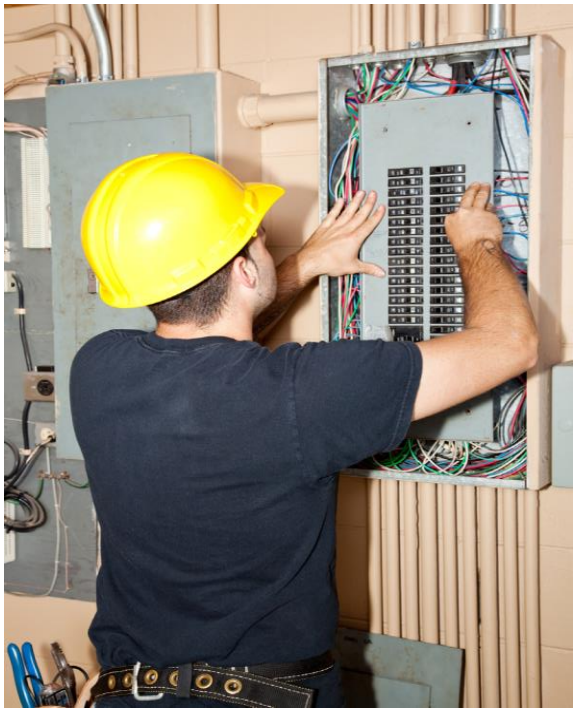
Low Voltage Electrical Work Rescue



The reason for Low Voltage Electrical Work Rescue training is to provide a person with skills to perform a safe rescue of a casualty who has received an electrical shock or personal injuries while working on low voltage conductors or equipment. Speed of the rescue is essential but safety must never be compromised. Safety of the rescuer is always the first priority.

This booklet describes principles based on a risk assessment of the work environment, the competence of the rescuer and the type of rescue equipment required to:

- Remove the casualty from the source of injury
- Move the casualty to a clear, safe area
- Administer Cardiopulmonary Resuscitation
- Basic bleeding control
- Treat burns

It is essential for the safety observer to be competent at performing CPR

TRAINING

Training conducted by qualified facilitators is essential to achieve proficiency and, in accordance with **Electricity Safety Regulation 2013,** retraining and reassessment should be carried out every 12 months.

Electrical Safety Code of Practice 2013 states that a competent safety observer must be present when work is carried out on energised electrical equipment, unless the work consists only of testing and a risk assessment shows that there is no serious risk associated with the proposed work.
The safety observer must:

a) be competent to implement the control measures in an emergency
b) be competent to rescue the worker who is carrying out the work
c) must have been assessed in the previous 1 year as competent to rescue and resuscitate a person.

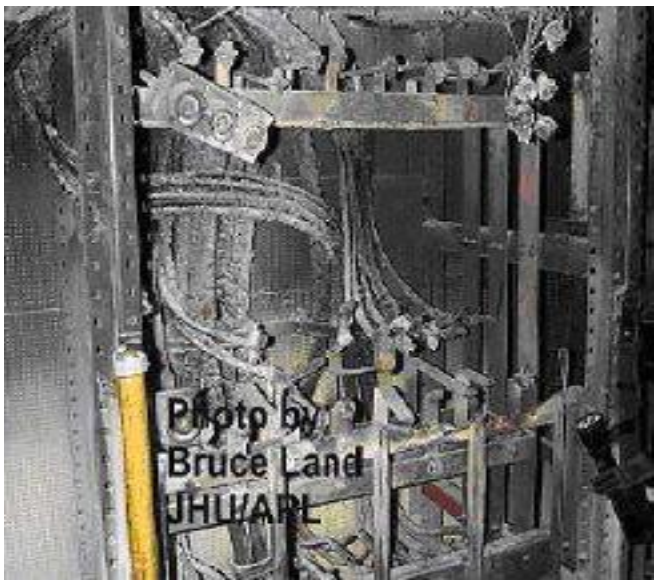
The safety observer should:

a) not carry out any other work or function that compromises their role
b) not be situated in the work basket of the elevating work platform from which electrical work is being carried out

c) be able to communicate quickly and effectively with the electrical worker(s) carring out the work

d) not have any known temporary or permanent disabilities that would adversely affect their role and performance.

In an emergency situation, it should be recognised that limited access to switchboards and similar areas may make the rescue difficult or virtually impossible. Further, risk assessment of hazardous situations, the dangers from toxic gases and from smoke is an integral part of training.



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LOW VOLTAGE SWITCHBOARD RESCUE KIT

- Rescue Kit Carry Case
- Weatherproof Torch and Batteries
- Fire Blanket
- Multi-Trauma Dressing
- Isolation Tag
- 1000 volt Rescue Crook
- 1000 volt Insulating Gloves

(It is recommended to have a first aid kit available to treat personal injuries as necessary and locate the nearest AED)

Introduction

These notes are a guide for people who have completed a training course for Safety Observers in the Electrical Industry in Queensland.

Employer Obligations

It is the **employer's obligations** to provide training and all necessary safety equipment to enable a person to perform a rescue safely. It is a requirement of the Electricity Safety Act 2013 that an employer must provide a Safety Observer if there is danger of accidental direct contact with exposed live conductors or exposed live parts of electrical articles. An employer must provide:

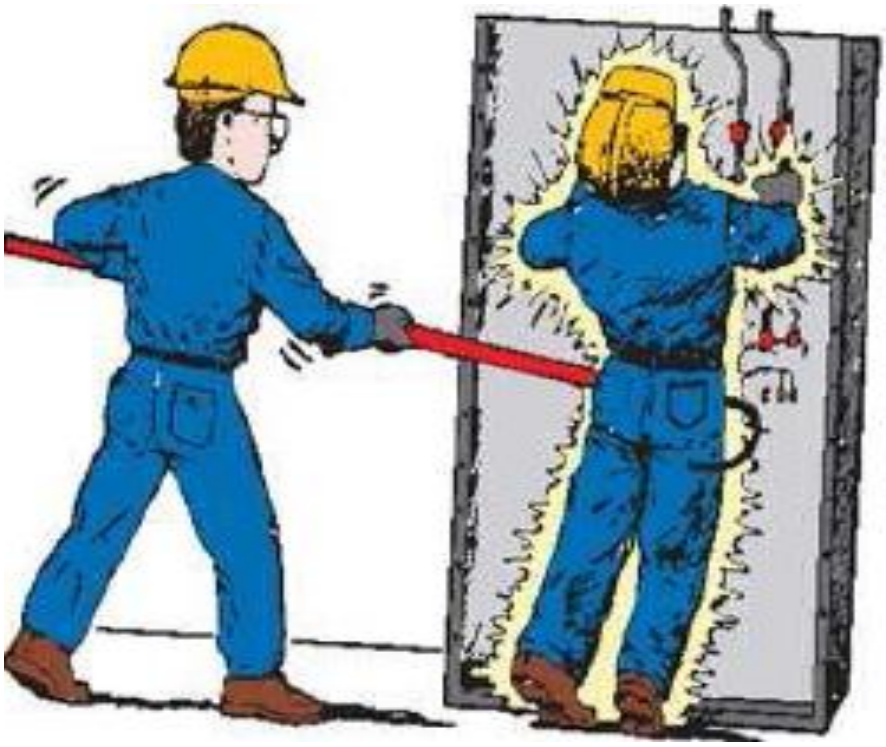
- Training by qualified facilitators
- Assessment every 12 months to confirm competence
- Suitable rescue equipment, which is appropriate for the type of work situation.

Employee Obligation

It is the **employee's obligation** to wear the appropriate safety clothing and to use the safety equipment provided. The safety observer must refrain from performing any other duties/activities other than that of being a safety observer.

Persons performing the duties of a safety observer must ensure that they have suitable knowledge of rescue and resuscitation related to the type of work being performed and they must have been trained/reassessed during the previous

12 months as a safety observer. **Any member of the work group may request verification of this requirement**.
The employer and employee are expected to complete a risk assessment and apply experience and prior knowledge of potential risk exposure to determine the means of performing a safe rescue in the event of an emergency.



Planning

Work Site

On arrival at the work location all persons in the work group must ensure that the following checklist is complete:

CHECKLIST BEFORE WORK STARTS

Location of the work area (risk assessment of area where work is to be carried out)	☐
Electrician to check Safety Observer's currency	☐
Work Permit	☐
Communications to be set up and checked	☐
Discuss risks which may be encountered, including the likelihood of fire or shock	☐
Electrician to explain isolator switch	☐
Electrician and Safety Observer to discuss approach and exit plan	☐
Items in Kit to be checked and counted out	☐
Check Torch	☐
Gloves to be tested and checked for currency	☐
Crook to be checked	☐
Identify Fire Exit	☐
Identify nearest water supply if needed for burns management	☐
Ensure electrician's work mat is in place	☐
Safety Observer to read rescue procedure before work starts	☐
Safety Observer to call for help in the event of an emergency	☐
Kit items to be checked and counted back in at the end of task	☐
Low Voltage Kit to be put back in its original location	☐

Note: Conductors are to be treated as "LIVE" at all times

Isolation

The appropriate point of isolation must be identified before commencement of work and the method of operation explained to the safety observer. Where possible, electrical equipment causing shock or injury should be disconnected immediately from the source of supply, to allow a rescue. However, in some circumstances, it may be more expedient to free the casualty without first isolating the supply, provided safety precautions are taken and there is a low risk to the rescuer of receiving an electric shock.

Rescue Equipment

Rescue kits must be checked prior to commencement of work, to ensure the contents are in good condition and applicable to the work situation. The rescue kit should be placed in a suitable position, which is accessible to the work area. Suitable harnesses/lifting equipment may be required to rescue a casualty from a confined space, for example, a cable pit. Rescue from confined spaces is not covered in the training delivered in conjunction with these notes.

Check LVR kit before starting a job and certify every 6 months

Personal Protective Equipment

Personal protective equipment appropriate to the work situation shall be worn. Clothing of 100% cotton or clothing with flame retardant properties will give maximum protection, provided all surfaces are adequately covered (that is, sleeves rolled down and buttoned at the wrist and legs totally covered). Rings, metal neck chains and other conductive materials should be removed before commencement of work.

Gas Contamination

Generation of toxic gases or inhalation of gas causing possible asphyxiation or poisoning of people working in confined spaces occur (for example, cable pits). It may be necessary to supply appropriate gas testing and rescue equipment if the risk assessment has determined that toxic gases could be present.

Communication

If a major accident occurs, assistance should always be sought from an Ambulance and/or medical personnel. Be familiar with the means of calling for help, that is, operation of two-way radios, location and use of telephones (phone numbers) to call relevant emergency services.

General Principles for a Rescue

Generally, these principles form the basis for the performance of a rescue of a casualty who has received an electric shock or other injuries from a low voltage electrical installation or equipment. Low voltage is up to 1000 volts AC or 1500 volts DC.

Send for help as soon as the situation allows

- Isolate the supply if possible
- Avoid becoming another casualty due to the risk of electric shock, extreme heat, toxic fumes or smoke
- Avoid direct skin-to-skin contact with the casualty
- Assess the situation and rescue the casualty as quickly as possible
- Move the casualty to a clear, safe area to allow for assessment/treatment
- Assess the casualty's condition
- Perform resuscitation/treatment of injuries – bleeding, burns etc
- Place the casualty in the recovery position awaiting further medical help
- Rescuer to remain with the casualty

Placing the Casualty in a Safe Area

If access is restricted or hazards exist, the casualty should be moved to a clear, safe area for treatment. The most effective way of moving a casualty is the one man drag method.

One Man Drag Method

- Crouch behind the casualty
- Position arms around the casualty's upper chest
- Securely grip one hand over the opposite wrist
- Adopt correct lifting procedure to avoid sustaining a back injury when lifting and dragging the casualty
- Drag the casualty to a clear, safe area.

Use of a Fire Blanket

- Quickly remove the fire blanket from the container
- Wrap blanket around the casualty to extinguish the flames starting from the casualty's head down to the feet – direct flames away from the casualty's face.
- Ensure flames have been extinguished by carefully removing the blanket from the feet back towards the head.

Risk Assessment

The purpose of Risk Management is to assess the risks of identified hazards and to use appropriate control measures to reduce the level of risks and enable the work to be performed safely. The work group should perform a risk assessment of the work site, not only in relation to the type of work to be carried out, but relevant to performing a rescue in the case of an accident.

The basic principles of Risk Management include:

- Identification of the hazards associated with the work activity or in the work environment.
- Assessment of the risk, using the method the work group is conversant with, to determine if controls are necessary to minimize the risk.
- Reduce the risk to an acceptable level using required controls, as assessed.

These controls could be accomplished by:

- Eliminating the risk by not continuing with the activity until other controls can be put in place.
- Substituting – by using equipment or plant tests that present a lower, more acceptable level of risk.
- Engineering Controls/Separation – by the use of isolating barriers or insulating mats or by improving the design of equipment or changing its location.

- Administration – by rescheduling the activity, providing adequate training or using appropriate warning signs
- Wearing personal protective equipment for example, in the form of insulating gloves, protective clothing, face shields, safety footwear etc.

Following a risk assessment it may be found necessary to implement any one or more of the above control measures to minimize the risks associated with the activities being performed.

The following table indicates typical events and likely factors to consider when assessing the work site:

Typical Event	**Factors to Consider**
Casualty receives an electric shock	• Casualty is thrown clear of the energized electrical equipment • Casualty remains in contact with energized electrical equipment
Fire develops as a result of an accident	• Casualty receives flash burns to the eyes or to other parts of the body, direct burns to any part of the body or is engulfed in flames • Presence of smoke, toxic fumes, extreme heat and/or poor visibility
Casualty receives other injuries	• Head/spinal Injuries • Fractures • Bruising • Lacerations • Burns

While Awaiting Medical Assistance

DRSABCD EMERGENCY ACTION PLAN

Danger – yourself, bystanders, casualty
Response – Touch & Talk
Send for Help – 000, 112 (mobile phones)
Airway – check for obstructions
Breathing – Look, Listen, Feel
CPR – start CPR – 30 compressions: 2 breaths
Defibrillation – Attach an AED if available

CPR Cardiopulmonary Resuscitation

The types of injuries that can occur from Electrical Accidents include: Cardiac Arrest, Respiratory Arrest, and Burns/Tissue Damage.

Electrical burns can cause massive tissue damage. Currents between 1000 – 4300 milliamps cause ventricular fibrillation, muscles contract, nerve damage occurs and death is likely. Currents at 10000 milliamps cause cardiac arrest, severe burns and death is probable.

The skin highly resists electrical currents and transforms this energy into heat energy, which produces burns. Electrical burns are often associated with an entry and exit point along with massive internal tissue damage. Burns can also occur from Arc flashes and the casualty may also suffer airway burns from smoke and gas inhalation.

A casualty suffering airway burns should be kept under observation and transported to hospital without delay – preferably by ambulance. Resuscitation should be commenced if necessary.

The only effective management of flash burns to the eyes is to close both eyes of the casualty and cover with pads if available and seek medical aid.

Note: Flash burns to the eyes result from the effect of heat and light waves on the superficial layers of the cornea and do not involve deep layers so there is no permanent scarring but the pain is severe and frightening for the casualty. Medical aid must be sought.

Burns – General

- Identify nearest water supply
- Flood burnt area with a gentle stream of tap water for 20 minutes
- Gently remove any rings (if possible), watches, belts or tight clothing from burnt areas before it starts to swell
- Cover the burnt area with sterile non-stick burns dressings or use wet dressings.
- Continue to irrigate the dressings to the burnt areas if they begin to become dry.
- Monitor the casualty's skin temperature to avoid overcooling the casualty. Use a space blanket to treat for shock.
- Do not attempt to remove clothing or melted synthetic material which is sticking to the skin
- Do not break blisters and apply burn creams
- Seek medical aid.

Control Severe Bleeding

- When attending to any wound, precautions must be taken to avoid direct contact with blood and any body fluids.
- Apply pressure over the wound with a hand or squeeze the edges of the wound together.
- Keep pressure on the wound with a thick pad, covering the entire wound, bandage firmly in place
- Elevate the injured part
- Check circulation to ensure bandage is not too tight
- Seek medical assistance.

Place a second pad and dressing over the first if bleeding continues

-REMEMBER-

THERE IS ONE CASUALTY ALREADY; DON'T BE THE SECOND!

Toxic Gases Generated From Electrical Fires

Gas	Characteristic	How Produced	Toxicity	Effects	Remarks
Carbon Dioxide (C02)	Unable to detect in low concentrations	By combustion of organic & some non-organic material	Asphyxiant	Headaches Sweating, dim-vision, dizziness, tremors, unconsciousness if exposed to 5-8% concentration for 5-10mins death if exposed to 10% concentration of C02	
Nitrogen Oxide	Irritant to eyes and throat	In combustion fires	Asphyxiant	In low concentrations more of an irritant	
Carbon Monoxide (C0)	Colourless, odourless gas that is heavier than air & gives no warning of its presence	Burning natural organic matter ie, wood or manmade materials ie. plastic	Affects the oxygen carrying capacity of the blood	Unconsciousness without warning leading to death Rapid onset in high concentrations	A reasonable fire in a switchboard or substation could generate hazardous levels of this gas as they can be located in low areas & normal ventilation may fail. During a fire pockets of gas may occur, always assume this gas present during a fire
Hydrogen Chloride (HCL)	Very pungent smelling gas	By burning PVC & plastics that coat electrical wiring	Can cause severe lung damage	Causes severe throat, eye & nose irritation	Medical attention should be sought with exposure as effects can be delayed for several hours