AS 7503.2:2014

Australian STANDARD®

Train Identification and Integrity
Part 2: Freight Rolling Stock

RISSB
RAIL INDUSTRY SAFETY AND STANDARDS BOARD

Rolling Stock Standard

This Australian Railway Standard AS 7503.2 Train Identification and Integrity Part 2: Freight Rolling Stock 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. This Standard was published on the RISSB website (www.rissb.com.au) on January 29, 2015.

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The following organisations were represented on the RISSB Development Group:

Bruce Engineering	Bombardier	TransAdelaide
Aurizon	Queensland Rail	RTBU
Pacific National	Transport for NSW	Wabtec

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.

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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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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

The Australian Standard AS 7503 Train Identification and Integrity describes requirements for the identification of rolling stock.

AS7503 specifies:

- That each rolling stock shall have a specific vehicle identifier.
- Requirements for display of the identifier
- The fitment of a manufacturer's nameplate on each new vehicle
- Requirements for AEI tags
- Requirements for identification of equipment

The standard does not cover:

- Operation of rolling stock in regards to network safeworking rules and route standards which, however, may apply in addition to this standard.
- Rolling stock used on light rail, cane railway and monorail networks.
- Heritage rolling stock operating on a railway solely under the control of the Rolling Stock Operator of that heritage rolling stock, or on a railway under the control of another Rolling Stock Operator solely operating heritage rolling stock.

Objective of Standard

The general purpose of AS 7503 is to maintain consistency in the identification of rolling stock, including the location and programming of Automatic Equipment Identification (AEI) tags on Australian rail networks. Rolling stock shall be fitted with AEI tags where required by the network they are running on as specified in the Standard. The standard includes other requirements on tag size and location etc. for consistency of access and visibility.

This AEI based standard refers to US standards developed by the Association of American Railroads (AAR) which are proprietary and only supported by Rolling Stock Operators' systems and processes. This is presently suitable for the purpose of vehicle identification for condition monitoring. The standards can help improve operational efficiency for rail systems.

Estimation of Benefits

There is a strong industry demand for Rolling Stock standards, which has been measured by their likely adoption rates.

The 2014 RISSB Products Survey found current adoption rates for RISSB rolling stock products (of which AS 7503 Train Identification and Integrity is one) at 53% of industry surveyed, with a likely future increase to 90% of potential users.

The 2014 Products Survey 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

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.

D-Rail 2012 Report estimated a total direct cost of 24700€ (approximately $35,000) per derailment.[2] The quantification of the benefit that would be obtained from the AS 7503 Train Identification and Integrity Standard is estimated to be $1 million per year or present value of $6.9 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 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 7503 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 Study

Automatic Equipment Identification tags have been installed on all U.S. and Canadian freight cars and locomotives since 1995. Electronic reading of these tags, combined with information from wayside condition-monitoring equipment enables the identification of faulty rolling stock equipment. Once identified, faulty equipment may be removed from service and repaired, thus preventing derailments from occurring.

AS7503 nationally formalises a previous set of agreements (via the Railways of Australia Manual - which applied to the Defined Interstate Rail Network or to specific state-based networks) to comply with tagging and identification requirements. The introduction of rolling stock condition monitoring supported by electronic tagging has demonstrably reduced the incidence of wheel bearing failure and therefore a sizeable number of derailments which were caused by this form of equipment failure.

"European Union studies show that condition-monitoring systems (including Hot Axle Box Detectors / Hot Wheel Detectors, B Acoustic Monitors, Wheel Impact Load Detectors and Wheel

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

Impact Monitors) prevent an estimated 174 derailments across the EU annually.[3] Average European rail freight traffic volumes are higher than in Australia (approximately 300 billion tonne kilometres for EU in 2010[4] vs approximately 64 billion tonne kilometres in Australia in the same year).

It is reasonable therefore to assume that the systems in Australia which support the identification of rolling stock equipment failures would prevent a proportionally lower number of equipment-failure-caused derailments than in Europe – in other words about 37 derailments per year. Continuing to implement such preventative measures is absolutely vital to the integrity of the rail network.

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 the AS 7503 Train Identification and Integrity standard is expected to deliver benefits to its individual users as well as contributing to the overall rail harmonisation process.

The need for global open standards

This standard refers to US standards developed by the Association of American Railroads (AAR) which are proprietary and only supported by Rolling Stock Operators' systems and processes. While this is suitable for the purpose of vehicle identification for condition monitoring, many rail companies are looking to take a "whole-of-supply-chain" approach and are implementing global standards which are also supported by cargo owners and other transport Rolling Stock Operators in an integrated fashion across the supply chain.

The ARA Board has, in principle, endorsed the transition to global GS1 standards to all future applications. These standards are already being used by some companies for inventory control and other processes and systems and have the advantage that they are open standards (meaning that a competitive pool of suppliers of the hardware and software systems is available).

Applying global standards, where each physical object such as wagons or locomotives or containers are assigned a globally unique identifier, can result in more effective asset management, supply chain interoperability and end-to-end freight visibility as well as reduced overall costs.

Supporting global systems with the legacy AEI tag systems

Transport companies using the existing AAR AEI tag system are able to support GS1 standards without the need to fully replace existing tags, reader systems and hardware. The ARA, RISSB

[3] DNV; Anderson, T & Astin, G; (Powerpoint Presentation) "Assessment of measures: Potential new measures, or extended scope of existing measures"; 29 September 2011
[4] UIC Statistical Synopsis

and GS1 Australia have worked together to develop this transitional solution to help reduce cost by leveraging off existing capital investments.

The process requires:

(a) The rail organisation to join GS1 Australia if not already a member (costs apply)

(b) The allocation by GS1 Australia of a GS1 Company Prefix to the rail organization. This company prefix can be used to create a Global Individual Asset Identifier (GIAI) - a globally unique identifier.

(c) The enhancement / modification of the existing system to embed the AAR AEI Identifier being captured by RFID Readers currently into a GIAI (contact GS1 Australia for assistance)

Once the GIAI has been created, each rail organisation will be able to use this globally unique identifier to interoperate with other transport providers, indirect and direct customers across a number of different supply chain management applications.

Document Control

Identification

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Version 1.0	29/01/2015	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 standard describes requirements for the identification of freight rolling stock.

1.2 Scope

This documents applies to new, modified and existing freight rolling stock.

The document covers the design, construction and maintenance of freight rolling stock.

Operation of rolling stock in regards to network safeworking rules and route standards is not covered.

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

Heritage rolling stock operating on a railway solely under the control of the Rolling Stock Operator of that heritage rolling stock, or on a railway under the control of another Rolling Stock Operator solely operating heritage rolling stock is excluded from this standard.

The classification and numbering system given in Section 2.3 applies to freight rolling stock operating on the Defined Interstate Rail Network.

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 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

1.4.1 Normative references

The following referenced documents are indispensable for the application of this Standard:

(a) AS 7524.2 Railway rolling stock - Drawgear - Part 2: Freight rolling stock