SECTOR BRIEFING

TRANSPORT HERITAGE NSW

Electricity

Your organisation has a legal obligation to provide and maintain a safe environment for your volunteers, customers, and visitors – you can read more on this in the previous Sector Brief – Safety Responsibility and Accountability.

Under the Duty of Care requirements, you should have in place processes to identify, control, and monitor risk. See Sector Brief – Managing Safety Risk. A specific risk for workers and visitors to your site is electricity. This sector briefing covers identifying and controlling the risks associated with electricity.

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

- Electric shock causing injury or death. The electric shock may be received by 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 (such as a metal toaster body or a fence) becomes energised due to a fault.
- Fire (such as fire resulting from an electrical fault), arcing or explosion causing burns. These injuries are often suffered because arcing, explosion or both occur when high fault currents are present.
- Electric shock from 'step-and-touch' potentials[1].
- Toxic gases causing illness or death. Burning and arcing associated with electrical equipment may release various gases and contaminants.

IMPORTANT

Even the briefest contact with electricity at 50 volts for alternating current (V a.c.) or 120 volts for direct current (V d.c.) can have serious consequences for a person's health and safety. High voltage shocks (involving more than 1000 V a.c. or 1500 V d.c.) can cause contact burns and damage to internal organs. Electric shocks may also lead to other injuries, including falls from ladders, scaffolds or other elevated work platforms. Workers using electricity may not be the only ones at risk—faulty electrical equipment and poor electrical installations can lead to fires that may also cause death or injury to others.

1) Risks associated with electricity

Predominantly, the risks associated with electricity fall into two hazard areas for rail heritage sector groups:

- Installing/maintaining electrical equipment. i.e., completing electrical work
- Using electrical equipment

The likelihood of the of each of these hazards occurring will be dependent upon the scope of operations.

2) Controlling the hazards – Installing/maintaining electrical equipment

[1] Step and touch potential are the phenomena that explain how you could be electrocuted or suffer an electric shock injury from a downed power line, even if you do not actually touch it. You could be injured by stepping into the power line's electrical current or by touching an electrified object.

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Electrical work includes:

- Connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment.
- Installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical installation.

To control the risk electrical work must only be completed by a competent person (licensed or registered electrician). They will understand the risk, be able to assess the risk of the task they are completing and be able to control those risks.

3) Controlling the hazards - Using electrical equipment

Defective electrical equipment poses an electric shock risk to the user. This is especially true for portable equipment, as their leads are at a higher risk of damage. There are several controls that can be used to mitigate the risk of electric shock from portable equipment, these include:

- Pre-use inspection.
- Routine 'test and tagging'.

Pre-use inspection

Prior to using portable electrical equipment, as a minimum, the user should complete an inspection of the equipment. This basic inspection should include:

- Inspection of plug for damage or exposed conductors
- Inspection of the flex for damage or exposed conductors
- Inspection of the equipment (body, switches etc) for damage and correct operation.
- If Test and Tag is implemented, verification that the testing is not out of date, by referring to the testing tag.

If a defect is found the portable electrical equipment must not be used until a repair is made by a competent person licensed or registered electrician.

TIP

Use battery powered portable electrical equipment over mains powered. Battery powered equipment has a significantly lower electric shock risk and eliminates the risk of trailing leads. While it might not be practical to replace serviceable equipment, consider mandating new portable electrical equipment must be battery powered.

Routine 'Test and Tagging'

Routine Test and Tagging is a control that could be considered to mitigate the risk of electric shock from the portable electrical equipment. For most rail heritage sector groups this is not a compulsory requirement as they are not subject to WHS law, see previous Sector Brief – Safety Responsibility and Accountability. Test and Tagging confirms at a predefined frequency (based upon risk) that an item is electrically safe, and is completed by a competent person. AS/NZS 3760:2010: In-service safety inspection and testing of electrical equipment defines

frequency of testing.

Residual current devices

Serious injuries and fatalities may be prevented by the use of properly installed and maintained residual current devices (RCDs), commonly referred to as 'safety switches'. An RCD is an electrical safety device designed to immediately switch off the supply of electricity when electricity 'leaking' to earth is detected at harmful levels. RCDs offer high levels of personal protection from electric shock. There are 4 types of RCD:

1) Non-portable ('fixed') RCDs installed at the main switchboard
   These RCDs protect all the fixed wiring and electrical equipment plugged into the relevant circuit(s).

2) Non-portable ('fixed') RCDs installed at a socket outlet
   These RCDs are installed at socket outlets and provide protection to electrical equipment plugged into the outlet.

3) Portable RCDs—portable plug type
   These RCDs can be plugged into a socket outlet to protect a single piece of equipment. They can be incorporated into a power cable or can be the RCD unit alone, without a cord.

4) Portable RCDs—portable stand-alone unit
   These RCDs are incorporated into a power board. They provide multiple protected socket outlets and can provide RCD protection to multiple items of electrical equipment from one power board.

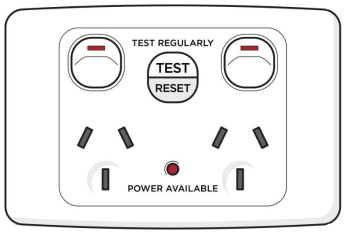

Figure 1 - Non-portable ('fixed') RCDs installed at a socket outlet

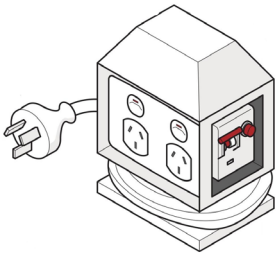

Figure 2 - Portable RCDs—portable stand-alone unit

Each RCD type has its own advantages and disadvantages. For example, a non-portable ('fixed') RCDs installed at the main switchboard will likely isolate many circuits when tripped and may require an electrician to reset, whereas a portable stand-alone RCD will only remove power from the specific equipment.

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TIP

When an organisation is not using test and tag as a control, stipulating the use of RCDs would provide an alternative and good level of protection. This is especially true for higher risk electrical equipment, such as equipment used outside in a potentially wet environment.

Electricity is, and will continue to be, a risk for all heritage groups. By applying the risk mitigation strategies detailed above you can demonstratively show you have managed the risk and prevent harm to volunteers, customers, and visitors.

If you have more questions or queries, contact:

John Thorogood
Safety, Environment & Quality Manager
Transport Heritage NSW
john.thorogood@thnsw.com.au
0418 615 555