Discipline

Engineering Standard – NSW

Category

Signalling

Title

The Claw Lock Mechanism Installation On Swing Nose Crossings

Reference Number

SMS 09 – (RIC Standard: SC 07 37 00 05 EQ)

Document Control

Status	Date	Prepared	Reviewed	Endorsed	Approved
Issue 1 Revision 1	Mar 05	Standards and Systems	Standards Engineer	GM Infrastructure Strategy & Performance	Safety Committee
		Refer to Reference Number	H Olsen	M Owens	Refer to minutes of meeting 12/08/04

Disclaimer

Australian Rail Track Corporation has used its best endeavors to ensure that the content, layout and text of this document is accurate, complete and suitable for its stated purpose. It makes no warranties, express or implied, that compliance with the contents of this document shall be sufficient to ensure safe systems of work or operation. Australian Rail Track Corporation will not be liable to pay compensation in respect of the content or subsequent use of this document for any other purpose than its stated purpose or for any purpose other than that for which it was prepared except where it can be shown to have acted in bad faith or there has been willful default.

Document Approval

The technical content of this document has been approved by the relevant ARTC engineering authority and has also been endorsed by the ARTC Safety Committee.

Document Supply and Control

The Primary Version of this document is the electronic version that is available and accessible on the Australian Rail Track Corporation Internet and Intranet website.

It is the document user's sole responsibility to ensure that copies are checked for currency against the Primary Version prior to its use.

Copyright

Document History

Primary Source – RIC Standard SC 07 37 00 05 EQ Version 2.0

List of Amendments –

ISSUE	DATE	CLAUSE	DESCRIPTION
1.2	14/03/2005	Disclaimer	▪ Minor editorial change ▪ Footer reformatted

Contents

1. VAE Swing Nose Crossings

1.1. General

The VAE swing Nose Crossing is assembled onto a fabricated frame which serves to support the swing nose and wing rails as well as acting as a stiffener in around the tip of the swing nose.

The claw locks are bolted to this frame rather than to the wing rails

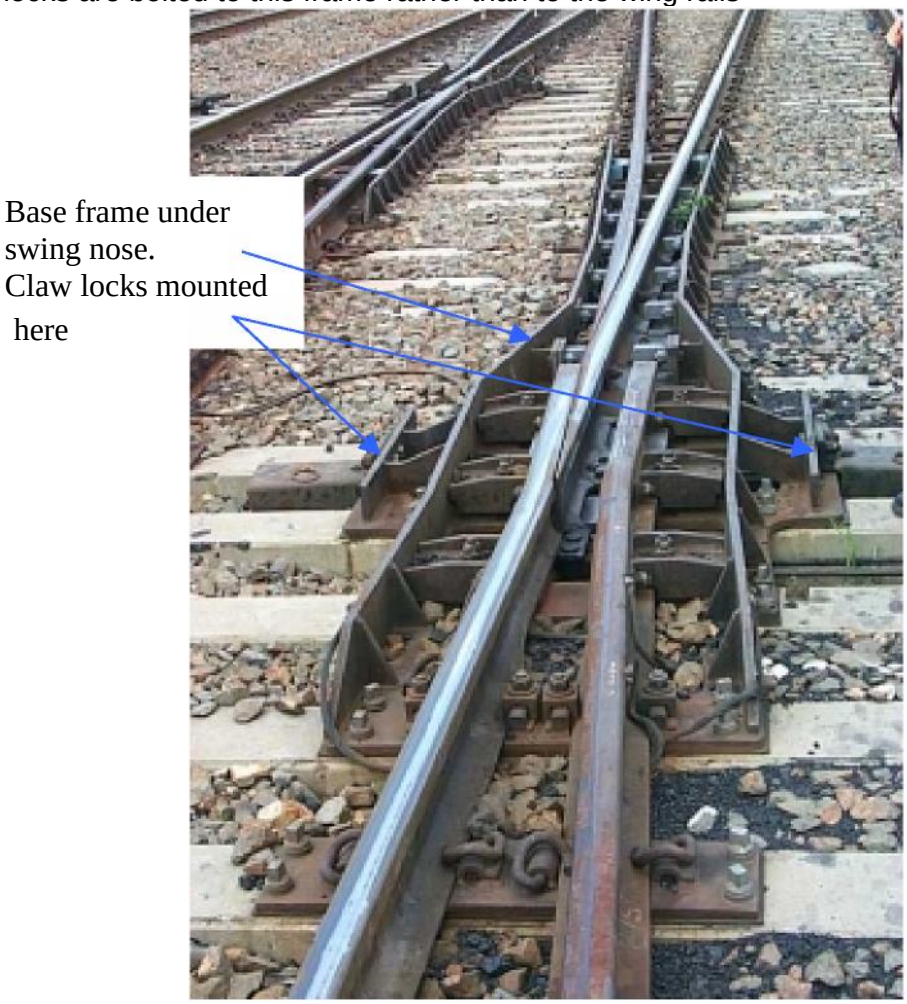


Figure 1.1 – VAE Swing Nose Crossing

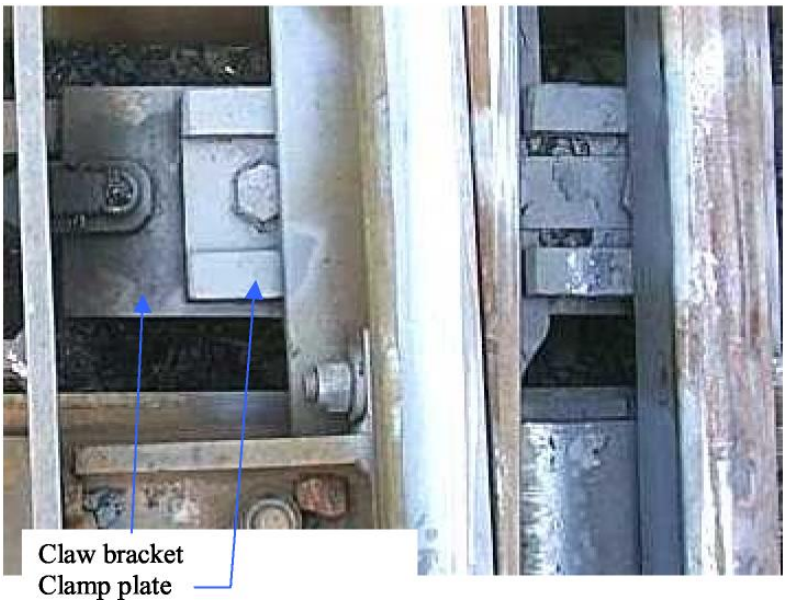


Figure 1.2 – VAE Swing Nose Crossing

The swing nose itself is manufactured from 60 kg rail section and a bracket to mount the claws is bolted and clamped to the swing nose.

Wing rails on this swing nose are made from Zu60 section (half height) rails.

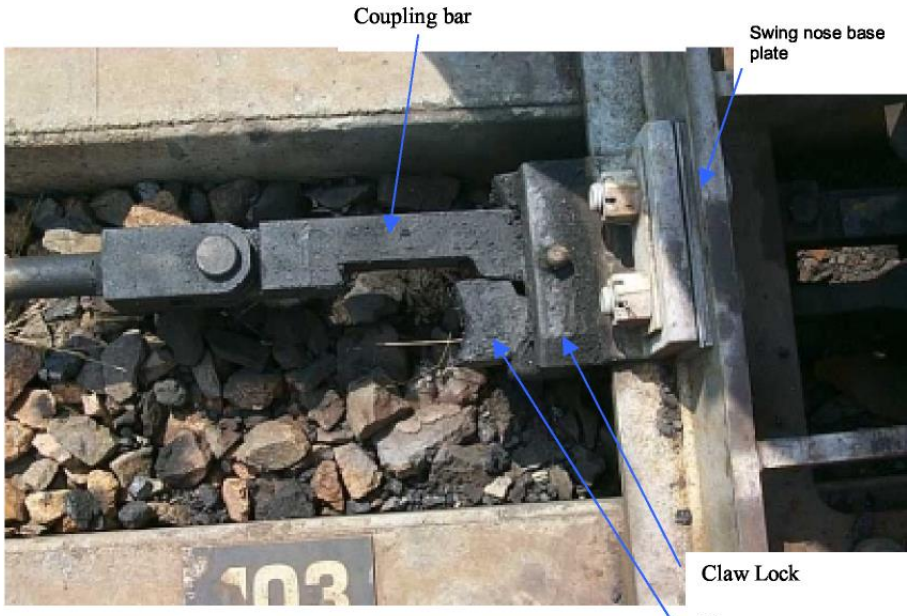


Figure 1.3 – VAE Claw and Coupling I

1.2. nstallation of the Claw Lock Mechanism

CAUTION

Only remove sufficient ballast from between beams to clear the underside of the claw lock assembly and detector rods by 30-40mm.

Removal of more ballast than necessary will only lead to lack of support under the swing nose, may lead to premature swing base frame failure and will lead to excessive wear and loss of reliability on claw lock components.

1) Fit a claw lock to one side of the swing nose base frame.

2) Only tighten the bolts sufficiently to hold the claw lock in place and do not fit any shims

3) Slide the coupling bar and claw through this claw lock. The claw must be in the notch in the coupling bar. (Claw toward the tip of the swing nose)

4) Continue to slide the bar and claw through until the claw can be pinned to the claw bracket. Note that the eccentric bush must be inserted into the bracket before the claw slides over the bracket. The thickest section of the bush should be towards the swing nose.

5) Do not fit the claw pin retainer and split pin at this stage.

6) Fit the opposite eccentric bush, claw and claw pin to the claw bracket.

7) Swing the claw into the notch in the coupling bar

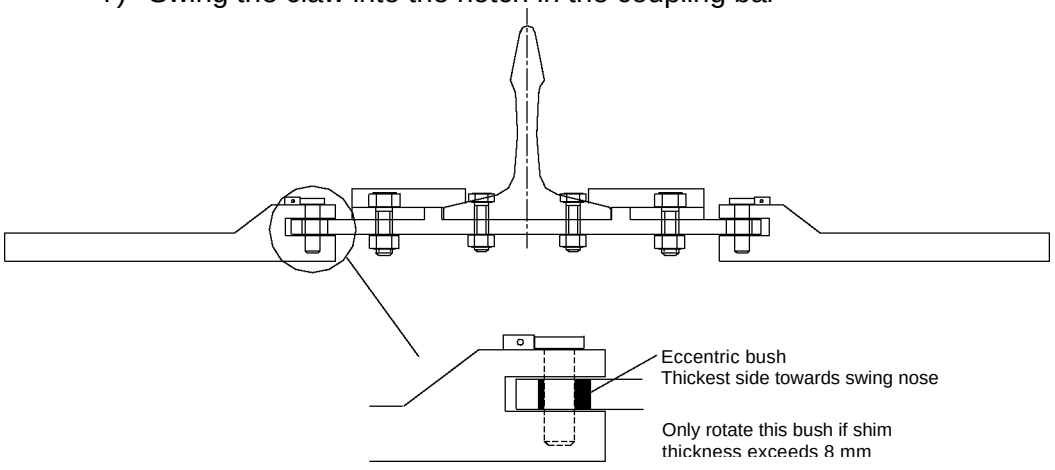


Figure 1.4 – Eccentric bush

8) Slide the other claw lock over the coupling bar and claw and bolt to the swing nose frame. Only tighten the bolts sufficiently to hold the claw lock in place and do not fit any shims.

9) Bar the swing nose over and back a couple of times to ensure that the coupling bar and claws are moving freely.

10) Nip up the claw lock bolts but do not fully tighten

11) Mount the operating mechanism and connect the operating bar. This is described in clause 1.3

12) Carry out the facing point lock test. Shim as necessary between the claw lock and swing nose frame. The nominal thickness of shims is 4 mm. Maximum thickness of shims should not exceed 8 mm.

13) If it is necessary to change the position of the eccentric bush (only if shim thickness required is more than 8 mm) on one or both claws, swing the claw out behind the claw lock, remove the claw pin and operate the swing nose over until the bush can be removed and rotated.

14) Operate the swing nose back and reinsert the pin.

15) Complete the FPL testing.

16) Fit the claw pin retainers and split pins and fully tighten the bolts securing claw locks to the swing nose frame.

17) Fit split pins to the claw lock bolts where castellated nuts are fitted.

18) Fit the covers to the claw locks.

19) Fit the stop pieces to the coupling bar so that the total coupling bar stroke is 184 mm. (ie 180mm nominal stroke plus 2 mm clearance from the swing nose base frame each side.)

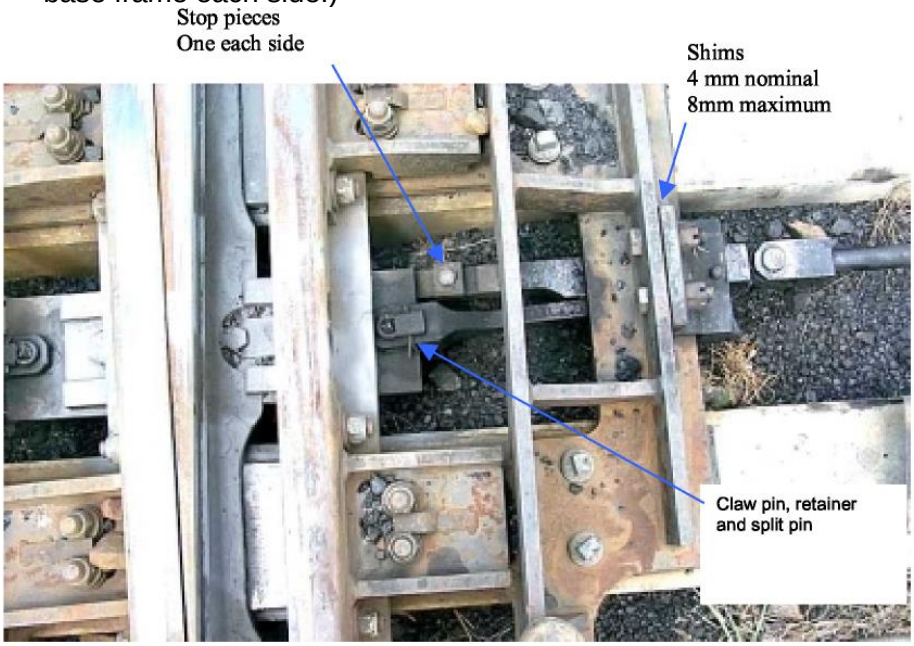


Figure 1.5 – Claw pin retainer and stop pieces

1.3. Installation of Westinghouse 84M Mechanism

1) Fit the mechanism base plates to the extended concrete beams. If stainless steel bolts are used to secure the base plates, an anti-seize compound must be used on the bolts. If galvanised bolts are used a die nut must be run down the galvanised thread.

2) Mount the mechanism onto the baseplates and fasten down

3) Close the swing nose against the wing rail closest to the mechanism

4) Operate the mechanism so that the throw bar is fully retracted

5) Move the claw lock coupling bar until the stop piece (if fitted) is 2 mm clear of the swing nose base frame. If stop pieces are not fitted move the coupling bar to the locking set position shown in figure 1.6

Figure 1.6 – Locking set dimension

6) Remove the two outer nuts on the throw rod and wind the two inner nuts in as far as possible on the thread

7) Fit the operating rod onto the mechanism throw bar and pin it to the claw lock coupling bar. Ensure insulating bushes are fitted between the operating rod and coupling bar.

8) Bring one inside nut and one outside nut up to the operating rod. Nip up but do not fully tighten.

9) Operate the swing nose over using the machine.

10) The stop piece on the coupling bar, if fitted, must be at least 2 mm clear of the swing nose base frame. If not fitted, the locking set dimension should be the same as the other side ~2 mm.

11) If the stop piece contacts the swing nose base frame, its position must be adjusted so that it is at least 2mm clear with the machine at full stroke.

12) If the locking set dimensions are not balanced, adjust the operating rod position on the machine throw bar by ½ the difference in set dimensions.

13) Fully tighten the nuts and locknuts on the mechanism throw bar and fit and spread the split pin through the coupling bar.

14) Check that the mechanism has the correct detector slides for a swing nose crossing.

15) Remove the outer two nuts and slide both detector rods through the lugs on the detector slides. Ensure that the dished washers are fitted between the lugs and nuts on the rods.

16) Bolt the detector rods to the swing nose crossing. Ensure insulating bushes are fitted.

17) Roughly position the detector slides normal or reverse whichever way the mechanism is laying and fit the outer dished washers and nuts to the detector rods. Bring the nuts (but not locknuts) up to both sides of the lugs finger tight.

18) Carry out the detection testing procedure described in Chapter 2

19) When detection settings are correct, tighten the nuts and locknuts on both sides of the detector slide lugs. Note that these nuts should be tightened so that there is no movement between rod and lug but not so tight that the rod cannot rotate slightly in the lug.

20) Tighten the bolts securing the detector rods to the swing nose.

21) Operate over and back under power two or three times to ensure that stop pieces on the coupling bar do not make contact with the swing nose base frame. Adjust the position of the stop pieces if necessary.

2. PRE 1 in 24 Swing Nose Crossing

2.1. General

The PRE swing nose crossing mounts onto purpose built chair plates directly onto the concrete beams. There is no additional stiffening but the wing rails extend well beyond the swing nose.

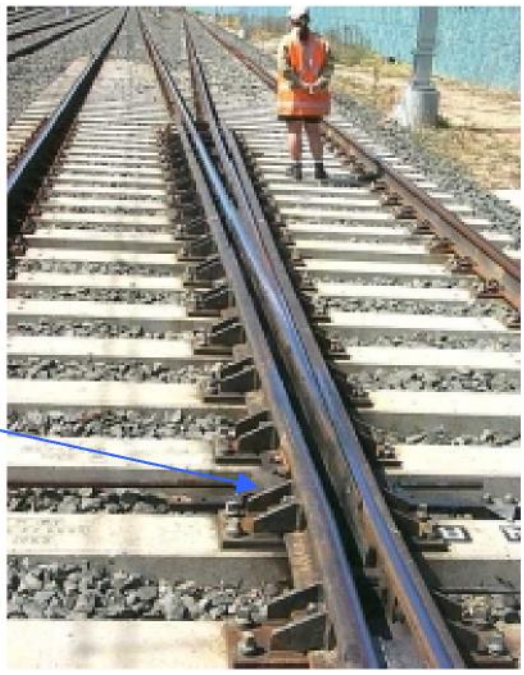


Figure 2.1 - PRE 1 in 21 Swing nose crossing

The claw locks are bolted to the wing rails with an adaptor between the claw lock and wing rail web.

Both swing nose and wing rails are made from 60 kg rail section.

2.2. Installation of Claw Lock Mechanism

CAUTION

Only remove sufficient ballast from between the beams to clear the underside of the claw lock
assembly and detector rods by 30 – 40 mm.

Removal of more ballast than necessary will only lead to lack of support under the swing nose,
may lead to premature swing nose failure and will lead to excessive wear and loss of reliability
on claw lock components

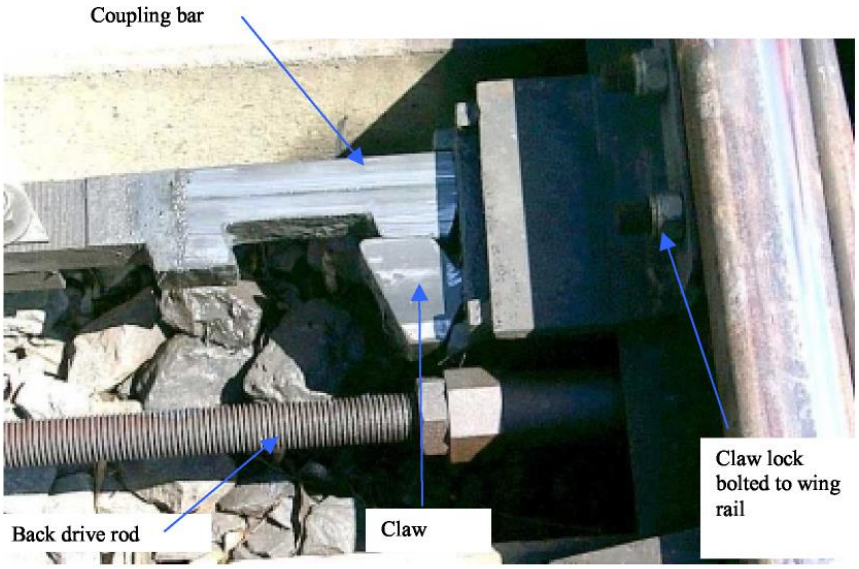


Figure 2.2 – PRE Claw lock

1) Bolt the claw lock with adaptor to one wing rail. Do not use any shims. Note that countersunk socket head cap screws must be used.

2) Nip the bolts up but do not fully tighten.

3) Slide the coupling bar and claw through the claw lock and pin the claw to the claw bracket.

4) Move the swing nose to that side and swing the claw out behind the claw lock. Move the coupling bar until it holds the claw in place.

5) With the opposite claw held in the notch in the coupling bar, slide the claw lock over the bar and claw and bolt it and the adaptor to the wing rail. Again, do not fully tighten the bolts.

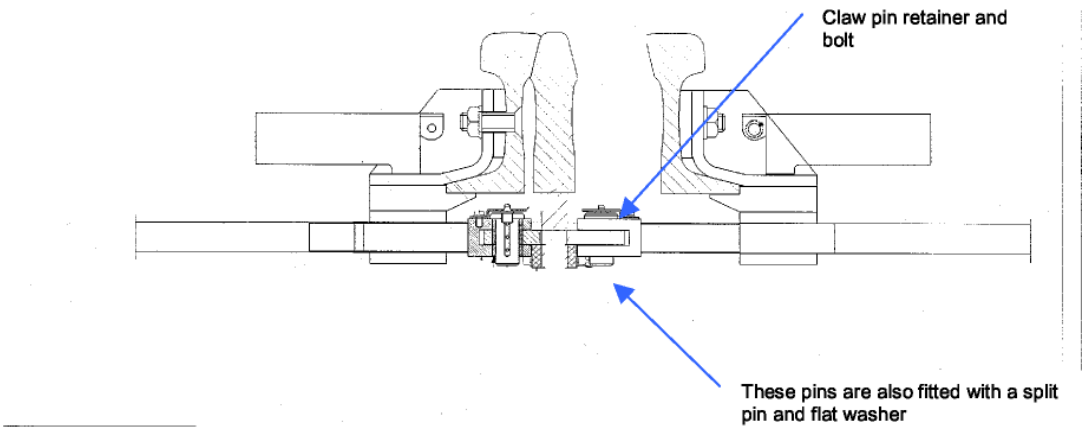


Figure 2.3 – Claw pin retainer

6) Pin this claw to the claw bracket

7) Fit the retainer and bolt over each claw pin and fit the split pin and washer to the bottom of each claw pin.

8) Mount and connect the operating mechanism. This is described in clause 2.4

9) Carry out the facing point lock test described in Chapter 2.

10) Use shims between the claw lock and the adaptor plate as required. It should not be necessary for shim thickness to exceed 6 mm.

11) Fully tighten the bolts securing the claw locks to the wing rails.

12) Fit the claw lock covers.

2.3. Back Drive Installation

1) Bolt the crank baseplates to beams Nos 98 and 104.

2) Bolt the guide bracket to beam No 101

3) Bolt the cranks to the base plates

4) Fit the back drive rods to the brackets under the swing nose ensuring that the sleeves are in place where the rods pass through the brackets.

5) Pin these rods to the cranks

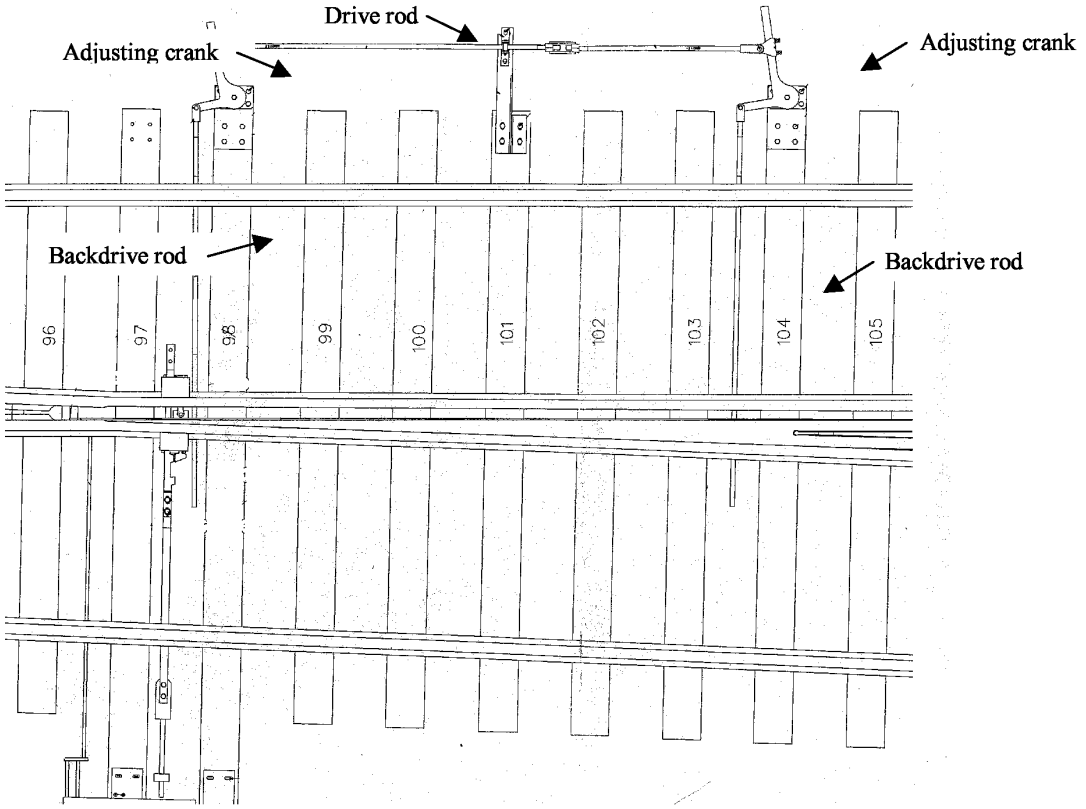


Figure 2.4 – Back drive assembly

6) Adjust the length of the rod near the tip of the swing nose so that the crank is biased approximately 45 mm towards the swing nose with the swing nose in the position shown in figure 2.4. (A great deal of difficulty will be experienced in gaining access to tighten the nuts on the back drive rods when the swing nose is in the track. Ideally this work should be carried out after the swing nose is mounted on the concrete beams but before it is lifted into the track)

7) Adjust the length of the back rod so that the crank is biased about 30 mm towards the swing nose.

8) Do not fit the drive rod until the operating mechanism has been mounted and connected to the claw lock mechanism.

9) When the mechanism has been fitted and adjusted, fit the drive rod and guide roller.

10) Adjust the front and/or back crank so that when the tip of the swing nose is closed, there is a 0 – 2 mm gap between swing nose and wing rail at the back drive.

11) Tighten the adjusting lugs on the cranks and fit the split pins to the pins between the cranks and driving rod and cranks and backdrive rods.

2.4. Installation of Westinghouse 84M Mechanism

1) Fit the mechanism base plates to the extended concrete beams. If stainless steel bolts are used to secure the base plates, an anti-seize compound must be used on the bolts. If galvanised bolts are used a die nut must be run down

the galvanised thread.

2) Mount the mechanism onto the base plates and fasten down

3) Close the swing nose against the wing rail closest to the mechanism

4) Operate the mechanism so that the throw bar is fully retracted

5) Move the claw lock coupling bar to the locking set position shown in figure ???.

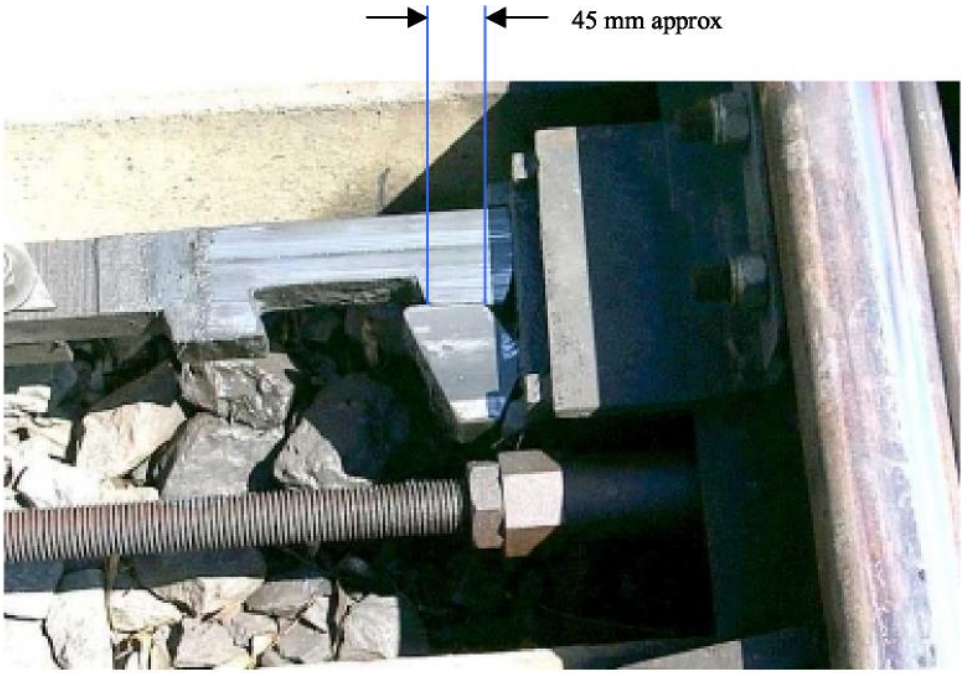


Figure 2.5 – Locking set dimension

6) Remove the two outer nuts on the throw rod and wind the two inner nuts in as far as possible on the thread

7) Fit the two piece operating rod onto the mechanism throw bar and bolt it to the claw lock coupling bar.

8) Bring one inside nut and one outside nut up to the operating rod. Nip up but do not fully tighten.

9) Operate the swing nose over using the machine.

10) The locking set dimension should be the same as the other side ~2 mm.

11) If the locking set dimensions are not balanced, adjust the operating rod position on the machine throw bar by ½ the difference in set dimensions.

12) Fully tighten the nuts and locknuts on the mechanism throw bar. Check that all bolts on the operating rod connections are tight.

13) Check that the mechanism has the correct detector slides for a swing nose crossing.

14) Remove the outer two nuts and slide the detector rod assembly through the

lugs on the detector slides. Ensure that the dished washers are fitted between the lugs and nuts on the rods.

15) Fit the detector rod to the swing nose crossing.

16) Roughly position the detector slides normal or reverse whichever way the mechanism is laying and fit the outer dished washers and nuts to the detector rods. Bring the nuts (but not locknuts) up to both sides of the lugs finger tight.

17) Carry out the detection testing procedure described in Chapter 2

18) When detection settings are correct, tighten the nuts and locknuts on both sides of the detector slide lugs. Note that these nuts should be tightened so that there is no movement between rod and lug but not so tight that the rod cannot rotate slightly in the lug.

3. PRE 1 in 12.5 Swing Nose Crossing

3.1. General

The PRE swing nose crossing mounts onto purpose built chair plates directly onto the concrete beams. There is no additional stiffening but the wing rails extend well beyond the swing nose. There is a sliding joint in the turnout rail of the swing nose and the foot of the straight rail is relieved to allow the swing nose to move

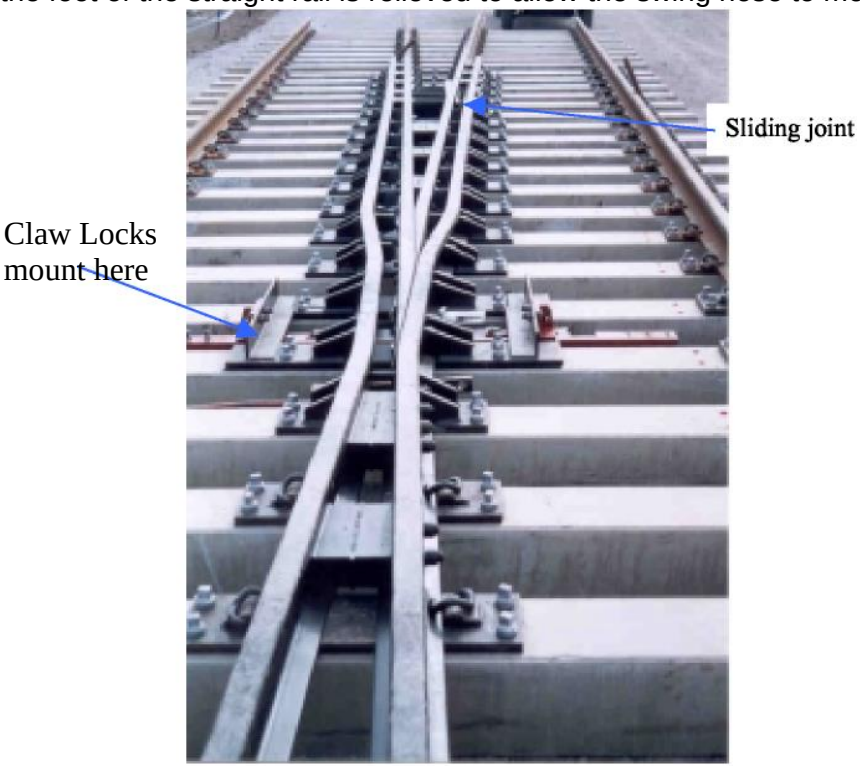


Figure 2.1 - PRE 1 in 12.5 Swing nose crossing

The claw locks are bolted to brackets welded to extended rail plates Both swing nose and wing rails are made from 60 kg rail section.

3.2. Installation of Claw Lock Mechanism

CAUTION

Only remove sufficient ballast from between the beams to clear the underside of the claw lock
assembly and pin and the detector rods by 30 – 40 mm.

Removal of more ballast than necessary will only lead to lack of support under the swing nose,
may lead to premature swing nose failure and will lead to excessive wear and loss of reliability
on claw lock components

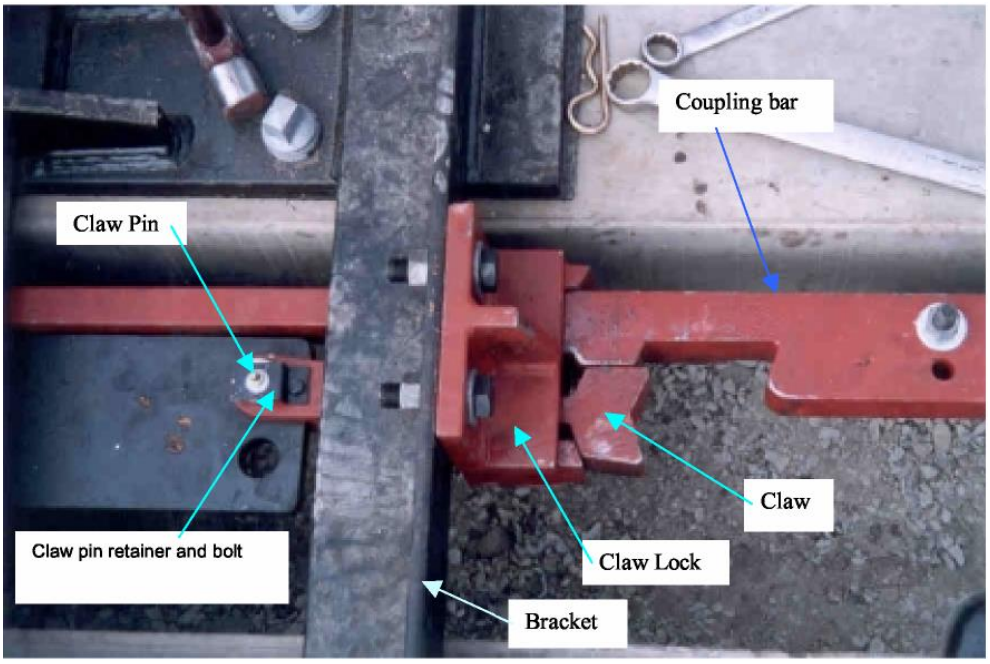


Figure 2.2 – PRE Claw lock – 1 in 12.5 Swing nose crossing

1) Bolt the claw lock one bracket. Do not use any shims.

2) Nip the bolts up using plain nuts, but do not fully tighten.

3) Slide the coupling bar and claw through the claw lock and pin the claw to the claw bracket.

4) Move the swing nose to that side and swing the claw out behind the claw lock. Move the coupling bar until it holds the claw in place.

5) With the opposite claw held in the notch in the coupling bar, slide the claw lock over the bar and claw and bolt it to its bracket. Again, do not fully tighten the bolts.

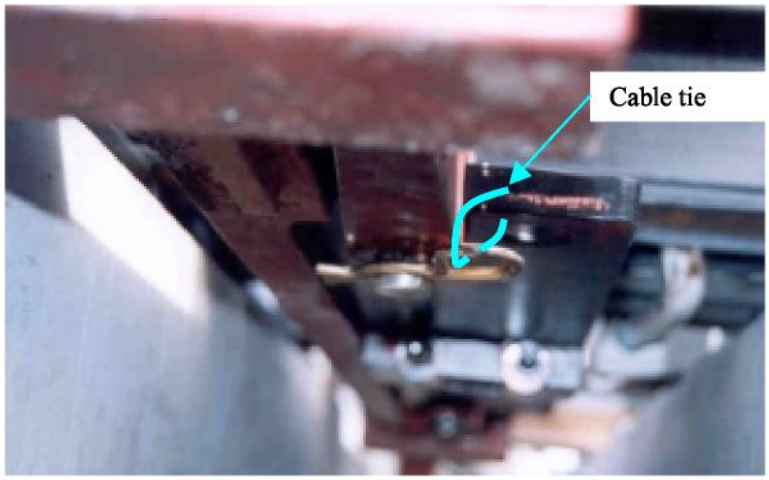


Figure 2.3 – "R" Pin and cable tie

6) Pin this claw to the claw bracket

7) Check that the coupling bar and claws are not binding in the claw locks, ie that there is clearance between the top of the claw and the claw lock and between the top of the coupling bar and the claw lock and that the coupling bar is sitting flat

8) Check that the coupling bar is parallel to the concrete beams. Adjust the position of the claw locks if necessary.

9) Fit the retainer and bolt over each claw pin and fit the "R" pin to the bottom of each claw pin.

10) Tie the "R" pin to the claw bracket with a stainless steel cable tie (eg "CABAC" part No SST200/316). Locate the tie over the end of the claw bracket, not the side.

11) Mount and connect the operating mechanism. This is described in clause 3.3

12) Carry out the facing point lock test described in Chapter 2.

13) Use shims between the claw lock and the bracket as required. It should not be necessary for shim thickness to exceed 6 mm.

14) Fully tighten the bolts securing the claw locks to the wing rails using the "HARD-LOCK" nut/locknut combination .

15) Fit the claw lock covers.

3.3. Installation of Westinghouse 84M Mechanism

1) Fit the mechanism base plate(s) to the extended concrete beams. If stainless steel bolts are used to secure the base plates, an anti-seize compound must be used on the bolts. If galvanised bolts are used a die nut must be run down the galvanised thread.

2) Mount the mechanism onto the base plates and fasten down

3) Close the swing nose against the wing rail closest to the mechanism

4) Operate the mechanism so that the throw bar is fully retracted

5) Move the claw lock coupling bar to the locking set position shown in figure 3.5.

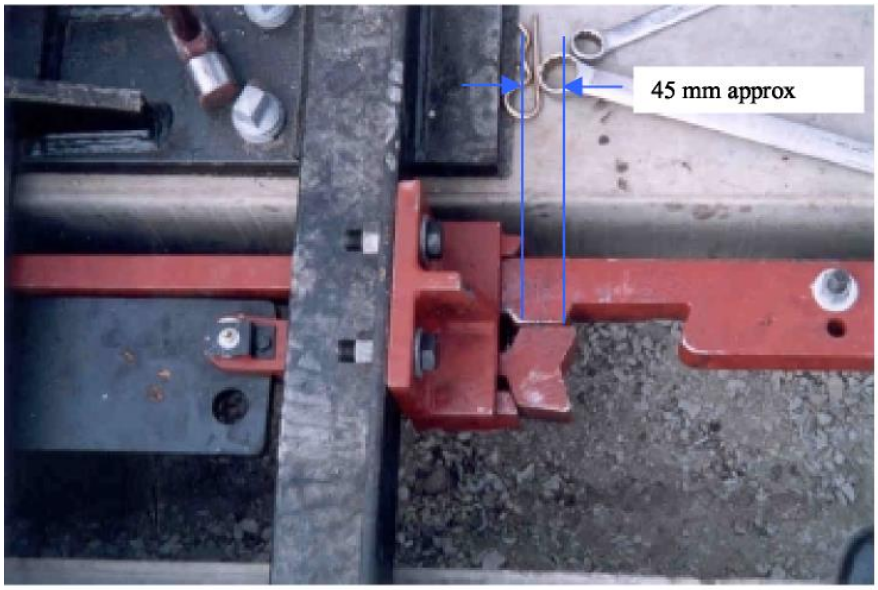
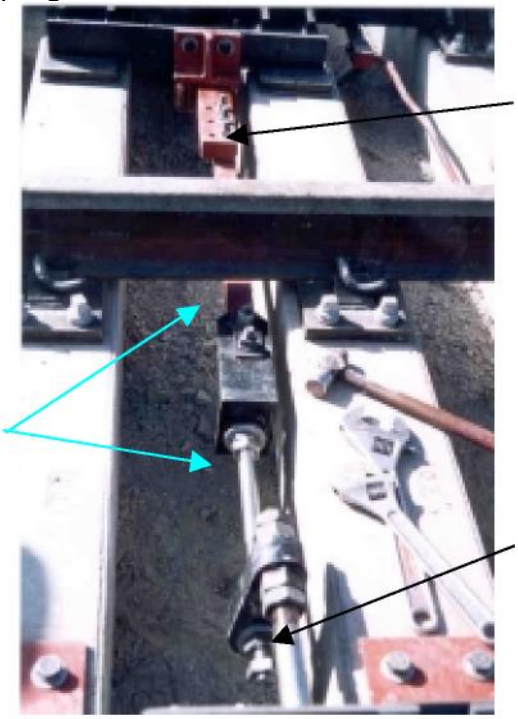


Figure 3.5 – Locking set dimension

6) Remove the two outer nuts on the machine throw rod and wind the two inner nuts in as far as possible on the thread

7) Fit the two piece operating rod onto the mechanism throw bar and bolt it to the claw lock coupling bar.



1. Fig 3.6 - Operating rod

8) Adjust the operating rod so that the dropper is in the centre of the thread on the machine throw bar. Fully tighten the nuts and locknuts on each end of the adjustable length of the operating rod.

9) Bring one inside nut and one outside nut on the throw bar up to the dropper. Nip up but do not fully tighten.

10) Operate the swing nose over using the machine.

11) The locking set dimension should be the same on the other side ~3 mm.

12) If the locking set dimensions are not balanced, adjust the operating rod position on the machine throw bar by ½ the difference in set dimensions.

13) Fully tighten the nuts and locknuts on the mechanism throw bar. Note that the nuts either side of the dropper should only be tightened sufficiently to prevent the dropper moving along the thread. The dropper should still be able to rotate if force is applied. Locknuts must then be fully tightened against the nuts. It is not essential that the dropper is vertical. A slight offset will not effect operation.

14) Check that the mechanism has the correct detector slides for a swing nose crossing.

15) Remove the outer two nuts and slide the detector rod assembly through the lugs on the detector slides. Ensure that the dished washers are fitted between the lugs and nuts on the rods.

16) Fit the detector rod to the swing nose crossing.

17) Roughly position the detector slides normal or reverse whichever way the mechanism is laying and fit the outer dished washers and nuts to the detector rods. Bring the nuts (but not locknuts) up to both sides of the lugs and nip up but do not fully tighten.

18) Carry out the detection testing procedure described in Chapter 2

19) When detection settings are correct, tighten the nuts and locknuts on both sides of the detector slide lugs. Note that these nuts should be tightened so that there is no movement between rod and lug but not so tight that the rod cannot rotate slightly in the lug.