NEW EQUIPMENT & SYSTEM APPROVAL PROFORMA

Ref: *13/14390*

Note: the prompts given below are only a guide to the information required for approval. Dependent on the type of equipment or system that requires approval delete any section that is not applicable or include additional information if necessary. Mandatory fields are marked with an asterisk (*).

1 **Equipment or System to be approved** *

VAE Spring Wing Crossing Technology – for Farley and Branxton only

2 **Originator** *

Name: Alan Pollard Company: Rhomberg Rail Australia Pty Ltd

3 **Introduction** *

ARTC have two particular turnouts in their 2012/2013, 2013/2014 Turnout Renewal Programs that are the priority locations subject to this Approval for New Equipment. ARTC's current policy for renewing turnouts in the Hunter Valley Coal Network is to utilise Swing Nose Crossing Technology. However the operation of trains/rolling stock through the turnout direction, in these particular locations, is minimal.

Farley - 420 Pts Turnout is a facing turnout providing access from the Main North to the North Coast Line through a triangle connection. Train Operations on this movement comprise 3 trains a week, with an increase to about 12 during certain weekend possessions. Farley 420 Pts is programmed for installation in May 2013.

Branxton - 3B Frame Points turnout is a trailing turnout and provides access to a small siding used for the Storage of Track Maintenance Machines during Possessions. Access to the siding is required about 6 times per annum. Branxton B Frame Pts is due for renewal in the 2013/14 Program.

4 **Determination of Need** *

It is difficult to justify the high cost of installing and operating a swing nose crossing for such a minor number of rolling stock movements in the turnout directions at both sites. As a result other crossing technology has been investigated. The VAE Spring Wing Crossing has been identified as providing the best "fit for purpose" option. It provides a constant running face for traffic on the main line (similar to benefits of a swing nose crossing) while allowing access in the turnout direction (in both the trailing and facing operations).

Figure 1 – Spring Wing Crossing *(www.voestalpine.com)*

Figure 1 shows the wing rail pushed to the rigid point of the crossing, via a spring assembly, to create a continuous running edge in the main running direction. For travel in secondary lines, the wheel flange makes contact with the wing rail and forces it to open, then once the vehicle has passed the spring forces the wing rail back to the original position. Unlike a Swing Nose Crossing, the wing rail moves and the point remains rigid.

5 **Significant Change or Not** *(as determined by the Manager Standards)* *

This change in equipment or system is assessed as Significant.

6 **Review Panel** *(as determined by the Manager Standards)* *

- John Furness - Manager Standards
- Gunaratnam Jayakumar – Manager Infrastructure and Planning, Hunter Valley
- Denis Snowden – WHS Coordinator
- Jess Tai – Track Engineer

7 **Safety**

The spring wing crossing is designed to operate in both trailing and facing movements. The opening flexed wing rail is held in place by a robust adjustable coil spring arrangement and incorporates two sliding vertical horn guides to ensure the wing rail remains correctly aligned when the wheel flange pushes the wing rail across. This occurs for travel in either direction.

The likelihood of failure is rare, but in the event of failure the consequences are insignificant.

If the operating spring is damaged or broken the flexed wing rail will remain closed due to the short distance to the wing rail heel block. Therefore even if damaged, the closed wing rail will still provide a constant running face on the main line. If jammed closed the check rial will control and guide the ouside wheel, while the inside wheel will either run up and over the head of the wing rail and top of the casting or force the wing rail apart.

If the wing rail was to remain open, the operation of the crossing on either leg would not be affected as the spring wing would act like a normal fixed nose crossing. The spring wing is designed to carry full loads on the mainline even if the flexed wing rail is open up to 30mm.

See attached:

- Approval Application from VAE
- Risk Assessment

8 **Performance and Suitability**

VAE Spring Wing Crossings are manufactured with AS 60kg rail and are suitable for VAE Standard 300:12 tangential turnouts (1:12). Estimated 600-800 MGT crossing life in the main line operation.

Allowable Axle Loads:

- Mainline:
  - Max 32.5 TAL
- Diverge:
  - Max 32.5 TAL
  - Min 1.5 Gross Vehicle Mass (GVM) - Hi Rail Vehicle

Allowable Speeds:

- Mainline:
  - Max 100 km/hr for 32 TAL
  - Max 160 km/hr for 25 TAL
- Diverge:
  - Vehicles GVM 1.5-2 Tonne (light hi rail vehicles) = 25 km/hr
  - Vehicles GVM >2 Tonne = 30 km/hr

Turnout speeds of 25 km/h are compatible with the requirement at both Farley and Branxton

(i) **Use in other rail networks**

The Spring Wing design originates from the USA where it has been in service for over 18 years. VAE have adapted this design for use in their Standard 300:12 tangential turnout configuration, which is currently in operation in the ARTC Network. Rail Systems using the crossings include:

- Amtrack
- Burlington Northern
- ConRail
- Canadian National
- Canadian Pacific
- CSX

Over 70 Spring Wing Crossings have been installed in the Queensland Rail Systems (over 14 Years) where they are used under similar operating conditions as found in the Hunter Valley. Contacts within QR and QRN can be provided by Rhomberg Rail on request.

(ii) **Use in the ARTC network**

The Spring Wing Crossing technology has not yet been installed in the ARTC Network.
The standard 300:12 tangential turnout, which this technology is to be supplied with, is common in the ARTC Network.

(iii) **Issues arising from usage of the equipment/system**

New maintenance inspection documents are required.
Changes from existing inspection documents include but are not limited to:

- Tolerance on gaps at the end of vee.
- Tolerance for gauge and cross level readings.

(iv) **Changes required to infrastructure or systems for use of the equipment**

Item numbers to be added to the system.

9 **Reliability**

VAE have a good reputation as a proven manufacturer of turnouts.

FEA analysis was carried out with assumed 32.5 tonne axle load.

10 **Maintainability**

The materials being used are similar to materials used in existing ARTC Crossings and hence maintenance procedures will also be similar. Maintainability of the crossings will be included in the Maintenance Manuals to be supplied with the turnouts.
See attached Approval Application from VAE.

11 **Approval** *

Approved for installation in the ARTC Hunter Valley Network at the following locations only:

- Farley 420 points turnout in the Up Main – renewal during a possession in May 2013
- Branxton 3B frame points – due for renewal in the 2013/14 program

The Spring Wing Crossing is detailed in VAE Drawing No. VAM 14222A (see attached VAE Approval Application).

12 **Conditions of Approval** *

1. Installation approved for Farley and Branxton only.
2. Installation and maintenance to be as per manufacturer's instructions and have a different Standard Job Number in Ellipse to reference the manufacturer's instructions.
3. VAE is to supply Inspection Sheets and Maintenance Manual with detail of frequency requirements and inspection elements – to be programmed through Ellipse.
4. VAE to include correct lifting points for tamping machines in their maintenance manual, which ARTC Project Manager must ensure is available to tamping contractor.
5. VAE to do a design lay-over for the ARTC layout to determine what modifications are necessary for installation in existing VAE turnouts.
6. Allowable speeds and axle loads stated in section 8 above.
7. Specific signalling bonding arrangements required.

13	**Does the Originator accept the additional Conditions of Approval as set by the Review Panel:**	Yes	☒	No	☐	N/A	☐

14 **Sign off** ***ARTC office use only***

Review Panel:

John Furness	**On file**	Date:	**3/04/2013**
Gunaratnam Jayakumar	**On file**	Date:	**3/04/2013**
Denis Snowden	**On file**	Date:	**3/04/2013**
Jess Tai	**On file**	Date:	**3/04/2013**

Approval:

Operations Safety & Environment Review Group – 13 May 2013