



Rethinking safety through
INCLUSION
+
WELLBEING

RAIL

ELEMENT 17H

20/10/2023

RAIL WHEEL INSPECTION

PURPOSE AND SCOPE

This Procedure applies to all items of rolling stock purchased or acquired through hiring or other means by Laing O'Rourke for the railway operations they will be engaged in throughout Australia.

The purpose of this Procedure is to advise Laing O'Rourke personnel involved in rail wheel inspections of the processes to be applied for the inspection of rail wheels.

1.0 PROCEDURES

1.1 INSPECTION PROCEDURE

The following general procedure relating to daily and periodical inspection/maintenance, along with the specific measurement limits and techniques must be adhered to.

1.2 DAILY PRE-TRAVEL AND PRE-WORK INSPECTION

1.2.1 VISUAL INSPECTION - GENERAL

A visual inspection will be undertaken by the operator prior to commencing operations. Looking for flange damage, flat spots, cracks, overheating.

Where a visual inspection indicates that the condition of the wheel may be approaching or exceeding any of the limiting parameters, the wheel must be checked as per wear parameters for contour, flange condition and rim thickness. By using the correct steel wheel gauge (calibrated) and any other relevant tools. This will be undertaken by a competent person / Select.

1.2.2 WHEEL FLANGE INSPECTION

Particular attention should be given to the form and condition of the wheel flange because of the potential for rail climb and derailment caused by either worn, irregular or deformed flanges – check for conditions such as:

- Arises
- Wear grooves
- Machining marks
- Steps
- Sharp flange angle.

This is just as important for the crest and back of the flange as it is for the running surface of the rail side.

The flange and tread should be inspected for thermal cracks, spalling, skid flats, scaling and tread wear.

1.2.3 DETERMINING SEVERITY OF DEFECTS

In determining the severity of any defects found a table is contained in in the RISBB Code of Practice Wheel Defects. This Code also gives advice on speed restrictions that apply to defective wheels or when the wheel is not to be used until the defect is rectified.

Wheel inspections performed as daily inspections or part of normal inspections may not generally cover the full wheel because of practical limitations on the access to all parts of the wheel.

However, if any defects are identified during this inspection the whole wheel must be closely examined by a competent person.

1.2.4 TREAD DEFECTS

Wheels should be regularly inspected for tread defects include wheel skids, spalling and thermal cracking. Action should be taken in accordance with the Code of Practice Wheel Defects.

Periodical Inspection and Maintenance

Wheelset inspections must be carried out at 6-month intervals and must include checks on:

- Profile
- Flange – width, height, angle (visual inspection using a Hi Rail Supplement Service (monthly)
- Rim – thickness
- Tread condition
- General physical condition, including tread hollowing
- Wheel studs – where applicable

The wheels, or wheel sets, will require repair or replacement if limits referred to in the following sections are exceeded. These measurements must be recorded on the Rail Wheel Inspection Form and retained on the asset file, for the life of the vehicle. Wheels are also to be inspected for any visible indication of lateral displacement or rotation on the axle wheel seat. A back-to-back measurement and inspection of the wheel axle contact area should indicate if the wheel is out of position. When required to measure wheel sets, the Select fitter must complete Rail Wheel Inspection.

Also, inspections take place as follows:

- Hi Rail Supplement Service (monthly visual inspection)
- Annual inspection for all Rolling Stock

Equipment calibration - Measuring devices are to be classified as per the guidance in IGMS Control and Monitoring of Measuring Devices.

1.3 APPLICATION OF RAIL WHEEL GAUGE

The gauge must be inspected for any obvious sign of damage prior to use. If found to be damaged, return to the nearest Select Workshop for replacement. Record all measurement taken on the relevant inspection form.

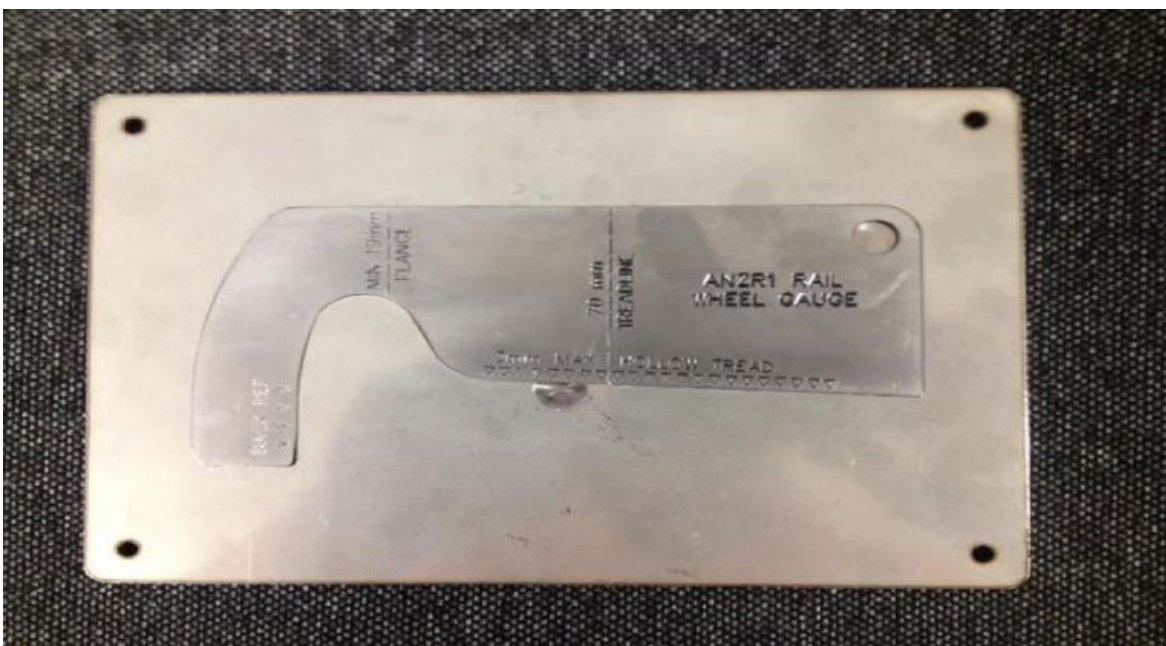


Figure 1 Rail Wheel Gauge



1.4 APPLICATION OF THE STEEL WHEEL MEASURING GAUGE

The gauge must be inspected for any obvious sign of damage prior to use. If found to be damaged, tag out of use.

The Fitter is to place the serial number of any gauges used on the Rail Wheel Inspection form.

The gauge in Figure 1 is not a condemning gauge but is used to monitor the wear of wheels. When the measurement approaches the condemning criteria the Standard Wheel Condemning Gauge can be used to verify the result.

The Select Wheel Inspection form gives a use guide, information and tolerances.

1.5 WHEEL SET BACK-TO-BACK GAUGE

The back-to-back dimension of a wheel set must be checked:

- at all scheduled inspections
- after any derailment
- at any other time the wheel condition may indicate a bent axle or incorrectly positioned wheel.

Where flexitons are fitted the measurement shall be recorded at the interface with the rail. A measurement at the top of the wheel set shall be taken and must be within the Hi-Rail OEM specifications. If an Original Equipment Manufacturer's (OEM) specification is not available Select is to ensure one is in place before the Rail plant goes into service.

1.6 WHEEL SET DERAILMENTS

Whenever a wheel set is involved in a derailment or similar incident, each wheel must be given a thorough examination to identify any potential defects that may have resulted.

Such examination must include a complete back-to-back gauge check of each wheel set involved in the derailment and measurement recorded on **Rail Wheel Inspection Form**

The examination should also include a bearing rotation test to assess whether any bearing damage has occurred.

Approval for the wheel set to continue in service must be given by a Competent person from Select.

1.7 PERIODICAL INSPECTION AND MAINTENANCE

Examine all wheels for major damage, such as a shattered rim, or a cracked web (plate), rim or hub. In the event of such a defect, the affected bogie must be changed out on site.

The defective area on the wheel must be marked and a tag attached to the axle identifying the following:

- Description of Fault:
- Axle No.
- Track machine No.
- Date:
- Reported By:

1.8 MATCHING WHEEL SETS

If a single wheel set on a bogie is replaced the diameter of the wheels on the replacement wheel set must not differ from the diameter of the wheels on the other wheel set on the same bogie by more than 25mm.

No two-wheel sets on the one vehicle may have wheel diameters differing by more than 60mm.

1.9 STRUCTURE

Visually examine the side frames and bolsters for structural cracking. Note the most likely location of cracks. If cracking is evident in either bogie, then the bogie must be changed out.

1.10 BEARINGS

A visual inspection of all roller bearing should be made in accordance with the service sheet requirements. All bogies are fitted with roller bearings. In most cases the roller bearings are in full axle-boxes, while the remainder consist of double taper roller bearing package units. In some cases, the package units are totally surrounded by the side frame casting, while in other cases the package units are fitted into conventional pedestal openings.

Check axle end cap for missing lubrication fittings or plugs, cap screws, set screws in the axle-boxes or package units for tightness. Where necessary, remove locking wires, or straighten tab washers, tighten the bolts or cap screws, and re-apply the locking wires, or tab washers.

Visually inspect for damage or wear to end cap from a displaced (cocked) adapter. Inspect all axle-boxes or package units for loose backing rings and for excessive wear of the boxes or adaptors, or of the mating faces on the side frames. If the amount of wear on the adaptors exceeds 3mm or other faults are found the wheel set and/or bogie must be replaced.

Inspect for loose or damaged seals, Excessive accumulation of fresh grease around a seal may indicate a loose, damaged or defective seal remove the bearing from service if you identify the following conditions:

- A seal that can be moved laterally (back and forth) or rotated by hand.
- A seal that is cocked out of position in the bearing outer ring
- A seal that is bent damaged from an external source
- Seal lips that are damaged

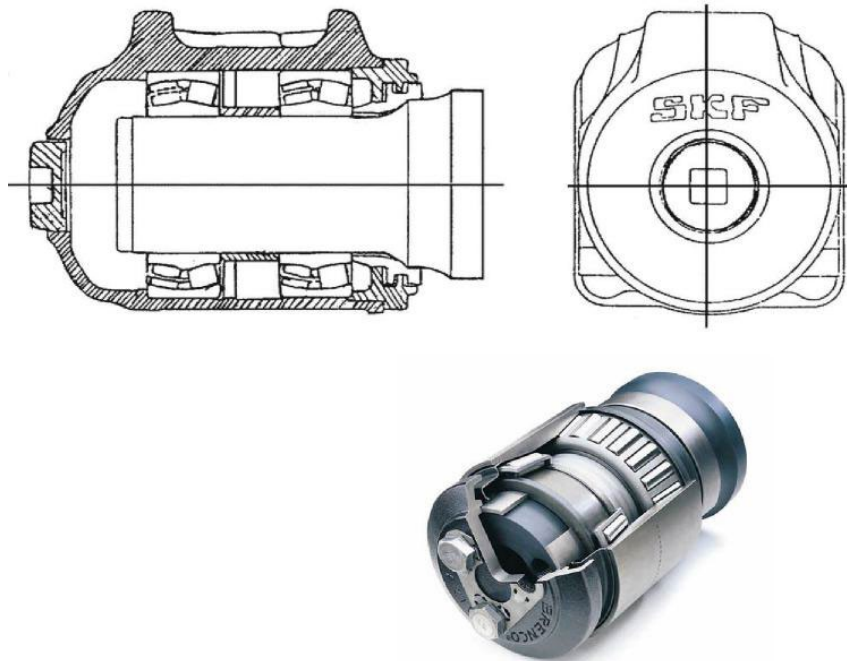


Figure 2 Axlebox bearing & Package unit roller bearings (example only)

Check for cracked broken or loose outer rings (Bearing Cups)

Inspect for loose backing ring. If a backing ring can be moved or rotated by hand, remove the bearing from service. Check that the ring has not been damaged by a displaced (cocked) adapter.

As these pads and adapters are used to locate the wheel sets the pads must be in good condition. If any faults are found the bogie must be replaced.

To conduct repairs and wheel set replacement, contact the Select and remove the machine from service, isolate the track machine.

First remove the end cover of the bearing unit, and examine the condition of the bearing cages, rollers and races. If any components show signs of damage, then the wheel set must be replaced.

In the case of a package unit in which the cap screws in the end of the axle are found to be loose, the cap screw seal rings are to be removed. If the heads of the cap screws are painted white, then these seals have already been removed. Package unit cap screws must be tightened to the specified bolting torque identified in the OEM manual.

The wheels, or wheel sets, will require repair or replacement if limits are exceeded as per the Rail wheel inspection. These measurements must be recorded on the Rail Wheel Inspection Form and retained in the asset file for the life of the vehicle.

Wheels are also to be inspected for any visible indication of lateral displacement or rotation on the axle wheel seat. A back-to-back measurement and inspection of the wheel axle contact area should indicate if the wheel is out of position.

2.0 REGULATIONS, GUIDES AND STANDARDS

- Rail Safety National Law
- ONRSR Guideline Preparation of a Safety Management System
- RISSB Standards relating to rolling stock as under:
 - AS 7514 - Wheels
 - AS 7517 – Wheelsets
 - AS 7507 Rolling Stock outline for road wheels
 - AS 7502 Road Rail Vehicles
- Network owners Rolling Stock Standards
- Network owners Train Operating Conditions Manual (Where relevant)
- Manufacturer's standards and operators manual
- RISBB Code of Practice Wheel Defects

3.0 FORMS, TEMPLATES AND REPORTS

The following Documents will be retained / produced in accordance with this Procedure:

- Engineers Reports as required
- Rail Infrastructure Managers Registration
- Rail Wheel Inspection Form

4.0 TERMINOLOGY

