

ASSEMBLY, INSTALLATION & MAINTENANCE MANUAL

Vossloh Cogifer Australia

Client: BHP Billiton Iron Ore

SUPPLY OF TURNOUTS AND CROSSOVERS

**1 in 20 R1000 Swing Nose Crossing Turnouts and
Crossovers
AS68kg/136lb T.W. Rail**

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CONTENTS

1	INTRODUCTION	3
2	SWING NOSE CROSSING TURNOUTS	4
3	VOSSLOH CONTAINED DRIVE (VCD)	4
4	DELIVERY, HANDLING AND STORAGE DETAILS	4
4.1	Delivery	4
4.2	Handling	5
5	INSTALLATION	9
5.1	Installation of 1 in 20 Tangential Swing Nose Crossing Turnouts & Crossovers ..	9
5.3	Necessary Tools.....	10
1)	Inspection tools	10
2)	Installation special tools.....	10
3)	Handling tools.....	10
5.4	Identification of Components	11
5.5	Turnout Concrete Bearer Layout	12
5.6	Crossover Concrete Bearer Layout	13
5.7	Plating / Insulation Pads	14
5.8	Stockrails/ Switches/ Running Rails / Closures	15
5.9	Anti-Creep Device Setting	17
5.10	Swing Nose Crossing	19
5.11	Final Turnout Alignment	21
5.12	Switch Rollers.....	21
5.13	Welding	22
5.14	Points Machine Installation.....	23
5.15	Swing Nose Crossing Points Machine Installation.....	24
5.16	V.C.D. - Vossloh Contained Drive	25
6	MAINTENANCE	25
6.1	Maintenance of Points Machine	25
6.2	Maintenance of Turnout after Initial Installation	26
6.3	Periodic Maintenance of Turnout.....	27
6.4	Recommended Spares to be kept.....	28
7	DATA SHEET	30
7.1	Drawings	30
7.2	Other Documents	30
7.3	Referenced Documents.....	31

REVISIONS TO THIS DOCUMENT

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2	28 JULY 2015	R. Mueller	G. Lorenz	Title change, Add delivery, handling & storage, safety considerations, I.D. of Components sections.
3	29 Oct 2015	R. Mueller	G. Lorenz	Revised Inspection Sheets & Maintenance notes
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5	13 Nov 2019	G Doherty	G. Lorenz	Formatting and General revision

Vossloh Cogifer Australia Pty. Ltd.

ABN 98 118 751 929

ACN 118 751 929

Head Office : 381 Barker Street, Castlemaine, Victoria, 3450, Australia

Correspondence : P.O. Box 1248, Castlemaine, Victoria, 3450, Australia

www.vossloh-cogifer.com

1 INTRODUCTION

This Manual contains a general description of Swing Nose Crossing (SNX) turnouts as supplied by Vossloh Cogifer Australia Pty. Ltd. (VCA, alternatively VC Australia); a description of the special components which are included in those turnouts; specific assembly, removal and maintenance instructions for the special turnout components; and the relevant Manufacturer's brochures.

This Manual also contains a Data Sheet and reduced copies of the relevant Drawings which apply to the turnout or turnouts for which this Manual has been supplied. The Data Sheet contains the relevant Customer Order Number and the VCA Job Number which apply to the turnouts for which this Manual has been supplied. Please quote these numbers when making any further inquiries.

For any further sales and commercial information, please contact Vossloh Cogifer Australia Pty. Ltd. Sales department as follows:

Vossloh Cogifer Australia Pty. Ltd.

361 Barker Street / Po Box 1248
CASTLEMAINE, VIC, 3450

Telephone : (+61 3) 5470 4800
Fax : (+61 3) 5470 4802
Email : VCAU.SalesAdmin@vossloh.com

If further technical information is required, please contact Vossloh Cogifer Australia Pty. Ltd. Engineering Department as follows:

Vossloh Cogifer Australia Pty. Ltd.

361 Barker Street / Po Box 1248
CASTLEMAINE, VIC, 3450

Telephone : (+61 3) 5470 4830
Fax : (+61 3) 5470 4801
Mobile : (+61) 447 335 257
Email : CAS.Engmanager@vossloh.com

Vossloh Cogifer Australia Pty. Ltd.

ABN 98 118 751 929

ACN 118 751 929

Head Office : 381 Barker Street, Castlemaine, Victoria, 3450, Australia

Correspondence : P.O. Box 1248, Castlemaine, Victoria, 3450, Australia
www.vossloh-cogifer.com

2 SWING NOSE CROSSING TURNOUTS

Swing Nose Crossing (SNX) turnouts, as with any conventional Railway Turnout, allow for rolling stock to be guided from one track to another.

A Swing Nose Crossing Turnout consists of: Switch and Stockrail Assemblies, SNX Crossing, Closure Rails, Plating, Bearers, Fasteners, Rail Joints and Point Operating Equipment.

The Swing Nose Crossing incorporates a moveable nose that switches from main rail line to the diverge rail line, depending on the required train movement. It allows for a continuous surface for the train wheel as it runs through the crossing. Check Rails are not required for this type of Crossing.

The switch and crossing section such as the switchblade, point, housed and heel rail are made from 68kg head hardened thick web rail. The head hardened thick web rail provides increased wear performance and a reduction in vertical deflection. Unlike standard AS68kg rail no reinforcement and associated fastening components are needed due to the full depth thick web section.

3 VOSSLOH CONTAINED DRIVE (VCD)

The VCD System is designed to enclose switch and rodding componentry inside a steel bearer. Enabling ease of access to rodding and safer maintenance and tamping practices. Please refer to VCA Document A4B17954 1 in 20 R1000 VCD installation Manual

4 DELIVERY, HANDLING AND STORAGE DETAILS

4.1 Delivery

The completed Turnout will be delivered to site by road transport (free on truck). Components will be unloaded and stacked by others who have suitable training and qualifications (See Handling section). Turnouts will be supplied in sub-assemblies, with loose components packed in wooden crates.

Delivery documentation shall detail the weights and lengths of the rail components, weights and dimensions of the boxes and the total number of pieces in the shipment. The weights of the boxes shall also be detailed on the packing lists and attached to the individual boxes.

Balance point will be marked on components in stencil.

(Please note weights and lifting positions can change if loads are modified, always test balance of load prior to lift).

4.2 Handling

The handling section in this manual is a general guide only, always follow your companies safe working procedures.

Only suitably trained and appropriately qualified persons should handle components.

When handling any loads, all lifting equipment must be of sufficiently high performance and Safe working loads must never be exceeded. Faulty or defective equipment must not be used.

It is imperative that crossings and switches are held level when being handled and stored.

Ensure the method of slinging does not result in the load being in excess of the working load limits (WLL) of the lifting gear. Avoid contact of slings with sharp edges of loads. Provide packing or insulation where a sling could damage the load. Ensure that slings or parts can't slip or move when load is applied, and that the load is centred.

Do not overload crane or lifting equipment. Avoid sudden movements, jerking and shock load when traveling. Keep load as low to ground as practicable.

Swing Nose Crossings shall always be handled with care to ensure the plates are not bumped or damaged in any way.

Particular care and attention to be given to the drive rod and detector rod brackets, which hang below the Swing Nose Crossing, during the unloading and storage process.

Swing Nose Crossings must be stored level and on timbers of an adequate size to ensure that the brackets protruding from beneath the crossing are always protected.

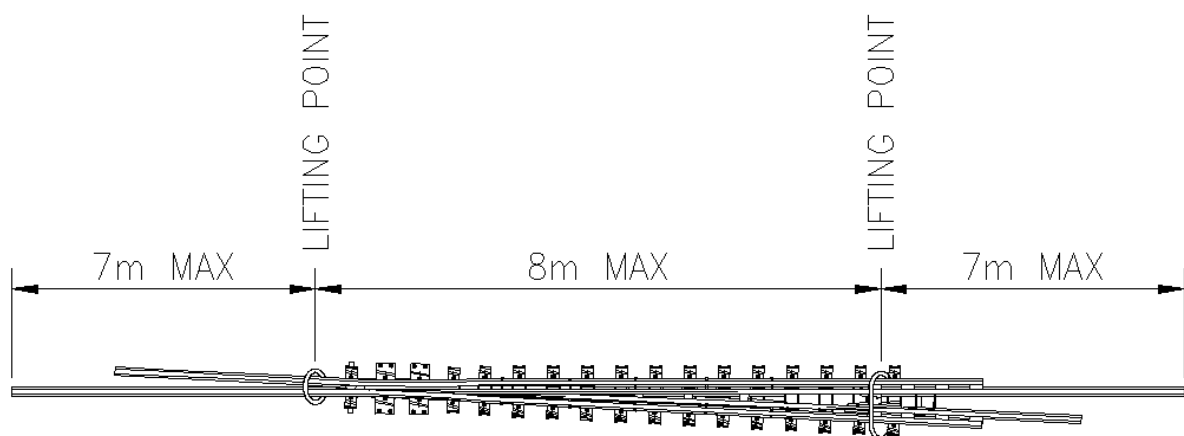


Fig. 1 Swing Nose Crossing

Swing Nose Assembly Panel: - Bearers 83 to 111

Approx. 35 Tonne with dimensions of **20.6m** long x **4.6m** wide x **0.7m** high (Swing Nose assembly, fitted to concrete bearers, and motor). The completed Turnout will be delivered to site by road transport (free on truck). Unloading, and stacking by others.

Vossloh Cogifer Australia Pty. Ltd.

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ACN 118 751 929

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It is recommended that the Swing Nose Crossing be unloaded using a suitably adequate Crane Lift, with an adjustable Lifting Beam/Spreader Bar.



Fig. 2 Typical Lifting Beam



Fig. 3 Typical Double Adjustable Chain Sling
(2 off)



Fig. 4 Typical Rail Grab
(4 off)

Use Double adjustable chain slings at each end of Lifting Beam.

On each chain use a 68KG Rail Grab to securely latch onto wing rails of crossing. Adjust slings as necessary to limit any excessive bending and to keep the rails as level as is practicable.

VCA recommend the point rail of SNX not to deflect any more than 60mm. Further restraints may be necessary.

Acceptable lifting is two gripping points of less than 8m corresponding to a maximum deflection of 80mm and overhang of the extremities of less than 7m.

When handling Half sets of switches, extra care is to be taken so that rail does not distort or bend in any manner that may cause a permanent change in rail geometry.

Ensure Switch blade is securely strapped to the stock rail.



Fig. 5 Endless Chain Sling



Fig. 6 Lifting Point (Guide only)

Lifting beams for handling half sets of switches, single switches or single stocks must comply with the following regulations:

Distance between two gripping points of less than 10m corresponding to a maximum deflection of 125mm (equivalent to a radius 100m); overhang of the extremities of less than 6m. When lifting critical rail components, stock rail, crossings, and in particular switch blades

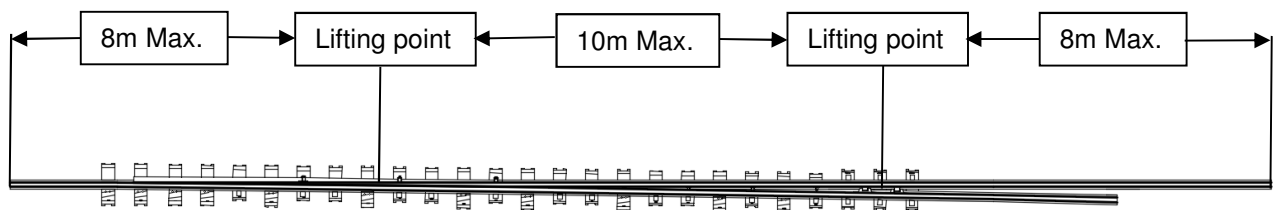


Fig. 7 Switches and/or Stock rails

Switch Assembly Panel: - Bearers 1 to 41

Approx. 35 Tonne with dimensions of **24.6m** long x **2.9m** wide x **0.7m** high (Switch assemblies, fitted to concrete bearers, and motor).

When cranes are not available, two (2) forklift trucks or loaders with tynes may be used. These must be capable of safely lifting 10000kg in weight and 18m in length. Always ensure that you have planned the lift and cleared the pathway that you are going to use. A spotter should be used to co-ordinate the drivers to ensure the assembly remains stable and level.

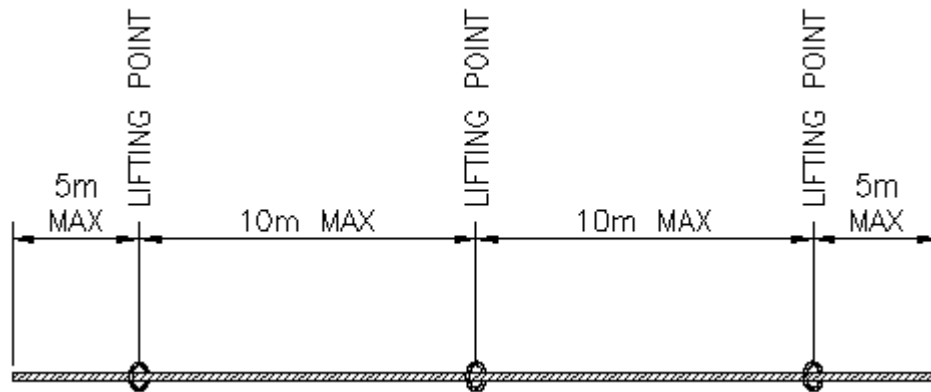


Fig. 8 Plain Rail & Loose Switch Blades Over 20m

For pre-assembly of turnout and quick placement of large panels into location it is recommended a lifting study be done.

Due to the large weights involved in a panel lift, it is extremely important to ensure excessive stress is not placed upon the rails causing deformation. This can compromise the geometry and integrity of the Turnout and is particularly important with switch and crossing panels.

All wooden boxes should be handled using a single forklift truck or loader with suitable tynes.

4.3 Storage

All rail components and wooden boxes should be stored and stacked in an **upright** position.

Insulated Rail Joints (IRJ's) should be stored on a minimum of four (4) timbers laterally, with two (2) being placed either side of the joint. IRJ's shall be protected from the elements at all times if they will be subject to additional electrical testing.

Swing Nose Crossings must be stored level and on timbers of an adequate size to ensure that the brackets protruding from beneath the crossing are protected at all times.

Extra timbers may be required to maintain a level surface and reduce sagging through S.N.X.



Fig. 9 Typ. Swing Nose Crossing Storage

5 INSTALLATION

5.1 Installation of 1 in 20 Tangential Swing Nose Crossing Turnouts & Crossovers

Each turnout is to be set out and assembled in accordance with the following drawing:

RH Turnout General Arrangement &
Setting Out Detail:

VCA Dwg. A0B16960
BHP Dwg. 000-R-00003

LH Turnout General Arrangement &
Setting Out Detail:

VCA Dwg. A0B17371
BHP Dwg. 000-R-00004

RH Crossover General Arrangement &
Setting Out Detail:

VCA Dwg. A0B16960 & A1B18528
BHP Dwg. 000-R-00003 & 000-R-00006

LH Crossover General Arrangement &
Setting Out Detail:

VCA Dwg. A0B17371 & A1B18529
BHP Dwg. 000-R-00004

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5.2 Safety Considerations

All Occupational, Health and Safety requirements for the respective work sites should be adhered to at all times during the assembly and installation process.

Consideration should be given to the following warnings and hazards prior to and during any work being undertaken.

- The use of appropriate PPE and safety gear.
- Be mindful of potential slips, trips and falls, eg. rails and bearers on the ground.
- Avoid pinch points, especially when installing and operating the switchblades and swing nose crossing.
- The use of lifting devices for plating, assemblies, etc., which often weigh more than 20kg.
- Using slings and spreader beams for lifting bearers and large assemblies rather than chains.
- Spotters maybe required if the work is taking place in a high traffic area, whether it be trains, vehicles or plant equipment.
- Always ensure you are using the appropriately rated sling for the load, that you are slinging it in the pre-determined manner and that you have planned the lift and cleared the pathway that you are going to use. Most importantly if in any doubt seek further advice from a qualified/ competent person

5.3 Necessary Tools

1) Inspection tools

Track Gauge
Feeler Gauge
String for geometry lines
Calliper Gauge
1.5m Square
10m Tape Ruler
Torque wrench with sockets

2) Installation special tools

PANDROL clip lever
Hydraulic bending frame.
Grease gun (6mm connection)

3) Handling tools

Suitable lifting devices for rail parts/crossing. i.e. Crane
Lifting beam with a distance of approx. 8+ meters for use with 'panel' assemblies.

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5.4 Identification of Components

The Concrete Bearers, Plating and Insulation Pads all have identification markings on one end, and the individual rails and crossing assembly have identification plates attached that show the details for the particular item. This information should be used in conjunction with the Turnout General Arrangement drawings A0B16960 (BHP Dwg. 000-R-00003) or A0B17371 (BHP Dwg. 000-R-00004) to assist with locating the items during assembly.

The identification plates are fixed to the rail web, and for example on the switchblades and crossing they are located at the heel end of the components as shown below.



Fig. 10 Switchblade

Identification
Plates



Fig. 11 Crossing

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5.5 Turnout Concrete Bearer Layout

- a) On flat level site place Concrete Bearers on ballast in accordance to Turnout General Layout drawing
 RH Turnout **A0B16960 (BHP Dwg. 000-R-00003).**
 LH Turnout **A0B17371 (BHP Dwg. 000-R-00004)**
- b) Concrete bearers are designed to suit both RH & LH Turnouts, concrete Bearers are not handed in accordance with Turnout Handing.
- c) Rotation of Concrete Bearers is determined by the “VCA” marking on the Bearers.
- d) For **both** RH and LH Turnouts, looking in from the point of switches toward crossing, **“VCA” bearer markings always to be located on the LH side of the Turnout**

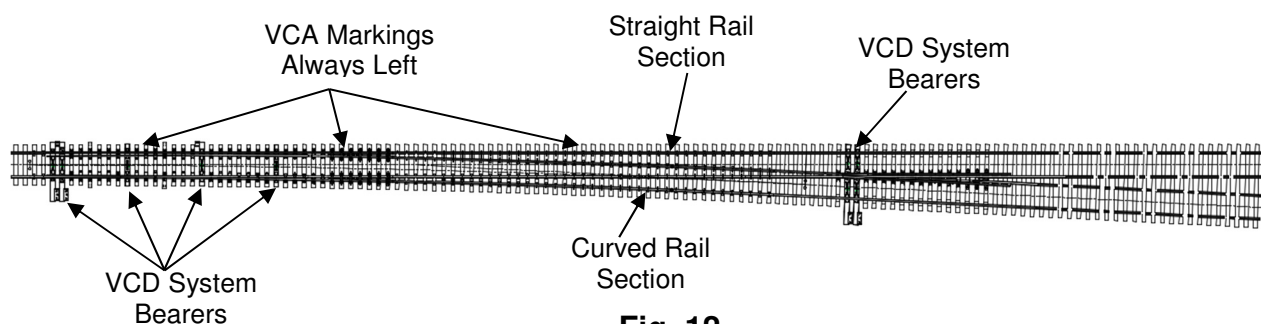


Fig. 12
RH Turnout

For LH Turnout, looking in direction of switches toward crossing, VCA marking on bearers to be located on the LH (or curved track) side of the Turnout as drawn on dwg **A0B17371(BHP Dwg. 000-R-00004)**

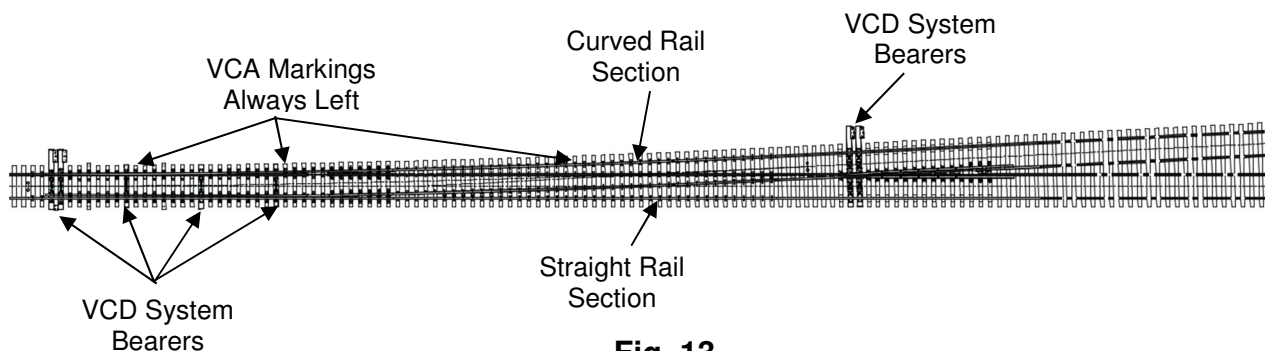


Fig. 13
LH Turnout

- g) For VCD system, bearer orientation depends upon R.H. or L.H. motor position Bearers 5, 6, 13, 21, 91 & 92. VCD Spreader Bar Bearer 29 IS Bi directional and have no set rotation.
 Refer to Vossloh Contained Drive (V.C.D.) Installation Manual : **A4B17954**

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- f) Bearers to be roughly arranged as drawn from 1 to 135.
- g) Use Cumulative bearer spacing's provided on drawings RH Turnout **A0B16960** or LH Turnout **A0B17371**. The Straight road dimensions are measured along the rail running edge on the straight, outside rail for the mainline track. The Divergent dimensions are measured along the running edge of the curved outside rail for the turning out track.
- h) Bearers will need to be more accurately adjusted once outside rails are in place.
- i) Ensure the seating surfaces of the Rails are level,
 - Infill bearers i.e. Bearers 1 to 4, 42 to 89 and 107 to 135 are positioned level with each other
 - Bearers 5 to 41 & 90 to 106 sit 20mm below infill bearers to allow for Switch and Crossing platework.
 - Bearers 7, 12, 17, 22, 27 to sit 56mm below infill bearers to allow for roller plates.

5.6 Crossover Concrete Bearer Layout

Turnout Bearers for Crossovers to be arranged generally in accordance with details listed above in Item 4.4.

15.6.1. 5m Crossover Concrete Bearer Layout.

- a) For 5m RH Crossover. Bearers to be placed on ballast in accordance to RH Turnout General Layout drawing **A0B16960 (BHP Dwg. 000-R-00003)** in conjunction with RH Crossover drawing **A1B18528 (BHP Dwg. 000-R-00006)**.
For 5m LH Crossover. Bearers to be placed on ballast in accordance to LH Turnout General Layout drawing **A0B17371 (BHP Dwg. 000-R0004)** in conjunction with LH Crossover drawing **A1B18529**
- b) Two partial Turnout sets of bearers are required for a 5m crossover.
- c) Bearers for Turnout 1 to be roughly arranged 1 to 127 as drawn in Turnout General Layout drawing. Then 2 off bearers 128S parallel offset at 512mm as per drawings **A1B18528 R.H. CROSSOVER or A1B18529 L.H. CROSSOVER**. Then bearers for Turnout 2 should be placed from 127 to 1 as drawn in Turnout General Layout drawing.
- d) Use Cumulative bearer spacings provided in Turnout drawing to more accurately position bearers from both ends of Crossover
- e) Bearers will need to be more accurately positioned once rails are in place.

5.7 Plating / Insulation Pads

- a) For typical sections of plating refer to drawing **A1B17544**.
- b) Place all loose insulating pads with plating associated in position on bearers, Plates and insulating pads will locate between Cast-in Pandrol inserts in bearers. This includes
 - Insulating pads (under plates)
 - Special wedge clip insulating pads.
 - Resilient rail brace plates.
 - Heel plates.
 - Pandrol plates.
 - Roller Plates.
 - Pandrol 'H' Pads
 - VCD Switch slide plates.
- c) Crossing plates and adjustable braces will be pre-assembled to Swing Nose Crossing. Plating and insulating pads are typically identified using the bearer numbers onto which they shall be placed. i.e. Insulation Pads "SNX20:35 shall be located on bearer 35.
- d) Pads "**PPP**" shall be located beneath Pandrol switch and switch roller plates, on bearers **7, 10, 12, 15, 17, 20, 22, 25, 27, 30, 32 & 34**.

Pads "**PRBP**" shall be located beneath switch brace plates, on bearers **8, 9, 11, 14, 16, 18, 19, 23, 24, 26, 28, 31 & 33**.
- e) Plating under Switch area, up to Bearer 34, to be orientated with adjustable brace housing and Pandrol shoulders facing the field.
- f) Plates and insulating pads will be Pandrol clipped to concrete bearers.
- g) For VCD Switch slide plates ensure switch slide plates are loosely attached to the appropriate VCD Bearer. Refer to Plating component dwg. as shown.

<i>Plating Components for VCD Front Drive</i>	: A2B18833
<i>Plating Components for VCD Mid Drive</i>	: A2B18875
<i>Plating Components for VCD Back Drive</i>	: A2B18875
<i>Plating Components for VCD Spreader Bar</i>	: A2B18871
- h) Crossing plates and resilient braces will be pre-assembled to Swing Nose Crossing.

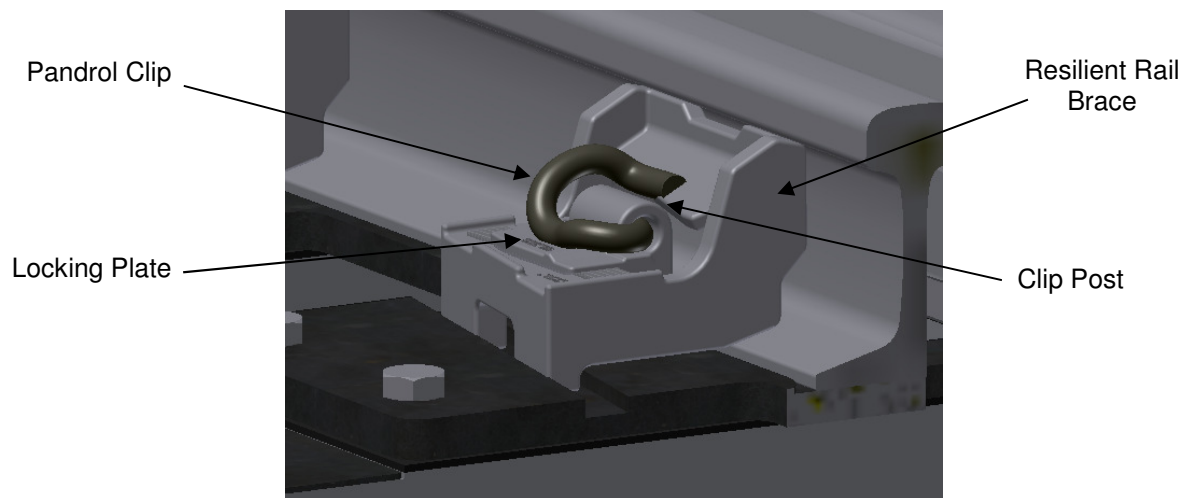


Fig.14
Typical Plate with Adjustable Brace

- i) To fit adjustable brace, ensure rail is seated flat on plate. Place adjustable brace over clip post and slide brace into position so that brace is seated inside rail web and plate slot. Continue to slide brace laterally until a firm fit is achieved. Place locking plate atop adjustable brace adjacent to clip post ensuring serrations mate correctly. Insert Pandrol clip (It may be advisable to leave adjustable braces loose until final turnout alignment is achieved).
- j) Ensure insulation pads and carrier plates are loosely attached to the appropriate VCD Swing Nose Crossing Bearer. Refer to Plating component dwg.
VCD Swing Nose crossing Plating Components : **A2B18873**

5.8 Stockrails/ Switches/ Running Rails / Closures

Each successive replacement Switches, Stock rails, and Glued Insulated Joints to be cut into the centre of the next bearer Crib (space between bearers).

Consideration of lengths required for Flash-Butt welding is necessary when cutting legs to keep point of switch, Anti Creep Device, and Crossing point located in correct position.

This is especially important when welding inner Closures onto crossing legs so as to **maintain correct Point of Switch (P.O.S) and lead length.**

- a) Place Switch and Stockrail assemblies and all straight and curved outside running rails on Plating and Bearers.
- b) Locate Stockrail ends relative to bearer No. 1. Ensure bearer is square to Stockrails.

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- c) Using Cumulative Bearer spacing's, in the table on GA drawing, on the outside rails, mark the position of where the bearer centre is to be located.
- d) Re position bearers relative to marking on outside rails and bearer centre.
- e) Place remaining Switches, Closure rails and insulated joints into position on bearers.

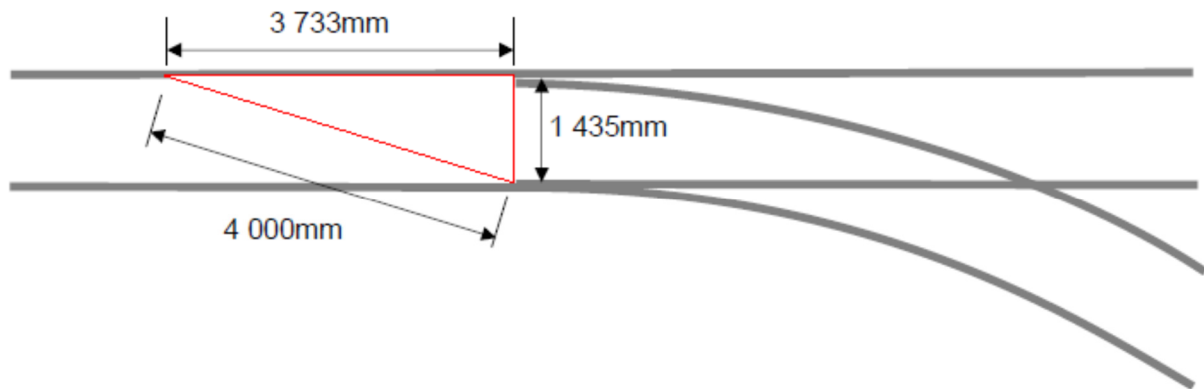


Fig. 15
Method of squaring switches

- f) Locate Stockrail ends relative to bearer No. 1. Ensure bearer is square to Stockrails. Ensure correct gauge and that the points are square to each other. Use a 'T' square or by measurement as shown above.
- g) With the aid of a string line extending from one end of the turnout to the other, ensure the outside straight Stockrail and straight running rails are positioned straight on the bearers. These rails will be used as a datum to check the distance between rail running edges, (along bearer centreline)
- h) Use set out diagram on GA drawing to check correct offsets of curved Stockrail, closures, I.J.'s and running rails.
- i) Use 1435mm Calibrated Gauge to check opposite rails.

5.9 Anti-Creep Device Setting

Anti-Creep Device on the switchblade (male half) to be positioned prior to welding of the blade to closure, with the male portion sitting centrally within the female portion (fitted to stock). It is recommended, when practical, for this positioning to be done at the ambient rail temperature for the location, i.e., 38 °C.

Allowance must be made for variation from the ambient rail temperature. This can be done by moving the switchblade longitudinally along the stockrail, either further forward or further back as required.

The amount of adjustment, or movement of the switchblade in relation to the stockrail at the Anti-Creep Device is approximately, calculated as follows –

The Switchblade and closure rail leading up to the crossing have nothing to resist thermal expansion (clips provide small resistance but tend to slip along foot of rail), assuming the crossing remains fixed and stationary.

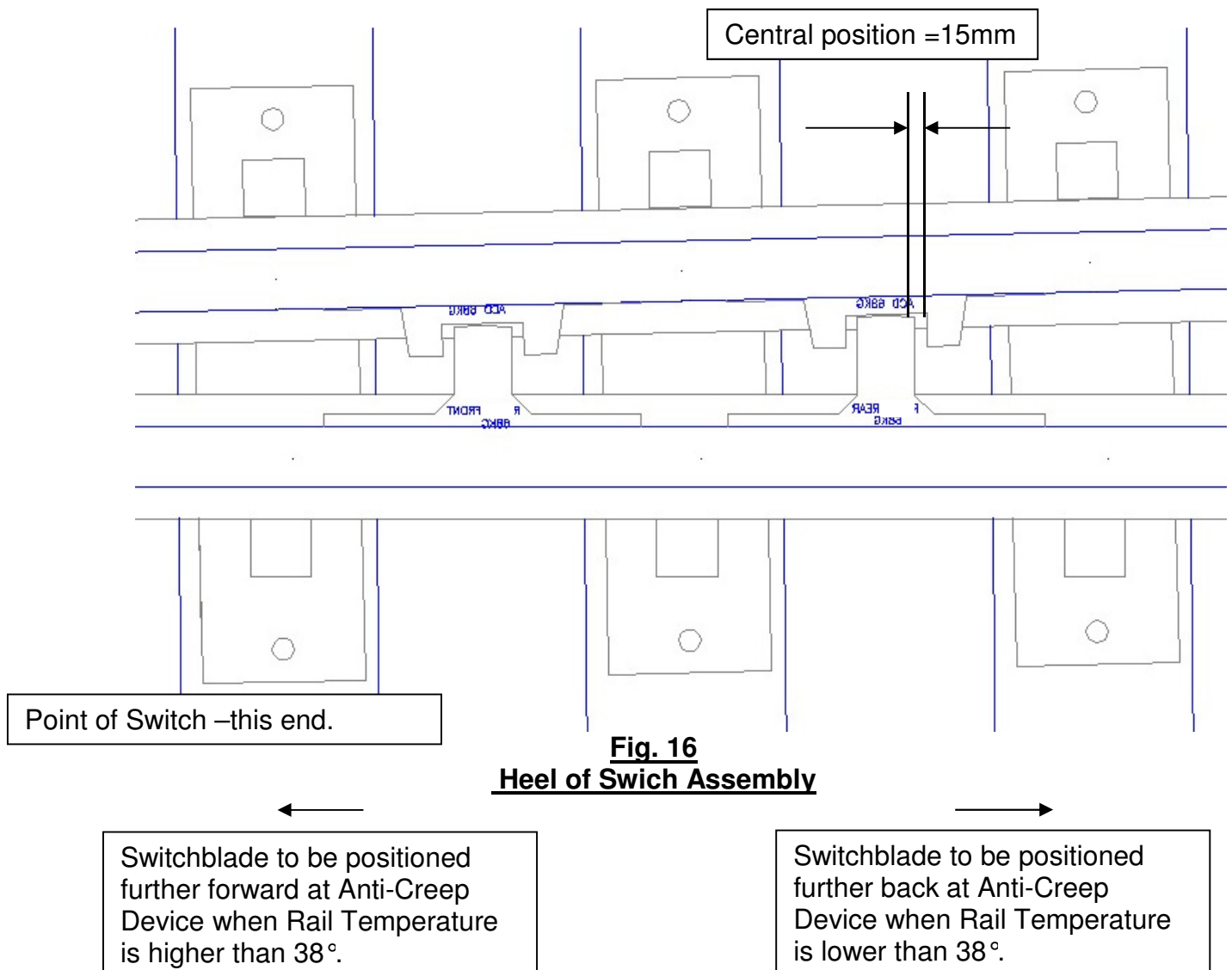
The 1 in 20 turnout has approx. **30.8m** of free movement in the switch between the crossing and the rear Anti-Creep Device. The thermal expansion coefficient in the free rail length = **0.0115mm/m/ °C**.

For the adjustment to be the same as the movement apparent at that point, the setting of the anti creep device is based on the formula:–

Expansion per metre per degree x free length of rail x temperature difference (°C) from Ambient rail temperature,
 = 0.0115mm/m/ °C x 30.8m x Temp difference (from Ambient)
 = **0.354 mm per degrees C** x Temp difference (from Ambient) , movement at the Anti-Creep Device

Examples,

1. If Rail Temperature is 35 degrees above ambient, the blade will need to be positioned further forward, $0.347 \times 35 = 12.4\text{mm}$ from the central position.
2. Similarly, if Rail Temperature is 15 degrees below ambient, the blade will need to be positioned further back, $0.347 \times 15 = 5.3\text{mm}$ from the central position.



Adjusted Anti-Creep Positions at measured rail temperatures, °C							
Positioned Forward				Positioned Rearward (closer to crossing).			
70°C	60°C	50°C	38°C	30°C	20°C	10°C	0°C
11.3	7.8	4.3	0.0	2.8	6.4	9.9	13.5

- a) Once the Switchblade is adjusted to the correct position at the Anti-Creep Device, The Switchblade may then be welded into position.

5.10 Swing Nose Crossing

Each successive crossing replacement, crossing legs are to be cut in the centre of next bearer Crib (space between bearers).

Consideration of weld type is necessary when cutting legs. To **maintain correct Point of Switch (P.O.S) and lead length.**

Refer to Welding Section for details on Weld type and recommended sequence at each joint.

RH SNX Crossing Arrangement Details
LH SNX Crossing Arrangement Details

VCA Dwg. A1B17277
VCA Dwg. A1B18591

- a) Swing Nose Crossing will have Rail Brace Crossing Plates pre-assembled to Crossing via adjustable Rail Braces.
 - b) Ensure Crossing insulation pads are located in correct position over bearers and fit between cast in shoulders
 - c) Locate Swing Nose Crossing assembly over bearers on insulating pads. The plating to fit evenly between cast in shoulders.
- Note: Particular care and attention to be given to drive rod and detector rod brackets and adaptor brackets, which hang below the swing nose crossing.



Fig. 17 SNX Crossing with V.C.D.

Vossloh Cogifer Australia Pty. Ltd.

ABN 98 118 751 929

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Head Office : 381 Barker Street, Castlemaine, Victoria, 3450, Australia

Correspondence : P.O. Box 1248, Castlemaine, Victoria, 3450, Australia
www.vossloh-cogifer.com

5.11 Final Turnout Alignment

- a) Check gauge throughout turnout, make adjustment to rails or bearers to suit.
- b) Use a string line to check straightness of main line, make adjustment to rails or bearers to suit.
- c) Check Lead length and rail alignment.
- d) Use Checking sheets **A4B17952** Turnout
A4B17953 Crossover
To achieve critical dimensions
- e) Place all Pandrol H.D. Insulators between Rails and Plates to fit between Cast in Shoulders.
- f) Note: Std H.D. Insulators not required between fabricated shoulders on plating.
- g) Locate and place wedge clips into correct position.
- h) Insert Pandrol Clips.
- i) Locate and fix adjustable Rail Braces to plates.
- j) Tighten all bolts
 - Recommended Torque for Rail Brace Screws 200 - 220Nm.
 - Suitable thread locking adhesive may be used in areas of high vibration.

5.12 Switch Rollers

- a) Switch roller assemblies are provided attached to Switch slide plates at nominated locations - bearers 7, 12, 17, 22 and 27.
- b) Set Switch rollers via the adjusting screws. Ensure closed switchblade sits flat on plate with switch roller assembly seated with a 3 to 5mm gap between roller and flange of rail. Open switchblade sits 1 to 3mm above plate while resting on rollers.

Prior to welding ensure gauge is correct. Adjust spreader bars and operating rod to obtain suitable switch opening and clearances. Ensure all rails are sitting flat on the plates and bearers, except for the Switchblades where a Switch Roller is attached as outlined in the previous step.

5.13 Welding

Utilize Flash-butt welding through the mainline.

Utilize Flash-butt welding through the diverge line where possible and practical.

Aluminothermic (Thermit) Welding may be used on short legs of crossing (diverge line).

- a) Prior to welding joints, ensure track gauge is correct. Adjust operating rods to obtain suitable switch opening and clearances. Ensure all rails are sitting flat on the plates and bearers.
- b) All welding to conform to Australian Standard AS1085 Part 20.
- c) It is recommended, when practical, for all welding to be done at the ambient rail temperature for the location, i.e., 38°C.
- d) It is recommended that the following steps be used when welding rails into place:-
 - i) Closures shall be welded to stockrails, crossings and Insulated Joints first. Note: The welds adjoining the switchblades shall be done last.
 - ii) Stockrails shall be welded to the plain track ahead of the turnout.
 - iii) Crossing heel end and carrier rails on the straight track side shall be welded to plain track behind the turnout.
 - iv) Crossing heel end and carrier rails on the turnout track side shall be welded to plain track behind the turnout.
 - v) Finally, referring to the following section on Anti-Creep Device Setting regarding adjustments, the switchblades can be welded to the closures.

5.14 Points Machine Installation

- a) 'M23A' MKII Points Machine to be set out and installed in accordance with Front drive assembly drawing A2B18445.
- b) Also to be set out and installed in accordance with 'M3A & M23A Mk II Turnout - Field Installation, Adjustment and Maintenance Guide' - Invensys Rail document number: TTTN3-23A2, refer to Appendix section at the rear of this manual.
- c) Ensure bearers are positioned and arranged correctly according to the required handing of points machine, either LH or RH side of turnout, as described in Section 5.4 of this manual. Refer also to section 2 of Invensys Rail document no. TTTN3-23A2, for Getting Ready, by checking drawings and the condition of the turnout.
- d) Place HDPE pads for motor tie plates in positions on bearers.
- e) Motor to be put in place and fastened. Refer to section 3 of Invensys Rail document no. TTTN3-23A2, for Installation and Adjustment procedures of points machine.
- f) Drive rod, Lock rod, and Detection rodding to be installed as per Front drive assembly drawing A2B18445.
 - Particular attention to be given to how the Lock bar and Detector rods are oriented within the machine. Refer to section 3 of Invensys Rail document no. TTTN3-23A2.
- g) Final adjustment of rodding and lost motion devices to be performed in accordance with section 3 of Invensys Rail document no. TTTN3-23A2.
- h) Contact train control centre and confirm point position and detection accurately corresponds to what the train controller sees. As is required in section 4 of Invensys Rail document no. TTTN3-23A2.
 - Note: this step to be performed in conjunction with section 5.14 i).
- i) Secure all fastenings.

5.15 Swing Nose Crossing Points Machine Installation

- a) 'M23A' MKII Points Machine to be set out and installed in accordance with SNX VCD system assembly drawing A2B17315.
- b) Also to be set out and installed in accordance with 'M3A & M23A Mk II Turnout - Field Installation, Adjustment and Maintenance Guide' - Invensys Rail document number: TTTN3-23A2, refer to Appendix section at the rear of this manual.
- c) Ensure bearers are positioned and arranged correctly according to the required handing of points machine, either LH or RH side of turnout, as described in Section 5.4 of this manual. Refer also to section 2 of Invensys Rail document no. TTTN3-23A2, for Getting Ready, by checking drawings and the condition of the turnout.
- d) Place HDPE pads for motor tie plates in positions on bearers.
- e) Place tie plates on top of HDPE pads in accordance with handing requirements shown on Invensys Rail Point Layout drawing 3301-214. Fasten to bearers where possible.
- f) Motor to be put in place and fastened. Refer to section 3 of Invensys Rail document no. TTTN3-23A2, for Installation and Adjustment procedures of points machine.
- g) SNX Drive rod, Lock rod, and Detection rodding to be installed as per drawing A2B17315.
 - Particular attention to be given to how the Lock bar and detector rods are oriented within the machine. Refer to section 3 of Invensys Rail document no. TTTN3-23A2.
- h) Final adjustment of rodding and lost motion device to be performed in accordance with section 3 of Invensys Rail document no. TTTN3-23A2.
- i) Contact train control centre and confirm point position and detection accurately corresponds to what the train controller sees. As is required in section 4 of Invensys Rail document no. TTTN3-23A2.
 - Note: this step to be performed in conjunction with section 5.13 h).
- j) Secure all fastenings.

5.16 V.C.D. - Vossloh Contained Drive

The VCD system utilises hollow steel bearers to contain rodding such as the Drive Rods, Detection Rods and Spreader Bars

For installation procedures of the VCD refer to **VCD Installation manual A4B17954 and drawing A1B18446.**

- a) Switch Drive/detection & lockout located in bearer positions 5 & 6. Refer to drawing **A2B18445.**
- b) Mid drive located in bearer position 13 and Spreader bar located in bearer position 29. Refer to drawing **A2B20450**
- c) Back drive located in bearer position 21. Refer to drawing **A1B18447**
- d) Spreader bar located in bearer position 29 Refer to drawing **A2B18416**
- e) Swing Nose Drive/detection & Lockout in bearer positions 91 & 92. Refer to drawing **A2B17315**

6 MAINTENANCE

6.1 Maintenance of Points Machine

Permission is to be obtained from the relevant track authority prior to servicing the Points Machines. Once permission is obtained, perform all tasks specified under **section 5** of Westinghouse document no. **TTTN3-23A2.**

Note: all safety warnings issued should be heeded during the maintenance process.

- One Week after commissioning – Inspect all set distances and adjust if necessary.
- 2-Monthly maintenance to be performed to ensure correct operation, which includes checking, inspecting and cleaning of fixings, rodding, wiring, etc., in accordance with **section 5.1** of Westinghouse document no. **TTTN3-23A2.**
- 6-Monthly maintenance to include all of 2-monthly checks, as well as adjustment of clutch, detection switches, etc., in accordance with **section 5.2** of Westinghouse document no. **TTTN3-23A2.**
- 500,000 cycle or 6 Year Operation Maintenance (whichever comes first) to be performed in accordance with **section 5.3** of Westinghouse document no. **TTTN3-23A2.**

6.2 Maintenance of Turnout after Initial Installation



Fig. 18
Switch blade



Fig. 19
Swing Nose Crossing

Vossloh Cogifer Australia Pty. Ltd.

ABN 98 118 751 929

ACN 118 751 929

Head Office : 381 Barker Street, Castlemaine, Victoria, 3450, Australia

Correspondence : P.O. Box 1248, Castlemaine, Victoria, 3450, Australia

www.vossloh-cogifer.com

a) Switch

- Check line and level through switch, ensuring the switchblade is supported evenly and flat on the brace plates and slide plates.
- After 0.5 Million Gross Tonnes of traffic, check the switch blades for any metal flow. Grind off metal flow to maintain running edge and profile of rail, to keep correct shape and fit. Grinding to be done by experienced Per Way welder. Repeat at 5, 10, 15 & 20 Million Gross Tonnes of traffic or when metal flow is observed.
- Ensure switch chairs are lubricated. The use of a 'dry' lubricant on the slide chair plates is recommended, as this enables them to be brushed off easily prior to re-treatment. (Do not Lubricate Cogislide plates).
- Check brace plating for any loose braces or fasteners.
- Check for damage on all insulated connections to the switchblade.
- Check operating rods obtain suitable switch opening and clearances.

b) Swing Nose Crossing

- Check condition of running edges and surfaces of swing nose crossing.
- After 0.5 Million Gross Tonnes of traffic, check the crossing for any metal flow. Grind off all metal flow to maintain gauge corner radius, running edge and profile of rail, to keep correct shape and fit. Grinding to be done by experienced Per Way welder. Repeat at 5, 10, 15 and 20 Million Gross Tonnes of traffic and when metal flow is observed.
- Ensure swing nose slide plates are lubricated. The use of a 'dry' lubricant on the slide plates is recommended.
- Ensure sliding joint at crossing plates 105 and 106 has sufficient lubrication between heel and housed rails. Top up grease at grease nipple on sliding joint chair braces (use Castrol SBX Grease or equivalent suitable for environment).
- Check brace plating for any loose braces or fasteners.
- Check for damage on all insulated connections to the switchblade.

6.3 Periodic Maintenance of Turnout

Periodic maintenance should be carried out in accordance with the End Users previously established maintenance regime and the volume of traffic (gross tonnes) passing through the turnouts. VCA recommends that at a minimum the following checks are carried out.

a) Switch

- Check lubrication of chairs and smooth operation of switch. The use of a 'dry' lubricant on the slide chair plates is recommended. (Do not Lubricate Cogislide plates).
- Check brace plating for any loose braces or fasteners.
- Check for any broken Pandrol clips especially around the heel area of the switch.
- Check connecting rods and fittings to switch. Ensuring good lubrication of joints so there is no binding.
- Regular inspections are required to check switchblade for wear. Grind off metal flow to maintain running edge and profile of rail, to keep correct shape and fit. Grinding to be done by experienced Per Way welder. If a switchblade does not

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fit snugly to the stock rail, or if the point does not house neatly into the stock rail, the cause must be investigated and corrective action taken.

- Check switch stops and bolts.

b) Swing Nose Crossing

- Check condition of running edges and surfaces of swing nose crossing.
- Regular inspections are required to check the crossing nose and wing rails for any metal flow. Grind off metal flow to maintain gauge corner radius, running edge and profile of rail, to keep correct shape and fit. If a swing nose rail does not fit snugly to the wing rails, the cause must be investigated and corrective action taken.
- Check for any signs of loose Huckbolts.
- Check plating for any broken Pandrol clips.
- Ensure swing nose slide plates are lubricated. The use of a 'dry' lubricant on the slide plates is recommended.
- Ensure sliding joint at crossing plates 105 and 106 has sufficient lubrication between heel and housed rails. Top up grease at grease nipple on sliding joint chair braces (use Castrol SBX Grease or equivalent suitable for environment).
- Check brace plating for any loose braces or fasteners
- Check connecting rods and fittings to swing nose, ensuring good lubrication of joints so there is no binding.

c) General requirements

- Check turnout for any loose bolts and any Pandrol clips that are broken.
- Check Track Gauge, intended gaps and switch openings.
- Check Bearer spacing's for any movement longitudinally along track. Adjust to dimensions on general arrangement. Excessive movement of bearers (+/- 10mm) may require bracing between bearers.
- Check line and top of turnout.
- Check cross level throughout turnout but especially at the crossing.
- Check insulating bush assemblies for any damage.

6.4 Recommended Spares to be kept

It may be necessary to hold spares of items such as rodding assemblies (in the case of derailments or damage), as long lead time for supply can cause delays.

Recommended items include: -

RH TURNOUT

- LH Switch and Stock Rail assemblies (plating not required). :300.B16960V11
- RH Switch and Stock Rail assemblies (plating not required). :300.B16960V12
- RH Swing Nose Crossing assembly (which includes plates). : 310.B17277V02

LH TURNOUT

- LH Switch and Stock Rail assemblies (plating not required). : 300.B17371V11
- RH Switch and Stock Rail assemblies (plating not required). : 300.B17371V12
- LH Swing Nose Crossing assembly (which includes plates). : 310.B18591V02

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RH MOTOR MOUNT

- VCD: Standard A Detection /Lockout Bearer Assembly : 390.B18445V01
- VCD: Mid-Drive Bearer Assembly : 390.B18416V02
- VCD: Back drive Bearer Assembly : 390.B18447V01
- VCD: Swing Nose Crossing Bearer Assembly : 390.B17315V01

LH MOTOR MOUNT *

- VCD: Standard A Detection /Lockout Bearer Assembly : 390.B17311V02
- VCD: Mid-Drive Bearer Assembly : 390.B18416V01
- VCD: Back drive Bearer Assembly : 390.B18447V02
- VCD: Swing Nose Crossing Bearer Assembly : 390.B17315V02

* note LH Motor Mount Bearer Assemblies Utilise the same components as equivalent RH Mount Bearer Assemblies but are assembled in handed arrangements. As such a set of RH assemblies should be sufficient with same reassembly to create LH assemblies

COMMON COMPONENTS

- Spreader Bar Rodding Bearer Assembly : 390.B18416V03

7 DATA SHEET

7.1 Drawings

Vossloh Cogifer Australia drawings –

RH Turnout General Arrangement & Setting Out Detail	:	A0B16960 (000-R-00003)
LH Turnout General Arrangement & Setting Out Detail	:	A0B17371 (000-R-00004)
RH SNX Crossing Arrangement Details	:	A1B17277
LH SNX Crossing Arrangement Details	:	A1B18591
5m RH Crossover set out to be in accordance with drawing	:	A1B18528 (000-R-00006)
5m LH Crossover set out to be in accordance with drawing	:	A1B18529
Assembly Details for VCD Drive/Detection rodding	:	A1B18445
Assembly Details for VCD Spreader Bars	:	A1B18416
Assembly Details for VCD Back Drive rodding	:	A1B18447
Assembly Details for VCD SNX rodding	:	A0B17315
Typical sections for 68kg Tangential Turnouts	:	A1B17544 (000-R-00008)
Reduced copies of drawings are attached at rear of this document.		

7.2 Other Documents

On-Site Inspection Sheet for 1 in 20 Turnout with Swing Nose Crossing & V.C.D. bearer operation – document no.	:	A4B17952.
On-Site Inspection Sheet for 1 in 20 RH Crossover with Swing Nose Crossing & V.C.D. bearer operation – document no.	:	A3B17953.
Installation Manual V.C.D. system bearer	:	A4B17954
BHP Cant reducing Bearers dwg's	:	073-R-00043 MAINLINE 073-R-00044 YARD

Appendices are attached at rear of this document.

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www.vossloh-cogifer.com

7.3 Referenced Documents

M3A & M23A Mk II Turnout - Field Installation, Adjustment and Maintenance Guide.
Invensys Rail document no. **TTTN3-23A2 Issue 1**
(Typically supplied with motor) Available upon request.