

Engineering Advice Electrical Distribution Unit

EA D 21-05

Returning to normal duties

This Engineering Advice is produced for information and guidance. Adherence to the information in this Advice is recommended but not mandatory.

Date in Force: 22 October 2021

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Approved by:

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Audience:

- All persons performing electrical work in accordance with PR D 78701.
- All persons working near exposed electrical equipment in the rail corridor.
- Project Managers, Facility Managers.

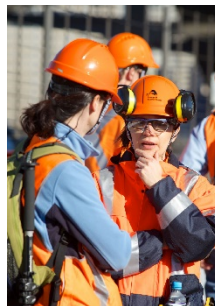
Main Points:

- Take 5 – Stop, Think, Act.
- Look out for your co-workers.
- If you are not confident of working safely please reach out for advice.

Reference Document: PR D 78000 Electrical Network Safety Rules

Scope

Due to our COVID-19 response some staff have been unable to perform normal duties as often as they normally would. Those returning to their duties may be a little out-of-practice, and we ask you all to pause to think about what you are doing, identify how to work safely and look out for your co-workers.



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Action required

- **Take 5** minutes before you start a work activity, think about what you are about to do, what could go wrong and the key safety controls.
- **Look up** – for overhead lines.
- Test OHW structures before touching – they may be **hazardous**.
- Avoid un-necessary contact with rails. If you are working within a track possession - with trains running on adjacent lines - be aware of the possibility of electric shock from the voltage transferred via the bonds between the traction rails, as well as the impulses from track circuits on the signal rail.
- Project Managers, Facility Managers and Team Leaders – if the work involves excavations or drilling holes in structures please ensure live equipment and cables in the immediate vicinity – notably in or behind walls or buried cables – have been **de-energised**.
- Near-misses should be reported and discussed openly, so we can all learn from each other's mistakes - no matter how trivial.
- For electrical staff who have not been switching recently:
 - Line managers are encouraged to consider assigning another authorised operator to observe/assist as needed.
 - Brush up on your communications protocol with ICON (EDU can provide the team managers with materials for coaching).
 - Familiarise yourself with the work area prior to commencing work.
 - Locate and read any of the local instruction and familiarise yourself with any Electrical equipment prior to its operation.

If in doubt, contact your line manager or another Authorised Operator.

Contact

For further information please contact Electrical Distribution Unit

E: RailElectricalSafety@transport.nsw.gov.au

<p>Engineering Advice Electrical Distribution Unit</p>	<p>EA D 19-02</p>
<p>Approved by: Nadine Youssef, Associate Director Electrical Distribution Unit, Sydney Trains</p> <p>Authorised by: Jonathon McKinnon, Engineering Technical Publications Manager, Sydney Trains</p>	<p>Date in Force: 18 April 2019 Date Expires: 18 April 2020</p>
<p>This Engineering Advice is produced for information and guidance. Adherence to the information in this Advice is recommended but not mandatory.</p>	
<p>WORK ON OR NEAR CABLES High Voltage, 1500V and LV Distribution Networks</p>	
<p>Audience:</p> <ul style="list-style-type: none"> • All persons working or supervising or managing work in the railway corridor, including but not limited to: <ul style="list-style-type: none"> – Project teams – all disciplines – Maintenance personnel – all disciplines – Line managers – all disciplines – Project managers – all disciplines – Managers of Fleet Maintenance Centres – Station staff – Electrical workers • SEQR 	<p>Main Points:</p> <ul style="list-style-type: none"> • Electrical work must only be performed by suitably authorised persons • Electrical work must be performed in accordance with Sydney Trains Electrical Network Safety Rules • Treat all cables as live until proven safe • Working on cables (including abandoned cables) is electrical work • Low voltage installations are outside the scope of this Engineering Advice
<p>Reference Document: PR D 78000 Electrical Network Safety Rules</p>	

Scope

All staff – including project teams, maintenance staff, project engineers and line managers - are required to observe Sydney Trains Electrical Network Safety Rules when working on, near or in the vicinity of cables – including abandoned cables.

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Background

Buried cables – even abandoned cables – may pose hazards including contact with electricity, resulting in electric shock or death, as well as non-electrical hazards such as asbestos. In this context hazardous work includes:

- Work on abandoned cables
- Work in the vicinity of buried cables
- Working with tools, plant and machinery in the vicinity of cables
- Drilling holes in poles or walls where cables may be in the wall or on the back side
- Moving live cables
- Excavations in the vicinity of cables

Action required

Line managers, project managers, project teams, maintenance managers and managers of maintenance facilities and stations are reminded of the following mandatory obligations:

- You must search for cables and/or electrical conduits near, adjacent, in or behind walls, or under the worksite, using Dial-Before-You-Dig, Sydney Trains ISS and DSS – in addition to checking for overhead power lines in the vicinity of the worksite. This includes the access route used to move plant and machinery, tools, materials and personnel to/from the worksite
- Treat all cables as live – and hazardous - until proven otherwise
- Work on abandoned cables is considered "electrical work"
- Electrical work must only be performed by an Authorised Person in accordance with PR D 78000 Electrical Network Safety Rules published on the RailSafe website
- Arrange for live cables and equipment in the vicinity of your work to be isolated BEFORE work commences
- Any alternations to cables – including abandoned cables – must be documented and the changes submitted through the normal processes

If you are in any doubt about how to deal with electrical risks at your worksite REQUEST ADVICE from any of the following:

- Associate Director Electrical Distribution Unit, Electrical Distribution Unit
- Professional Head Electrical Engineering, Engineering System Integrity Division
- Senior Manager Electrical Engineering, Network Maintenance Division or
- ICON Electrical

Contact

Electrical Distribution Unit

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Engineering Procedure
Electrical Distribution Unit

PR D 78000

Electrical Network Safety Rules

Version 1.2

Date in Force: 19 February 2019

Approved by: Nadine Youssef
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 Engineering System Integrity

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Disclaimer

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Document control

Version	Date	Author/ Prin. Eng.	Summary of change
1.0	16 May 2016	Nick Loveday	First issue as a Sydney Trains document, rebranded from previous RailCorp SMS-06-EN-0550 V1.2
1.1	10 September 2018	Amy Atkins	Addition of record keeping requirements and update of references to regulations
1.2	19 February 2019	Nick Loveday	Updated roles and position names to reflect the current organisation

Summary of changes from previous version

Summary of change	Section
Updated "Professional Head Electrical Engineering ESI" to "Associate Director Electrical Distribution Unit"	5

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1. Purpose and scope

As an electrical network operator under the Electricity Supply Act, Sydney Trains shall comply with all relevant provisions of the Act and the Electricity Supply (Safety and Network Management) Regulations. Sydney Trains' compliance process to comply with statutory requirements is detailed in PR D 78101 General Requirements for Electrical Work, Clause 2 Statutory requirements.

The purpose of the documents within the Electrical Network Safety Rules (ENSR) manual is to provide electrical work instructions for those persons who are certified to work "on" or "near" electrical assets for the supply of electricity. Certifications are addressed in accordance with the PR D 78701 Personnel Certifications – Electrical.

The instructions in this ENSR manual shall be read in conjunction with, and in addition to, other relevant Safety Management System (SMS) procedures. PR D 78700 Working around Electrical Equipment provides further work instructions for all persons working around, above, in the vicinity, near, or on electrical equipment. Refer to Appendix D Part G References of this procedure for a detailed list of supporting SMS instructions.



NOTE

Work on low voltage electrical installations is outside the scope of the ENSR, and is covered by the SMS instruction D2013/80873 Work on Low Voltage Installations.

2. Background

The ENSR is a manual published on RailSafe. The material in the ENSR has been revised to address:

- Lessons learnt from incidents;
- Issues arisen from electrical safety inspections and audits;
- Incorporation of relevant Engineering Instructions and Industry Safety Notices issued;
- Relevant stakeholders comments received; and
- Latest Australian Standards, codes of practices, industry guidelines or legislation.

The historical development leading to the present manual is described in Appendix A.

3. Overview of Electrical Network Safety Rules (ENSR)

The ENSR manual comprises as follows:

- Introduction
- Part A – General
- Part B – High Voltage
- Part C – 1500 Volt
- Part D – Low Voltage
- Part E – Permits
- Part F – Live Work
- ENSR Comment Form

3.1. Introduction

Reference Number	Instruction Title and Sections
PR D 78000 (previously SMS-06-EN-0550)	Electrical Network Safety Rules <ul style="list-style-type: none">• Purpose and Scope• Background• Overview of Electrical Network Safety Rules (ENSR)• Process• Responsibilities• Training and instruction• Tools and guidance material• Performance measurement, monitoring and review, and corrective action• Record management• Definitions• References• Appendices

3.2. Part A – General

This part includes requirements that apply to working on or near High Voltage AC, Low Voltage AC and 1500V DC RailCorp electrical assets for the supply of electricity. The instructions and their scope are tabulated below:

Reference Number	Instruction Title and Sections
PR D 78100 (previous SMS-06-EN-0551)	Definitions and Conventions for Electrical Safety <ul style="list-style-type: none"> • Purpose and Scope • Conventions used in the RailCorp Electrical Network Safety Rules • Definitions • References
PR D 78101 (previous SMS-06-EN-0552)	General Requirements for Electrical Work <ul style="list-style-type: none"> • Purpose and scope • Statutory requirements • Special exception from working to the SMS • Emergencies involving danger to human life • Reporting dangerous conditions and practices • Safety first • Clothing and footwear • High-visibility clothing • Personal Protective Equipment for operating work • Pre-work briefings and supervision • Work around electrical equipment • Working alone near electrical equipment • Operation of high voltage and 1500 Volt equipment • Entry to substations • Entrances and exits NOT to be obstructed • Precautions when leaving work unfinished • Precautions to be undertaken when lightning is imminent • References • Appendices
PR D 78102 (previous SMS-06-EN-0553)	Electrical Hazards and Warnings <ul style="list-style-type: none"> • Purpose and scope • 'Danger Do Not Operate' tags (DANGER Tags) • Warning signs and protective measures • Electric arcs, Electric shocks and Explosion • Earthing system • Neutral, negative and earth circuits • Rectifier negative • Capacitors • Battery rooms • Current Transformers • Work on or above and roof equipment of electric vehicles • References • Appendices

Reference Number	Instruction Title and Sections
PR D 78108 (previous SMS-06-EN-0554)	Pre-Work Hazard Assessment and Controls for Work on Poles with Live Exposed Equipment <ul style="list-style-type: none"> • Purpose and scope • Hazard assessment • Completion of Pole Hazard Assessment form • Controls • Completed forms • Audits • References • Appendices
PR D 78104 (previous SMS-06-EN-0555)	Locking Systems for Electrical Equipment <ul style="list-style-type: none"> • Purpose and scope • General • Standard locks • Special locks • References
PR D 78107 (previous SMS-06-EN-0556)	Insulated Sticks, Tools and Equipment used for work On, Near or In the Vicinity of Exposed Electrical Equipment – Inspection, Testing, Care and Maintenance <ul style="list-style-type: none"> • Purpose and scope • General • Responsibility • Training • Hazards • Insulated Stick Identification • Care of Insulated Sticks, Tools and Equipment • Cleaning and Maintenance • Inspection of Equipment – General • Inspections of Insulated Sticks, Tools and Equipment • Routine Tests • Replacement of Equipment • References
PR D 78106 (previous SMS-06-EN-0557)	Inspection and Testing of Fixed Electrical Equipment <ul style="list-style-type: none"> • Purpose and scope • 1500 volt or high voltage electrical equipment • Low voltage equipment • References

Reference Number	Instruction Title and Sections
PR D 78109 (previous SMS-06-EN-0558)	Pole Top Rescue Kits <ul style="list-style-type: none"> • Purpose and scope • Work requiring a pole top rescue kit • Hazards • Responsibility • Pole top rescue kit components • Communications • Pre-work inspection of pole top rescue kit • Accompanying person • Pole top rescue kit pre-work set up • Live low voltage rescue procedure • Incapacitated person rescue procedure • Storage of equipment • Inspection of equipment – general • References
PR D 78105 (previous SMS-06-EN-0599)	DANGER Tags for Electrical Equipment <ul style="list-style-type: none"> • Purpose and scope • 'Danger Do Not Operate Tags' (DANGER Tags) • Attachment of DANGER Tags • Information to be included on a DANGER Tag • Removal of a DANGER Tag • References
PR D 78103 (previous SMS-06-EN-0668)	Electrical Operational Communication and Records <ul style="list-style-type: none"> • Purpose and scope • Responsibility • Training • Hazards • Voice Communications • Written Communications • References

3.3. Part B – High Voltage

SMS Reference number	Instruction Title and Sections
PR D 78200 (previous SMS-06-EN-0559)	Description and Labelling of the High Voltage Distribution System <ul style="list-style-type: none"> • Purpose and scope • Instruction <ul style="list-style-type: none"> – High Voltage System Description – High Voltage Feeder Labelling • References
PR D 78201 (previous SMS-06-EN-0560)	Removal & Restoration of High Voltage Supply <ul style="list-style-type: none"> • Purpose and scope • General • High Voltage Cables Or Overhead Lines Outside Substations • High Voltage Equipment within Substations • References
PR D 78202 (previous SMS-06-EN-0561)	Working High Voltage Instruction <ul style="list-style-type: none"> • Purpose and scope • General • Issue of WHVIs Under Normal Conditions • Issue of WHVIs Under Emergency Conditions • Responsibility of the Person in Charge of the WHVI • Backup Record of Permits and/or Operating Agreements • Procedure in Case of the WHVI Being Lost • Cancellation of WHVIs • References • Appendices
PR D 78203 (previous SMS-06-EN-0562)	High Voltage Operating Procedures <ul style="list-style-type: none"> • Purpose and scope • General Requirements <ul style="list-style-type: none"> – Isolation of High Voltage Equipment – Operation of Isolating Devices – Proving Dead of High Voltage Equipment – Earthing High Voltage Equipment – Portable Insulated Operating Sticks – Replacement of HV Fuses • References

<i>SMS Reference number</i>	<i>Instruction Title and Sections</i>
PR D 78204 (previous SMS-06-EN-0563)	Earthing of High Voltage Equipment Using Portable Earthing Equipment <ul style="list-style-type: none"> • Purpose and scope • General Requirements • Hazards • High Voltage Aerial Lines Outside Substations • High Voltage Underground Cables to Aerial Equipment • Equipotential Bonding for Work on Conductive Poles/Structures • Exposed High Voltage Outdoor Busbars at Substations • References • Appendices
PR D 78205 (previous SMS-06-EN-0564)	Inspection and Care of Portable Earthing Equipment for the High Voltage System <ul style="list-style-type: none"> • Purpose and Scope • Definitions • Configuration of Earthing Equipment <ul style="list-style-type: none"> – Substation Earthing Sets – Aerial Line Earthing Set – Identification and Labelling • Inspection and Testing of Earthing Sets • Inspection of Sticks • Defective Equipment • References • Appendices

3.4. Part C – 1500 Volt DC

SMS Reference Number	Instruction Title and Sections
PR D 78300 (previous SMS-06-EN-0565)	Description and Labelling of the 1500 Volt System <ul style="list-style-type: none"> • Purpose and scope • Instruction <ul style="list-style-type: none"> – 1500 Volt Overhead Wiring System – 1500V Overhead Wiring Identification • References
PR D 78301 (previous SMS-06-EN-0566)	Removal and Restoration of 1500 Volt Supply <ul style="list-style-type: none"> • Purpose and scope • General • Removal and Restoration of Supply for Work on or Near 1500 Volt Overhead Wiring which is to be Rail Connected <ul style="list-style-type: none"> – Authority for Removal of Supply from 1500 Volt Sections – Other Network Operator's Services – Procedure for Removing Supply – Rescue Power Outage – Procedure for Restoring Supply • Removal and Restoration of Supply for Work on or Near 1500 Volt Equipment Within Substations • Removal and Restoration of Supply for Engineering Work in Electrical Vehicle Maintenance Centres • Removal of 1500 Volt Supply Under Emergency Conditions • References • Appendices
PR D 78302 (previous SMS-06-EN-0567)	1500 Volt Authority <ul style="list-style-type: none"> • Purpose and scope • General Requirements • Issue of Authorities for Planned Work • Issue of Authorities Under Emergency Conditions • Overhaul of Isolating Links, Switch Pairs and Three Position Switches • Responsibility of the Person in Charge of the Authority • Backup Record of Permits and/or Operating Agreements • Procedure in Case of the Authority Being Lost • Cancellation of Authorities • References • Appendices

SMS Reference Number	Instruction Title and Sections
PR D 78303 (previous SMS-06-EN-0568)	Work on 1500 Volt Negative Equipment Outside Substations <ul style="list-style-type: none"> • Purpose and scope • Safety Principles • Work Which Requires the Substation or Sectioning Hut Negative to be Disconnected from Rail • Rail Spark Gaps • Electrolysis Bonds • References
PR D 78304 (previous SMS-06-EN-0569)	Work on 1500 Volt Negative Equipment Inside Substations <ul style="list-style-type: none"> • Purpose and scope • Instruction <ul style="list-style-type: none"> – Work requiring the substation negative to be disconnected from the rail – Work that requires equipment negatives to be disconnected – Work on substation negative equipment on the rectifier side of the rector • Rail earth contactor • References
PR D 78305 (previous SMS-06-EN-0570)	1500V Operating Procedures <ul style="list-style-type: none"> • Purpose and scope • Isolation of 1500 Volt Equipment • Operation of Overhead Wiring Isolating Devices • DANGER Tags • Identification of Traction Rail • Proving Dead 1500 Volt Equipment • Approved Test Equipment • Rail Connecting 1500 Volt Equipment • References

SMS Reference Number	Instruction Title and Sections
PR D 78306 (previous SMS-06-EN-0571)	Overhead Wiring Structure to Rail Voltage Test <ul style="list-style-type: none"> • Purpose and scope • Definitions • Background • Situations that require the Overhead Wiring structure to rail voltage test • Equipment to be used for the Overhead Wiring structure to rail voltage test • Procedure and 'safety' criterion common for using either tester • Procedure for measuring the Overhead Wiring structure to rail voltage from a rail vehicle by using the Fluke Tester • Procedure for measuring the Overhead Wiring structure to rail voltage from the ground by using the Fluke Tester • Procedure for measuring the OHW structure to rail voltages by using the Hivotech Tester • References
PR D 78307 (previous SMS-06-EN-0572)	Inspection and Care of Portable Rail Connecting Equipment for 1500 Volt Overhead Wiring <ul style="list-style-type: none"> • Purpose and scope • Definitions • Configuration of Portable Rail Connecting Equipment • Inspection and Testing of Portable Rail Connecting Equipment • References • Appendices

3.5. Part D – Low Voltage

Note: Work on low voltage electrical installations is outside the scope of the ENSR, and is covered by the SMS instruction *D2013/80873 Work on Low Voltage Installations*.

SMS Reference Number	Instruction Title and Sections
PR D 78400 (previous SMS-06-EN-0573)	Description and Labelling of the Low Voltage Distribution System <ul style="list-style-type: none"> • Purpose and scope • Instruction <ul style="list-style-type: none"> – Circuit labelling • References
PR D 78401 (previous SMS-06-EN-0574)	Isolation and Energisation of Low Voltage Equipment <ul style="list-style-type: none"> • Purpose and scope • General • Isolation of Low Voltage Equipment • DANGER Tags • Proving Dead of Low Voltage Equipment • Energising Low Voltage Equipment • References
PR D 78402 (previous SMS-06-EN-0575)	Work on the Low Voltage Distribution System <ul style="list-style-type: none"> • Purpose and scope • Instruction <ul style="list-style-type: none"> – General Safety Requirements – Non-contact LV Voltage Detectors – Warnings – Work on Low Voltage Aerial Lines – Work on Low Voltage Substation Controls and Auxiliaries – Phase Identification of 3-Phase Low Voltage Services • References

3.6. Part E – Permits

SMS Reference Number	Instruction Title and Sections
PR D 78500 (previous SMS-06-EN-0577)	Electrical Permits <ul style="list-style-type: none"> • Purpose and scope • Instruction <ul style="list-style-type: none"> – Responsibility – Principles – Types of Permit – Retention period of cancelled Electrical Permits • References
PR D 78501 (previous SMS-06-EN-0598)	Electrical Permit to Work <ul style="list-style-type: none"> • Purpose and scope • Responsibility • Overview of the Electrical Permit System • General Requirements • Details Specified on the Electrical Permit • Writing, Checking, Instructing, Issuing and Cancelling Permits • Permit Holders • Responsibility of the Person Instructing Prospective Permit Holders • Responsibility of the Person Issuing the Permit • Return of the Permit • Responsibility of the Person Cancelling the Permit • Test Electrical Permit to Work • Use of Work Area Markers • Loss of an Electrical Permit to Work Booklet • Associating Electrical Permits with several WHVIs and/or Authorities • Electrical Permit Issued for the Purpose of Issuing a Substation Access Permit • References • Appendices

SMS Reference Number	Instruction Title and Sections
PR D 78502 (previous SMS-06-EN-0583)	Substation Access Permit <ul style="list-style-type: none"> • Purpose and scope • Responsibility • System Overview • General Requirements • Details Specified on the Permit • Writing, Checking, Instructing, Issuing and Cancelling Permits • Permit Holders • Responsibility of the Person Issuing the Permit • Return of the Permit • Responsibility of the Person Cancelling the Permit • Extraordinary Substation Access Permit • Test Substation Access Permit • Procedure in case of a Permit being Lost • References • Appendices
PR D 78503 (previous SMS-06-EN-0584)	Low Voltage Access Permits <ul style="list-style-type: none"> • Purpose and scope • Responsibility • System Overview • General Requirements • Details Specified on the Permit • Writing, Checking, Instructing, Issuing and Retrieving Permits • Permit Holders • Responsibility of the Person Instructing the Permit Holder • Responsibility of the Person Issuing the Permit • Return of the Permit • Responsibility of the Person Retrieving the Permit • Procedure in case of a Permit being Lost • References • Appendices
PR D 78504 (previous SMS-06-EN-0585)	Operating Agreements <ul style="list-style-type: none"> • Purpose and Scope • Responsibility • System Overview • General Requirements • Details Specified in the Operating Agreement • Writing, Checking, Instructing, Issuing and Retrieving Operating Agreements • Responsibility of the Person Issuing the Operating Agreement • Responsibility of the Person Retrieving the Operating Agreement • References • Appendices

Part F – Live Work

<i>SMS Reference Number</i>	<i>Instruction Title and Sections</i>
PR D 78403 (previous SMS-06-EN-0590)	Work on Live Low Voltage Equipment <ul style="list-style-type: none">• Purpose and scope• Legislation• Work that shall not be carried out live• Hazards relating to live work• Hazard controls for work on or near energised LV equipment, including installations• Working on live Low Voltage (LV) aerial lines• Working on live Low Voltage (V) equipment or installations• References

3.7. ENSR Comment Form

<i>SMS Reference Number</i>	<i>Instruction Title</i>
PR D 78000 FM 01 (previous SMS-06-FM-0712)	ENSR Comment Form

4. Process

The ENSR is subject to continuous improvement as a result of:

- Feedback and suggestions from users via the use of *PR D 78000 FM 01 ENSR Comment Form*;
- Recommendations and lessons learned arising from incident investigations;
- Introduction of new technology;
- Revision of Australian Standards, codes of practices, industry guidelines or legislation;
- Initiative to improve work processes; and
- Periodic review (3-yearly).

The process for user feedback is via the submission of a *PR D 78000 FM 01 ENSR Comment Form* to the document custodian for the document concerned.

Generally documents making up the ENSR will be revised individually or as a group of related documents. Other than minor and editorial amendments, a consultative working party will be formed for each document or group of documents being revised. Consultative working parties shall include front line users, line managers / supervisors, and representatives of the document custodian. Others such as subject matter experts may be invited to join consultative working parties as appropriate.

Changed requirements will be communicated to users via Engineering Instructions, Special Briefings or in conjunction with the periodic re-certification process.

5. Responsibilities

Position or Role	Performance requirements
Associate Director Electrical Distribution Unit	<p>The Associate Director Electrical Distribution Unit owns the technical authority of these Instructions and shall:</p> <ul style="list-style-type: none"> • facilitate the ongoing refinement of the ENSR in response to legislation changes, changed industry practices, changes in technology, users' feedback, and lessons learnt from incidents; and • approve/endorse new or updated documents.
Managers and Supervisors	<p>Managers and Supervisors shall:</p> <ul style="list-style-type: none"> • ensure all persons, including contractors, undertaking electrical work are appropriately qualified, and their competencies maintained, in accordance with <i>PR D 78701 – Personnel Certifications – Electrical</i>; • ensure appropriate Personal Protective Equipment (PPE), tools and equipment for electrical work, are issued, used, inspected and maintained in accordance with Sydney Trains and/or Industry Standards; • ensure persons under their control are familiar, and comply with the requirements of these Instructions; • undertake periodic reviews to ensure compliance with ENSRs; and • review completed forms including Electrical Permits.
Employees and contractors	<p>Employees and contractors shall:</p> <ul style="list-style-type: none"> • comply with the requirements of these Instructions; • raise any queries or concerns on the ENSRs with their supervisors or managers; • inspect any PPE, tools or equipment issued, prior to use, to make sure they are serviceable; and • be appropriately qualified, and maintain currency of competence.
Stakeholders	<p>Any stakeholder of this Manual may provide comments to any part, section or paragraph via the use of <i>PR D 78000 FM 01 ENSR Comment Form</i>.</p>

6. Training and instruction

Only persons properly trained and qualified in accordance with the requirements of these ENSR Instructions and *PR D 78701 Personnel Certifications – Electrical Authorisations* may undertake tasks for which specific training or Authorisation is prescribed. The latter instruction also specifies provisions for persons under training and the requirements for re-certification.

7. Tools and guidance material

Not applicable.

8. Performance measurement, monitoring and review, and corrective action

Monitoring compliance with the ENSR instructions may be achieved by including, but not limited to the following:

- Field audits undertaken by line management and other Sydney Trains personnel with specific duties on safety audits and mentoring;
- Line management review of completed Electrical Permits and other safety documents; and
- Incident investigations to ensure that the causes and major contributing factors leading to the incidents are identified and remedial measures timely implemented to avoid recurrence.

Corrective actions may include, but not be limited to:

- Issue of Engineering Instructions; and
- Revision of relevant ENSRs.

9. Record management

Depending on the nature of the individual instruction, it may not be necessary for records to be required to be kept, especially for those describing technical information only.

For electrical work, the risk assessment and the SWMS are to be readily accessible to any worker engaged to carry out the electrical work or upon request for inspection. The risk assessment is to be kept for at least 28 days after the work is completed and the SWMS is to be kept until the work it relates to is completed. If a notifiable incident occurs, the risk assessment or the SWMS (as applicable) must be kept for at least 2 years after the incident.

Where required, records are to be maintained according to *SMS-09-SP-3021 System Procedure 09: Records Management*. Records produced when implementing these Instructions include, but not be limited to:

- (a) Forms used in conjunction with relevant instructions, such as those related to the issue of Electrical Permits;
- (b) Incident investigation reports;
- (c) External audit/performance reports;
- (d) In-house audit reports;
- (e) Training and re-certification records; and
- (f) Inspection reports

10. Definitions

These are included in PR D 78100 Definitions and Conventions for Electrical Safety.

11. References

- Rail Safety (Adoption of National Law) Act 2012
- Rail Safety (Adoption of National Law) National Regulations 2012
- Electricity Supply Act 1995
- Electricity Supply (Safety and Network Management) Regulation 2014
- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2017
- Relevant standards and industry guidelines or codes of practices (as listed after each relevant individual instruction in that instruction)
- PR D 78700 Working around Electrical Equipment
- PR D 78703 Printing and Supply of Electrical Permit to Work booklets
- D2013/80544 Working in Accordance with an Electrical Permit
- D2013/80869 Electrical Shock Protocol
- D2013/80870 Rescue from Live Low Voltage (Including Rescue Kit Care)
- D2013/80871 Electrical Equipment – Selection, Inspection, and Testing
- D2013/80872 Inspection and Testing of Insulated Sticks, Tools and Equipment used for work On, Near or In the Vicinity of Exposed 1500V OHW or Equipment
- D2013/80873 Work on Low Voltage Installations
- D2013/81208 Electrical Practices for Construction Work
- PR D 78701 Personnel Certifications – Electrical

11.1. Document Index

General

Title	New Reference Number	Old Reference Number
Electrical Network Safety Rules	PR D 78000	SMS-06-EN-0550
Definitions and Conventions for Electrical Safety	PR D 78100	SMS-06-EN-0551
General Requirements for Electrical Work	PR D 78101	SMS-06-EN-0552
Electrical Hazards and Warnings	PR D 78102	SMS-06-EN-0553
Electrical Operational Communication Records	PR D 78103	SMS-06-EN-0668
Locking Systems for Electrical Equipment	PR D 78104	SMS-06-EN-0555
DANGER Tags for Electrical Equipment	PR D 78105	SMS-06-EN-0599
Inspection and Testing of Fixed Electrical Equipment	PR D 78106	SMS-06-EN-0557
Insulated Sticks, Tools and Equipment used for work On, Near or In the Vicinity of Exposed Electrical Equipment - Inspection, Testing, Care and Maintenance	PR D 78107	SMS-06-EN-0556
Pre-Work Hazard Assessment and Controls for Work on Poles with Live Exposed Equipment	PR D 78108	SMS-06-EN-0554
Pole Top Rescue Kits	PR D 78109	SMS-06-EN-0558

High Voltage AC

Title	New Reference Number	Old Reference Number
Description and Labelling of the High Voltage Distribution System	PR D 78200	SMS-06-EN-0559
Removal & Restoration of High Voltage Supply	PR D 78201	SMS-06-EN-0560
Working High Voltage Instruction	PR D 78202	SMS-06-EN-0561
High Voltage Operating Procedures	PR D 78203	SMS-06-EN-0562
Earthing of High Voltage Equipment Using Portable Earthing Equipment	PR D 78204	SMS-06-EN-0563
Inspection and Care of Portable Earthing Equipment for the High Voltage System	PR D 78205	SMS-06-EN-0564

1500V DC

Title	New Reference Number	Old Reference Number
Description and Labelling of the 1500 Volt System	PR D 78300	SMS-06-EN-0565
Removal and Restoration of 1500 Volt Supply	PR D 78301	SMS-06-EN-0566
1500 Volt Authority	PR D 78302	SMS-06-EN-0567
Work on 1500 Volt Negative Equipment Outside Substations	PR D 78303	SMS-06-EN-0568
Work on 1500 Volt Negative Equipment Inside Substations	PR D 78304	SMS-06-EN-0569
1500 V Operating Procedures	PR D 78305	SMS-06-EN-0570
Overhead Wiring Structure to Rail Test	PR D 78306	SMS-06-EN-0571
Inspection and Care of Portable Rail Connecting Equipment for 1500 Volt Overhead Wiring	PR D 78307	SMS-06-EN-0572

Low Voltage AC

Title	New Reference Number	Old Reference Number
Description and Labelling of the Low Voltage Distribution System	PR D 78400	SMS-06-EN-0573
Isolation and Energisation of Low Voltage Equipment	PR D 78401	SMS-06-EN-0574
Work on the Low Voltage Distribution System	PR D 78402	SMS-06-EN-0575
Work on Live Low Voltage Equipment	PR D 78403	SMS-06-EN-0590

Electrical Permits

Title	New Reference Number	Old Reference Number
Electrical Permits	PR D 78500	SMS-06-EN-0577
Electrical Permit to Work	PR D 78501	SMS-06-EN-0598
Substation Access Permit	PR D 78502	SMS-06-EN-0583
Low Voltage Access Permits	PR D 78503	SMS-06-EN-0584
Operating Agreements	PR D 78504	SMS-06-EN-0585

Electrical Forms

Title	New Reference Number	Old Reference Number
Test Sheet for Insulated Sticks, Tools and Equipment used On, Near or In the Vicinity of Exposed 1500V	PR D 78107 FM 01	SMS-06-FM-0468
ENSR Comment Form	PR D 78000 FM 01	SMS-06-FM-0712
Pre-work Pole Hazard Assessment	PR D 78108 FM 01	SMS-06-FM-0593
Working High Voltage Instruction	PR D 78202 FM 01	SMS-06-FM-0603
Inspection of Portable Earthing Equipment for the High Voltage System	PR D 78205 FM 01	SMS-06-FM-0742
Notification for the Removal of 1500V Supply in EVMCs	PR D 78301 FM 01	SMS-06-FM-0604
Authority for Removal of Supply from 1500V Sections	PR D 78302 FM 01	SMS-06-FM-0602
Portable Rail Connecting Equipment Inspection Sheet	PR D 78307 FM 01	SMS-06-FM-0601
Request for Electrical Permit to Work	PR D 78501 FM 01	SMS-06-FM-0484
Portable Rail Connection / Earthing Schedule	PR D 78501 FM 02	SMS-06-FM-0600
6 Personnel Register Cover	PR D 78501 FM 03	SMS-06-FM-0616
26 Personnel Register Cover	PR D 78501 FM 04	SMS-06-FM-0618
Electrical Permit to Work (Do Not remove from booklet)	PR D 78501 FM 05	SMS-06-FM-0582
Electrical Permit to Work (To be removed by Permit Issuer)	PR D 78501 FM 06	SMS-06-FM-0666
6 Personnel Register	PR D 78501 FM 07	SMS-06-FM-0579
26 Personnel Register	PR D 78501 FM 08	SMS-06-FM-0581
Substation Access Permit	PR D 78502 FM 01	SMS-06-FM-0594

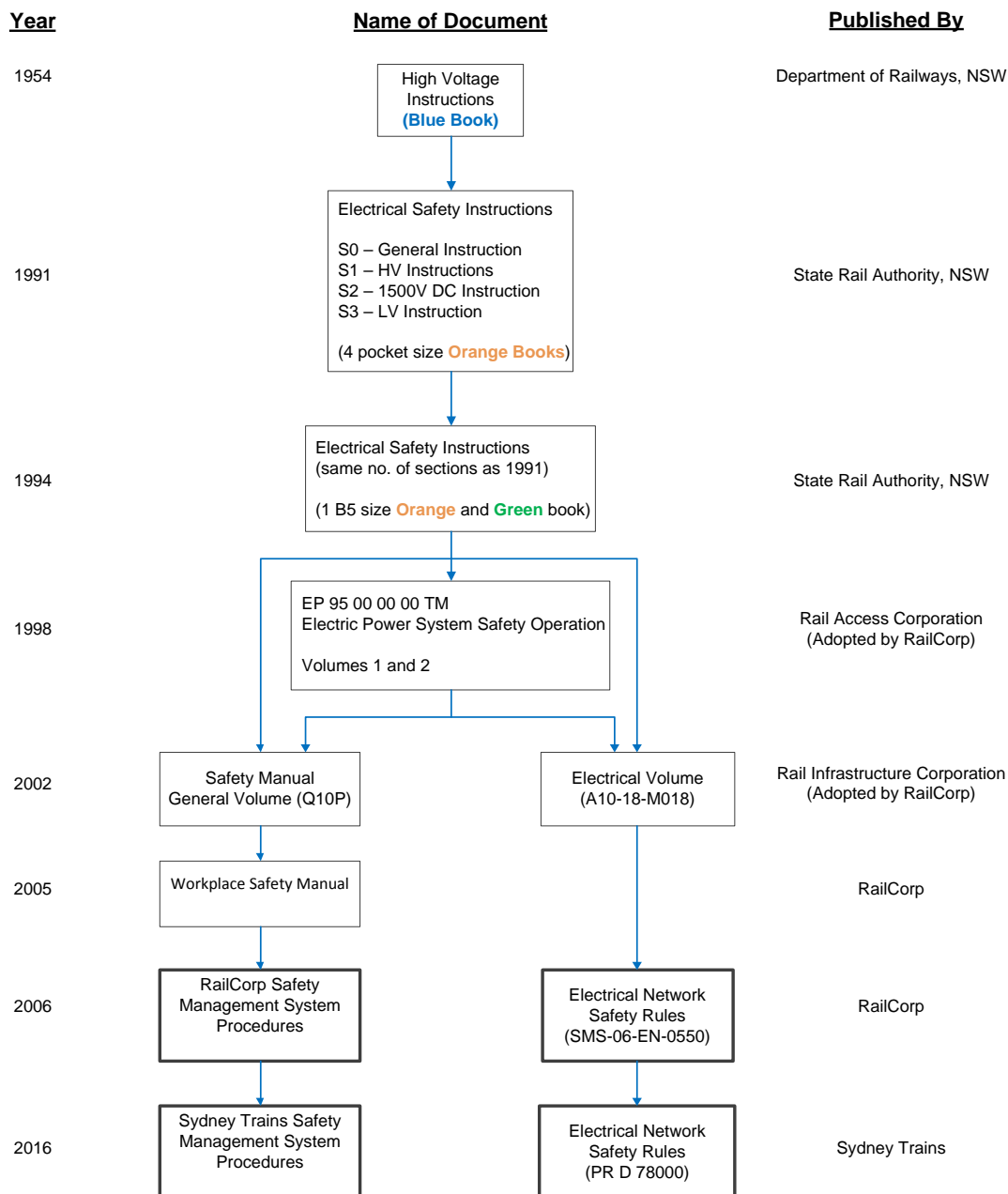
Title	New Reference Number	Old Reference Number
Substation / Low Voltage Personnel Register	PR D 78502 FM 02	SMS-06-FM-0713
Low Voltage Access Permits	PR D 78503 FM 01	SMS-06-FM-0595
Operating Agreement	PR D 78504 FM 01	SMS-06-FM-0596
Electrical Equipment Environment Assessment	N/A	SMS-06-FM-0279
Electrical Equipment Inspection and Test Record	N/A	SMS-06-FM-0278
Supervisor Letter - Distribution - Re-certification	<u>PR D 78701 FM 01</u>	FM D 78623
Supervisor Letter - Mains - Re-certification	<u>PR D 78701 FM 02</u>	FM D 78624
Supervisor Letter - Authorised Person (Low Voltage) - Re-certification	<u>PR D 78701 FM 03</u>	FM D 78625
Application for Certification / Recertification in Authorised for Entry	<u>PR D 78701 FM 04</u>	FM D 78626

Electrical Guides and SWIs

Title	New Reference Number	Old Reference Number
Working around Electrical Equipment	PR D 78700	SMS-06-GD-0268
Personnel Certifications - Electrical	PR D 78701	SMS-11-GD-0244
Guide for the Stringing of 1500V OHW Conductors in the Vicinity of Existing Electrical Equipment	PR D 78702	SMS-06-GD-1588
Printing and Supply of Electrical Permit to Work booklets	PR D 78703	SMS-06-GD-0667
PPE for Electrical Work	D2013/80874	SMS-06-SW-0538
Electric Shock Protocol	D2013/80869	SMS-06-SW-0269
Rescue from Live Low Voltage (Including Rescue Kit Care)	D2013/80870	SMS-06-SW-0271
Working in Accordance with an Electrical Permit	D2013/80544	SMS-06-SW-0267
Work on Low Voltage Installations	D2013/80873	SMS-06-SW-0276
Electrical Equipment - Selection, Inspection and Testing	D2013/80871	SMS-06-SW-0274
Inspection and Testing of Insulated Sticks, Tools and Equipment used for work On, Near or in the Vicinity of Exposed 1500V OHW or Equipment	D2013/80872	SMS-06-SW-0275
Electrical Practices for Construction Work	D2013/81208	SMS-06-SW-0298

12. Appendices

Appendix A Historical Development of Electrical Network Safety Rules



Appendix B Forms used in the ENSR manual and related SMS documents

Form No.	Title of Form	Rule Reference
D2018/8994	Electrical Equipment Inspection and Test Record	D2013/80871
SMS-06-FM-0279	Electrical Equipment Environment Assessment	D2013/80871
PR D 78107 FM 01	Test Sheet for Insulated Sticks, Tools and Equipment used On, Near or In the Vicinity of Exposed 1500V	PR D 78107
PR D 78501 FM 01	Request for Electrical Permit to Work	PR D 78302 PR D 78501 PR D 78700 D2013/80544
PR D 78501 FM 07	6-Personnel Register	PR D 78501 D2013/80544
PR D 78501 FM 08	26-Personnel Register	PR D 78501 D2013/80544
PR D 78501 FM 05	Electrical Permit to Work (Do Not remove from booklet)	PR D 78107 PR D 78501 D2013/80544
PR D 78108 FM 01	Pole Hazard Assessment	PR D 78108 PR D 78403
PR D 78502 FM 01	Substation Access Permit	PR D 78502 D2013/80544
PR D 78503 FM 01	Low Voltage Access Permit	PR D 78503 D2013/80544
PR D 78504 FM 01	Operating Agreement	PR D 78504
PR D 78501 FM 02	Portable Rail Connection / Earthing Schedule	PR D 78202 PR D 78302 PR D 78504 PR D 78501

Form No.	Title of Form	Rule Reference
PR D 78307 FM 01	Portable Rail-Connecting Equipment Inspection Sheet	PR D 78307
PR D 78302 FM 01	Authority for Removal of Supply from 1500V Sections	PR D 78107 PR D 78302
PR D 78202 FM 01	Working High Voltage Instruction	PR D 78202
PR D 78301 FM 01	Notification for the Removal of 1500 Volt Supply for Engineering Work in EVMCs	PR D 78301
PR D 78501 FM 03	6-Personnel Register Cover	PR D 78501 D2013/80544
PR D 78501 FM 04	26-Personnel Register Cover	PR D 78501 D2013/80544
PR D 78501 FM 06	Electrical Permit to Work (To be removed by Permit Issuer)	PR D 78501 D2013/80544
PR D 78000 FM 01	ENSR Comment Form	PR D 78000
PR D 78502 FM 02	Substation / Low Voltage Personnel Register	PR D 78502 PR D 78503 D2013/80544
PR D 78205 FM 01	Inspection of Portable Earthing Equipment for the High Voltage System	PR D 78205

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Appendix C EP Specifications for Electrical Safety Equipment

<i>EP Document number</i>	<i>Title</i>
EP 15 00 00 01 SP	High Voltage AC Voltage Detector (Nominal Voltage of 11 kV – 66 kV)
SP E 70000	Voltage Detector for use on 1500V DC Overhead Wiring
SP E 70001	Voltage Detector for use on 1500V DC Equipment Inside Substations
EP 15 00 00 04 SP	Pole Top Rescue Kits
EP 15 10 00 03 SP	1500V OHW Attached Climbing Kit Assembly
SP E 70003	Requirements for Portable Earthing Equipment for the High Voltage System
EP 95 20 00 06 SI	Methods of Rail Connecting 1500 Volt Overhead Wiring

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Appendix D Guidance Notes for Assembling Hard Copies of ENSR Manuals

D.1 Introduction

The purpose of these guidance notes is to enable respective Document Controllers to assemble hard copies of the ENSR, which will be issued to the field teams by these Document Controllers for their ready reference.

D.1 Parts of the Electrical Network Safety Rules (ENSR)

The ENSR comprises as follows:

Introduction

Part A – General

Part B – High Voltage

Part C – 1500 Volt DC

Part D – Low Voltage

Part E – Permits

Part F – Live Work

Part F – References

ENSR Comment Form

D.1 Assembly Instructions

- a) The Documents to be contained in each part are as listed in Section 3 of *PR D 78000 Electrical Network Safety Rules*.
- b) All individual instructions should be downloaded from RailSafe.
- c) A hard cover ring binder with a clear front sleeve and spine sleeve, and of sufficient thickness to accommodate up to 50 documents, should be used.
- d) The front cover art work on page **Error! Bookmark not defined.** is to be inserted in the front clear sleeve of the ring binder. The spine cover artwork on page 38 is to be trimmed in accordance with the folder spine size, and inserted in the clear sleeve of the spine of the ring binder.
- e) The ring binder should be partitioned by white divider tabs into 8 parts (i.e. Introduction, Parts A to F, and ENSR Comment Form). Each part shall be labelled as in Section D.2 above. All labels should be easily readable as soon as the ring binder is opened.
- f) Each part should be headed with a list of documents contained in that part. The list of documents should appear behind the white divider for the part. Artwork for each part is located on pages 30 to 38.

Part A General

<i>SMS Reference number</i>	<i>Instruction Title</i>
PR D 78100	Definitions and Conventions for Electrical Safety
PR D 78101	General Requirements for Electrical Work
PR D 78102	Electrical Hazards and Warnings
PR D 78108	Pre-work Hazard Assessment and Controls for Work on Poles with Live Exposed Equipment
PR D 78104	Locking Systems for Electrical Equipment
PR D 78107	Insulated Sticks, Tools and Equipment used for work On, Near or In the Vicinity of Exposed Electrical Equipment – Inspection, Testing, Care and Maintenance
PR D 78106	Inspection and Testing of Fixed Electrical Equipment
PR D 78109	Pole Top Rescue Kits
PR D 78105	DANGER Tags for Electrical Equipment
PR D 78103	Electrical Operational Communications and Records

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Part B High Voltage

SMS Reference number	Instruction Title
PR D 78200	Description and Labelling of the High Voltage Distribution System
PR D 78201	Removal & Restoration of High Voltage Supply
PR D 78202	Working High Voltage Instruction
PR D 78203	High Voltage Operating Procedures
PR D 78204	Earthing of High Voltage Equipment Using Portable Earthing Equipment
PR D 78205	Inspection and Care of Portable Earthing Equipment for the High Voltage System

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Part C 1500 Volt DC

<i>SMS Reference number</i>	<i>Instruction Title</i>
PR D 78300	Description and Labelling of the 1500 Volt System
PR D 78301	Removal and Restoration of 1500 Volt Supply
PR D 78302	1500 Volt Authority
PR D 78303	Work on 1500 Volt Negative Equipment Outside Substations
PR D 78304	Work on 1500 Volt Negative Equipment Inside Substations
PR D 78305	1500 Volt Operating Procedures
PR D 78306	Overhead Wiring Structure to Rail Voltage Test
PR D 78307	Inspection and Care of Portable Rail Connecting Equipment for 1500 Volt Overhead Wiring

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Part D Low Voltage

<i>SMS Reference number</i>	<i>Instruction Title</i>
PR D 78400	Description and Labelling of the Low Voltage Distribution System
PR D 78401	Isolation and Energisation of Low Voltage Equipment
PR D 78402	Work on the Low Voltage Distribution System

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Part E Permits

<i>SMS Reference number</i>	<i>Instruction Title</i>
PR D 78500	Electrical Permits
PR D 78501	Electrical Permit to Work
PR D 78502	Substation Access Permit
PR D 78503	Low Voltage Access Permit
PR D 78504	Operating Agreements

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Part F Live Work

<i>SMS Reference number</i>	<i>Instruction Title</i>
PR D 78403	Work on Live Low Voltage Equipment

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Part G References

<i>SMS Reference number</i>	<i>Instruction Title</i>
PR D 78700	Working around Electrical Equipment
PR D 78703	Printing and Supply of Electrical Permit to Work booklets
D2013/80544	Working in Accordance with an Electrical Permit
D2013/80869	Electrical shock protocol
D2013/80870	Rescue from Live Low Voltage (Including Rescue Kit Care)
D2013/80871	Electrical Equipment – Selection, Inspection, and Testing
D2013/80872	Inspection and Testing of Insulated Sticks, Tools and Equipment used for work On, Near or In the Vicinity of Exposed 1500V OHW or Equipment
D2013/80873	Work on Low Voltage Installations
D2013/81208	Electrical Practices for Construction Work
PR D 78701	Personnel Certifications - Electrical Authorisations

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ELECTRICAL NETWORK SAFETY RULES



ELECTRICAL NETWORK SAFETY RULES

