AUSTRALIAN RAIL TRACK CORPORATION LTD
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Engineering Practices Manual

Civil Engineering

Field Replacement of RBM Crossing Inserts

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1. Purpose

This document details the approved process for field replacement of Rail Bound Manganese inserts in crossings, the conditions associated with use of the process and advice on the advantages and disadvantages of its use.

2. Reason and Nature of Change

Document reissued as ARTC Engineering Practice Manual.

3. Introduction

In the past, when Rail Bound Manganese Crossings were worn beyond specified requirements, they were either repaired by surface welding in-situ or a complete crossing was installed.

The development of a method for field replacement of the RBM insert offers significant savings in terms of possession time and cost, labour requirements, lifting equipment required and the number of welds and closures.

The method does not, however, provide the same degree of precision or accuracy as the workshop environment. The chock blocks cannot be reworked to fit the new insert for profile and taper, the underside crossing flatness cannot be checked, the crossing cannot be re-pressed if required, nor can it be planed on the gauge face. Instead, a hand grinder and a hammer are used.

All parts of a crossing have manufacturing tolerances. When a crossing is assembled, the parts have to be individually fitted in, to achieve correct alignment of the crossing.

The leg openings of the crossing and therefore the alignment can be changed by

misfitting chock blocks. Misfitting chock blocks also may roll the rails in or out when bolted up.

By shifting the theoretical point of the crossing to the wing rails the alignment can be changed. Incorrect alignment of a crossing can cause the wheel of rolling stock to hit the nose of the crossing, thus causing damage or destruction of the manganese inserts.

The issues outlined above may lead to an increase in long term maintenance costs. Crossings repaired by this method should be subjected to more frequent monitoring and/or grinding.

It should also be noted that inserts that are not factory fitted by the manufacturer, are not covered by the warranty.

This method is approved for use for 1:10.5 and 1:15 Rail Bound Manganese Crossings in 53kg and 60kg rail.

4. Conditions

This process can be used to replace RBM inserts provided that:

- If a new insert is used, it must be supplied by the manufacturer who supplied the original insert.
- If a reconditioned insert is used, it has been rebuilt by a suitably qualified person in accordance with Instruction manual. The insert must be marked with a crossing rate.
- Approved Huck bolts and washers are used.

5. Replacement Procedure

The process is carried out as follows:

5.1 Planning

1. Compare the make and catalogue number of replacement insert with the make and catalogue number of the crossing being repaired.

   This action is critical, DO NOT GUESS. If you cannot determine that the insert will provide an exact replacement DO NOT replace the insert. The complete crossing needs to be replaced.

2. Establish and record the position of theoretical point of crossing to be replaced, by string lining and marking.

5.2 Removal of old insert

1. Remove rail fasteners from crossing and up to two metres beyond the short and long legs.

2. Remove all crossing bolts.

3. Cut legs or remove fishplates from all legs of the crossing.

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4. At the approximate position of the theoretical point, place one track jack under the left, and one track jack under the right wing rail. Position the jacks to allow the wing rails to move outwards on the jacks' lifting forks when in the lifted position.

5. Lift the wing rails until the foot of crossing is at least 25mm above lugs on turnout plates.

6. Jack the wing rails apart so that each wing rail clears the insert by a minimum of 50 mm.

7. Place another track jack horizontally between the Left and Right hand heel rail, close to the insert. Jack the heel rails apart so that each heel rail clears the insert by a minimum of 50mm.

8. Lift the insert (using a lifting device) and move it clear of the track.

9. Remove chocks and clean off any epoxy glue and other debris.

10. Thoroughly clean wing rails and heel rails where chock blocks make contact from epoxy glue and other debris.

5.3 Installation of new insert

1. Install new or reconditioned insert between the wing rails

2. Place Toe chock, Left and Right hand flangeway chocks and Heel chock into position.

3. Remove jacks that are holding wing rails apart (horizontally).

4. Hit the wing rails into place with a sledge hammer so that it is a snug fit around insert, and check whether the insert is sitting in wing rails properly.

   Some grinding of Wing rails and Heel rails may be required to properly fit the insert.

5. When wing and heel rails are close to the right position, place location pins or bolts through:

   - Wing rails and toe chock block
   - Left Hand Heel rail and flangeway chock block, manganese insert, Right Hand flangeway chock block and heel rail.
   - Left Hand heel rail, heel chock block and Right Hand heel rail

6. Hit the wing and heel rails again with a sledge hammer to improve the fit against the manganese insert.

7. Place Huck Bolts through the crossing. Place tapered or flat washer where required and swage every second bolt up. Continue hitting the wing and heel rails, to seat the insert correctly in position with a sledge hammer.\

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8. Place the rest of the Huck bolts through the crossing. Place tapered or flat washers where required and swage up.

9. Remove jacks from under the crossing

10. Re-install all track fastenings (keep checking insert to make sure it is in the correct position).

5.4 Check work

1. Check for correct position of theoretical point by locating theoretical point with stringline and comparing it to the previous record.

2. Check track gauge

3. Check checkrail effectiveness, mainline and turnout.

5.5 Time to complete

The in-track replacement of a crossing insert will take approximately two hours in welded track and three hours if track adjustment is required. If welding is required then traffic can negotiate the track one hour after the last weld has been poured.

Replacing a crossing fishplated into the track will take approximately one hour, or three hours if track adjustment is required. There is no time lapse before traffic can negotiate .the track

Times quoted for the in-track crossing insert replacement require four people. This excludes personnel for worksite protection.

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