AS 7510.4:2014

RISSB
RAIL INDUSTRY SAFETY AND STANDARDS BOARD
ABN: 58 105 001 465

Accredited Australian Standards Development Organisation

Australian Railway Rolling Stock

Braking Systems – Part 4 – Infrastructure Maintenance Rolling Stock

STANDARD

Australian STANDARD

This Australian Railway Standard *AS 7510.4 Railway Rolling Stock - Braking Systems - Part 4: Infrastructure Maintenance Rolling Stock* was prepared by the RISSB *Brake Systems Development Group*. It was signed off by the RISSB *Brake Systems Development Group* and *Rolling Stock Standing Committee* in *June 2014* and subsequently by the Development Advisory Board (DAB) in *May 2014*. The DAB confirmed that the process used to develop the standard was in accordance with the RISSB accredited development process. On the 10th June 2014 the RISSB Board approved the Standard for release. This Standard was published on the RISSB website (www.rissb.com.au) on the *12 September 2014*

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The following organisations were represented on the RISSB Brake Systems Development Group :

Pacific National	Faiveley Transport
Aurizon	Wabtec
ARTC	Knorr-Bremse
V/Line	Bradken

Asset Standards Authority (Transport for NSW)

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

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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

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Notice to Users

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Justification

The Australian Standard AS7510 Rolling Stock Braking Systems aims to ensure that railway rolling stock is able to control its speed and stop safely. It specifies that:

a) any brake equipment failure should fail safe;

b) the thermal capacity of wheels and brake friction materials is not exceeded, thereby minimising the risk of derailments due to wheel failure or excessive speed.

The standard describes acceptable good practice such as relayed single-pipe automatic braking systems for freight and locomotive hauled passenger trains. It also describes recommended better practices such as:

a) two-pipe relayed automatic braking systems for bulk coal and mineral trains;

b) electro-pneumatic braking systems for self-propelled passenger rolling stock; and

c) fail-safe brake systems for infrastructure maintenance rolling stock.

AS7510 was developed using Australian (including company specific) and international standards as a baseline, including those referenced in Section 1.8 of the standard, as well as the Railways of Australia Manual.

Objective of this Standard

The AS7510 standard is expected to provide safety benefits in that proper braking performance contributes to the prevention of collisions or derailments of railway rolling stock by providing controls for the hazards listed in the HAZARD column and enumerated in Appendix A.

Identification of Benefits

Adoption of AS7510 is expected to result in a reduction of incidents of death or injury to crew, passengers, and public; damage to rolling stock, infrastructure, and other equipment, and a commensurate reduction in associated costs.

There is a strong industry demand for this standard, which has been measured by its likely adoption rate.

The 2014 RISSB Products Survey found current adoption rates for RISSB rolling stock products (of which AS7510 is one) at 53% of industry surveyed, with a likely future increase to 90% of potential users.

The 2014 Products Survey reported an estimated Safety Risk reduction of 13%; a 15% Operational Cost and 8% Training Cost reduction, following adoption of RISSB products.

The RISSB's independent economics consultant (Strategex) has also conservatively estimated a reduction of 5% in incident risks that could result from industry-wide harmonisation toward the AS7510 standard.

Valuation of the Benefits

The average annual economic burden of railway safety incidents during the past 8 years was estimated to be approximately $360.1 million. The safety incidents included in this estimation are Signals Passed at Danger (SPADs), signal restored, level crossing collisions – persons and vehicles, load irregularity, fatalities and serious injuries (excluding level crossing) and collisions (trains, rolling stock, infrastructure) [1]. The significant amount of economic burden associated with safety incidents in Australia means that a small percentage improvement in safety performance can translate into a significant economic benefit.

The quantification of the benefit that would be obtained from the AS7510 - Rolling Stock Braking System standard is estimated to be $1.3 million per year or present value of $9.2 million over the next 10 years. This estimate was derived from the 2014 RISSB products survey which reported that the estimated benefit of the 21 rolling stock standards survey surveyed for rail safety performance, operational cost savings and workforce training costs were $4.6 million, $34.6 million, and $100K respectively. In total, the expected benefit for adopting the 21 rolling stock standards was $39.3 million per year.

Cost of Implementation

Adoption of the AS 7510 standard is not expected to impose significant additional cost on the industry as much of it is in-line with existing practice and product offerings, with the equipment supply sector to respond by incorporating relevant requirement in their product development cycle.

Case Studies

This section contains some example incidents that have occurred in the past of which the developers of this standard were aware at the time of writing AS7510. This standard contains controls so far as reasonably practicable, at the time of writing, to mitigate or contribute to the mitigation of the hazards that led to these accidents.

Diligent, risk-based adoption of this standard, integrated with appropriate operational and safe working rules (such that the braking systems performance meets the requirements of the standard at all times) should help to prevent similar incidents such as the following from occurring in future:

a) Derailment of Coal Train EG37, Black Mountain, Qld, 1 July 2001 (ATSB);

b) Grass fire and subsequent fatality due to brake equipment sparks, Wingeel, Victoria, 2 February 2001 (Victorian Coroner); and

c) Runaway of Suburban Electric Passenger Train 5264 and collision with Diesel Locomotive Hauled Passenger Train 8141 on 3 February 2003 (ATSB).

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

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 CBA 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 the AS7510 Rolling Stock Braking Systems – is expected to deliver benefits to its individual users as well as contributing to the overall rail harmonisation process.

Document Control

Identification

Document Title	Number	Version	Date
Rolling Stock – Braking Systems – Infrastructure Maintenance Rolling Stock	AS 7510.4	1.0	12 September 2014

Document History

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1	12 September 2014	All	First Publication

Approval

	Name	Date
Approved	Development Advisory Board	27 May 2014
Approved	Rail Industry Safety and Standards Board	10 June 2014

Standard Change Procedures

The 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.

The RISSB will identify and communicate changes to this publication.

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Appendix Contents

1 INTRODUCTION

1.1 PURPOSE

This standard describes minimum standards for brake performance, features and compatibility for the braking systems of Infrastructure Maintenance Rolling Stock.

The main purpose of the requirements is to:

a) Provide a uniform basis for compliance with AS4292 - Railway Safety Management;

b) Support mutual accreditation by Rail Infrastructure Manager and Regulators covering the various rail operations across Australia;

c) Identify the risks being controlled.

1.2 SCOPE

This standard is applicable to rail bound Infrastructure Maintenance Rolling Stock that is new, substantially modified or that is to operate in a Network in which it has not previously operated.

This standard covers the design and construction of brake systems.

This standard covers the maintenance of the brake systems of existing Infrastructure Maintenance Rolling Stock.

The operation of rolling stock, considering network safeworking rules and route standards, is not covered.

Items of rolling stock used on light rail, cane railway and monorail Networks are not covered.

Items of Infrastructure Maintenance Rolling Stock not covered are:

a) Road/Rail vehicles;

b) Trailers, Trolleys and Quadricycles;

c) Freight wagons used to carry track materials. See AS7510.2.

1.3 COMPLIANCE

There are two types of control contained within the RISSB Australian Rolling Stock Standards:

1. mandatory requirements
2. recommended requirements

Each of these types of control addresses hazards that are deemed to require controls on the basis of existing Australian and international rolling stock practices 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 terms shall or must.

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