AS 7517:2014

Wheelsets

Rolling Stock Standard

rissb.com.au

This Australian Railway Standard AS 7517 Wheelsets was prepared by the RISSB Development Group. It was signed off by the Development Group and the Rolling Stock Standing Committee in October, 2014 and subsequently by the Development Advisory Board (DAB) in October, 2014. The DAB confirmed that the process used to develop the standard was in accordance with the RISSB accredited development process. On November 10, 2014 the RISSB Board approved the Standard for release.

Kevin Taylor
Chief Executive Officer
Rail Industry Safety and Standards Board

The following organisations were represented on the RISSB Development Group:

UGL Limited	Gemco Rail	Marais Consulting Engineers
Hardchrome Engineering	Transport for NSW	Downer
Bradken	Public Transport Authority of Western Australia	Bombardier Transportation

This standard was issued on two occasions for open review and was independently validated before being signed off and the approvals granted.

RISSB wish to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the committees and through the open review periods.

Keeping Standards up-to-date

Australian Standards developed by RISSB are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are reviewed every five years, and new editions are published. Between editions, amendments may be issued.

Australian Standards developed by RISSB may also be withdrawn. It is important that readers assure themselves they are using a current RISSB Standard, which should include any amendments that may have been published since the Standard was published.

Information about Australian Standards to be developed by RISSB, drafts, amendments, and new projects can be found by visiting www.rissb.com.au

RISSB welcomes suggestions for improvements, and encourages readers to notify it immediately of any apparent inaccuracies or ambiguities. Contact us via email at rissb@rissb.com.au or write to Rail Industry Safety and Standards Board, PO Box 4608, Kingston, ACT 2604.

AS 7517:2014

Wheelsets

First published as: AS 7517.1:2007, AS 7517.2:2007, AS 7517.3:2007, AS 7517.4:2007.

Copyright

Published by Rail Industry Safety and Standards Board (RISSB) ABN: 58 105 001 465

P O Box 4608, Kingston, ACT, Australia 2604

ISBN 978-1-76035-026-0

Notice to Users

This RISSB product has been developed using input from rail experts from across the Rail Industry and represents good practice for the industry. The reliance upon or manner of use of this RISSB product is the sole responsibility of the user who is to assess whether it meets their organisation's operational environment and risk profile.

Justification

Specification of Standard

AS 7517 Standard describes the requirements for assembly, maintenance and interface of rolling stock wheelsets.

The Standard covers the requirements for:

- assembly,
- geometric tolerances,
- electrical resistance,
- balancing,
- identification and records, and
- actions following derailment.

The standard does not cover:

- Operation of rolling stock.
- Rolling stock axles used on light rail, cane railway and monorail networks.
- Wheelsets operating at speeds in excess of 200 km/hr.

Objective of Standard

The main purpose of AS 7517 requirements is to reduce the risk of derailment due to incorrect wheelset assembly.

Estimation of Benefits

There is a strong industry demand for rolling stock standards, which has been measured by their likely adoption rate.

The 2014 RISSB Products Survey found current adoption rates for RISSB rolling stock products at 53% of industry surveyed, with a likely future increase to 90% of potential users. Specifically, adoption rates for AS 7517 Wheelsets will increase from 51% to 77%.

The 2014 Products Survey reported an estimated safety risk reduction of 9%; and reductions of 8% and 9% for operational cost and training cost respectively, following adoption of RISSB products.

Valuation of the Benefit

D-Rail 2012 Report estimated a direct damage cost of 24700€ (approximately $35,000) per derailment.[1] The average economic cost of train derailments was estimated to be around $30 million per annum, compared to the total burden of railway safety incidents at approximately $360.1 million per annum. By helping to reduce derailment risks, AS 7517 can deliver a significant economic benefit. Further, significant indirect benefits could accrue from the rail industry implementing harmonised national standards. These cost savings were estimated to be approximately 1.4% for operational costs and 3.8% for both capital expenditure and training costs.[2]

The quantification of the benefit that would be obtained from the AS 7517 Railway Rolling Stock Wheelsets Standard is estimated to be approximately $0.5 million per year (or present value of $3.2 million over the next 10 years). This estimate was derived from the 2014 RISSB products survey which also reported that the estimated benefit of the 21 rolling stock standards survey for rail safety performance, operational cost savings and workforce training costs were $3.6 million, $28.4 million, and $150K respectively. In total, the expected benefit for adopting the 21 rolling stock standards was $32.1 million per year.

Cost of Implementation

Adoption of the AS 7517 standard is not expected to impose significant additional cost on the industry as it is consistent with existing practice and product offerings, with the equipment supply sector to respond by incorporating relevant requirement in their product development cycle. The previous version of this standard has been in use by the industry for over five years.

Case Study

The following event provides an example that AS7517 may help to prevent similar incidents from occurring in future:

- Express freight Train 230 derailment Paraparaumu 6 July 1999, Transport Accident Investigation Commission NZ Report 99-117.

Broader Industry and Economic Benefits

Development of a more complete suite of RISSB rolling stock products is expected to promote their recognition and further adoption by industry members, leading to greater harmonisation in the rail industry. A more harmonised national rail industry can become more competitive with other modes of transport, road in particular, by becoming more cost efficient through lower equipment cost and lower operating costs. Induced mode transfer (shifting passengers and freight from road to rail) can result in reduction of harmful emissions and road congestion.

The cost benefit analysis of RISSB Products Report (2012) estimated the benefit cost ratio of investment in RISSB products for the industry at approximately 17 to 1 (i.e. for every $1 spent, the industry receives $17 of benefits). In addition, the broader economic benefits to the national economy have been estimated at between $92-142 million per year.

Application of AS 7517 Wheelsets is expected to deliver benefits to its individual users as well as contributing to the overall rail harmonisation process.

[1] Development of the Future Rail Freight System to Reduce the Occurrences and Impact of Derailment, Report on Derailment Economic Impact Assessment, D-Rail November 2012

[2] Strategex estimates based on 'Cost Benefit Analysis of RISSB and its products' report by AECOM ("CBA of RISSB Products (2012) ").

Document Control

Identification

Document Title	Date
AS 7517 Wheelsets	10 November 2014

Document History

Publication Version	Effective Date	Page(s) Affected	Reason for and Extent of Change(s)
2014	10/11/2014	All	Review and four documents consolidated into one.
2007	14/12/2007	All	First publication

Approval

Name	Date
Development Advisory Board (DAB)	30/10/2014
Rail Industry Safety and Standards Board (RISSB)	10/11/2014

Standard Change Procedures

RISSB maintains the master for this document and publishes the current version on the RISSB website.

Any changes to the content of this publication require the version number to be updated.

Changes to this publication must be approved according to the procedure for developing management system documents.

RISSB will identify and communicate changes to this publication.

Contents

Appendix Contents

1 Introduction

1.1 Purpose

This document describes requirements for rolling stock wheelsets.

The main purpose of the requirements is to reduce the risk of derailment due to incorrect wheelset assembly.

1.2 Scope

This documents applies to new and existing rolling stock.

The document covers the assembly, maintenance and interface requirements of rolling stock.

Operation of rolling stock is not covered.[3]

Rolling stock used on light rail, cane railway and monorail networks are not covered.[4]

This standard applies to wheelsets for operating speeds up to and including 200 km/hr.

1.3 Compliance

There are two types of control contained within RISSB Standards:

(a) mandatory requirements

(b) recommended requirements

Each of these types of control address hazards that are deemed to require controls on the basis of existing Australian and international Codes of Practice and Standards.

A **mandatory** requirement is a requirement that the standard provides as the only way of treating the hazard.

Mandatory requirements are identified within the text by the term shall.

A **recommended** requirement is one where the standard recognises that there are limitations to the universal application of the requirement and that there may be circumstances where the control cannot be applied or that other controls may be appropriate or satisfactory, subject to agreement with the Rolling Stock Operator, Rail Infrastructure Manager and/or Rail Safety Regulator.

Recommended requirements are to be considered when compliance with the standards is being assessed.

Recommended requirements are identified within the text by the term should.

Hazards addressed by this standard are included in an appendix. Refer to the RISSB website for the latest Hazard Register Guideline: www.rissb.com.au

1.4 Referenced documents

The following documents are referred to in this Standard:

(a) AS 4292 Railway safety management

(b) AS 7501 Railway rolling stock - Rolling stock compliance certification

(c) AS 7505Railway rolling stock - Signalling detection interfaces

[3] Operation of rolling stock is covered in the Operations section of the Code.
[4] Currently excluded.

(d) AS 7514 Railway rolling stock - Wheel

(e) AS 7515 Railway rolling stock - Axles

(f) AAR Manual of Standards and Recommended Practices - Section G-II

(g) BS 5892-3 Railway rolling stock materials – Part 3 : Specification for monobloc wheels for traction and trailing stock

(h) BS 5892-6 Railway rolling stock materials – Part 6 : Specification for wheelsets for traction and trailing stock

(i) EN 13260 Railway applications – Wheelsets and bogies – Wheelsets – Products requirements

(j) ISO 1005-7 Railway rolling stock material – Part 7 : Wheelsets for tractive and trailing stock – Quality requirements

(k) JIS E 4504 Wheelsets for railway rolling stock – Quality requirements

The most current version of referenced documents and their amendments are applicable as they become available.

1.5 Definitions

Axial Run-out: The amount by which a rotating component is out of parallel with the axis of rotation.

Cane Railway Network: A railway system dedicated to hauling harvested sugar cane from farms to a raw sugar factory. Typically 610mm gauge.

Conventional wheelset: A wheelset having two wheels interference fitted to the axle and two outboard bearings.

Freight Vehicle: Hauled vehicles designed and used for carrying payloads which do not include people.

Infrastructure Maintenance Rolling Stock: Track Machines and Road-Rail Vehicles. Also known as On Track Vehicles.

Light Rail Network: A passenger-carrying railway system operating with trams or other similar shorter length, lower speed and lower axle-load self-propelled vehicles. Typically used in urban areas and often having a shared right-of-way with road traffic.

Locomotive Rolling Stock: Self-propelled, non-passenger-carrying railway vehicles used for hauling other (typically freight or passenger) rolling stock.

Monorail Network: A passenger-carrying system in which vehicles travel over a single broad beam (rather than two narrow rails connected by sleepers as with conventional railway rolling stock).

Passenger Rolling Stock: Rolling stock carrying people and facilities for these people. Excludes locomotive and infrastructure maintenance rolling stock.

Rolling Stock Operator: The person or body responsible by reason of ownership, control or management, for the provision, maintenance or operation of trains, or a combination of these, or a person or body acting on its behalf.

Radial Run-out: The amount by which a rotating component is running off the ideal centre of rotation.

Regulator: A government body responsible for ensuring compliance with particular laws, acts, regulations etc., e.g.. rail safety regulator.

Service Period. The period of time in service use until scheduled withdrawal for the next overhaul.

Shall: The word "shall" indicates that a statement is mandatory for the applicable vehicles.

Should: The word "should" indicates that a statement is a recommendation for the applicable vehicles.

Technically Competent Authority. A company or person having proven competence in the particular technology or process in which they are providing technical expertise.

Tread Line: The circumference of the wheel around the wheel tread measured 70 mm from the back face of the wheel (i.e.. circumference at the nominal wheel/rail contact point), also known as the taping line.

Rail Infrastructure Manager: The person or body responsible by reason of ownership, control or management, for the construction and maintenance of track, civil and electric traction infrastructure, or the construction, operation or maintenance of train control and communication systems, or a combination of these; or a person or body acting on its behalf.

Wheelset: An assembly consisting of axle, wheels, bearings, and where applicable associated components such as brake discs, traction gears, traction motor support bearings, gearbox etc.

2 Wheelset assembly

Wheelsets shall be assembled so that all components remain attached for the service period of the wheelset or component.

Wheels may be press fitted or shrink fitted onto axles.

Wheels fitted to a wheelset assembly shall be of the same type and from the same manufacturer

The method for assembling wheels onto axles should address the following:

(a) Required wheel type to be fitted to the axle[5]

(b) Confirmation of wheel bore and wheel seat geometric requirements

(c) Required temperature of components

(d) Lubricants to be used

(e) Measurement equipment requirements

(f) Avoiding damage to wheelset component surfaces

(g) Wheel mounting peak press force limits {if press fitted}

(h) Wheel mounting press force curve characteristics {if press fitted}

(i) Proof load testing

When considering the type of lubricant to use, it is to be considered that some lubricants are affected by increased wheel temperatures due to braking, allowing relative movement between wheel and axle.

[5] i.e. to ensure correct type of wheel is fitted (to both ends of a conventional wheelset)

Methods of achieving a suitable assembly of wheels and axles for specific applications include the following:6

(a) BS 5892-6 Sections 4 and 5.[7]

(b) EN 13260[8]

(c) ISO 1005 -7[9]

(d) JIS E 4504[10]

(e) AAR S-659 Rule 1.4 and RP-631 Section 2.3[11]

Components other than wheels should be fitted onto wheelsets in accordance with the component manufacturer's instructions.[12]

It is usual for the manufacturers of brakes discs, gearboxes, bearings etc to specify the installation requirements but these may be modified or produced by a technically competent authority.

3 Geometric tolerances

The geometric tolerances below are to be measured on a fully assembled conventional wheelset with bearings fitted.

The following dimensions shall be measured at three points 120 degrees apart around the wheelset circumference:

(a) Wheel flange back to back, Figure 1 dimension A1.

(b) Wheels to axle alignment by either (i) Wheel flange back to bearing abutment difference, Figure 1 dimension (C minus C1) or (C1 minus C) or (ii) Wheels centre to axle centre difference, Figure 1 dimension D.

(c) Wheel back to back dimension shall be measured at a point 40 mm below the outer circumference of the wheel flange.

The following dimensions shall be measured around the entire circumference of both wheels whilst the wheelset is rotated on the bearings:

(a) Tread radial run-out on the tread line, Figure 1 dimension H.

(b) Flange back axial run-out, Figure 1 dimension G.

(c) Tread diameter difference on the tread line, Figure 1 dimension L minus L1 or L1 minus L.

For the steps above, the bearings may be supported on the axle boxes, in a workshop jig or on similar apparatus.

The locations for the measurements of geometric tolerances on a conventional wheelset are shown in Figure 1.

[6] The following all include a mixture of performance (force) and prescriptive (interference) requirements. They are all examples of established safe practice and both types of requirement are therefore essential.
[7] British Standard for wheelsets.
[8] European Standard for wheelsets.
[9] ISO Standard for wheelsets.
[10] Japanese Standard for wheelsets.
[11] AAR Wheel and Axle Manual.
[12] These components are not always interference fits. Some designs of gears and brake discs are bolted onto flanges on the axle.

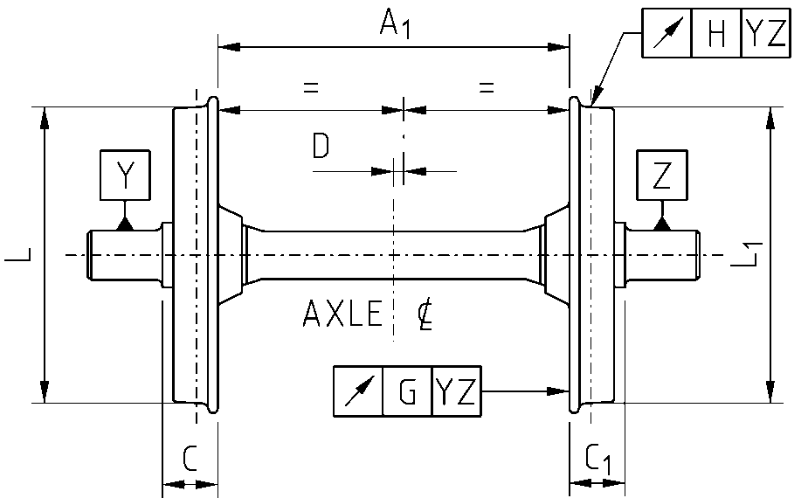

Figure 1 - Wheelset measurements

Wheel flange back to back dimensions shall comply with the applicable range given in Table 1 for newly assembled wheelsets.

Table 1 - Back to back dimensions - as assembled free standing

Network Gauge	A1 (mm)
Standard gauge track (except standalone heavy haul systems)	1357 to 1359
Broad gauge track	1522 to 1525
Queensland and Tasmanian narrow gauge track	990 to 992
West Australia narrow gauge track	992 to 993
South Australia narrow gauge track	988 to 991

In service wheel flange back to back dimensions should comply with the applicable range given in Table 1 up to an additional +1.5mm on the upper limit.[13]

All wheelset back to back dimensions are applicable for approved wheel profiles for each network gauge.

Wheels to axle alignment on a conventional wheelset should comply with either:

(a) The difference in wheel flange back to bearing abutment measurements should not exceed 1mm, or

(b) The difference in wheels centre to axle centre measurements should not exceed 2.4mm.

Tread Radial run-out on the tread line should comply with:

(a) For each wheel on a wheelset, Dimension H (Figure 1) should comply with the applicable tolerance given in Table 2 for locomotive and Table 3 for passenger vehicles.

(b) Tread radial run-out on the tread line for each wheel on a wheelset should be less than or equal to 0.75mm for freight and infrastructure vehicles.

Flange back axial run-out should comply with the following:

[13] Some rolling stock operators allow in service back to back measurements to differ from those as assembled.

(c) Flange back axial run-out for each wheel on a wheelset, Dimension G (Figure 1) should comply with the applicable tolerance given in Table 2 for locomotive and Table 3 for passenger vehicles.

(d) Flange back axial run-out for each wheel on a wheelset should be less than or equal to 1.5mm for freight and infrastructure vehicles.

The difference in tread diameter measurements (Dimension L minus L1 or L1 minus L), taken at the tread line, between both wheels on a conventional wheelset should not exceed the applicable tolerance given in Table 2 for locomotive and Table 3 for passenger vehicles.

Table 2 - As assembled tolerance dimensions for wheelsets on locomotives

Dimension	Service Speed (km/h)	
	≤ 120	> 120 to ≤ 200
Predominately passenger traffic H (mm)	≤ 0.5	≤ 0.3
Predominately freight traffic H (mm)	≤ 0.75	-
Predominately passenger traffic G (mm)	≤ 0.5	≤ 0.4
Predominately freight traffic G (mm)	≤ 1.5	-
Predominately passenger traffic L-L1 or L1-L (mm)	≤ 0.5	≤ 0.25
Predominately freight traffic L-L1 or L1-L (mm)	≤ 1.0	-

Table 3 - As assembled tolerance dimensions for wheelsets on passenger vehicles

Dimension	Service Speed (km/h)	
	≤ 120	>120 to ≤ 200
H (mm)	≤ 0.5	≤ 0.3
G (mm)	≤ 0.5	≤ 0.4
L-L1 or L1-L (mm)	≤ 0.5	≤ 0.25

The difference in tread diameter measurements between the wheelsets under a vehicle should be in accordance with the vehicle manufacturer's instructions.

It is usual for the vehicle manufacturer to specify wheelset diameter tolerance across a vehicle but it may be modified or produced by a technically competent authority.

Table 4 provides typical wheelset diameter tolerances across a freight vehicle fitted with conventional 3-piece bogies.

Table 4 - Wheelset diameter difference across a freight vehicle

Wheelset Diameter Difference	Wheelset 1 L - Wheelset 2 L (mm)
Across a bogie	25
Across a vehicle	60

The wheelset dimensions nominated in this section shall be checked after a wheelset is assembled for locomotives and passenger vehicles.

The wheelset dimensions to be measured at three points at 120 degrees apart shall be checked after a wheelset is assembled for freight vehicles.

The wheelset dimensions to be measured around the entire circumference of both wheels whilst the wheelset is rotated on the bearings should be checked on at least 10% of wheelsets assembled and machined with automated equipment, and inspected to achieve at least 99% confidence of meeting the required limits for wheelsets assembled and machined with manual methods on freight vehicles.

Tread radial run-out and tread diameter difference should be checked after wheels on a wheelset are re-profiled for locomotive and passenger vehicles.

Tread radial run-out and tread diameter difference should be checked after wheels on a wheelset are re-profiled on at least 10% of wheelsets machined with automated equipment, and inspected to achieve at least 99% confidence of meeting the required limits for wheelsets machined with manual method for freight vehicles.

Wheel flange back to back dimension should be checked whenever a wheelset is in a Wheel Shop.

Geometric requirements for wheels are given in AS 7514.

Geometric requirements for axles are given in AS 7515.

4 Electrical resistance

Requirements for wheelset electrical resistivity are given in AS 7505.

5 Balancing

Wheelsets should be balanced.

Balancing of wheelsets may be achieved by:

(a) Controlled machining and assembly of components, typically sufficient for vehicles operating at 120 km/h or less.

(b) Aligning the static imbalances of the wheels in the same orientation and the static imbalances of other components (such as brake discs) diametrically opposite to the wheel imbalance, where required by the vehicle manufacturer.

(c) Dynamic balancing, where required by the vehicle manufacturer.

Where dynamic balancing of wheelsets is required the values in BS 5892-6 Table 1 are suggested limits.

Methods for balancing wheelsets should not introduce stress concentrations which were not considered as part of the design.[14]

The method for balancing wheelsets in BS 5892 -3 should be employed.[15]

[14] Failures have occurred from balance weight holes.

[15] Describes machining of the inner rim. A common alternative is the fitting of balance weights to holes in the wheel web. In the UK this has caused wheel failures due to fatigue cracks initiating from fretting and corrosion under the balance weights and from poorly executed hole machining. That method is not recommended.

6 Identification and records

Operators shall ensure that each of their wheelsets has a unique identification.[16]

The unique axle identification required by AS 7515 may be used as the unique identification for the assembled wheelset.[17]

Operators shall ensure that wheelset assembly records are retained until wheelset disposal.

Wheelset assembly records shall include the following:[18]

(a) Wheelset assembly facility

(b) Assembly date

(c) Wheelset unique identity

(d) Axle unique identity

(e) Wheels unique identity

(f) Wheel to axle interference fits if appropriate

(g) Wheel pressing on force curves if press fitted

(h) Lubricant used if press fitted and a choice permitted by the design

(i) Wheel test loads if shrink fitted

(j) Package bearing numbers if fitted

(k) Wheelset back to back dimension

(l) Wheel bore diameter

(m) Wheel seat journal diameter

(n) Wheel tread diameter difference across the wheelset

(o) Tread radial runout, Figure 1 dimension H

(p) Flange back axial runout, Figure 1 dimension G.

7 Actions following derailment

Post-derailment axle checks shall involve an assessment of bending or distortion using a three point test of the wheelset back to back rim to rim distance, or by measuring the flange back axial runout of the wheelset. run-out as the axle is revolved between centres or on its own bearings.

Wheelsets shall comply with the geometric tolerances in section 3

If the axle is kept under a vehicle for assessment following a derailment, the assessment shall be performed a second time after rotating the wheelset through 180 degrees.[19]

[16] Unique identification and record keeping are required to aid investigation of service problems and location of potentially similarly affected wheelsets.
[17] Simplifies record keeping.
[18] Unique identification and record keeping are required to aid investigation of service problems and location of potentially similarly affected wheelsets.
[19] This is done to account for the deflection imposed on the axle due to the mass of the vehicle.

Appendix A Hazard register

Hazard reference number	Hazard description	Applicable section
5.2.1.9	Mismatched wheel and rail profiles causing excessive rail wear and deterioration	2, 3
5.2.1.10	Mismatched wheel and rail profiles causing Rolling Contact Fatigue resulting in excessive rail wear and deterioration	2, 3
5.4.1.47	Mismatched wheel and rail profiles causing excessive wheel wear	2
5.4.1.54	Excessive diameter difference between wheels on an axles causing excessive wheel wear	3
5.4.1.55	Misaligned wheels or bearings causing excessive wheel wear	3
5.5.1.46	Manufacturing deficiency causing the inability to operate trains	2
5.5.1.47	Maintenance deficiencies causing the inability to operate trains	2
5.5.1.49	The absence of (unique) components identification causing the inability to trace or identify (suspected) faulty components	6
5.13.1.9	Wheelset diameter variation across bogies or vehicles outside traction system limits	3
5.13.1.10	Wheelset diameter variation across bogies or vehicles outside brake or WSP system limits	3
5.19.1.32	Thin flanges and narrow wheel back-to-back dimensions (Derail at turnout)	3
5.19.1.35	Wheelsets being excessively unbalanced resulting in bogie unbalance causing wheel unloading	5
5.19.1.37	Wheels being out of round thus bogie geometry causing wheel climb or unloading	3
5.19.1.38	Wheels not being the same size on a wheelset thus bogie geometry causing wheel climb or unloading	3
5.24.1.9	Freight bogies pop out of centreplates due to train compressive forces and excessive diameter difference between bogies' wheelsets causing excessive friction at bogie pivot point	3
5.25.1.6	Axlebox clearance not being maintained (Frame cracking or bending - Frame failure)	3
5.25.1.9	Out of balance wheelsets (Frame cracking or bending - Frame failure)	5
5.25.1.10	Out of balance wheelsets (Spring failure - Suspension)	5
5.25.1.28	Excessive difference in wheelset diameters across a 3-piece freight bogie (Damper failure - Suspension failure)	3
5.26.1.2	Incorrect wheel bore and axle seat surface roughness causing wheels to move on the axle (Wheel failure)	2
5.26.1.3	Wheel bore being too large or axle seat too small causing wheels to move on the axle (Wheel failure)	2

Hazard reference number	Hazard description	Applicable section
5.26.1.5	Wheel bore and axle seat not parallel causing wheels to move on the axle (Wheel failure)	2
5.26.1.6	Gross overloading e.g.. derailment causing a bent axle (Axle failure)	3
5.26.1.14	Fretting at wheels, brake discs or gear seats causing a cracked axle (Axle failure)	2, 3
5.26.1.30	Increased stress at shrunk or press fitted components causing a cracked axle (Axle failure)	2
5.26.1.39	Cracks initiated at 'intentional' stress raisers e.g.. mounting holes creating stamping causing cracked wheels (Wheel failure)	5
5.26.1.40	Incorrect or excessive lubricant used during wheel fitment causing wheels to move on the axle (Wheel failure)	2
5.26.1.44	Components being at the wrong temperature during wheel fitment (Wheel moves on axle - Wheel failure)	2
5.27.1.9	Wheels being mounted too wide making wheel to rail conicity too high	3
5.35.1.3	Excessive difference in coupler heights	3
5.48.1.26	Out of balance wheelset	5

About Rail Industry Safety and Standards Board

Established by the Australasian Railway Association (ARA) in 2004, the Rail Industry Standards and Safety Board (RISSB) is responsible for the development and management of the rail industry's

- Standards;
- Codes of Practice;
- Rules; and
- Guidelines.

RISSB products are developed under the umbrella of the Australian Code of Practice (ACOP). The development of Standards by the RISSB is done under the accreditation of the Accreditation Board for Standards Development Organisation (ABSDO). The RISSB product development process involves working closely with industry stakeholders. In this regard, RISSB maintains close relations with the ARA, Standards Australia®, the Rail Tram and Bus Union and Government through the Department of Infrastructure Transport Regional Development and Local Government, the National Transport Commission and the Regulators.

For further information visit www.rissb.com.au

RISSB Australian Standards Development Process

RISSB is an accredited Standards Development Organisation (SDO) with ABSDO. All Standards produced by RISSB are Australian Standards. The Standards development process is rigorous and transparent. The same process is used in developing other RISSB products although Guidelines are not exposed to the public for comment given their non-binding nature.

Typically independent authors and validators are contracted to write and validate the products. The author works with one of RISSB's managers and a RISSB Development Group to ensure that the product is acceptable to industry. A RISSB Standing Committee oversees this work and ensures that proper governance and process is followed: this includes exposing the product to the public and industry on at least two occasions. Once the final draft has been produced and validated the product is passed to the Development Advisory Board (DAB) which assures itself that RISSB's accredited process has been followed in its development activities. Once the DAB endorses the product, it is passed to the RISSB Board for approval and the ARA Executive for agreement to publish.

Audits

The Accreditation Board for Standards Development Organisations (ABSDO) audits the RISSB annually to ensure that Standards are produced in accordance with the Accreditation Requirements.

Sales and Distribution

Australian Standards developed by RISSB are sold and marketed through SAI Global. For further information, please visit www.saiglobal.com

Financial members of the ARA/RISSB are granted access with membership.

RISSB
RAIL INDUSTRY SAFETY AND STANDARDS BOARD

ABN 58 105 001 465

For information regarding an Australian Standard® developed by RISSB, contact:

Rail Industry Safety and Standards Board
Suite 4, Level 4, Plaza Offices (East)
Terminal Complex, Canberra Airport
ACT 2609 Australia

PO Box 4608
Kingston ACT 2604

T +61 6270 4523
F +61 6270 4516
E rissb@rissb.com.au

For information regarding the sale and distribution of RISSB Standards, contact:

SAI Global Limited
Phone: 13 12 42
Fax: 1300 65 49 49
Email: sales@saiglobal.com
http://infostore.saiglobal.com/store

ISBN 978-1-76035-026-0