.19.2.2 be positioned in a suitable location to observe the approach of the crane, plant, or load to the overhead power lines;
  - 4.19.2.3 be able to warn the operator in sufficient time to ensure all clearances as prescribed are maintained;
  - 4.19.2.4 not be required to observe more than one crane or item of plant at any period of observance;
  - 4.19.2.5 hold a current Resuscitation (EAR, CPR) Accreditation;
  - 4.19.2.6 have certification in Low Voltage Escape, Release and Rescue;
  - 4.19.2.7 inspect all Escape, Release and Rescue Equipment prior to commencing work;
  - 4.19.2.8 withdraw any defective release and rescue item identified from service;
  - 4.19.2.9 not carry out any other duty during the period of observance; and.
  - 4.19.2.10 continue to monitor the work activity being carried out; and
  - 4.19.2.11 have the authority to suspend the work at any time.

#### **4.20 RESCUE REQUIREMENTS**

- 4.20.1 The accredited person will obtain an Electrical Rescue Kit from SCC Stores before undertaking this work and check that:
  - 4.20.1.1 the contents are as per the content list;
  - 4.20.1.2 the equipment is in serviceable order; and
  - 4.20.1.3 the inspection tag is current.
- 4.20.2 When on site, the Electrical Rescue Kit will be kept in a safe area in close proximity to the work at all times. If booked out for short term work, the Electrical Rescue Kit will be returned to Stores on completion of the job.
- 4.20.3 Managers, Supervisors and Operators will ensure compliance with these requirements.

#### **4.21 RECORDS**

- 4.21.1 all records generated as a result of the operation of this procedure will be managed in accordance with the requirements documented within P04 Document Control And Safety Records.

### **5.0 REFERENCES & ASSOCIATED DOCUMENTS**

- 5.1** Work WHS Act 2011
- 5.2** Work WHS Regulation 2011
- 5.3** How to manage work WHS risks: Code of practice 2011
- 5.4** Work WHS consultation, cooperation and coordination: Code of practice 2011
- 5.5** Managing electrical risks in the workplace: Code of practice 2015
- 5.6** Work Near Overhead Power Lines - WorkCover Code of practice 2006
- 5.7** General guide for working in the vicinity of overhead and underground electric lines – Safe Work Australia
- 5.8** AS 2550.1-2011 Cranes, hoists and winches – Safe Use - General requirements
- 5.9** AS/NZ 3000:2007 (Amended) Electrical installations: buildings, structures and premises (known as the Australian / New Zealand Wiring Rules)
- 5.10** AS/NZS 3760:2010 (Amended) In-service safety inspection and testing of electrical equipment
- 5.11** AS/NZS 3012:2010 Electrical installations – Construction and demolition sites
- 5.12** AS/NZS 3190:2011 Approval and test specification – Residual current devices (current-operated earth leakage devices)
- 5.13** National Self-Insurer OHS Audit Tool 2014
- 5.14** P04 Document Control and Safety Records

- 5.15 P10 Risk Management
- 5.16 P20 Inspection, Testing, Monitoring and Health Surveillance
- 5.17 P18.F01 Working Near Overhead Power Lines – Risk Assessment Checklist

## APPENDIX 1 DEFINITIONS

<b>Accredited Persons (Electrical Work)</b>	A competent person authorised by SCC to access electrical installations.
<b>Class I Equipment (basic insulated, protectively earthed equipment)</b>	Equipment in which protection against electric shock does not rely on basic insulation only. But which includes an additional safety precaution, in that accessible parts are connected to the protective earthing conductor in the fixed wiring of the installation in such a way that those accessible parts cannot become live in the event of a failure of the basic insulation.
<b>Class II Equipment (double insulated equipment)</b>	Equipment in which protection against electric shock does not rely on basic insulation only. But, in which additional safety precautions such as double insulation or reinforced insulation are provided, there being no provision for protective earthing or reliance upon installation conditions.
<b>Licensed Electrician</b>	A person who is the holder of a Qualified Supervisor Certificate/Electrician as defined under the Building Service Corporation Act, 1989.
<b>Certified Person (Overhead Powerlines)</b>	A Certified person is authorised to issue a Risk Assessment Checklist – Working Near Overhead Power Lines and holds the position of Supervisor or higher.
<b>Competent Person (Testing &amp; Tagging)</b>	A person who has successfully completed the SafeWork approved course offered by TAFE called “Safety Checking of Electrical Appliances”.
<b>Cord Extension Set (extension lead)</b>	An assembly of a plug intended for connection to a mains socket outlet, a sheathed flexible cord and a cord extension socket.
<b>Electric Portable Outlet Device (EPOD) (power board)</b>	A device, other than a cord extension set, having a single plug intended for connection to a mains outlet socket, a sheathed flexible cord and an assembly of one or more outlet sockets. It may incorporate a reeling or coiling arrangement.
<b>Electrical Equipment / Appliance</b>	Electrical equipment means any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire that: <ul style="list-style-type: none"> <li>• is used for controlling, generating, supplying, transforming or transmitting electricity at a voltage greater than extra-low voltage, or</li> <li>• is operated by electricity at a voltage greater than extra-low voltage, or</li> </ul>



	<ul style="list-style-type: none"> <li>• is part of an electrical installation located in an area in which the atmosphere presents a risk to WHS from fire or explosion, or</li> <li>• is, or is part of, an active impressed current cathodic protection system within the meaning of AS 2832.1:2004 (Cathodic protection of metals—Pipes and cables)</li> <li>• Excludes; Motor vehicles</li> </ul>
<b>Electrical Inspection Tag</b>	A tag indicating the piece of equipment has been tested to AS/NZS 3760:2010.
<b>Electrical Installation</b>	<p>Means any appliances, wires, fittings or other apparatus placed in, on, under or over any premises and used for purposes incidental to the conveyance, control and use of electricity supplied or intended to be supplied by an electricity supply authority, but does not include:</p> <ul style="list-style-type: none"> <li>• Any electricity supply main or service line of an electricity supply authority, or</li> <li>• Any appliances, wires, fittings, luminaries or other apparatus connected to and extending or situated beyond any electrical outlet socket: (i) that is installed for the purpose of connecting portable electrical appliances, fittings or other apparatus, and (ii) at which fixed wiring terminates, or</li> <li>• Any appliances, wires, fittings or other apparatus that are: (i) placed in, on or over any premises owned or occupied by an electricity supply authority, and (ii) used for the generation, transmission or distribution of electricity, or</li> <li>• Any electrical installation operating at not more than 32 volts alternating current or 115 volts direct current.</li> <li>• Any electricity supply main or service line of an electricity supply authority, or</li> </ul>
<b>Emergency Work</b>	<p>Electrical work means:</p> <ul style="list-style-type: none"> <li>• connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment</li> <li>• installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical installation.</li> </ul>
<b>Extra Low Voltage(ELV)</b>	Voltage not exceeding 50V ac, or 120V ripple free dc (refer AS 3000).
<b>Flexible Cord</b>	A flexible cable, no wire of which exceeds 0.31 mm diameter and no conductor of which exceeds 4mm <sup>2</sup> cross-sectional area, and having not more than five cores.

<b>Hand Held Portable Electrical Equipment</b>	Portable equipment which is grasped in the hand during normal use, including cords and plugs connecting to the equipment, e.g. hand held tools, portable lights.
<b>Hostile Operating Environment</b>	An operating environment at a place of work where an item of electrical equipment is, in its normal use, subject to operating conditions that are likely to result in damage to the item of equipment. This includes an operating environment that may: <ul style="list-style-type: none"> <li>• Cause mechanical damage to the item of equipment or expose the item of equipment to moisture, heat, vibration, mechanical damage, corrosive substances or dust that is likely to result in damage to the item of equipment.</li> <li>• And includes electrical equipment used in wet or dusty areas, outdoors, commercial kitchens, workplaces using corrosive substances and factory-type environments including assembly, fabrication, manufacturing, refurbishment or repair.</li> </ul>
<b>Isolation of plant</b>	Lock out, quarantine or other means by which plant and equipment is removed from its source of energy, and thereby prevented from being inadvertently operated.
<b>Low Voltage</b>	Exceeds extra low voltage (ELV), but not exceeding 1000V ac or 1500V dc.
<b>Mains Powered Portable Electrical Equipment</b>	Readily movable electrical appliances usually having a flexible supply cable and connected to a source of supply by means of a plug and socket outlet. This includes the equipment itself with all accessories, its flexible cable and the plug that connects it to the supply. e.g. Extension cords, welders, portable pumps, portable generators, power boards, and portable computers.
<b>Near</b>	Encroaching within 3 metres of power lines. Where there is a reasonable possibility of a person, either directly or through any conducting medium, coming closer to power lines than the approach distances specified in this procedure.
<b>Network Operator</b>	The owner, controller or operator of an electricity network (also known as electricity supply authority).
<b>Person Conducting a Business or Undertaking (PCBU)</b>	<ul style="list-style-type: none"> <li>• A person conducts a business or undertaking: <ul style="list-style-type: none"> <li>– whether the person conducts the business or undertaking alone or with others, and</li> <li>– whether or not the business or undertaking is conducted for profit or gain</li> </ul> </li> <li>• A business or undertaking conducted by a person includes a business or undertaking conducted by a partnership or an unincorporated association.</li> <li>• If a business or undertaking is conducted by a partnership (other than an incorporated partnership), is a reference in the WHS Act (WHS) to a person conducting the business or undertaking is to be read as a reference</li> </ul>

	<p>to each partner in the partnership.</p> <ul style="list-style-type: none"> <li>• A person does not conduct a business or undertaking to the extent that the person is engaged solely as a worker in, or as an officer of, that business or undertaking.</li> <li>• An elected member of a local authority does not in that capacity conduct a business or undertaking.</li> <li>• The regulations may specify the circumstances in which a person may be taken not to be a person who conducts a business or undertaking for the purposes of the WHS Act or any provision of WHS Act.</li> <li>• A volunteer association does not conduct a business or undertaking for the purposes of this WHS Act.</li> <li>• Volunteer association means a group of volunteers working together for one or more community purposes where none of the volunteers, whether alone or jointly with any other volunteers, employs any person to carry out work for the volunteer association.</li> </ul>
<p><b>Residual Current Devices (RCDs)</b></p>	<p>Also known as earth leakage circuit breakers (ELCB's), are relay switches that measure current going through the active wire into a device, such as a power tool, and leaving it through the neutral wire. When the current becomes diverted by being earthed (through a worker holding the tool, for instance) the RCD reacts to the electrical imbalance and cuts off the electricity within .03 of a second. RCDs are recommended for use with all portable or hand-held power tools and extension leads. They are now mandatory as permanent meter box fixtures for all new domestic installations, and on all construction sites under NSW regulations.</p>
<p><b>Safety Observer / Spotter</b></p>	<p>A Certified Person specifically assigned the duty of observing and warning against unsafe approach of the crane or any other plant, its lifting attachments or its load, to overhead power lines and associated electrical apparatus.</p>
<p><b>Training</b></p>	<p>A structured system of training ensures individuals receive appropriate and relevant WHS information, instruction and supervision and are assessed as competent by a qualified person before they are expected to carry out the responsibilities of their job.</p>
<p><b>Workers</b></p>	<p>SCC's employees, contractors, and labour hire personnel.</p>