

Engineering Procedure
Electrical Distribution Unit

PR D 78108

Pre-work Hazard Assessment and Controls for Work on Poles with Live Exposed Equipment

Version 1.2

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Document control

Version	Date	Author/ Prin. Eng.	Summary of change
1.0	11 November 2015	Chris Leung	First issue as a Sydney Trains document, rebranded from previous RailCorp SMS-06-EN-0554 V1.2
1.1	26 February 2016	Chris Leung	Updated checker responsibilities
1.2	19 February 2019	Nick Loveday	Updated PR D 78108 "Approved by" to Associate Director Electrical Distribution Unit

Summary of changes from previous version

Summary of change	Section

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1. Purpose and scope

The purpose of this procedure is to identify and mitigate the risks associated with working on poles or structures supporting live exposed High Voltage or Low Voltage electrical equipment, even when it is not intended to work on or near the live equipment

This procedure applies to all workers when working more than one metre above the ground on RailCorp poles or structures supporting live exposed electrical equipment, including working from an Elevating Work Platform (EWP).

“Structures” includes all freestanding structures such as poles and towers of timber, steel, concrete or other construction.

The Pole Hazard assessment required by this procedure is, in addition to a Safe Work Method Statement, prepared in accordance with SMS-06-OP-3043 Managing Risks Using Safe Work Practices.



NOTE

This procedure does not apply to work on poles or structures that support only Extra Low Voltage Equipment or 1500 Volt Overhead Wiring.

2. Hazard assessment

PR D 78700 Working around Electrical Equipment Clause 5.2 requires that “Persons planning work around electrical equipment shall ensure that the work is assessed and planned to enable the highest practicable level of risk control to be applied”. Refer to PR D 78700 for details.

For a pole with multiple circuits, PR D 78108 FM 01 Pre-work Pole Hazard Assessment shall be completed prior to work commencement if there is exposed electrical equipment on the pole, even if a Permit has been received for isolated equipment to be worked on or near at the same pole.

A separate Pre-work Pole Hazard Assessment form shall be completed for each pole on which work is to be carried out except where:

- a number of poles are included in a single job,
- the arrangement of conductors on the poles are identical, and
- the same work is to be performed on each pole.

3. Completion of Pre-work Pole Hazard Assessment form

3.1. General

The *Pre-work Pole Hazard Assessment* form may be downloaded from [RailSafe](#) or reproduced as required by photocopier (A4 size).

The *Pre-work Pole Hazard Assessment* form is to be completed as an original only. A book copy is not permitted.

The *Pre-work Pole Hazard Assessment* form is to be completed by a member of the team doing the work. If the worker completing the form is not an Authorised Person (Mains), the form shall be countersigned as “checked” by an Authorised Person (Mains).

Where practicable, all members of the work team shall discuss and agree on the possible hazards associated with the work to be carried out. All workers assisting with the work on the pole shall read the completed *Pre-work Pole Hazard Assessment* form and acknowledge this by signature.

Most questions require “Yes” or “No” answers. In some cases, “N/A” (not applicable) is an acceptable response where the circumstance or situation does not exist for the pole or structure to be climbed up (e.g. The ‘Permit number’ will be “N/A” if the work does not require issuing an Electrical Permit).

3.2. Identification

3.2.1. General

The first section of the form provides for the identification of each circuit on the pole and for each to be nominated as “alive”, “dead” or “earthed”.

In the case of communications cables write “Communications” or “Comms” on the line for “Voltage”. The “Owner / Operator” line may be left blank for communications cables if this information is unknown.

For all electricity distribution circuits on the pole, the voltage shall be correctly identified to ensure that the correct *Safe Approach Distances* are considered. If the voltage can not readily be ascertained, and the use of higher *Safe Approach Distances* will not prevent the efficient performance of the required work, the voltage of a circuit shall be taken to be the highest voltage consistent with the arrangement and insulators used.



NOTE

Refer to PR D 78700 *Working around Electrical Equipment* for applicable *Safe Approach Distances*.

If the use of higher *Safe Approach Distances* will prevent the efficient performance of the required work, the actual circuit voltage shall be ascertained.

3.2.2. Substation location poles

Special consideration should be given on locations with pole-mounted transformers fed from the main HV feeder via air break switches (ABS) and HV fuses.

Practically there are three (3) ‘circuits’ to be considered when filling the *Pre-work Pole Hazard Assessment* form at such locations:

- (i) The HV circuit between the ABS and main HV feeder – this will remain energised if the ABS is opened and isolated to enable work to be carried out on the transformer.
- (ii) The HV aerial connection between the ABS and the HV terminal of the transformer via the HV fuses – this will be de-energised upon opening of the ABS.
- (iii) The low voltage (LV) outgoing circuit from the transformer secondary – this should be de-energised upon opening the ABS or removal of HV fuses. However, care shall be exercised to check and ensure that there is no backfeed from other possible LV sources.



Warning

Where back-up supplies are provided, electro-mechanical interlocks usually prevent feedback from the alternative source. However, due to the presence at some locations of electronic changeover equipment or Uninterruptible Power Supplies (UPS), solar grid inverters or capacitors, great care shall be taken when isolating LV circuits.

3.3. Relationship to the work

The second section of the form requires the consideration of the relative position of each circuit with respect to the work area and also to the access to the work area.

3.3.1. Application of Safe Approach Distances

In relation to *Safe Approach Distances*, the worker completing the *Pre-work Pole Hazard Assessment* form, having established the Safe Approach Distances for each live circuit shall then relate this distance to physical “landmarks” such as pole steps. They should determine that such physical landmarks to which they may contact with their body and/or the tools they hold during completion of the proposed work are outside the applicable *Safe Approach Distance*.

3.3.2. Raising or lowering conductors or conductive equipment

The need to raise or lower conductors or conductive equipment through or past live equipment shall be considered. This consideration shall include earthing sets. Can such equipment be raised or lowered safely whilst keeping the equipment outside the minimum Safe Approach Distance?

4. Controls

The third section of the form documents controls put in place to mitigate the identified hazards.

4.1. Pole markers

Suitable pole markers are appropriate controls in some circumstances.

The use of pole markers is mandatory to warn people not to climb up, in the following two situations:

- (a) marking of poles that are outside but physically close to the electrically safe work area and hence not to be worked on, and
- (b) marking the upper limit of approach when working on the lower circuit erected on poles with the upper circuit live.

A suitable pole marker is shown in Figure 1. This is made of plasticised fabric and is secured around the pole by means of Velcro.



Figure 1 A suitable pole marker



Figure 2 Applying a pole marker at normal eye-viewing height

The pole marker can be easily applied on the pole at normal eye-viewing height (Figure 2), or up the pole via the use of an elevating work platform (Figure 3).



Figure 3 Applying the pole marker from EWP

If the poles are outside the railway corridor, the pole marker should be applied with sufficient clearance from ground so that it cannot be removed by an unauthorised person without the use of any climbing aid.

Care shall be exercised when applying the pole marker below the upper live circuit to ensure that the relevant minimum Safe Approach Distances from live conductors are not infringed. If the risk for applying the pole marker is higher than not applying it, e.g. at pole-mounted substation location poles, other means to warn people not to climb up shall be considered.

If erected up the pole, it can be easily removed via the use of an insulated stick from ground or via the use of an elevating work platform.

4.2. Inspection of permanent insulation

Where the work could inadvertently place workers and the tools they hold closer than 0.5m from live permanently insulated LV conductors, an initial inspection of the permanent insulation shall be conducted from the ground prior to the completion of the *Pre-work Pole Hazard Assessment* form.

A closer inspection shall be undertaken from the pole before coming closer than 0.5m from the live permanently insulated LV conductors.

Where the work could inadvertently place workers and the tools they hold closer than 1.2m from live permanently insulated conductors of a voltage greater than 1000 V but not exceeding 11kV, an initial inspection shall be conducted from the ground prior to the completion of the *Pre-work Pole Hazard Assessment* form.

This inspection shall confirm whether the conductors are of a type that includes an earthed metal screen and that the condition of the permanent insulation is satisfactory.

A closer inspection shall be undertaken from the pole before coming closer than 1.2m from the live permanently insulated high voltage conductors. If the conductors are of a type that does not include an earthed metal screen, they shall be treated as exposed conductors.

4.3. Installation of temporary insulation

Where it is necessary to install temporary insulation on LV conductors, and the insulation is not in place at the time the *Pre-work Pole Hazard Assessment* form is completed, an "R" shall be entered on the form indicating that it is required.

The completion of the *Pre-work Pole Hazard Assessment* form shall include consideration of the work of installing the temporary insulation. Once the temporary insulation has been installed, a "Y" shall be entered on the form next to the "R" indicating that the temporary insulation has been installed.

4.4. Exposed earths

Where work is to be undertaken on any pole/structure containing multiple earthing systems or more than one exposed earths, the hazard of transferred earth potential exists and appropriate controls shall be put in place prior to work commencement.

Some examples of exposed earths are HV feeder aerial earth down wires, lighting brackets, lighting control equipment boxes and support wires for communications cables. This is especially the case for joint-use poles or structures that contain installations belonging to another Electrical Network Operator, such as Ausgrid or telecommunications providers, e.g. Telstra or Optus etc.

Appropriate control measures include the temporary covering up of all exposed earths with insulation material, or to effectively bond them together to create equipotential working conditions. Equipotential bonding is an option for RailCorp assets ONLY, i.e. do NOT bond a RailCorp asset to any non-RailCorp asset.

4.5. Additional controls required?

PR D 78700 Working around Electrical Equipment Section 5.3 requires that "Work around electrical equipment exposes persons to health and safety risks that must be:

- eliminated, so far as is reasonably practicable, or
- if it is not reasonably practicable to eliminate those risks, minimised so far as is reasonably practicable (SFAIRP)"

Refer to *PR D 78700* for details. If additional controls are required to assure SFAIRP, then such controls shall be effectively implemented.

5. Can the work be done safely?

In consideration of the identified hazards related to the specified proposed work and given that the controls identified will be effectively implemented, the work team shall ask themselves,

“*Can the work be done safely without infringing the Safe Approach Distances?*”



Warning

Work shall **not** proceed unless the answer to this question is “Yes”.

6. Completed forms

At the completion of the work, the *Pre-work Pole Hazard Assessment* form shall be forwarded to the relevant Electrical Engineer in the District concerned. An illustrative example of a completed *Pre-work Pole Hazard Assessment* is shown in Appendix A.

7. Audits

Site supervisors shall ensure that the *Pre-work Pole Hazard Assessment* forms are available and completed when required.

The relevant Electrical Engineer in the business unit concerned shall ensure that completed *Pre-work Pole Hazard Assessment* forms are reviewed and that regular audits are conducted to ensure compliance.

Business units shall undertake audits of each depot randomly at intervals of not more than 12 months.

8. References

SMS-06-OP-3043 Managing Risks Using Safe Work Practices

PR D 78700 Working Around Electrical Equipment

PR D 78108 FM 01 Pre-work Pole Hazard Assessment

Appendix A Example of Pre-work Pole Hazard Assessment form used to assess hazard of work on poles supporting live exposed conductors



Sydney Trains Engineering Form – EDU
PR D 78108 FM 01

Pre-work Pole Hazard Assessment

Work Location: Sydney Trains Depot, Railway Parade Ballastville Pole Number: 32

Number circuits 1 to 6 from top down. Include street lighting as a separate circuit.	CIRCUIT					
	1	2	3	4	5	6
Voltage	11kV	11kV/415V	415			
Owner / operator	RailCorp	RailCorp	RailCorp			
Feeder number (high voltage)	693	693	693			
Conductors <i>damaged or down</i>	N	Y	N			
<i>Alive, dead, or earthed</i>	Live	Dead	Dead			
Safe Approach Distance (m) (Refer below for mandated distances)	700	0	0			
Safe Approach Distances visualised and related to <i>landmarks</i> ? [Y/N]	Y	Y	Y			
Is the work above this circuit? [Y/N]	N	Y	Y			
Is the work on this circuit? [Y/N]	N	Y	Y			
Will workers climb through or past this circuit to work on other circuits? [Y/N]	N	Y	Y			
Are live low voltage conductors spaced far enough apart to safely climb through? [Y/N/NA]	NA	NA	NA			
Will conductive equipment or conductors have to be raised or lowered through this circuit? [Y/N]	Y	Y	Y			
Other electrical pole hazards? [Y/N]	N	N	N			
Permit number (if circuit is dead)	N	1234	1234			
Has permanent insulation on the conductors been inspected? [Y/N/NA]	NA	NA	NA			
Is temporary LV cable cover required to be installed on low voltage conductors? [R/Y/N/NA]	NA	NA	NA			
Has the condition of this and adjacent poles and ties been checked? [Y/N]	Y	Y	Y			
Is it necessary to place a pole marker above this circuit? [Y/N]	N	Y	Y			
Have any exposed earths been pointed out to all persons who will work on the pole? [Y/N]	Y	Y	Y			
Is a pole top rescue kit open and ready for use at the base of the pole? [Y/N/NA]	Y					
Can the work be done safely without persons or tools infringing the SAD's? [Y/N]	Y	Y	Y			
Have workers put on the required PPE (including working gloves)? [Y/N]						Y

Voltage	240/415V	2.2-11kV	22kV	33kV	66kV	132kV
Safe Approach Distance (SAD) for authorised persons	0.5m	0.7m	1.0m	1.0m	1.0m	1.5m

Legend R: Required Y: Yes N: No N/A: Not Applicable

Completed by: A Prentice A Prentice 10 00 hours on 3/9/2015
Print Signature Time Date

Checked by: A Prentice A Prentice 10 00 hours on 3/9/2015
(Authorised Person Mains) Print Signature Time Date

Work party: J Blogg D Red T Jones A Heath
Signature Signature Signature Signature

This form must be used prior to work on poles supporting live exposed conductors or equipment. Refer to PR D 78108 for detailed instruction on how to use and complete this form.