



AUSTRALIAN RAIL TRACK CORPORATION LTD

This document has been adopted by the ARTC with the permission of the NSW Government and will continue to apply under the authority of the ARTC General Manager Infrastructure, Strategy & Performance until further notice

Discipline
Engineering Standard - NSW

Category
Electrical

Title
Work Near 1500V Equipment - Permit Requirements and Safe Working Distances

Reference Number
PMP 13 - (RIC Standard: EP 95 20 00 01 SI)

Document Control

Status	Date	Prepared	Reviewed	Endorsed	Approved
Issue 1 Revision 2	Mar 05	Standards and Systems	Signalling Standards Engineer	GM Infrastructure Strategy & Performance	Safety Committee
		Refer to Reference Number	T Moore	M Owens	Refer to minutes of meeting 24/01/05

Disclaimer

Australian Rail Track Corporation has used its best endeavors to ensure that the content, layout and text of this document is accurate, complete and suitable for its stated purpose. It makes no warranties, express or implied, that compliance with the contents of this document shall be sufficient to ensure safe systems of work or operation. Australian Rail Track Corporation will not be liable to pay compensation in respect of the content or subsequent use of this document for any other purpose than its stated purpose or for any purpose other than that for which it was prepared except where it can be shown to have acted in bad faith or there has been willful default.

Document Approval

The technical content of this document has been approved by the relevant ARTC engineering authority and has also been endorsed by the ARTC Safety Committee.

Document Supply and Control

The Primary Version of this document is the electronic version that is available and accessible on the Australian Rail Track Corporation Internet and Intranet website.

It is the document user's sole responsibility to ensure that copies are checked for currency against the Primary Version prior to its use.

Copyright

The information in this document is Copyright protected. Apart from the reproduction without alteration of this document for personal use, non-profit purposes or for any fair dealing as permitted under the Copyright Act 1968, no part of this document may be reproduced, altered, stored or transmitted by any person without the prior written consent of ARTC.

About This Standard

There are three basic criteria for working safely near exposed 1500 Volt equipment:

- Stay outside the safe working distance,
- Be trained to work at a close distance, (including working on live equipment), or
- Be signed onto an appropriate Permit.

This publication sets out the permit requirements and safe working distances for work near 1500V Equipment. Special safe working distances apply for some types of work and work using some types of equipment. It requires that, except in the case of bare hands live working, all persons either maintain a minimum safe working distance from 1500 Volt equipment or that they are signed onto an appropriate electrical permit.

Exceptions apply for work on disconnected equipment within Substations and for work on abandoned cables.

Document History

Primary Source – RIC Standard EP 95 20 00 01 SI Version 1.0

List of Amendments –

ISSUE	DATE	CLAUSE	DESCRIPTION
1.1	05/01/2005		Reformatted to ARTC Standard
1.2	11/03/2005	Disclaimer	Minor editorial change

Contents

About This Standard	3
Document History	4
1. General	6
2. Safe Working Distance	7
2.1. Table of Safe Working Distances	7
2.2. Testing and Adjusting 1500 Volt Equipment	7
2.3. Unscreened Insulated Cable	7
2.4. Person Training to Become an Authorised Person	8
3. Diagrammatic Example of Safe Working Distances	9
4. Inspection and Testing of 1500V Equipment	11
4.1. General	11
4.2. Tests where the equipment is energised from the 1500 volt system	11
4.3. Other tests (where the equipment is energised from the test equipment)	11
5. Work Above Exposed 1500 Volt Equipment	11
6. Jacking of Rolling Stock	12
7. Work On Abandoned Cables	13

1 General

A permit must be obtained when it is foreseeable that:

- A person will be required to, or might inadvertently, come within the minimum safe working distances shown in Table 1 of exposed 1500 volt equipment, either directly or through tools, equipment, materials or other conducting objects, or
- A crane or an item of plant will be required to, or might inadvertently, come within the minimum approach distances of exposed 1500 volt equipment as detailed in PMP 04 – "Requirements for Work Using Cranes and Plant".

Unless:

- the work is carried out in accordance with RailCorp publication EP 95 20 00 02 SI - "Work on live 1500V Overhead Wiring", or
- the equipment is within a substation and is disconnected equipment; or
- the work is carried out on an abandoned cable in accordance with section 7.

For work above exposed 1500 volt equipment, additional requirements apply. These are set out in Section 5.

For the following work, additional requirements and special safe working distances apply. These are set out in separate publications as follows:

- For work using cranes and plant see PMP 04 – "Requirements for Work Using Cranes and Plant".
- For work using scaffolding and metal ladders see PMP 07 – "Requirements for Work Using Scaffolding and Metal Ladders".

The contractor's Permit System shall specify the type of Permit to be issued if a Permit is required.

When it is necessary to isolate a service belonging to another Network Operator for the work, an Operating Agreement must be received from that Network Operator and the conditions of the Operating Agreement complied with.

WARNING

Floating sections of overhead wiring must be treated as live.

2 Safe Working Distance

2.1 Table of Safe Working Distances

	SAFE WORKING DISTANCE
Authorised Person	0.5m *
All Other Persons	1.0m **

Table 1

Safe Working Distances to Exposed 1500 Volt Equipment for Persons

Notes:

* See also Sections 2.2 and 2.3

** See also Section 2.4

WARNING

Table 1 does not imply that it is always safe to work up to these distances. An additional distance must be added to that shown in the table if inadvertent movement or mishandling of material would infringe on the safe working distance.

2.2 Testing and Adjusting 1500 Volt Equipment

Testing and adjusting procedures on certain equipment may bring the operator within the specified 0.5m safe working distance. This work may only be carried out by an Authorised Person who is trained in the procedures and in accordance with written instructions which specify a lesser safe working distance.

2.3 Unscreened Insulated Cable

1500 volt Unscreened Insulated Cable must be treated as exposed 1500 volt equipment. Authorised Persons may encroach the safe working distance but must maintain 0.05 m from 1500 volt Unscreened Insulated Cable on condition that:

- the reduced safe working distance only applies to the normally insulated cable, but does not apply to any exposed conductor or conductive components connected to the conductor, and
- extra care is taken when working at the reduced safe working distance.

2.4 Person Training to Become an Authorised Person

The contractor's Electrical Safety System may allow for suitably competent persons in training to come closer than the safe working distance shown for "All Other Persons" in Table 1 provided that:

- the person is deemed competent by the contractor to carry out the work,
- a safe working distance nominated in the contractor's Electrical Safety System and not less than 0.5m is maintained, and
- the work is continuously and closely supervised on a one to one basis by a person suitably authorised to perform the work.

Note

The person supervising the work will be responsible for the safety of the person in training.

3 Diagrammatic Example of Safe Working Distances

Diagrams 1 to 3 are a guide to the safe working distance requirements where persons, or persons using tools, equipment, materials or other conducting objects, work on or near 1500 volt overhead wiring equipment. These diagrams are a guide only and each situation must be assessed individually.

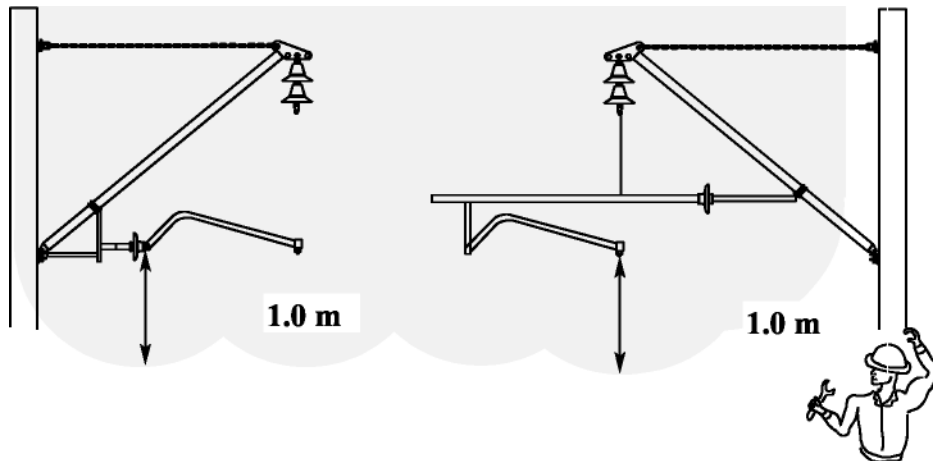


Diagram 1 - All persons who have not signed on a Permit must not enter the shaded area either directly or through any conducting object. The only exception is if work is carried out by an Authorised Person or a person training to become an Authorised Person in accordance with Section 2.4.

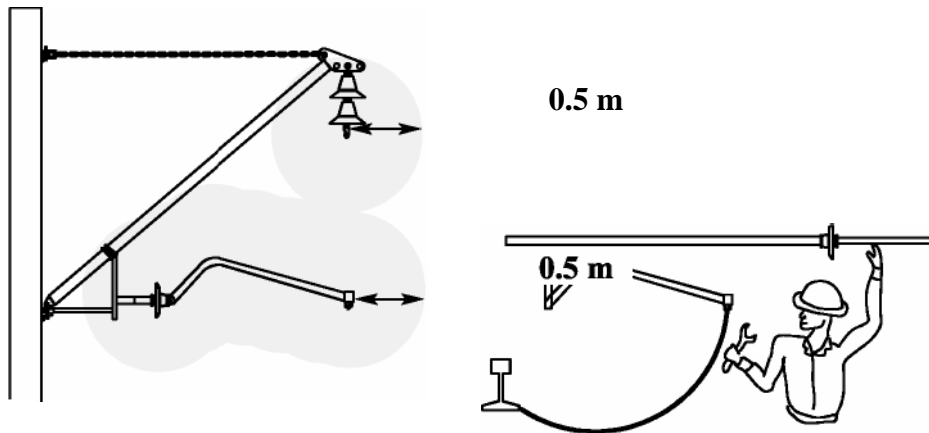


Diagram 2 - Authorised Persons working on structures or rail connected equipment near live 1500V equipment must not enter the shaded area either directly through any conducting object.

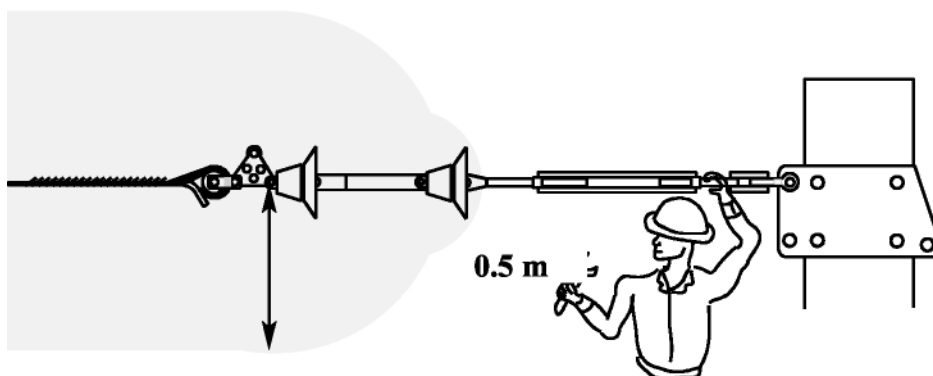


Diagram 3 - The safe working distance for an Authorised Person is **0.5 m** or the length of the insulator string if it is longer.

4 Inspection and Testing of 1500V Equipment

4.1 General.

All aspects of testing work, including connection & disconnection of the test equipment and the actual testing operations must be carried out in accordance with Section 1 except as set out in Sections 4.2 and 4.3.

Where a Permit or alternative documentation is required by Sections 4.2 and 4.3, the contractor's Electrical Safety System should distinguish that Permit or documentation from that used for normal working. Refer to Section 1.4 of document PMP 06 – "Permit System".

4.2 Tests where the equipment is energised from the 1500 volt system.

If a Permit is required for the connection of the test equipment, that Permit must be cancelled before the equipment is energised for the test.

4.3 Other tests (where the equipment is energised from the test equipment).

When testing requires test equipment to be connected to 1500 volt equipment and rail connections to be removed, the work must be carried out under an appropriate Permit.

5 Work Above Exposed 1500 Volt Equipment

When work is above exposed 1500 Volt equipment, either:

- the work must be carried out under an appropriate Permit, or
- the work must be carried out by an Authorised Person, or
- the work must be carried out in accordance with an approved procedure and the specific work must be authorised by an Electrical Engineer, or
- a special barrier must be erected, and the work must be carried out in accordance with a documented procedure.

Where a special barrier is to be used, the barrier and the documented procedure must be:

- (i) approved by an Authorised Person who understands sufficient detail of the work process for which the barrier is required, to assess its adequacy to prevent contravention of the relevant safe working distances, and
- (ii) approved by a competent person who understands sufficient detail of the structural limitations of the proposed barrier to assess its adequacy to resist the forces that may be imposed during the work process.

The person giving these approvals for the special barrier is responsible for ensuring that:

- the necessary restrictions on the work process arising from the barrier, and
- the maximum loads that may be applied to the barrier
- are documented in the procedure and are applicable for the work.

6 Jacking of Rolling Stock

Any jacking of a vehicle on or adjacent to an electrified track, must be carried out in accordance with the following instructions:

WARNING

The overhead wiring must be treated as LIVE by any person not signed onto a Permit for the section/subsection concerned.

A vehicle may be jacked under or adjacent to live 1500 volt overhead wiring provided that:

- 1) The Electrical System Operator is advised both prior to and at the completion of the work, and
- 2) If the vehicle is:
 - an electric locomotive, both pantographs are lowered and the associated air supply isolated, or
 - an electric multiple unit (EMU) motor car or trailer, the associated pantograph is lowered and the associated air supply isolated, or
 - a Tangara car, both pantographs on the 4 car set are lowered and the associated air supply isolated, and
- 3) No part of the vehicle is, or may come, closer than 1m to the overhead wiring. Where one bogie of the vehicle remains on the rails, the vertical distance below the contact may be reduced to 0.3m, provided that the rails are not separated from the traction current return path to a Substation. This distance may be further reduced to 0.15m if the electrical safety aspects are supervised by a suitably Authorised Person.

7 Work On Abandoned Cables

When it is necessary to carry out work on abandoned 1500 volt cables or near the exposed cores of abandoned 1500 volt cables:

- The cable must be identified by its former identifier and designated as abandoned e.g. "Former 332/1A (abandoned)",
- An appropriate Permit endorsed "Abandoned" must be issued.

If the above dot points are met, an Authority is not required, the Permit need not be numbered and the cable need not be rail connected.

If the cable is visually and continuously traced from end to end, a Permit is not required.

Note

Care must be exercised when tracing cables to include any tee-offs emanating from the cable.