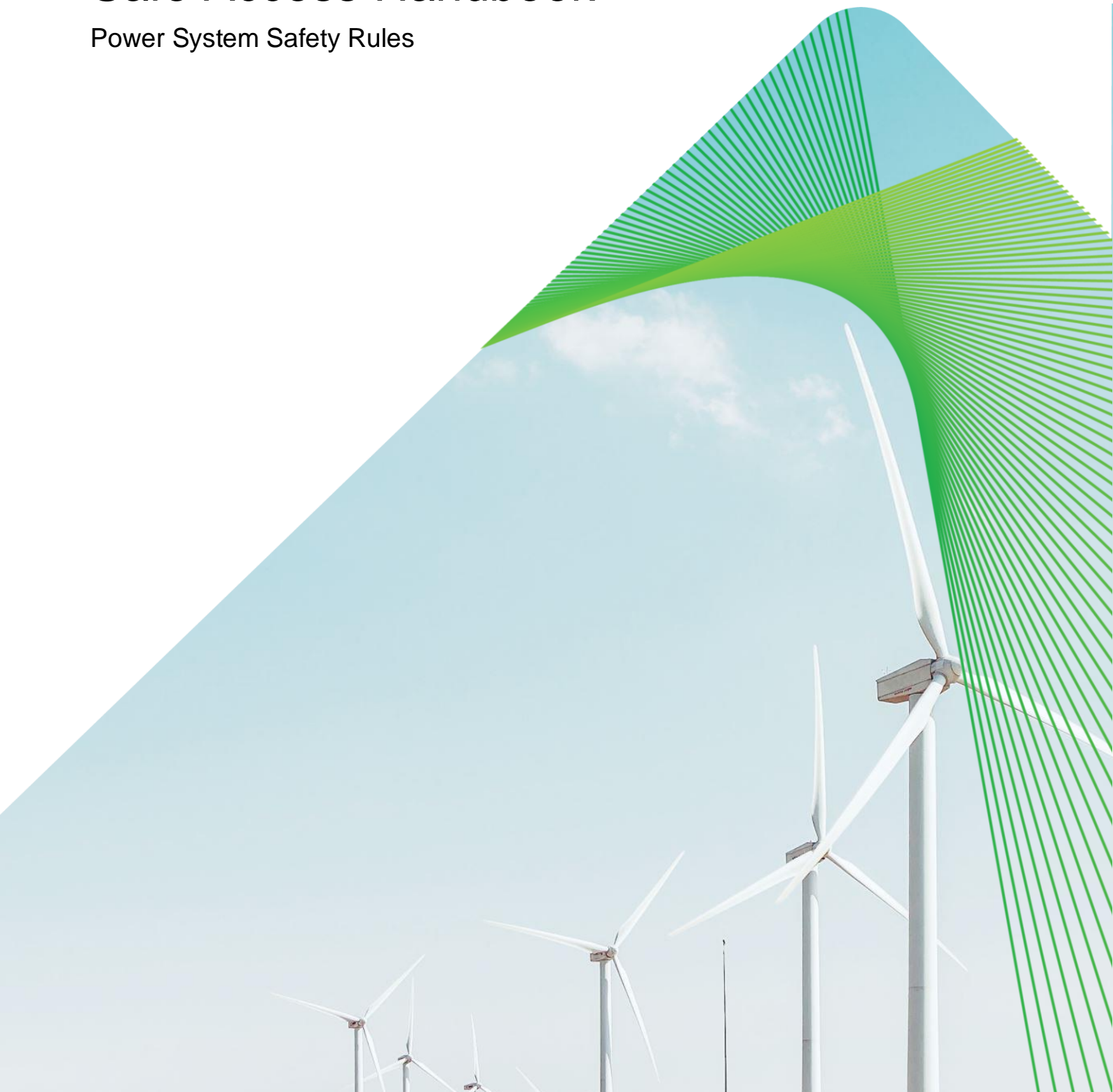


Substations

Safe Access Handbook

Power System Safety Rules



This Handbook covers the Power System Safety Rules requirements for safely accessing Substations for observation purposes only, including providing supervised access to visitors who are not authorised under the PSSR. The handbook aims to help you be safe and gain your authorisation to access Transgrid's High Voltage (HV) network.

It has been written in plain, easy to understand language and is a working interpretation of the Power System Safety Rules, known to everybody as the PSSR.

The PSSR and this handbook are reviewed and updated periodically. Check our website at <https://www.transgrid.com.au/working-at-transgrid/workplace-safety> for the latest information.

In this handbook, the words 'must' or 'must not' are used for rules that you have to follow. The words 'should' or 'should not' are used when explaining safe and low-risk work practices.

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Author:	J Mason, PSSR Lead/Health Safety & Environment				
Reviewers:	B Wasow, Technical Support Lead/Maintenance Delivery J Clayton, Senior HSE Business Partner/ Health Safety & Environment				
Approver:	J McMurtrie, GM/Health, Safety & Environment				

Introduction

This Handbook covers the Power System Safety Rules requirements for safely accessing Substations for observation purposes only, including providing supervised access to visitors who are not authorised under the PSSR. The handbook aims to help you be safe and gain your authorisation to access Transgrid's High Voltage (HV) network. It aims to prepare you for the HV network environment and reduce your risk when accessing hazardous areas or situations.

This handbook is the main resource to get your authorisation via the Worker Safety Authorisation and Training (WSAT) system. It supports training courses, which you must pass to get your worker authorisation.

Read this handbook to check the rules, understand your responsibilities and learn safe working behaviour.

There are also similar handbooks for Transmission Lines, Transmission Cables, Low Voltage Mechanical, Mobile Plant and Field Operations and more available at www.transgrid.com.au/working-at-transgrid/workplace-safety.

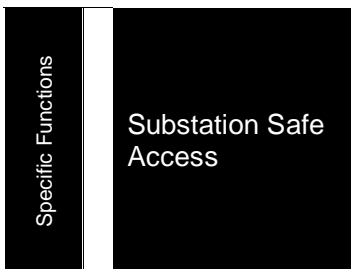
In this handbook, the words 'must' or 'must not' are used for rules that you have to follow. The words 'should' or 'should not' are used when explaining safe and low-risk work practices.

Remember, we all have a responsibility to work safely and look out for each other.

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Authorisation



The Power System Safety Rules (PSSR) authorisations are permissions to access an area, perform a type of work, apply a specific control, or execute a controlled process. Persons whose intended work duration is more than 3 days cumulative over 12 months should be authorised under the PSSR.

There are authorisations for Transmission Lines, Transmission Cables, Low Voltage Mechanical, Mobile Plant and Field Operations and more that can be found in the PSSR Authorisation Structure.

A PSSR authorisation gives you access to work but also brings responsibility. It's a commitment between you and Transgrid to work safely and look out for each other.

When you get your authorisation, do not abuse, or misuse it. If you do, you may lose your authorisation and access to work at Transgrid.

Persons authorised **Substation Safe Access** may access Substations and their HV areas for observation purposes only, including providing supervised access to visitors who are not authorised under the PSSR.

Persons authorised **Substation Safe Access** **must not**:

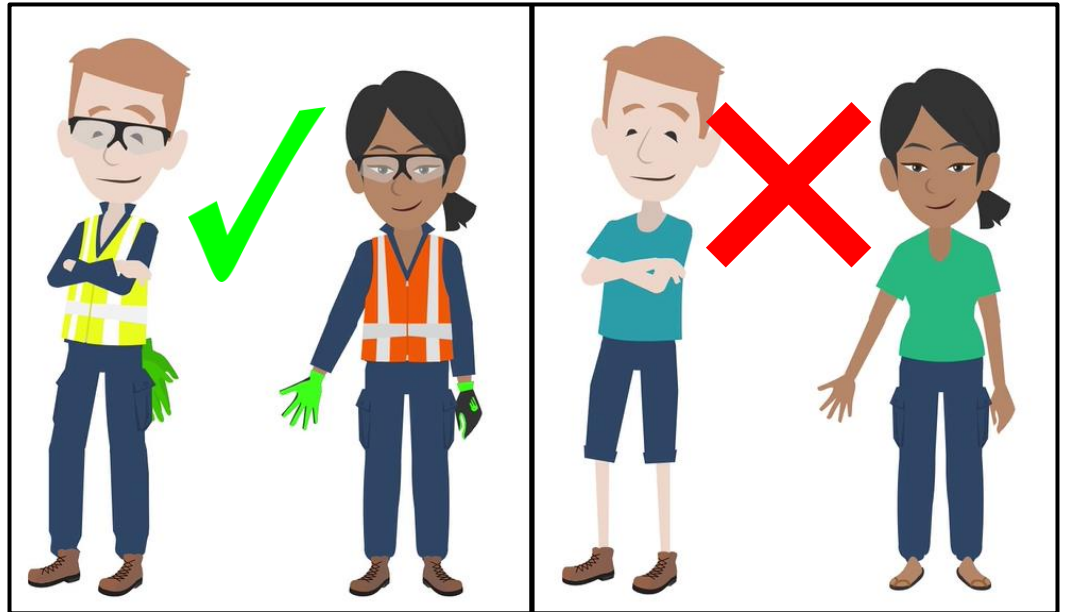
- Perform work.
- Supervise work; or
- Provide access for persons to perform work.

If you are unsure of how to apply the PSSR correctly, STOP and seek assistance from one of our Safety team before doing your work.

Personal Protective Equipment (PPE)

You need to wear the following PPE to access Transgrid substations:

- Long sleeve shirt
- Long trousers
- High visibility shirt or vest
- Safety footwear
- Safety eyewear
- Protective gloves (on clip)



When accessing High Voltage (HV) areas you will also need:

- Safety helmet



Substation Security

Substations must be kept secure to stop unauthorised persons entering the site.

When entering a substation:

- Do not allow unauthorised persons to enter the substation.
- Doors and gates:
 - must only be unlocked or open when in immediate use;
 - must be closed and locked immediately after using; and
 - any found open or unlocked, must be closed, and locked.

When leaving a substation:

- All doors and gates must be closed and locked; and
- Security alarms reset by the last person to depart.

Contact the Controller if the site cannot be made secure on 02 9620 0121.

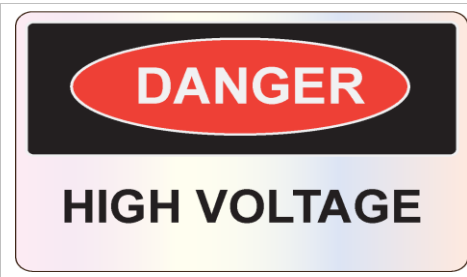

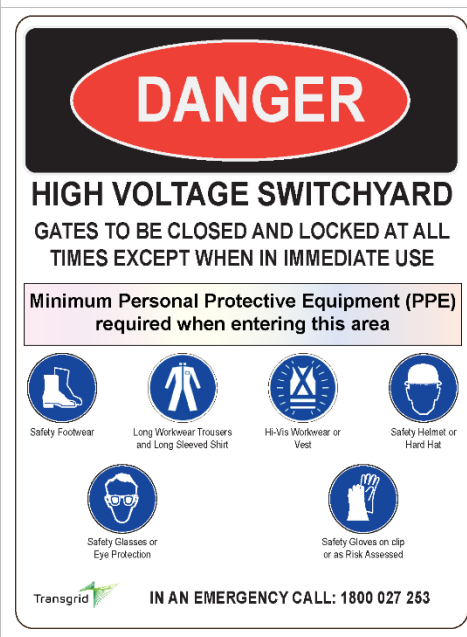


In an Emergency







- Remove yourself and anyone who you are supervising to a safe area;
- Ring 555 from any phone in the substation (or 02 96200555 from a mobile) and advise the System Operator of the nature of the emergency. They can assist with emergency services response; and
- If required to evacuate move to the evacuation assembly area near the main entry gate to the Substation.



Power System Notices

Signs and tags identify entry requirements, hazardous areas or conditions that must be observed.

 <p>DANGER HIGH VOLTAGE</p>		<p>Identifies a switchyard or HV area containing HV exposed conductors that maintain standard safety clearances.</p>
 <p>DANGER HIGH VOLTAGE CAGE LIVE HIGH VOLTAGE CONDUCTORS WITHIN</p>		<p>A fully fenced or walled area, with a locked access, containing HV exposed conductors which do not maintain standard safety clearances.</p>
 <p>DANGER HIGH VOLTAGE SWITCHYARD GATES TO BE CLOSED AND LOCKED AT ALL TIMES EXCEPT WHEN IN IMMEDIATE USE</p> <p>Minimum Personal Protective Equipment (PPE) required when entering this area</p> <ul style="list-style-type: none"> Safety Footwear Long Workwear Trousers and Long Sleeved Shirt Hi-Vis Workwear or Vest Safety Helmet or Hard Hat Safety Glasses or Eye Protection Safety Gloves on clip or as Risk Assessed <p>Transgrid  IN AN EMERGENCY CALL: 1800 027 253</p>		<p>Placed at the entrance to a switchyard or HV area and displays minimum PPE requirements for entry.</p>
 <p>WARNING</p> <p>MEDICAL IMPLANTS ELECTRIC AND MAGNETIC FIELDS IN THIS AREA MAY INTERFERE WITH IMPLANTS CONSULT YOUR PHYSICIAN BEFORE ENTERING</p>		<p>Placed at the entrance to a switchyard or HV area to indicate the presence of electric and magnetic fields that may interfere with medical implants.</p>

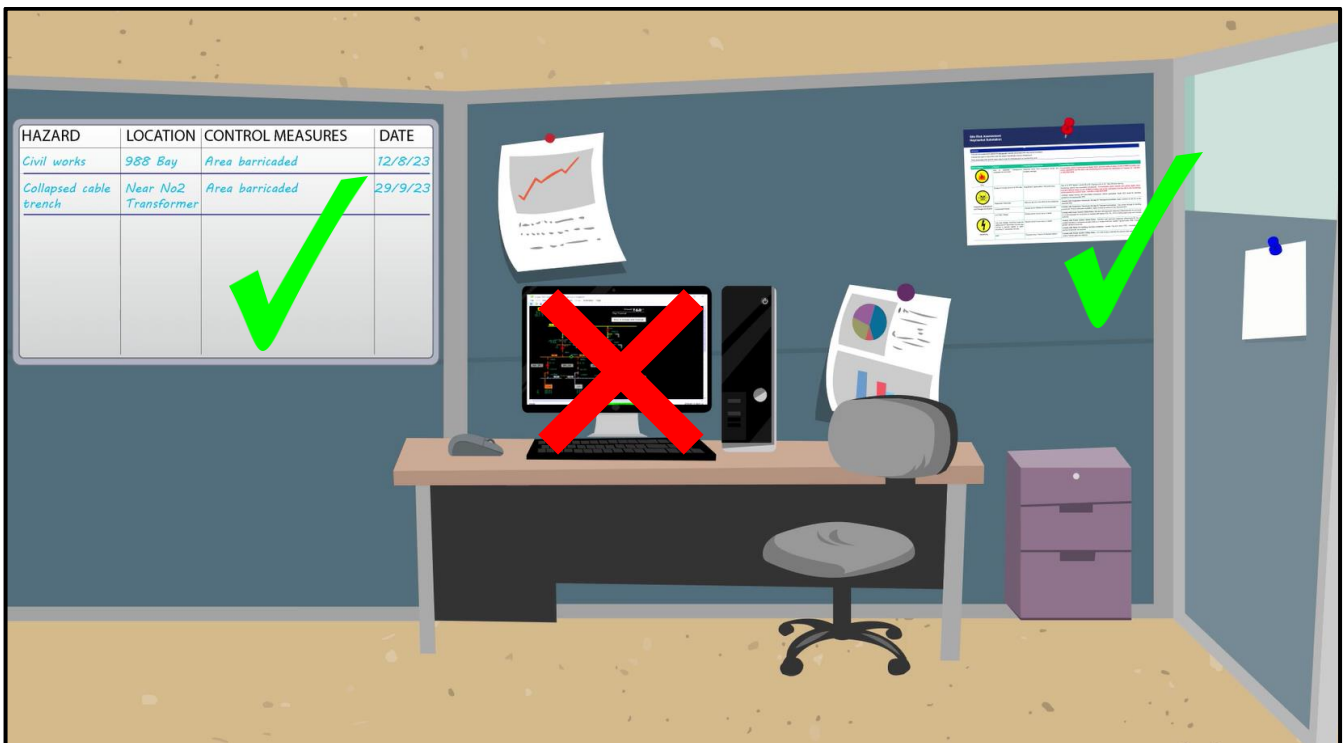
	<p>Indicates high voltage testing is in progress and the area must not be entered.</p>
	<p>Indicates the presence of HV conductors adjacent to a HV Access Authority designated work area. It is usually used with barriers or additional signs.</p>
	<p>HV apparatus operating nameplate. Often shows the voltage of the conductors.</p>
	<p>Transmission line, or cable destination nameplate, usually affixed to the substation fence. Will show the voltage of the conductors.</p>
	<p>This tag is used to warn of a particular hazard or temporary condition and allows limited operated by specifically authorised persons.</p>
	<p>This tag is used to warn that the operation of the device or equipment to which the tag is attached is likely to be life threatening.</p>

Building and Carpark Areas




Before accessing a substation, the following hazards must be considered, and appropriate safety controls implemented.

Workplace Risk Assessment and Hazard Board

Every substation has a Workplace Risk Assessment (WRA) and Hazard Board which list hazards and controls relevant to the site and current conditions. These are normally located in the auxiliary services building near the Network Operating desk and must be reviewed before further access to the site.



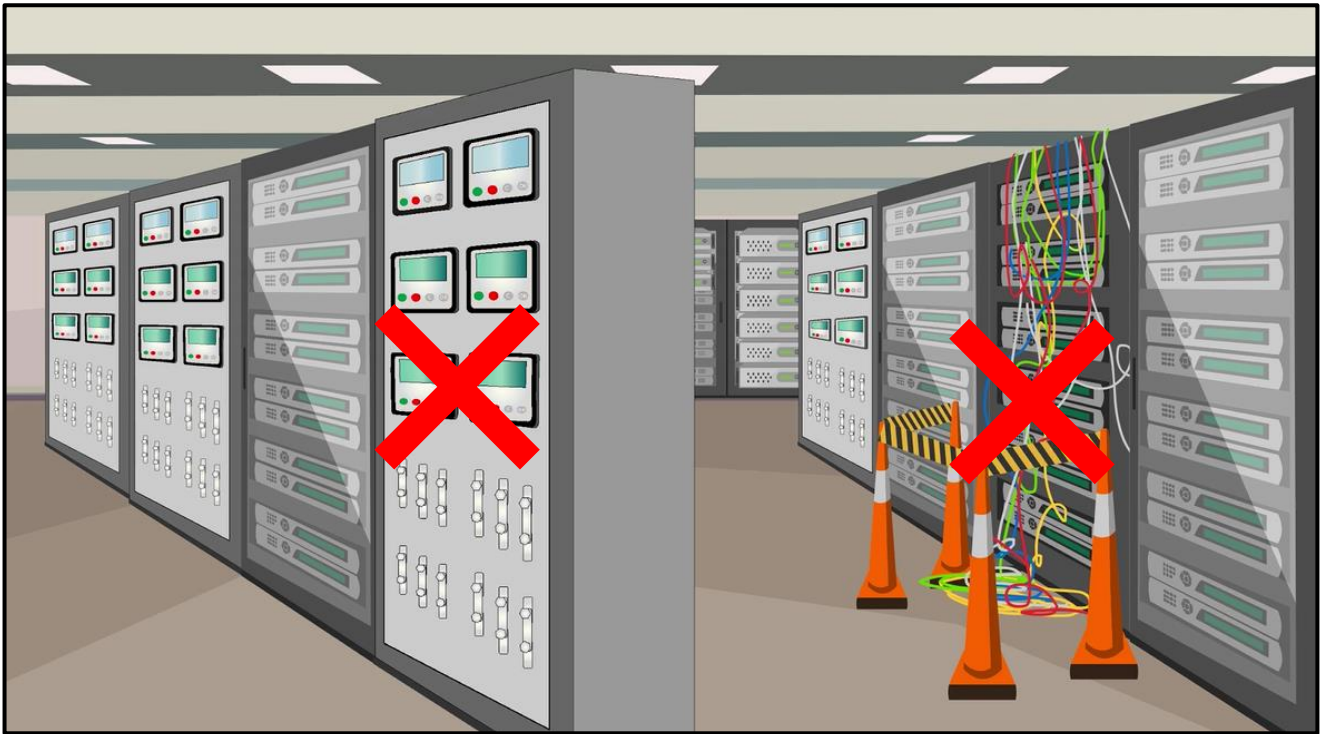
- The Workplace Risk Assessment lists known 'permanent' hazards for the site to be aware of.
- The Hazard Board lists temporary conditions to be aware of.
- Sensitive network operational equipment like computer interfaces **must not** be interfered with.

Risk Category	Hazard	Potential Consequences	Control Measures
 Fire	Fire in enclosed underground substation environment	Personal injury from burns/toxic fumes and property damage	If evacuation alarm sounds and red lights flash, proceed without delay via the STAIRS at either end of the substation (not the lift) to the mustering point outside the control room. Call 555 or (02) 9620 0555.
 Hazardous Substances and Dangerous Goods	Escape of a large amount of SF6 Gas Hazardous Chemicals Compressed Gases	Engulfment, asphyxiation, Personal injury. Risks as set out in the SDS for the substance Injuries due to release of compressed gas.	Sign on to SF6 register outside lift on B1 if going to B2 or B3. Sign off when leaving. Monitoring, alarms and evacuation procedures. If evacuation alarm sounds and yellow lights flash, proceed without delay via the STAIRS at either end of the substation (not the lift) to the mustering point outside the control room. Call 555 or (02) 9620 0555. Confined Space training and associated procedures (where applicable). Refer SDS sheet for handling guidelines and appropriate PPE. Comply with Hazardous Chemicals Storage & Transport procedure. Apply controls as set out in the chemical SDS Comply with Hazardous Chemicals Storage & Transport procedure - Use correct storage & handling procedures. Ensure adequate ventilation. Apply controls as set out in the chemical SDS.
 Electricity	Live High Voltage Live Low Voltage, including in-service cables and CT secondary circuits (e.g. moving in service cables or open-circuiting CT secondary circuits).	Electric shock/ burns injury or death Electric shock/ burns injury or death	Comply with Power System Safety Rules - Maintain safe approach distances (Attachment B). Do not come on or near exposed HV conductors or interfere with cables, GIS, GIL, GILs or GFR except under a HV Access Authority Comply with Power System Safety Rules - Maintain safe approach distances (Attachment B). Do not contact exposed LV conductors except under a LV Access Authority. Isolate, Tag and verify. PPE - Insulated gloves, barriers & tools etc. as required. Comply with Rules for building services isolations - Isolate, Tag and verify. PPE - Insulated gloves, barriers & tools etc. as required.
	EMF	Personal injury. Failure of Medical implant.	Comply with Power System Safety Rules - HV area access restricted for persons with medical implants unless medical approval obtained.

Relay rooms

Relay or control rooms have sensitive equipment (called apparatus) which may also have exposed Low Voltage (LV) and Extra Low Voltage (ELV) electrical conductors.

Work in progress by others may have specific hazards and control measure in place.

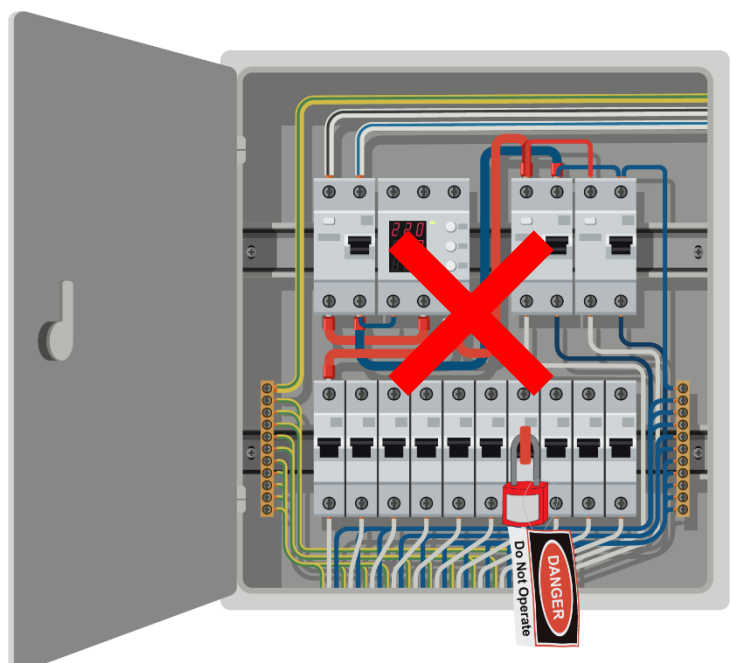


Excessive vibration or bumping of sensitive apparatus may cause it to inadvertently operate, affecting the Transgrid Network.

- You must keep yourself and equipment clear of relays, control panels and work by others.
- You **must not** open or interfere with control panels, cabinets, or other operational apparatus.

Touching or contact with exposed Low Voltage (LV) and Extra Low Voltage (ELV) electrical conductors can cause electric shock, injury, or death.

- You must keep yourself and equipment a minimum of 250mm from exposed LV and ELV conductors.

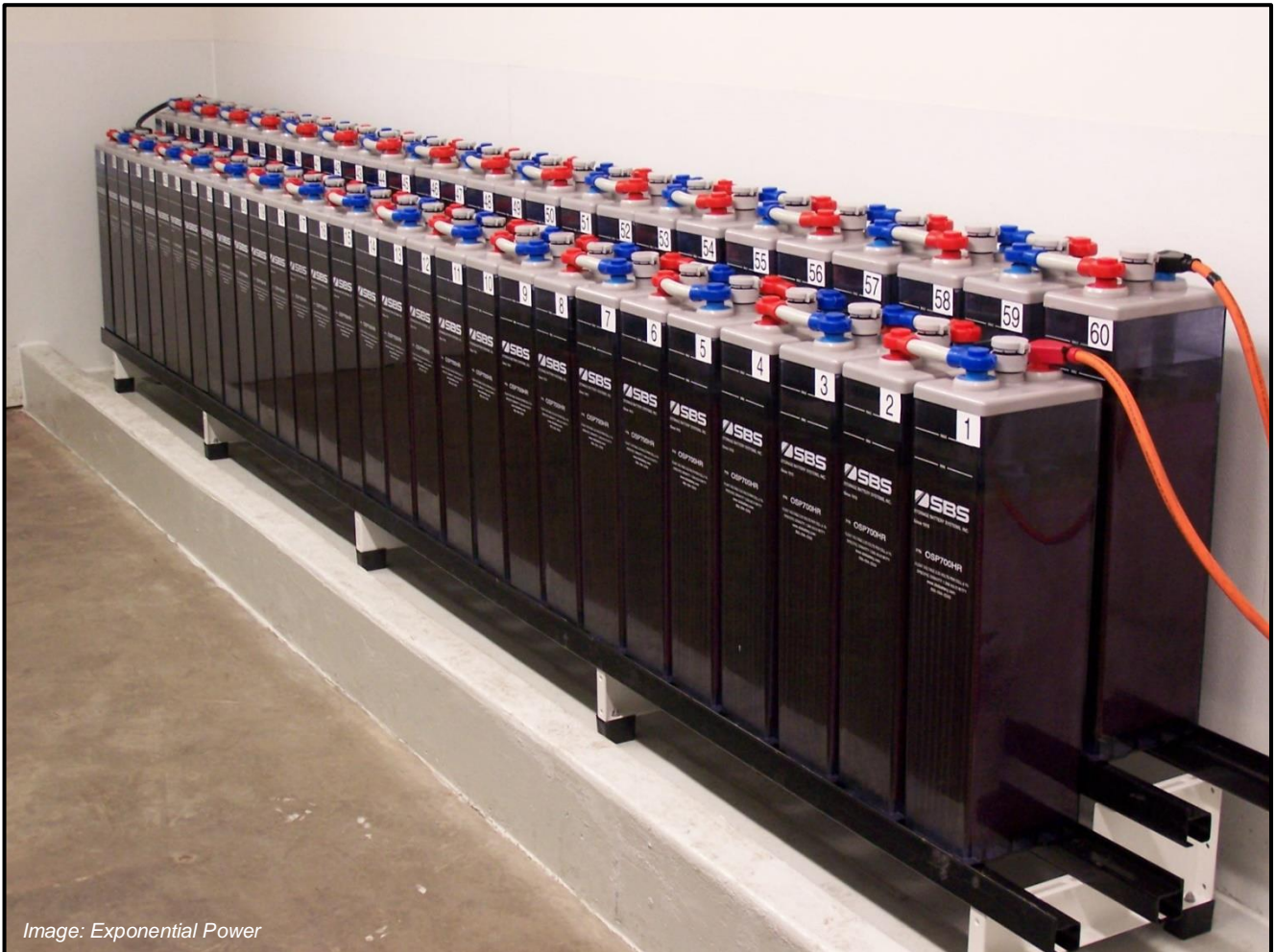


Battery rooms

Transgrid battery rooms typically have battery systems of 110V or 240V DC. Distinct types of batteries have specific hazards depending upon their voltage, construction, and electrolyte.

Controls for battery room hazards are normally listed in the site Workplace Risk Assessment.

- Before accessing these areas, you must ensure controls noted in the Workplace Risk assessment and those on battery room doors are implemented.



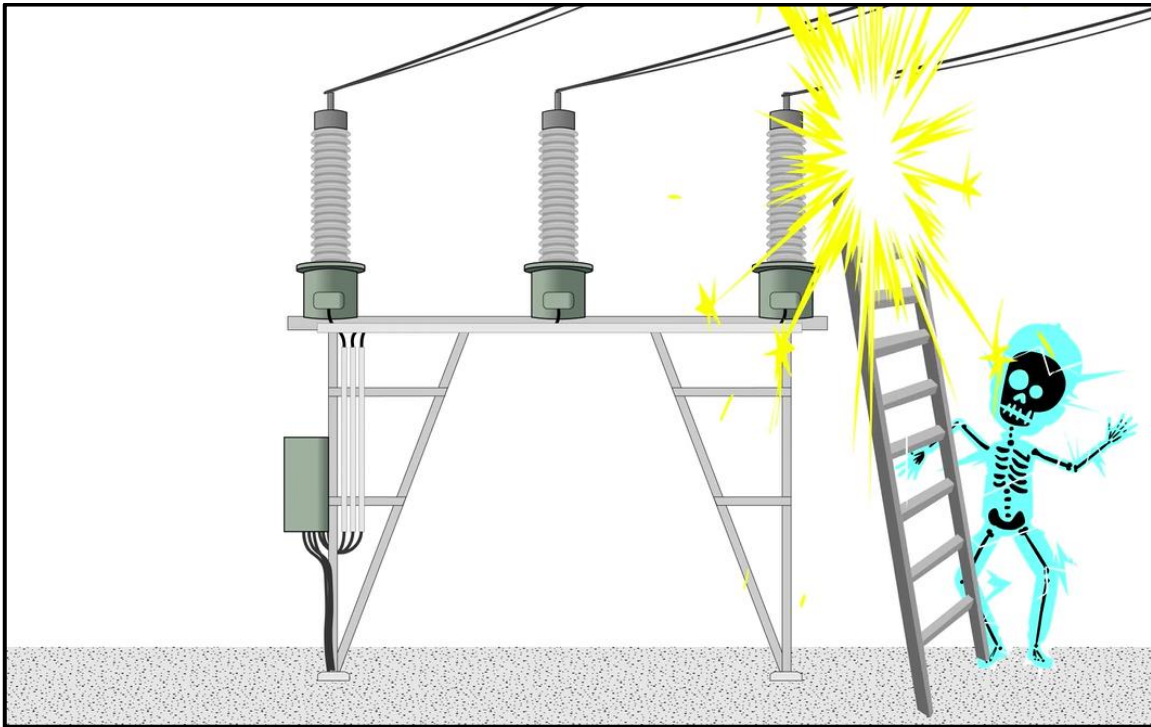
The connections of these batteries may have exposed electrical conductors and terminals. Touching or contact with exposed Low Voltage (LV) and Extra Low Voltage (ELV) electrical conductors can cause electric shock, injury, or death.

- You must keep yourself and equipment a minimum of 250mm from any exposed LV and ELV conductors.

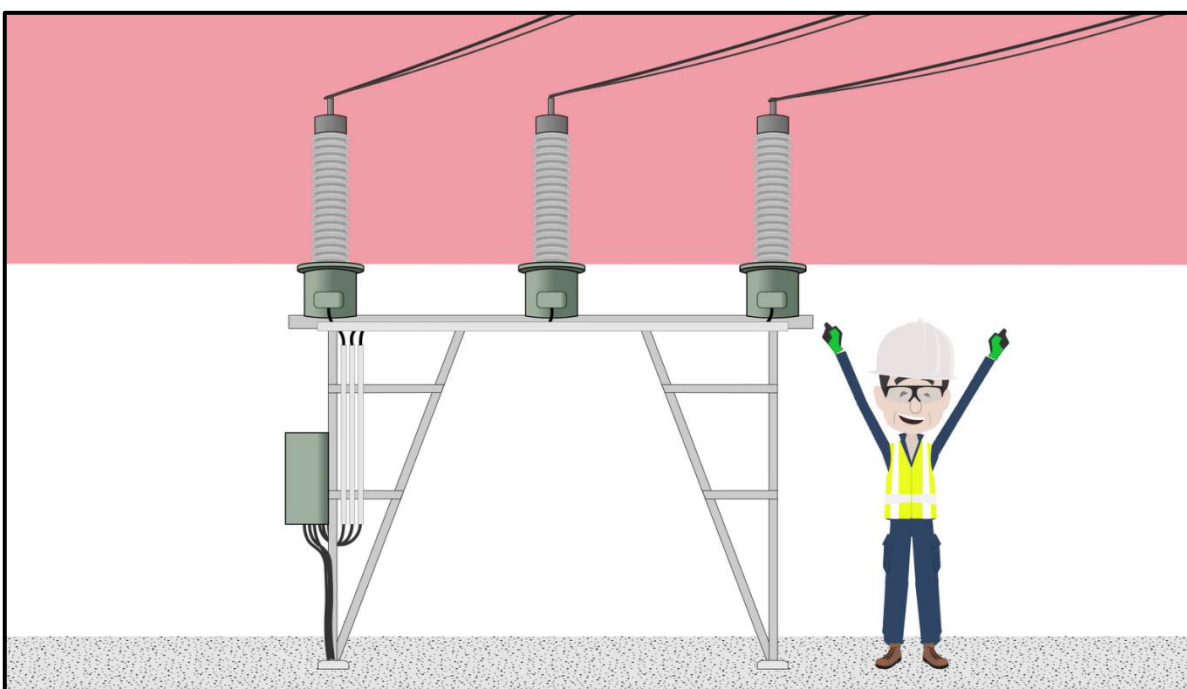
Accessing Switchyards and HV Areas

Near Approach to Energised High Voltage Conductors

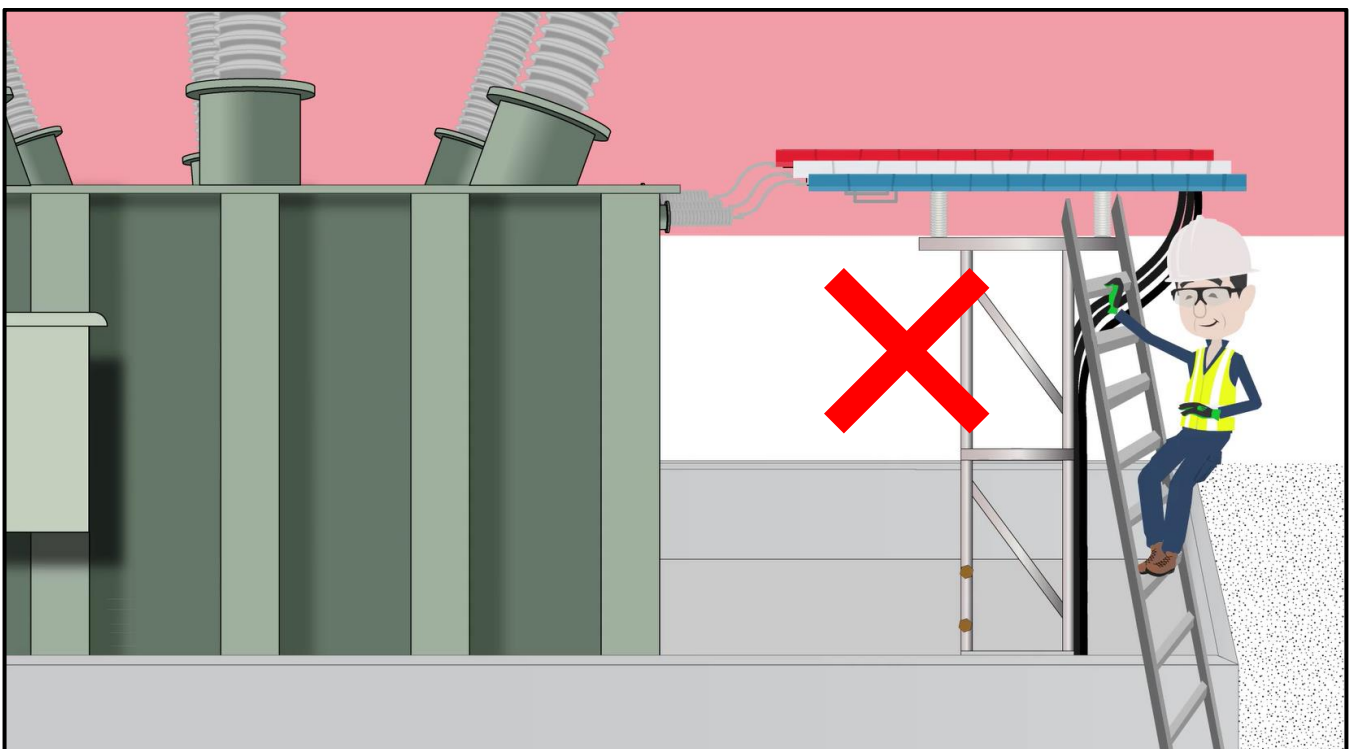
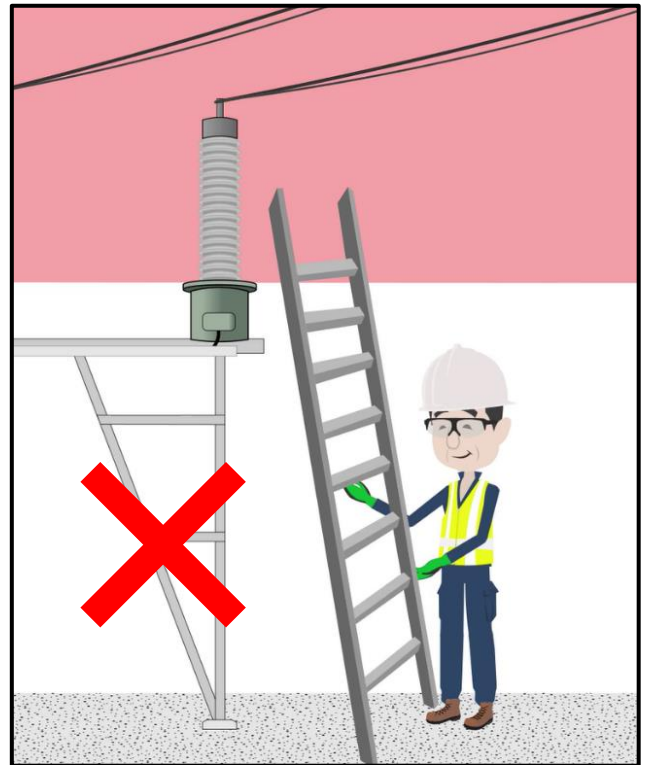
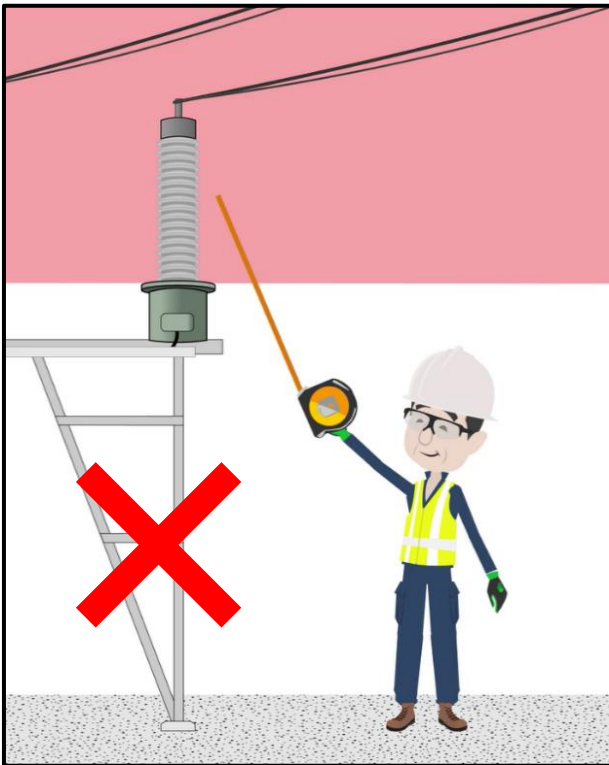
Contact with, or near approach to High Voltage (HV) exposed conductors can cause severe injuries or death.



Switchyards and HV areas are generally constructed so an average person standing under energised HV conductors can safely put their hand up.



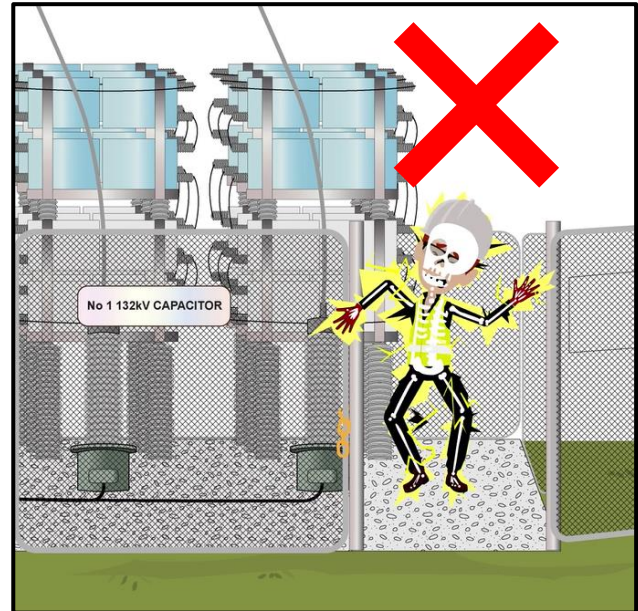
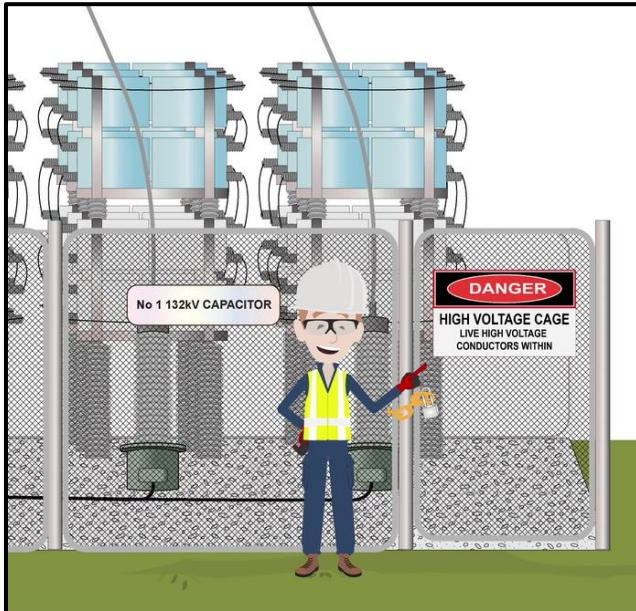
You **must not** take long objects, ladders, umbrellas, or tape measures into switchyards and HV areas.



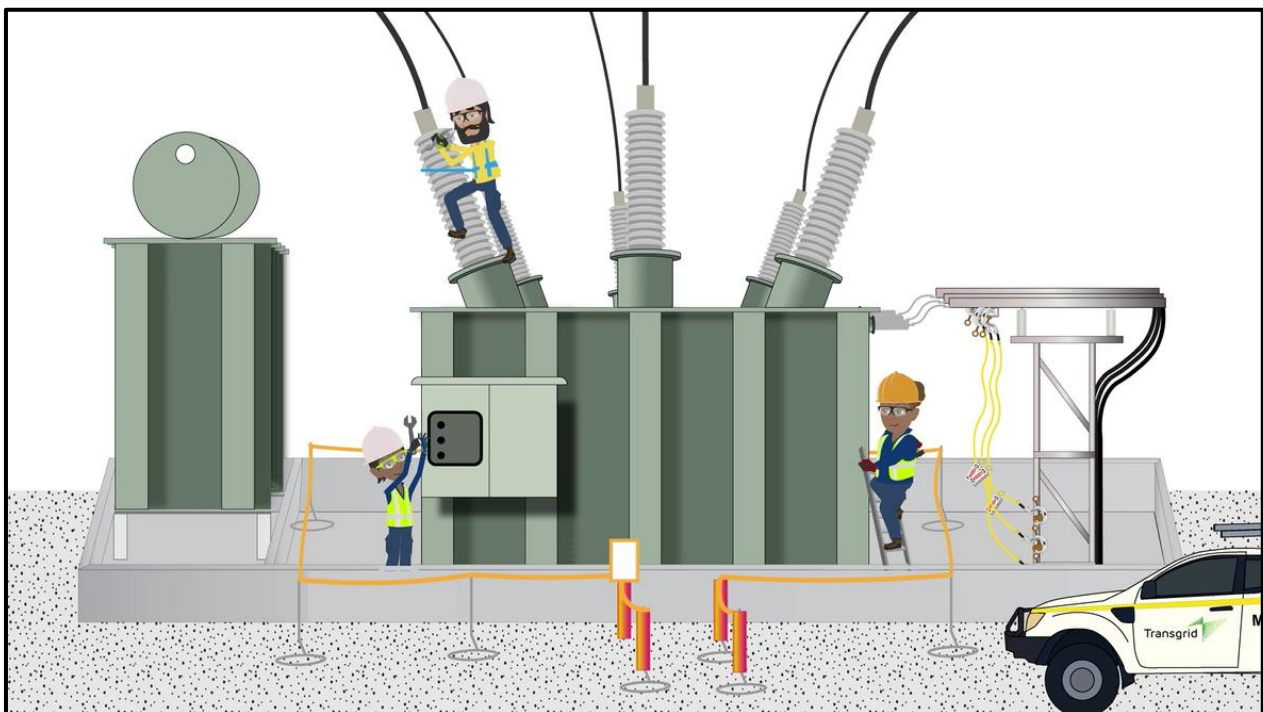
You must stay at ground level and **must not** climb on HV structures.

No Go areas

Some HV apparatus is cordoned off in a “High Voltage Cage”, which is a fully fenced or walled area with a special lock, containing HV exposed conductors which do not maintain standard safety clearances.



If a High Voltage Cage gate is found open or unlocked, **do not enter**, and report this hazard immediately.



HV apparatus being worked on is contained within a barriered off Designated Work Area. You **must not** enter these areas, nor alter the tapes or stands that define the safe area of work.

Induced Voltages and Currents (Induction)

The alternating current that flows through HV conductors in Transgrid's Substations produce electric and magnetic fields. The strength of these fields can generate voltages and currents on and in nearby objects which are not connected to earth.

A person who is insulated from the rest of the substation by the rubber soles on their boots charges up in this electric field, when brushing against substation structures the resulting discharge is sometimes felt as a small shock when in areas of high induction.



Some medical implants, such as pacemakers, can be affected by electric and magnetic fields. If you have such a device, you must consult your doctor and receive clearance to before entering switchyards or HV areas.

Supervision of Visitors

Visitors being supervised remain the responsibility of the person authorised **Substation Safe Access** and **must not** be left unattended at any time. The person authorised **Substation Safe Access** must ensure visitors are:



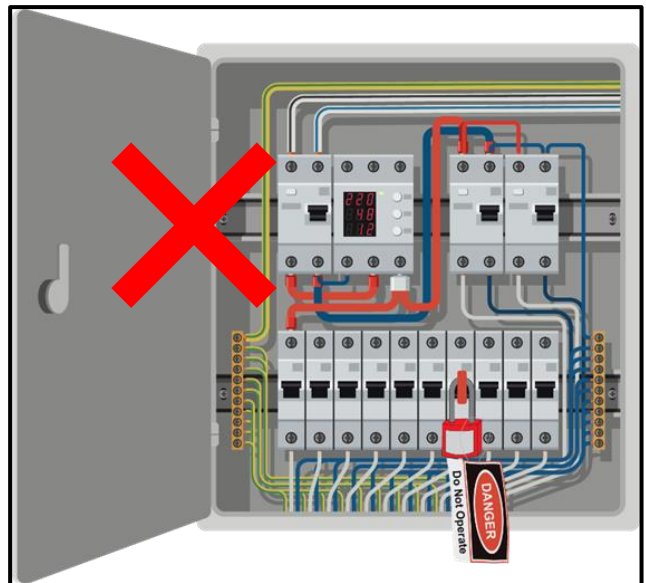
Wearing required PPE.



Advised of relevant site-specific hazards.



Not opening or interfering with control panels, cabinets, or other operational apparatus.



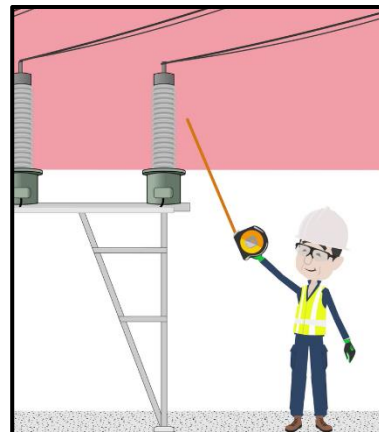
Keeping clear of any exposed LV and ELV conductors.



Given an appropriate entry briefing before entering the entering switchyards or HV areas. This briefing must cover all the relevant points outlined in this handbook including:



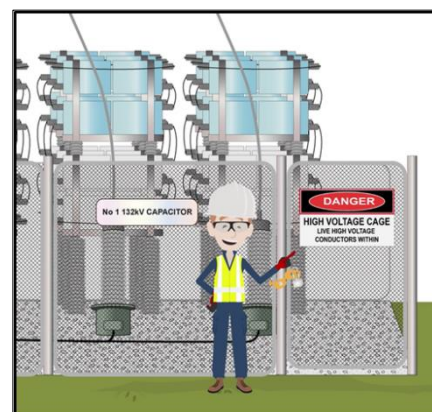
Potential effects to medical implants.



Not taking long objects, ladders, umbrellas, or tape measures into switchyards and HV areas.



Staying at ground level in HV areas and not climbing on HV structures.



Not entering 'No Go' areas.



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