AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Track & Civil) **Category:** Standard

Reporting & Investigation of Broken Rails, Welds and Insulated Joints

ETE-01-01

Applicability

ARTC Network Wide	✓

Primary Source

Document Status

Version	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
1.2	16 Oct 13	Standards	Stakeholders	Manager Standards	General Manager Technical Standards 15/11/2013

Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
1.0	24 Apr 06		First issue
1.1	26 Jul 06	Form 1	Form 1 removed and published separately as ETE0101F-01 Rail Break Report.
1.2	16 Oct 13	1, 4 & Appendix 1	Added example of completed ETE0101F-01 as Appendix 1. Updated disclaimer and other minor editorial updates including clarification of photo's required on report form.

Contents

1 General

The purpose of this procedure is to determine the cause of failure and why the defect, if present, was not previously detected, or if any trends in failures are becoming evident.

All inspection details are to be recorded and reported on ETE0101F-01 Rail Break Report form. An example is provided in Appendix 1.

2 Definitions

Competent Person:

Normally an experienced trade worker or trackworker with a recognised NDT (non destructive testing) qualification either from AINDT (Australian Institution of Non Destructive Testing) or ASNDT (American Society of Non Destructive Testing).

Manager:

Corridor Manager – ARTC New South Wales

Asset Manager – ARTC Western or Victorian Jurisdiction

Contract Manager – Alliance Contract Manager as applicable

3 Reference Documents

- SP-02-09 ARTC Accreditation Document Register
- Infrastructure Maintenance Standards published on the ARTC Intranet

4 Reporting and Investigation Process

For all broken rails, the pieces shall be initially inspected and assessed by competent persons nominated by the Area Manager Concerned (ARTC or Alliance Contractor as applicable) and part 1 of ETE0101F-01 Rail Break Report form completed in the field. Photographs of the break are to be attached. As a minimum, this should include one from the top of rail, and one from each side of the rail (field side and gauge side).

4.1 Standard Investigation Process

If there is no doubt about the cause of the break, the ETE0101F-01 Rail Break Report form is to be forwarded, with photographs of the break and submitted to the relevant nominated competent person in the area managers Office concerned, who shall complete Part 2 of the form. After review in the Office the data shall be entered into the database.

4.2 Additional Investigation Steps

For breaks such as those:

- Of an unusual or complex nature.
- Where defects appear to have been present in the broken rail for a considerable period of time and not detected by ultrasonic inspections.
- Where the cause of the break is not immediately apparent from visual inspection.
- Where a pattern of breaks is becoming apparent,

both sides of each break, (about 150mm long) including all pieces, together with the completed part 1 of the ETE0101F-01 Rail Break Report, are to be forwarded to the appropriate area Office concerned as soon as possible after removal from track, for visual examination by competent person(s) nominated by the relevant Manager.

The pieces of broken rail are to be packaged securely, with line, track rail (left/right), and kilometrage clearly marked on rail and with paperwork clearly identifying the incident (Rail Break Report).

After inspection by the competent person, part 2 of the ETE0101F-01 Rail Break Report is to be completed.

If after this inspection, doubt exists about the cause of the break or the break requires more detailed examination, the broken rail pieces are to be forwarded to an NATA accredited laboratory for metallurgical examination and report.

After assessment the data from the Rail Break Reports and any metallurgical reports are to be entered onto databases in order to trend rail breaks and failures in the area Office concerned.

5 System Defect Statistic

The databases are to be forwarded at 3 monthly intervals to the ARTC Manager Network Performance via the ARTC Manager concerned for review and compilation of system wide statistics.

Appendices

Appendix 1 – Example of Completed Form ETE0101F-01

Engineering (Track & Civil) Standard - Form
Rail Break Report

Form number: ETE0101F-01

RAIL BREAK REPORT

For reporting broken rails, welds and insulated joints

Part 1, to be completed in the field (Note: If a particular box or field is not applicable, leave blank)

REPORTING BROKEN: RAIL ☒ WELD ☐ INSULATED JOINT ☐ **Date of break:** 25/12/2012

LINE: Coomandook to Tailem Bend **Location:** 158.650 **km** **Base code:**

GPS Settings (if known): **Latitude** 35°29.8750 S **Longitude** 139°44.6592E **Proximity to fixed points:**

Track: **Single** ☒ **Double** ☐ **Loop** ☐ **Other (describe)**

Up ☐ **Down** ☐

Rail: Left/Dn ☒ Right/Up ☐ **For Known Defect, show no.:**

In curve: High ☐ Low ☐ **In dual gauge:** Common ☐ Standard ☐ Broad ☐

Plain line: ☐ In P&C: ☐ If in P&C describe component and location:

Cast crossing ☐

Rail Section: Less than 40 kg ☐ 40/41kg ☐ 47kg ☐ 50kg ☐ 53kg ☐ 60kg ☐ Other (describe)

Rail Type: Standard carbon ☒ Head hardened ☐

Rail Head Height either side of break: mm (left) mm (right)

Fastening type: Dogspikes ☐ Resilient ☒

Sleeper type: Timber ☐ Concrete ☒ Steel ☐ Mixed ☐

Sleeper condition each side of break: Good for 5 yrs or more ☒ Poor (Broken/rotten) ☐

Sleeper support condition each side of break: Good ☐ Pumping over 1 or 2 sleepers ☒ Pumping over 3 or more sleepers ☐

Ballast degradation: Mud hole ☐ Powdered ballast ☒ O.K ☐

Rail surface: Spalling ☐ Shelling ☒ Rolling contact fatigue ☐ Wheel burns ☐

Measured full height of rail at break: 138 mm

Vertical geometry of nearest welds both sides of break (1m straight edge): Weld 1 .03 mm Dip ☐ Peak ☐

Weld 2 1 mm Dip ☐ Peak ☐

Estimated air temperature at time of break: 19 °C **Gap at break:** 10 mm

If broken rail: Advise manufacturer, month & year rolled, heat number and ingot letter (usually on other side of rail standard and month & year rolled) and should be a letter from A to F etc.

Engineering (Track & Civil) Standard - Form
Rail Break Report

Form number: ETE0101F-01

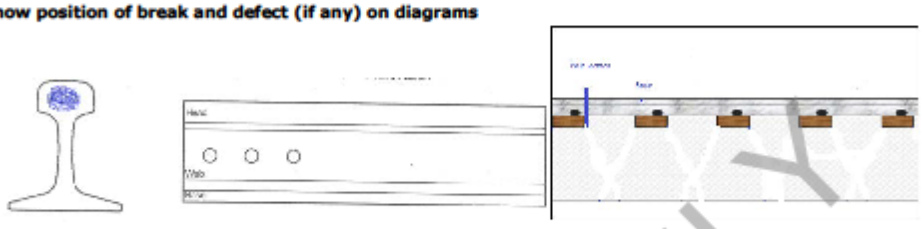
Manufacturer: 1956 **Heat Numbers:** 23518921 **Ingot Letter:** A

If broken weld, type: Thermic ☐ Flash Butt ☒ Manual Arc ☐ Junction Weld ☐

Welder's identification mark, name or weld number: NA

If the rail or weld was previously marked, details of weld and defect numbers:
NA

Show position of break and defect (if any) on diagrams



If break is at or within 100mm from a weld, show weld on diagram and distance of break from weld.

If broken insulated joint: Describe break (eg pull apart, broken fishplates) and if available manufacturer and insulated joint number.

Method of finding break: Visual by Infrastructure staff ☒ Signal Failure ☐ Train Crew ☐
Other (describe)

Break found by: Eye **Time found:** 1230 **Date:** 25/12/2012

TCR No if applicable: NA

Describe the defect and the cause if known:
Large TD

Attach photos of break taken in field

Photo 1

Photo 2

Photo 3

Inspector: Eye (print name)

Signed: **Date:** 25/12/2012

Part 2. to be completed in the office

Date of last continuous ultrasonic rail inspection: 01/07/2013

Engineering (Track & Civil) Standard - Form
Rail Break Report

Form number: ETE0101F-01

Was a defect at break reported on last continuous ultrasonic rail inspection? **Yes** ☐ **No** ☒

Stress free temperature at break location (if known): 38 °C **Verse measurement:** °C

If cause or break is immediately apparent, no further investigation required.

For breaks of an unusual or complex nature, or the cause is not apparent from visual inspection or a pattern of breaks on a particular line section is becoming apparent, further investigation is required.

Results of investigation, including metallurgical tests if required.

<<insert link to report - press F1 for help>>	*<<insert link to report - press F1 for help>>*
Report 1	***Report 2***

***Note:** to open the hyperlink the document must be unprotected – go to Tools > Unprotect Document*

Cause of break:

Large TD in flashbutt weld

Comments:

Additional Photos:		
<<insert photo - press F1 for help>>	*<<insert photo - press F1 for help>>*	*<<insert photo - press F1 for help>>*
Photo 4	***Photo 5***	***Photo 6***

Note: Attach or insert more detailed photographs of break if it is considered that the defect may have been detectable during the last continuous ultrasonic rail inspection, or for forwarding details of complex or unusual broken rails to continuous ultrasonic inspection Contractor.

Break details entered onto database and form filed by: ADA (Name)

ADA (Position) Date: 25/12/2012