



AUSTRALIAN RAIL TRACK CORPORATION LTD

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Standard

Rerailing and Anchoring

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Applicability

New South Wales	✓
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Primary Source

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Document Status

Version	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
2.0	06 Aug 12	Standards	Stakeholders	Operational Safety & Environmental Review Group	Safety & Environment Committee 15/10/2012

Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
2.0	06 Aug 12		Major rewrite required to match updates to superseded TMP 08 version 2.0. Updated to delete references to obsolete track components and to simplify and standardise anchor patterns. Risk assessed 19/05/2010. Other minor editorial changes.
		3.1	Updated clause 3.1 to include comments regarding CWR as recommended by Operational Safety & Environmental Review Group 9/10/2012.

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Mandatory requirements also exist in other documents.

Where alternative interpretations occur, the Manager Standards shall be informed so the ambiguity can be removed. Pending removal of the ambiguity the interpretation with the safest outcome shall be adopted.

1 Purpose

This document sets out the procedures for rerailing and anchoring in all tracks.

2 Rerailing

2.1 Rail Handling and Stockpiling

Rails should be handled and stockpiled so that the potential for the rail being crippled, notched or otherwise damaged is minimised.

During unloading from rail or road vehicles, rail shall be placed or stockpiled so that movement is prevented and there is no possibility of the rail fouling the rolling stock outline.

2.2 Rail Insertion into Track

When rerailing on concrete or steel sleepers and the rail to be replaced has been removed the rail seat shall be cleared of ballast. Ineffective pads, spacers and clips shall be replaced.

When rerailing on timber sleepers and the rail to be replaced has been removed the rail seat shall be cleared of all ballast. Ineffective fastenings shall be replaced.

2.3 Rail Grinding after Insertion into Track

Any new rail when inserted in the track should have its surface cleaned and/or ground to ensure that its running surface is shiny. This will ensure that there is sufficient electrical contact between train wheels and the rail to operate the signalling correctly. It applies to any rail installed in the track that will have train wheels operating on it and included turnouts, catch points and glued joints as well as normal rails and closures.

2.4 Replacement of Defective Rails and Welds

The location of rail and rail weld defects shall be painted on the rail web. The defect number, classification and sizing should be shown.

The site for closure rail insertion should minimize the use of rail. One end of the closure rail shall be located centrally between sleepers at a minimum of one sleeper spacing away from defect.

2.5 Mechanical Joint

Where the installation of new mechanical joints is required the joints should be:

- A minimum of 9m from any other mechanical or insulated joint;
- Be provided with electrical bonding across the joint in electrically circuited track.

New mechanical joints or joints that have been repaired should have a maximum dip of 1mm when measured with a 1m straight edge placed centrally over the joint.

2.6 Temporary Joints

The use of temporary joints is restricted to the joining of rails to permit the passage of trains with a speed restriction of 30km/h or less imposed. Special inspections are required while they remain in track.

They should only to be used to permit the passage of trains during work possessions or to plate broken rails or welds.

Temporary joints may consist of clamped fishplates (for example "G" clamps). This type of assembly may be secured additionally by fishbolt(s) if suitable hole(s) are present in the rail.

Where electrical bonding is provided for temporary joints in electrically circuited areas it shall be installed such that it fails if the temporary joint fails.

Temporary fishplates (for example bow plates) may be used to plate defective rails or welds or as required as a precautionary action.

2.7 Rail Inserts and Slotted Plates

2.7.1 Use of inserts during rail laying

Rail inserts must be sawn from the same nominal rail section as the track into which it is to be used. Approved thicknesses of inserts are 6mm, 12mm, 20mm and 25mm with only one insert permitted in a joint.

Rail inserts may be used during the laying of welded track or during emergencies such as rail breakaways.

It is the responsibility of the supervisor to ensure that the rail insert is removed immediately after the rail is adjusted, preferably on the same day that the rail insert is placed in the track.

If it is not possible to remove the insert from main line track within three days ARTC is to be advised, in writing, that the insert has been left in the track and the proposed removal date.

If, for some reason, the maintenance staff will be required to adjust the track and remove the insert, this is to be clearly stated and the agreement of the Infrastructure Manager or nominated representative obtained.

2.7.2 Details of approved rail inserts

Rail inserts made of a full rail section may be used with new rails only. Special inserts with 3mm machined from the top and with one side machined to correspond with 10mm curve wear may be used in existing track where required. Details for 53kg/m rail are shown on drawing F.3712. When placed in existing track rail inserts must not stand "proud" of the railhead on the running surface or the gauge face.

After placing a rail insert in the track it should be tested with a straight edge to ensure that no part of the head projects beyond the running surface or the gauge face. If necessary the projection may be filed or ground off to conform to the head of the rails in the track.

Rail inserts must be used with slotted fishplates with bolt holes prepared properly and not oxy cut.

2.7.3 Maintenance of Inserts

The location and details of all rail inserts in track are to be recorded by ARTC. A weekly check should be made by ARTC as to the reason for their use and the planned removal date.

Each rail insert is to be inspected in detail on each patrol inspection to ensure the rail insert is in good condition. That officer is to report the condition of the rail insert to ARTC each week. Inserts which cannot be removed within one week of installation is to have the fishplates removed each week, and a thorough inspection made for wear and batter on the top fishing surfaces of the fishplate, or on the underside of the head of the insert, which is also to be carefully inspected for any signs of cracking in the web.

The removal of the insert is to be recorded to complete the records required. Should the use of inserts be required regularly at the same location, an investigation is to be made into the cause and remedial action determined.

2.8 Lubrication after Rerailing

When re-railing takes place, particularly when rail is changed from 53kg to 60kg the rail mounted lubricators must be modified so that they can work effectively on the new rail size.

The **P&M** lubricators need the following changes:

- Plunger heights need to be increased from 63mm to 70mm;
- Bearer blocks need to be replaced by mounting blocks;
- Back and front plates need to be replaced by angled plates;

The **RTE 25** lubricators require the replacement of the mounting brackets.

2.9 Use of Temporary Signalling Bonds

This section complements Signalling Engineering documents by defining how Civil staff can use temporary bonding.

Signalling staff should manage and support the use of temporary rail bonds by Civil staff, to keep track circuits and signals working during some rail cutting and welding operations.

Approved use:

Temporary Rail Bonds may be placed around a rail break to keep track circuits working in connection with the following work:

- Pulling back for expansion or creep;
- Welding of joints;
- Renewing of defecting fishplates;
- Replacing a length of rail less than 5 metres.

Once installed and the rail break is made the bonds must remain in place until the break has been welded out or permanent bonds installed.

Bonds

Signalling staff will provide approved rail bonds. They will generally be restricted to two 6 metre bonds and two 2 metre shorting bonds per work team.

Temporary rail bonds will be tagged and inspected for condition every 6 months by signalling staff. Bonds that show evidence of damage to the cable or rail clips, have not been tagged or are overdue for inspection (previous inspection date is on the tag) should not be used.

Training

Only Civil staff trained by a Signal Engineer are permitted to use the bonds.

Conditions of use

Whether temporary bonding can or cannot be used depends on where you want to use it. The circumstances are summarised below but specific advice must be sought from the local Signalling Engineering representative, who is accountable for determining approved use.

Location	Permitted	Comments/Conditions
Double rail AC track circuit areas	<input type="checkbox"/>	conjunction with shorting bonds placed across both rails (4 foot) of the line either side of the break
Interlocked areas (General)	<input type="checkbox"/>	temporary bonding is to be placed by a qualified signalling representative
interlocked areas (where outer home signals are provided and the intervening track circuits do not impact on the operation of the interlocking)	<input type="checkbox"/>	Subject to advice from the Signal Engineer
non electrified areas	<input type="checkbox"/>	When you want to make multiple breaks, you can only make one break on each rail at one time. Two breaks can be made if the breaks are on opposite rails (eg square joints)

Special Situations

If temporary bonding is not permitted, then the work will be treated as re-railing by Signalling staff. For re-railing, appropriate network rules and signalling maintenance procedures will be applied by Signalling staff.

Special Note:

These guidelines do not preclude the use of 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 (4 foot) either side of the break.

3 Rail Anchors

3.1 General

The section applies to all dogspiked welded and non-welded track. It does not apply to tracks with resilient fastenings which do not require rail anchors. All tracks fastened with 1:2 or more resilient fastenings do not require anchoring.

Old type anchors may be re-used if considered suitable with light rails but all new anchors shall conform to AS 1085.10 Rail Anchors.

All Interstate and Intrastate Lines with dogspikes are to be anchored as specified herein. On Light Weight lines the existing anchoring is to be maintained. Existing non-anchored track is to be anchored where necessary to prevent rail creep.

Additional rail anchors are to be provided where creep persists.

Double (or box) anchoring of a sleeper means anchors are applied to both sides of a sleeper on each rail.

For Continuously Welded Rail (CWR), the anchor pattern for dog spiked track is specified in the ARTC Track & Civil Code of Practice (clause 2.1.6).

3.2 Anchoring of Ballasted Welded Track

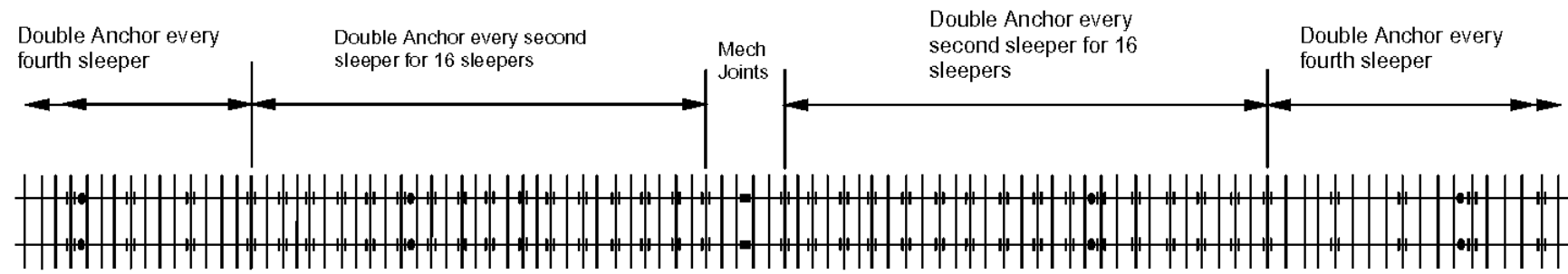
Welded track in lengths up to 110m shall be anchored as shown in Figure 1. This is to be regarded as minimum anchoring.

To prevent rail creep on tracks with a falling grade steeper than 1 in 80 in the direction of traffic, or at locations where it is considered necessary to control rail creep, the anchoring pattern should be increased by single anchoring each second sleeper (or every sleeper if necessary) throughout the welded rail length.

When existing 110m lengths of rail are welded into longer or continuous lengths, the existing anchors pattern should remain providing the pattern meets the requirements above.

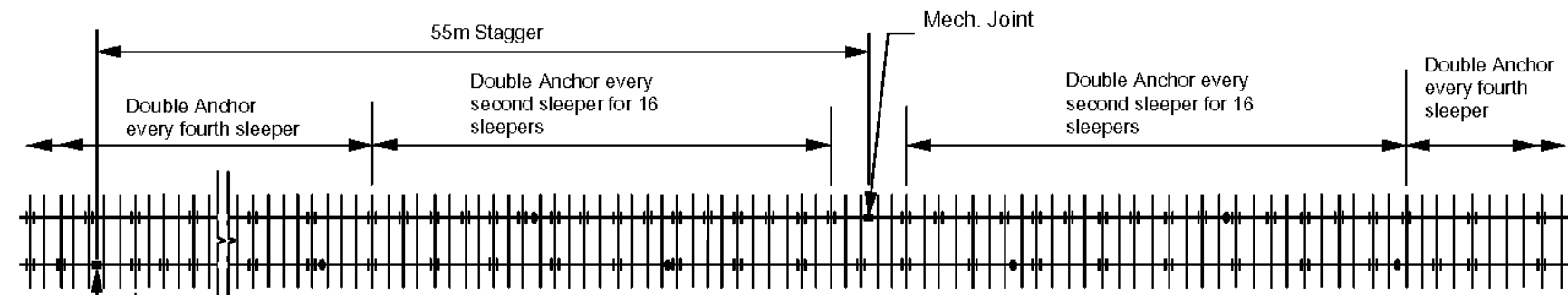
Basic anchoring involves anchoring sleepers on both sides of each rail, except for steep grades as above.

During rerailing if the track is already fitted with more anchors than specified above the additional anchors are to be duplicated on the new rails in addition to the standard pattern.



SQUARE JOINTS

(to be used only in special cases)



STAGGERED JOINTS
(Shown as for 110m lengths)

ANCHORING OF BALLASTED WELDED TRACK

- Denotes Double Anchor
- Denotes Fishplate (or Mechanical) Joint
- Denotes Welded Joint

Figure 1

3.3 Anchoring Insulated Joints in Welded Track

On each side of mechanical insulated joints every sleeper is to be double anchored for a distance of 32 sleepers.

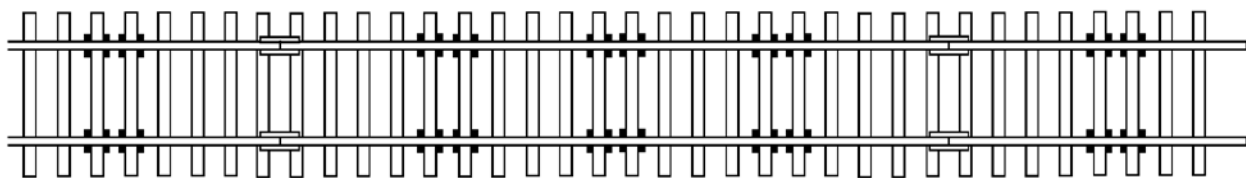
Bonded (glued) insulated joints are to be anchored as if they are plain track, and anchored in the same pattern as the track in which they are placed.

Where extensive and consistent pulling apart occurs at an insulated joint, rail adjustment must be carried out.

3.4 Anchoring of Short Rails

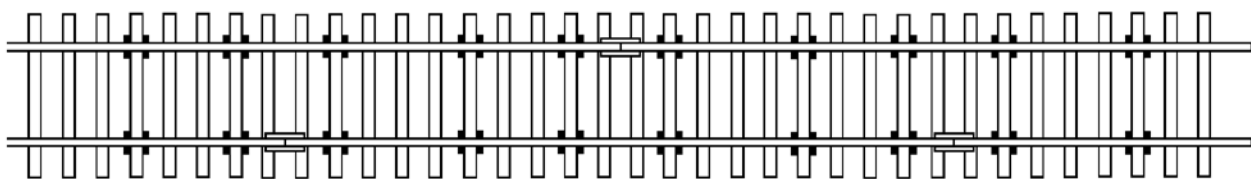
Lengths shorter than 23m

The anchoring for rail lengths shorter than 23m with square and staggered joints on ballasted track shall be as shown in Figure 2.



SQUARE JOINTS

12 m Rails – Angle
Fishplates



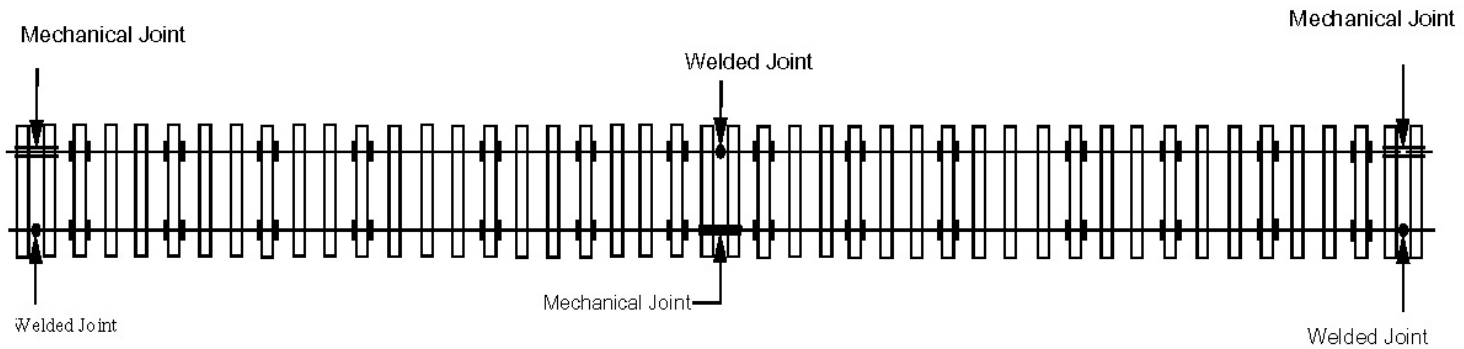
STAGGERED JOINTS

12 m Rails – Angle Fishplates

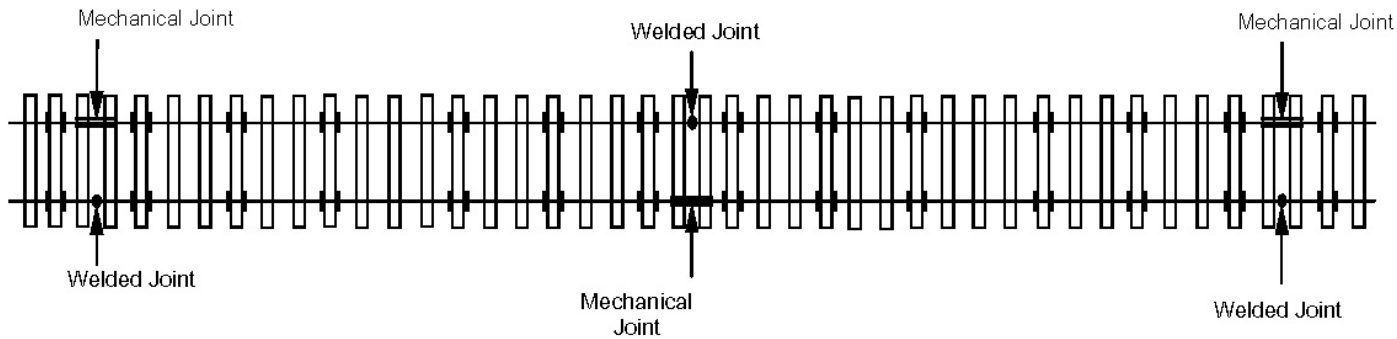
Figure 2

23m and 27m lengths

The anchoring for 23m and 27m rail lengths on open ballasted track and on bridges shall be as shown in Figure 3.



27.5m RAILS – 14 Double Anchors per rail length



23.0m RAILS – 12 Double Anchors per rail length

Figure 3

3.5 Anchoring of Point and Crossing Assemblies

This section covers turnouts, catchpoints, diamonds and slips (compounds).

3.5.1 Turnouts

Double anchor every second sleeper for 32 sleepers (16 anchored) in front of the switch. Commence with the first sleeper for main line turnouts and interlocked points. Commence with the second sleeper for non-interlocked points.

Double anchor every second sleeper/timber for 32 sleepers (16 anchored) behind the crossing. Commence with the first timber after the crossing that has plain track fastenings.

Double anchor every second timber on the through rails and turnout rails between the heel of the switches and the front legs of the crossing.

3.5.2 Catchpoints

In front of the switch as for turnouts, for the catchpoint rail only. Behind the heel as for behind the turnout crossing. Anchor the plain track rail as for plain track.

3.5.3 Diamonds

Behind the crossings, as for turnouts. Double anchor every second timber between the "V" and the "K" crossings clear of the checkrails.

3.5.4 Slips (Compounds)

Behind the crossings, as for turnouts. Double anchor every second timber between the "V" and the "K" crossings clear of the switches and checkrails.

3.6 Anchoring of Welded Track on Bridges

3.6.1 Transom Top Steel and Timber Bridges with spans less than 18m

- a) Mechanical joint are not permitted within 30m of a bridge end, or on a bridge. To achieve this requirement field aluminothermic welding of the rails is to be undertaken where necessary.
- b) Standard anchoring for welded rails on open track as shown in Figure 1 shall be used on welded rails on these bridges, except as specified in (c) below.
- c) Anchors shall not be applied on timber bridges where the transoms are fixed to the girders with dump spikes. Anchors shall also not be applied where transoms are fixed to steel girders by cast iron clip washers, except where an old rail or timber is bolted to the outer ends of the transoms. In this latter case anchoring as in (b) shall apply, but if there is a series of spans giving a total bridge length greater than 30m, then clause 3.4.2.(b), shall also apply.
- d) In special cases, glued insulated joints may be approved on bridges and within 30m of the bridge ends
- e) When a turnout is within 30m of a bridge end, the turnout except for the heel joint is to be aluminothermic welded throughout where possible.

3.6.2 Transom Topped Steel and Timber Bridges with one or more spans 18m long and greater, but less than 80m

- a) Mechanical joint shall not be placed within 60m of a bridge end or on a bridge.
- b) Within 60m of the bridge end the track shall be double anchored on every second sleeper
- c) On the bridge the track shall be double anchored to every second transom for half the span length, commencing at the fixed end, except as indicated in 3.4.1 (c).
- d) Anchors shall not be applied to transoms fixed to steel girders by C.I. clips or to transoms fastened to timber girders by dump spikes.
- e) In special cases, glued insulated joints may be approved on bridges and within 60m of the bridge ends.
- f) When turnouts exist within 60m of a bridge end, the turnouts are to be aluminothermic welded throughout and a fixed heel flexible switch provided if possible.

3.6.3 Bridges with spans greater than 80m

- a) Expansion switches are to be provided at the expansion end of the span(s) in accordance with drawings which are to be provided at these locations. The switch heel and stock rail may be welded to adjoining rails.
- b) (The rails are to be anchored and joints limited as enumerated in sections 3.4.2 (a) and 3.4.2 (b).
- c) Between expansion switches the rails are to be box anchored to every fourth transom.

3.6.4 Ballast Top Bridges (4.27m span lengths and greater, with any number of spans.

- a) Mechanical joint shall not be placed within 30m of a bridge end.
- b) Rails are to be welded continuously to eliminate joints on the bridge, providing the ballast section is standard.
- c) Standard anchoring for welded rails on ballasted track as shown on Figure 1 should be used on welded rails on these bridges.

3.6.5 Structures with rail bearing girders

As the rail on a longitudinal girder cannot be anchored, the numbers of anchors that cannot be located on the bridge are to be added to sleepers on each end of the structure.