

Engineering Procedure
Electrical Distribution Unit

PR D 78307

Inspection and Care of Portable Rail Connecting Equipment for 1500 Volt Overhead Wiring

Version 1.1

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Procedure

Approved by: Mark Armitage
 Electrical Manager ESI

Authorised by: Michael Kemmis
 Asset Standards Manager

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Document control

Version	Date	Author/ Prin. Eng.	Summary of change
1.0	6 July 2015	Chris Leung	First issue as a Sydney Trains document, rebranded from previous RailCorp SMS-06-EN-0572 V1.3
1.1	14 April 2016	Chris Leung	Updated document to latest ASA Standard

Summary of changes from previous version

Summary of change	Section
<i>Updated document to latest ASA Standard T HR EL 90003 ST Heavy Rail Traction System - Current Ratings of 1500 V dc Equipment</i>	3.2.5

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1. Purpose and scope

Portable rail connecting equipment consists of assemblies of insulated flexible cables and clamps and suitable insulated handles or sticks, which are used for connecting de-energised 1500 Volt Overhead Wiring (OHW) to rail.

This procedure sets out the requirements for the inspection, testing, maintenance, storage and disposal of the portable rail connecting equipment for the OHW.

This procedure applies to all Sydney Trains employees trained and assessed to be competent in the use of the rail connecting equipment for the OHW.

The purpose of this procedure is to ensure that such employees are aware and comply with the requirements for the correct treatment of the portable rail connecting equipment.

2. Definitions

Portable Rail Connecting Equipment

See *PR D 78100 Definitions and Conventions for Electrical Safety*.

3. Configuration of Portable Rail Connecting Equipment

3.1. Portable Rail Connecting Equipment

The equipment consists of:

- A 4-metre long two piece insulated operating stick, and
- An insulated cable with an OHW connection clamp at one end, and a rail clamp at the other end of this cable. The OHW connection clamp is attached to the insulated operating stick by means of a spring loaded slot in the end of the operating stick which receives the bayonet fitting on the OHW connection clamp. Refer to drawing EL0004233

Refer to Engineering Standard Electrical EP 95 20 00 06 SI – Methods of Rail Connecting 1500 Volt Overhead Wiring for detailed requirements for portable rail connecting equipment.

3.2. Identification and Labelling

Complete portable rail connecting equipment that have an existing label shall be maintained.

Each new major component of the complete portable rail connecting equipment is to be clearly and indelibly labelled with a unique identifier to take the following form:

“ST-“, then

A prefix as detailed in sections 3.2.1 to 3.2.5 below, then

A dash “-“, then

A unique 5 digit identification number.

Examples are given below, using the identification number “12345”.

It is important that identification of each major component of the portable rail connecting equipment remains intact during the life of the equipment, as it shall be referred to and recorded when routine tests are performed to determine the integrity of the equipment.

3.2.1. OHW Connection Clamp

Prefix "CC" to be used.

The OHW connection clamp is to be clearly and indelibly marked (engraved) with an identifier as above, with letters at least 5mm tall, at a location on the clamp that can be readily noticed.

Example: ST-CC-12345

3.2.2. Rail Clamp

Prefix "RC" to be used.

The rail clamp is to be clearly and indelibly marked (engraved) with an identifier as above, with letters at least 5mm tall, at a location on the clamp that can be readily noticed.

Example: ST-RC-12345

3.2.3. Cable

Prefix "CA" to be used.

The cable is to be clearly and indelibly marked with an identifier as above.

The lettering is to be at least 10mm tall and of a contrasting colour to the cable insulation.

The labels are to be located 1 metre from each end of the cable and are to be protected by the transparent heatshrink that extends at least 50mm on either side of the lettering (refer drawing EL0004233).

Example: ST-CA-12345

3.2.4. Insulated Stick

Prefix "IS" to be used, and a suffix "T" or "B" added to identify Top or Bottom stick section. The insulated stick is to be clearly and indelibly marked (engraved) with an identifier as above with lettering at least 5mm tall.

Example: ST-IS-12345T and ST-IS-12345B

3.2.5. Carry Bags

Prefix "CB" to be used.

Each carry bag for each earthing set is to be clearly and indelibly marked with an identifier as above, with letters at least 20mm tall and at a location in the middle of the outer face of the bag where it can be readily seen.

Immediately above this label should be another label with the title "ST-OHW/RAIL CONNECTORS –", along with the name of the depot at which they are to be stored.

Example: ST-OHW/RAIL CONNECTORS – CLYDE DEPOT

ST-CB-12345

The equipment shall be marked to identify its rated fault current/rated time classification in compliance with T HR EL 90003 ST Heavy Rail Traction System - Current Ratings of 1500 V dc Equipment Section 8.0.

Equipment that does not fulfil the minimum rating requirement shall not be used. Higher rated equipment should be labelled in accordance with its actual rating.

4. Inspection and Testing of Portable Rail Connecting Equipment



Warning

All current carrying components of portable rail connecting equipment are to be destroyed immediately after it has sustained fault conditions in the field.

4.1. Care and Storage

Portable rail connecting equipment shall be stored out of the weather and away from solvents and sharp objects.

4.2. Inspection before each Use

Each time before use, the portable rail connecting equipment shall be inspected for any visible or obvious outward sign of damage, deterioration, or faulty connections. Tape shall not be used on terminations or connections, as it prevents checking for broken strands. Clear heat shrink over terminations is the preferred method for termination support as it allows visual inspection of the cable condition and terminations to be undertaken.

Particular attention should be given to ensure that:

- the inspection labels as shown in the samples of Appendix A are attached to both the insulated operating stick and the insulated cable, and that the portable rail connecting equipment is within the indicated due dates for both six-monthly and three- yearly inspections. If there is no inspection label attached to the portable rail connecting equipment, it shall pass both six-monthly and three-yearly inspections and be labelled accordingly before being used.
- the operating stick is generally in good condition and clean – check for any ingress of moisture.
- the bolted connections are tight.
- there are no visible signs of corrosion at the cable/lug interface.
- there are no broken strands or stressing of cable.
- the moving parts are in sound condition – freedom of movement, sound thread condition and ease of use.

If any defect is found with the portable rail connecting equipment inspected, the equipment shall be withdrawn from service and not used until satisfactorily repaired.

4.3. Six-Monthly Inspection

Every six months and irrespective of any other inspection or test, the portable rail connecting equipment shall be inspected as follows:

- Inspections as detailed in Section 4.2, and
- Checking that the identification detailed in Section 3.2 is clear and legible.

Results of the inspection shall be recorded on *PR D 78307 FM 01 Portable Rail Connecting Equipment Inspection Sheet*. An appropriate inspection label as shown in the samples of Appendix A shall then be placed on the portable rail connecting equipment, indicating the due date for the next inspection or test.

4.4. Three-Yearly Inspection

Every three years and irrespective of any other inspection or test, the portable rail connecting equipment shall be inspected as detailed in Section 4.2 and either:

- all heatshrink tubing or other termination support is removed and the outer strands of the cable inspected at each termination. There shall be no broken strands and no visible corrosion or signs of overheating. After successful inspection, the termination support shall be renewed to the same specification as originally fitted, or
- re-terminated at each clamp as detailed in Appendix B. This method involves the cutting, inspection and re-termination of the cable terminations.

Results of the inspection shall be recorded on *PR D 78307 FM 01 Portable Rail Connecting Equipment Inspection Sheet*. An appropriate inspection label as shown in the samples of Appendix A shall be placed on the portable rail connecting equipment, indicating the due date for the next inspection or test.

5. References

EP 95 20 00 06 SI	Methods of Rail Connecting 1500 Volt Overhead Wiring
T HR EL 90003 ST	Heavy Rail Traction System – Current Ratings of 1500 V dc Equipment
ISSC14 (October 2010)	Guide to electrical workers' safety equipment
PR D 78307 FM 01	Portable Rail Connecting Equipment Inspection Sheet
PR D 78107	Insulated Sticks, Tools and Equipment for Electrical Work – Inspection, Testing, Care and Maintenance

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Appendix A Sample Inspection Labels

Six Month Inspection

Inspected by: _____

Next inspection due: ____/____/____

Three Year Inspection

Inspected by: _____

Next inspection due: ____/____/____

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Appendix B Earthing and Short-Circuiting Equipment – Retermination Procedure

The procedure is as follows:

- (a) Cut the cables at or beyond the end of any termination support, e.g. heatshrink tubing or stress control clamp.
- (b) Inspect the cable insulation.
- (c) Strip off enough cable insulation to allow careful inspection of the conductors by unwinding the individual strands.

If more than 1% of the conductor strands are broken, or the strands are significantly oxidised or the insulation is cracked or wrinkled, the cable is failed. If this damage is localised, the cable may be cut further back and the assessment repeated.

- (d) If the cable is satisfactory then the cable may be reterminated so that the new terminations are exactly the same as the originals.
- (e) Report the condition of the insulation and the proportion of broken conductors strands. The cable is rejected if cracks or wrinkles are visible in the insulation or if more than 1% of the conductor strands are broken.

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