



AUSTRALIAN RAIL TRACK CORPORATION LTD

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Engineering Practices Manual Civil Engineering

Inspection of Insulated Joints - Procedure

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1 Scope

This instruction details procedures for the inspection of mechanical and glued insulated joints in all areas.

2 Reason and nature of change

Document reissued as ARTC Engineering Practice Manual.

3 Detailed Examination

The inspection is to be carried out in accordance with the procedures in ARTC Standard TEP 03.

Areas with the potential to deteriorate rapidly causing signal failures are the main target, especially the high rail of sharp curves and mechanical insulated joints with the potential to close up in hot weather.

During examination it is necessary to look at the overall performance of the joint. This includes checking rail adjustment, insulation performance of the joint and the mechanical integrity of the joint, as well as rail wear, the holding ability of fastenings and the soundness of the sleepers and ballast bed.

If a defect is suspected in the portion of a component that is screened from view, the component must be removed for detailed examination.

If any defect is detected then it is essential that components are examined.

The inspection is performed by visually examining each insulated joint and looking for the following conditions:

At the insulation post

Rail - The rail is to be checked for wear as detailed in ARTC standard TEP 12. Visually check for damage caused by wheel burns, shelling or other surface defects which may cause cracking. End batter of rails causes rail steel to flow across the joint which ultimately will bridge the joint.

Insulation material - Check for loss of the insulation key, squeezing out due to rail movement, or visible cracking and disintegration of the key.

At the plates

Foreign Matter - Visually inspect for any build up of grease or foreign matter, in particular metal pieces, wires and slivers that can cause electrical bridging. Slivers originating from wheel burns or skids tend to settle around the joint because of magnetic attraction.

Fishplates - Visually check for cracks or fractures. Cracks can be difficult to detect; rusty traces are often a good indication of their presence. Cracks may occur around bolt holes or near the rail joint.

Fishplate Bolts - These may be loose, bent, cracked or broken. Tapping bolts give an indication of loose or broken bolts if rattling sound is present or bolts drop out. Visually inspect bolts for damage or cracks. Cracks can be detected by rusty traces which originate from cracks.

Associated trackwork

Fastenings - These may be loose, cracked or broken. Loose plates are caused by missing, damaged or loose clips and spikes. Pulling and tapping will reveal any loose components. Damaged components can be visually detected. Cracks can be detected by rusty traces which originate from cracks.

Rail fastenings can potential short circuit the insulation by coming into contact with the fishbolts. This is particularly the case with resilient fastenings (see ARTC Standard TCS 08 for replacement requirements.)

Sleepers - These may be ineffective, and not support the joint adequately or hold the rail firm. Visually inspect sleepers for condition.

Ballast - Visual inspection. Ballast can be at the incorrect level (i.e. above or below the upper sleeper level) or it can be degraded. Degraded or foul ballast will not support the joint and leads to "pumping" or "hanging" sleepers. Pumping sleepers give little support to the joint as the pumping action will displace the generally foul ballast under each load. Hanging sleepers are not in contact with the ballast and give no support to the joint.

Excessive ballast heaped around the joint provides potential for short circuiting of the insulation and should be removed.

Drainage - Visually inspect for poor drainage which is indicated by water logged ballast or mud reaching the surface of the ballast bed. Moisture could cause electrical bridging of joint.

When an insulated joint fault has been identified, the examiner will carry out repairs where possible. When repairs are beyond the capacity of the examiner the work is

to be programmed for the maintenance team.

4 Examination of Mechanical Insulated Joints

In addition to the aspects detailed above, mechanical insulated joints should be dismantled for inspection.

A Signalling representative is to be present during these examinations.

During examinations the conditions of endposts, liners and ferrules should be assessed. On dogspiked track the anchoring pattern is to be inspected and any deficiencies recorded as per ARTC Standard TMP 08.

Note: Mechanical Insulated joints are not considered an expansion joint and therefore may need extra anchors to reduce the tension loads on the joint.

NOTE: Insulated joint repairs which require the joint to be dismantled may only be carried out in conjunction with a Signal Electrician.