

# Rerailing – Precautions to be Taken

ESS-00-01

## Applicability

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ARTC Network Wide

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## Primary Source

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## Document Status

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## Amendment Record

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1.0	24 Jul 23		Alignment of wording with ESM-07-02 for train shunt check requirements. Document renumbered from ESM-00-13.

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## **1 Introduction**

### **1.1 Purpose**

This standard provides the minimum signalling requirements for rerailing work on track circuited areas.

### **1.2 Scope**

This standard outlines the precautions that apply when rerailing and is also applicable to other types of track works (e.g. welding of joints, renewing defective fishplates etc.) that may impact the traction return.

Generally, precautions include the following:

- Provision of alternative arrangement for traction return current
- Protection of trains
- Testing and certification of affected track circuits and associated signalling

This standard is applicable to all of the ARTC network.

### **1.3 Standard Owner**

The Head of Engineering Standards is the Document Owner. For any query, initial contact to be made at [standards@artc.com.au](mailto:standards@artc.com.au).

### **1.4 Responsibilities**

Signal maintenance staff, Track maintenance staff and Project Managers are responsible for implementation of this standard.

### **1.5 Reference Documents**

The following documents support this standard:

- NSW ARTC Network Rules and Procedures
- TA20 ARTC Code of Practice for the Victorian Main Line Operations
- Code of Practice for the Defined Interstate Network
- ARTC Addendum to the Code of Practice for the Defined Interstate Network
- ANRF 013 – Temporary Rail Bond Approval Form
- ANWT 318 – Work That Affects Traction Return Currents or Track Circuits
- ANPR 715 – Protecting Type F Level Crossings
- ANWT300 - ANWT 314 – Various procedures for work on track
- ESM-00-12 Disconnection of Signalling Apparatus
- SMP 27 Traction Return (1500v DC)
- ESM-24-01 Bridging or False Feeding Signalling Circuits
- ESM-07-02 Track Circuits and Train Detection Devices

## 1.6 Definitions

The following terms and acronyms are used within this document:

Term or acronym	Description
ABS	In SA, ABS is a signalling system and comprises the automatic operation of trackside fixed signals at successive locations along the route.  In Victoria, a system of Safeworking in multiple line areas, where points and signals at a number of locations may be remotely controlled from a control room or other locations.
ARTC	Australian Rail Track Corporation
Competency	A competency is a set of defined behaviors that provide a structured guide enabling the identification, evaluation and development of the behaviors in individual employees.
CTC	A system of Safeworking where points and signals at a number of locations are remotely controlled from a centralised control room or other locations.  In NSW, this may be referred to as a Rail Vehicle Detection (RVD)
Electrified Area	An area that has overhead wiring for the purpose of powering trains.
IBA	Infrastructure Booking Advice
NCC	Network Control Centre.
Network Controller	A Competent Worker who authorises, and may issue, occupancies and Proceed Authorities, and who manages rail traffic paths to ensure safe and efficient transit of rail traffic on the ARTC Network.
Protection Officer	The Competent Worker responsible for managing the rail safety component of worksite protection.  This is referred to a Track Force Protection Coordinator in Victoria and Track Worker in SA.
Right Side	Had failed safe and will not provide a false indication or proceed aspect.
Rerailing	The renewal of rails.
Train Graph	A diagram showing operational information for a train control area.

## **2 General**

Precautions to be taken when rerailing occurs in a track circuited or electrified area.

### **2.1 Authorisation**

Rerailing work shall be carried out in accordance with this procedure, ARTC standards and applicable network rules.

ARTC prefers to minimise the use of rail bonds where possible and prefers for track circuits to be dropped. In this case, track circuits and level crossings affected by the work shall be booked out. Safe passage of rail and road vehicles through affected crossings shall be managed by the project team as per applicable ARTC rules, procedures and standards.

When a signalling maintainer is not in attendance and temporary rail bonds are authorised by a Signal Maintenance Engineer for use by the civil engineering staff, the authorisation shall be in accordance with section 2.5 of this procedure.

Where the signalling maintainer is in attendance, they shall disconnect the track circuit and the affected signal(s) as per the applicable ARTC standard and if required provide an alternative path for the traction return current.

### **2.2 Planned Rerailing Work**

#### **2.2.1 Affected Apparatus**

Rerailing work shall be carried out in accordance with this procedure and applicable network rules.

Prior to the commencement of the rerailing, the Infrastructure Booking Advice (IBA) shall be completed showing the full particulars of the equipment affected and signed by the Civil and Signalling representatives and Network Controller. Where the rerailing affects the operation of signals and points controlled from an interlocking an entry shall also be made by the Network Controller on the train graph or logbook.

A record is to be kept by Signal Maintainers.

Where the Electrical Discipline is involved, the representative of that Discipline shall also sign the forms in which case an additional copy for them will be required.

The signalling maintainer should check that hand signallers, where necessary, are positioned at their posts by the Worksite Supervisor before the signals protecting the section where the rerailing is to take place are disconnected and maintained at stop. Where rerailing occurs on the overlap track circuits the signal in the rear shall also be disconnected and maintained at stop. Distant signals or equivalent signals in the rear are to be securely maintained at their correct restrictive indication by preventing the higher indication controls from operating.

In the cases when temporary bridging is required to maintain signalling on operational adjacent lines (e.g. point renewals) the requirements of ESM-24-01 for temporary bridging shall apply. Regulation jumper wires shall be used and care shall be taken to ensure that this temporary bridging is removed on completion of the work. The use of bridging of contacts or functions shall be clearly noted on the IBA form.

In Centralised Traffic Control (CTC)/ABS areas provided that the section is clear it is sufficient to disconnect the signal at one end of the section as well as disconnecting the Section Control and the track relay of the particular track affected. In case of single line section, signals at each end should be disconnected.

When it is necessary for rerailing to be carried out on a section of track controlling the operation of an automatic level crossing, the crossing must be protected as per applicable ARTC standards and following steps to be followed.

- Regulations permit the boom barriers to be secured in the raised position and to suppress the warning lights and bells.
- When rerailing is being carried out in an area where the operation of level crossing protection will be affected, and where individual emergency light and bell switches are not provided, the signalling maintainer must be in attendance to disconnect and reconnect the lights and bells (as requested by the protection officer for the passage of each train.)
- When rerailing is to be carried out in an area where the operation of level crossing protection will be affected and individual emergency lights and bell switches are provided, the Worksite Supervisor will supply handsignallers to switch on and off the lights and bells at the emergency switches as required, and flag road and train traffic accordingly.
- Booms are to be tied up in the raised position by the handsignallers/protection officer acting under the instructions of the Network Controller.
- The signalling maintainer shall disconnect the level crossing protection, removing the crossing control relay (XR) fuse; the affected up or down road control relay fuse and also removing the boom motor fuse to protect the motor should the emergency or control boom switch be inadvertently turned on while the booms are tied up. The level crossing protection should not be reconnected until the track circuits are reconnected and checked to be shunting trains reliably.
- In the case of rerailing affecting level crossing protection on single lines, the signalling maintainer shall also disconnect both the up and down direction sticks in addition to carrying out the other precautions before the work commences.
- Where the level crossing is situated in an interlocking and protected by home signals including the signal approaching the level crossing on the track not affected by the rerailing, the fixed signals protecting the interlocked level crossing are to be disconnected and maintained at stop and the distant signals or equivalent signals in the rear are to be securely maintained at their correct restrictive indications by preventing the higher indication controls from operating.
- Where the level crossing is situated in Double line Automatic areas, the signals approaching the level crossing on the track not affected by the rerailing may be left working, in addition to carrying out the other precautions before the work commences.
- On completion of the work the level crossing protection must be reconnected and the operation of the approach track circuits and the level crossing must be thoroughly tested before the hand signallers at the crossing are withdrawn and before the level crossing protection is booked back into use.

The Civil staff must protect their operations in accordance with the requirements of the local Network Rules and Procedures.

### 2.2.2 Electrified areas

In a 1500v dc electrification area, before any interference with the rails forming part of the traction return is permitted, adequate provision shall be made for a safe return path for the traction current to the sub-station or section hut.

At the same time the signalling equipment shall be safeguarded against damage due to a possible rise in traction return voltage.

Refer to procedure SMP 27 covering “Traction Return”, which details the precautions and safeguards which shall be adhered to when rerailing or disconnection of bonds is to be carried out in electrified areas, including rerailing at sub-stations and sections huts.

## 2.3 Reinstatement process

When the civil operations have been completed, the signalling (when on site) representatives shall then sign the IBA form and the protection for the civil operation may be withdrawn.

Testing and certification of the track circuits shall be done only after the traction return arrangements have been reinstated.

The following requirements shall be applied before the work can be certified and the signalling brought back into use:

- The signalling maintainer shall test that the track relay operates correctly in accordance with the procedure for track circuit testing.
- Tests shall be carried out to see that the tracks are correctly phased if the track connections have been disturbed or insulated rail joints installed.
- The signalling maintainer may require to carry out train shunt check on the track circuits affected by the rerailing to ensure correct shunting of the track before the signals are brought back into use. (Please refer procedure ESM-07-02 – Track Circuits and Train Detection Devices ).

Any temporary bridging must be removed before the work is certified correct and the signals placed back in order. The IBA form may then be completed and signed by the worksite supervisor, signalling maintainer and the Network Controller. Once completed protection may be withdrawn.

## 2.4 Short sections of New Rail

Whenever there is replacement of rails in points or at block joints, or for other short sections of rail in the vicinity of the clearance point between converging tracks and near the interface between adjacent track circuits, then the signalling maintainer is to be in attendance and ensure that the rail surfaces are clean before the track circuit is restored into use.

When block joints are renewed with a glued joint a dangerous situation could arise if a rear bogie of a train came to a stand on the new rail of a glued joint which is located just at the clearance point between two converging tracks. Short sections of new rail within a tuned loop might also cause similar problems if critically located, in respect of clearance points between tracks.

In these cases, the civil engineering staff are to grind the surface of the rail to clean off any protective coating, rust or other contamination and provide a shiny metallic surface for good electrical contact with the wheels. Alternatively, restoration of the track circuit is to wait until the passage of trains has cleaned the rail surface to ensure shunting.

Maintenance Supervisors and signalling maintainers are to liaise with their civil engineering counterparts to ensure they are aware of the rail cleaning requirement in these instances.

## 2.5 Rerailing affecting parallel bonding

Where rerailing affects parallel bonds the signalling maintainer must ensure that the parallel bonds are correctly and effectively connected as per track insulation plan. If the bonding is not correct to the track insulation plan the local signal maintenance engineer is to be advised. After the rerailing

and that the portion of the track circuit connected via the parallel bonds is tested to shunt correctly before the track circuit is booked back into use.

## 2.6 Guidelines for the use of Temporary Rail Bonds

### 2.6.1 Scope

These guidelines set out the circumstances under which temporary rail bonds may be applied to keep track circuits working and or maintain traction return currents during civil works, where it is necessary for the rail to be cut.

They are designed to assist Signal Maintenance Engineers or their specifically delegated signalling representatives in the determination of the rail bonding requirements and define the requirements for standard Temporary Rail Bonds.

These guidelines apply to both electrified and non-electrified areas.

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*Note: These guidelines do not preclude shorting bonds being used in-conjunction with bonding around the break. When used in this configuration the shorting bonds are to be placed across the rails (distance between the inner running faces of a pair of rails) either side of the break.*

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### 2.6.2 Circumstances

In order to allow particular civil engineering works which would otherwise affect the operation of signal/s to proceed with the minimum disruption to rail traffic, track circuits may be kept working by the placement of an approved Temporary Rail Bond around the rail break by suitably instructed civil engineering personnel in connection with the following work:

- Pulling back for expansion or creeping
- Welding of joints
- Renewing of defective fishplates
- Replacing a length of rail not more than can be reasonably accommodated between the connections of the standard 6 metre temporary rail bond

### 2.6.3 Applicable Procedures

The procedures and conditions described in this standard and local network rules defining the issue of Temporary Rail Bonds and the Temporary Bond Approval form are to be followed.

### 2.6.4 Competence

All duties allocated to the Signal Maintenance Engineer under these guidelines may be performed by a specifically delegated signalling representative but may not be further delegated.

The Signal Maintenance Engineer must ensure that the civil person/s placing temporary rail bond/s have been suitably instructed and understand the task to be performed. This will necessitate the Signal Maintenance Engineer providing instruction and practical demonstration on the placing of the temporary rail bond where civil staff are not familiar with the procedure.

The Signal Maintenance Engineer must ensure that the civil personnel installing the temporary rail bond/s, understands that the bond/s are not to be removed until the break has been welded out or permanent bonds installed.



Where traction bonding is concerned, the Signal Maintenance Engineer must ensure that the skill levels required and the dangers are understood by the civil engineering staff that will be responsible for installing the temporary rail bonding and there will be minimum risk to personnel or system by the work and bonding methods.

## 2.6.5 Temporary Rail Bonds

The Temporary Rail Bond must be to an approved design fitted with approved rail clamps. Temporary bonds preferably should be 6 meters maximum in length. This will generally limit the maximum rail cut to approximately 4.8 metres. Temporary rail bonds used as shorting bonds are to be limited to 2 metres in length.

Signal Maintenance Engineers are responsible for the issue of temporary rail bonds, limiting their issue to two 6 metre bonds and two 2 metre bonds per work team. If required, use of longer bonds can be assessed and authorised by the Signal Maintenance Engineer.

### 2.6.5.1 Rail Bond Control and Register:

Temporary rail bonds must be inspected every 6 months to assess their condition and effectiveness. Each bond and its associated rail clips/clamps are to be uniquely numbered and Signal Maintenance Engineers are to fix tag/s showing this number and the inspection date prior to issue and update and or renew the tag/s on subsequent 6 monthly inspections. Bond should be inspected for their condition and effectiveness. Where there is evidence of damage to the cable or rail clips that would impede its effectiveness, then appropriate repair/replacement shall be performed.

The Signal Maintenance Engineer shall keep a 'register' specifically for the purpose of recording the above-mentioned details. Register to include as a minimum:

- Bond description (length, cable size etc.)
- Identification number
- Last inspection date and condition
- Date of issue
- Issued by and Issued to

Where a bond is or may be used in electrified areas, special attention must be made of the bond's condition and where there is evidence of damage to the cable or rail clips/clamps the bond should be replaced.

## 2.6.6 Restrictions

In double rail AC track circuit areas temporary rail bonds can only be placed around the rail break in conjunction with shorting bonds placed across both rails (distance between the inner running faces of a pair of rails) of the line either side of the break.

In single line electrified areas, the use of temporary rail bonds by civil engineering personnel is not permitted due to the special arrangements required to maintain the traction return current.

In interlocked areas the application of temporary rail bonds by civil engineering personnel is not permitted and any temporary bonding is to be placed by a qualified signalling representative except in areas where outer home signals are provided and the intervening track circuits do not impact on the operation of the Interlocking.

**2.6.6.1 Electrified areas**

In electrified areas special consideration must be given to maintaining the traction return path.

In multiple line electrified areas, civil engineering staff are to be instructed that only one rail may be broken at any one time between adjacent traction sub-stations.

**2.6.6.2 Non-Electrified areas**

In non-electrified areas, the civil engineering staff are to be instructed that at any one locality, only one rail joint is to be broken or rail cut made in each rail of a line and cuts / breaks shall be made at no more than two positions at any one time. A locality for the purpose of these guidelines shall mean an area within a worksite where the breaks in the rail are opposite or in close proximity to each other.