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Preface

This standard was prepared by the Rolling Stock Emergency Equipment Development Group, overseen by the RISSB Rolling Stock Standing Committee.

Objective

The objective of this Standard is to describe the requirements for the portable emergency equipment that are to be carried by locomotives, self-propelled passenger rolling stock and infrastructure rolling stock.

The main purpose of the requirements is to:

(a) define the types of portable emergency equipment to be carried by locomotives, passenger rolling stock and infrastructure rolling stock.

(b) define the requirements for emergency equipment (where applicable);

(c) define quantities of emergency equipment;

(d) define the documentation that is to be carried relating to emergency equipment; and

(e) define maintenance requirements for the emergency equipment.

Compliance

There are four types of provisions contained within Australian Standards developed by RISSB:

(a) Requirements.

(b) Recommendations.

(c) Permissions.

(d) Constraints.

Requirements – it is mandatory to follow all requirements to claim full compliance with the Standard. Requirements are identified within the text by the term ‘shall’.

Recommendations – do not mention or exclude other possibilities but do offer the one that is preferred.
Recommendations are identified within the text by the term ‘should’.

Recommendations recognize that there could be limitations to the universal application of the control, i.e. the identified control is not able to be applied, or other controls are more appropriate or better.

Permissions – conveys consent by providing an allowable option. Permissions are identified within the text by the term ‘may’.

Constraints – provided by an external source such as legislation. Constraints are identified within the text by the term ‘must’.

For compliance purposes, where a recommended control is not applied as written in the standard it could be incumbent on the adopter of the standard to demonstrate their actual method of controlling the risk as part of their WHS or Rail Safety National Law obligations. Similarly, it could also be incumbent on an adopter of the standard to demonstrate their method of controlling the risk to contracting entities or interfacing organisations where the risk may be shared.

RISSB Standards address known hazards within the railway industry. Hazards, and clauses within this Standard that address those hazards, are listed in Appendix A.

Appendices in RISSB Standards may be designated either “normative” or “informative”. A "normative" appendix is an integral part of a Standard and compliance with it is a requirement, whereas an "informative" appendix is only for information and guidance.

Commentary

Commentary *C Preface*

This Standard includes a commentary on some of the clauses. The commentary directly follows the relevant clause, is designated by ‘C’ preceding the clause number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the Standard.

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Figures

Section 1 Scope and general

1.1 Scope

This Standard applies to locomotives, self-propelled passenger rolling stock and infrastructure rolling stock operating on open access networks. For the purposes of this Standard this is known collectively as the referenced rolling stock.

For the purpose of this Standard zero or low emissions systems refers to the use of lithium batteries, hydrogen or ammonia for traction or auxiliary power supply.

Rolling stock not operating on open access networks can apply parts of this Standard based on the safe working systems in use and the operational environment.

This document is relevant to the design and operation lifecycle phases of rolling stock.

This Standard sets the requirements for the portable emergency equipment carried on rolling stock.

Operation of rolling stock, network safe working rules and route standards are not covered.

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

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document:

- AS 1319, *Safety signs for the occupational environment*
- AS 2187.1, *Explosives - Storage, transport and use, Part 1: Storage*
- AS 2675, *Portable first aid kits for use by consumers*
- AS 2700, *Colour standards for general purposes*
- AS 3790, *Portable warning triangles for motor vehicles*
- AS 7531.2, Railway rolling stock - Lighting & rolling stock visibility - Part 2: Freight rolling stock
- AS/NZS 4280.1, *Global maritime distress and safety system (GMDSS), Part 1: Cospas-Sarsat EPIRB — Emergency position indicating radio beacon operating on 406 MHz — Operational and performance requirements, methods of testing and required test results (IEC 61097-2 (Ed.4.0) MOD)*
- AS/NZS 4280.2, *406 MHz satellite distress beacons, Part 2: Personal locator beacons (PLBs)*

1.3 Defined terms and abbreviations

For the purposes of this document, the following terms and definitions apply:

1.3.1

emergency equipment
portable items carried onboard rolling stock for use in emergencies, incidents, accidents, failures etc.

1.3.2

emergency position indicating radio beacon (EPIRB)
maritime-based distress beacon, monitored by satellite, designed to float in water and operate for a minimum of 48 hours once activated

1.3.3
open access network
railway network where freight and passenger operators other than the network owner are able to operate

1.3.4
operational area
area/s within a rail network or networks that a type of rolling stock would normally travel

1.3.5
personal locator beacon (PLB)
land and marine distress beacon, monitored by satellite, designed to operate for a minimum of 24 hours once activated

1.3.6
referenced rolling stock
locomotives, self-propelled passenger rolling stock and infrastructure rolling stock operating on open access networks

1.3.7
wheel chock
tapered block used for wedging into the interface between the rail and a wheel and restraining the wheel from moving in that direction

General rail industry terms and definitions are maintained in the RISSB Glossary. Refer to: https://www.rissb.com.au/products/glossary/

Section 2 Protection when stopped

2.1 Visible protection devices

2.1.1 Flags

Referenced rolling stock shall carry at least two (2) red flags and at least one (1) green flag. Flags should be made from resilient material such as vinyl or cloth.

Flags should be attached to a handle. The handle should not be of a length that could interfere/override operating or safety systems.

The following colours from AS 2700 should be used for flags:

(a) RED – Signal Red R13

(b) GREEN – Emerald Green G13

Where rolling stock does not have a means of securely attaching a flag to the end of a train, flags should include an integrated means of attachment.

Suggested flag dimensions are 500 mm (W) x 400 mm (H).

2.1.2 Hand signal lamps

The quantity of hand signal lamps to be carried on referenced rolling stock shall be agreed by the RSO and RIM for the network(s) it will operate on using sound, risk-based methodology. There should be a minimum of one.

Hand signal lamps shall meet the following requirements:

(a) A lens/reflector diameter of at least 50 mm.

(b) A red colour consistent with Signal Red R13 from AS 2700.

(c) Luminous intensity of at least one candela (1 cd).

(d) Capable of at least five (5) hours of continuous operation.

Hand signal lamps can be switchable colour type. In addition to red, hand signal lamps may include green and/or white.

NOTE 1:

The intent of (a) is that the aspect should be visible at an appropriate safe working distance. LED technologies can achieve a higher performance than incandescent lamps.

NOTE 2:

The intent of (d) is that there is an onboard train requirement for a 5-hour capacity. This could be achieved by using high-capacity batteries, multiple batteries, multiple hand signal lamps or other options.

2.1.3 Hand torches

Referenced rolling stock shall carry at least one (1) weatherproof hand torch suitable for use in all kinds of weather, either kept on board or issued to all train drivers or operators.

Hand torches should:

(a) include a lens/reflector diameter of at least 50 mm; and

(b) be capable of at least five (5) hours of continuous operation.

The white aspect of a hand signal lamp or shunting lamp may be used as a hand torch.

2.1.4 Reflective triangles

Reflective triangles maybe employed as a visible warning aid to road traffic when a train is stopped at a level crossing. If these are provided, they shall comply with Type B (‘ECE') triangles in AS 3790.

2.2 Railway track signals

2.2.1 Quantity

The quantity of railway track signals to be carried on referenced rolling stock shall be agreed by the RSO and RIM for the network(s) it will operate on using sound risk-based methodology. When rail track signals are used for train protection, the typical minimum quantity for a locomotive is 24.

2.2.2 Design

Railway track signals shall have a mechanism that securely attaches it to the centre of the top of the rail head.

Securely attaching to the rail head means that the railway track signal cannot be removed by the vibrations of oncoming or passing trains and is resistant to removal by wildlife such as birds.

The attachment mechanism should enable the railway track signal to be detached from the rail and reused fifty (50) times prior to failure of the attachment mechanism.

An example design of a railway track signal is shown in Figure 1.

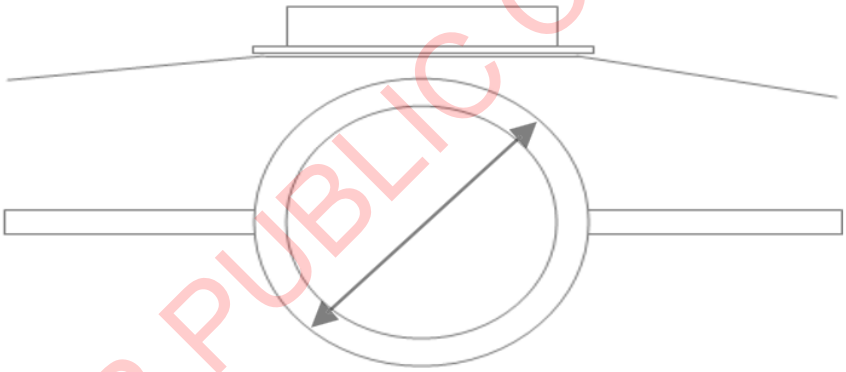

Figure 1 Example railway track signal design

Railway track signals should be coloured red or orange.

2.2.3 Storage

Railway track signals are Class 1.4S explosives and thus AS 2187.1 applies. Railway track signals should be stored in a container that prevents lateral movement within the container. Railway track signals containers should be made of a robust material and be big enough to hold the original packaging of the detonators. That packaging is designed to keep the detonators safe so should be used inside the carry box.

Railway track signals containers should be red or orange or if there is a separate inner container, this should be red or orange.

Railway track signals containers should be labelled with the following information:

(a) DANGER

(b) Railway Track Signals

(c) "No. of devices in the container when full" where "No. of" is replaced with the number of devices in the container when full.

(d) Manufacturer

(e) Manufacture Date

(f) Expiry Date

(g) "Ensure container is empty before discarding"

(h) "Relevant UN number"

(i) HAZMAT Class 1.4S

The outermost container for storage or transport of railway track signals shall be secured with a lock.

The RSO shall develop a risk-based process for the disposal of life expired railway track signals.

2.2.4 Performance

Railway track signals should detonate upon the passage of a vehicle of 5,000 kg or more axle load at any speed.

Railway track signals when exploded normally on a rail should not project fragments that will cut or puncture a 270 g/m² denim cloth (or equivalent) which completely covers a wood frame 2 m square placed upright at ground level, parallel to the rail on which the railway track signal is placed, at a distance of 1 m from the rail and with the longitudinal centre of the base opposite the railway track signal. This is shown diagrammatically in Figure 2.

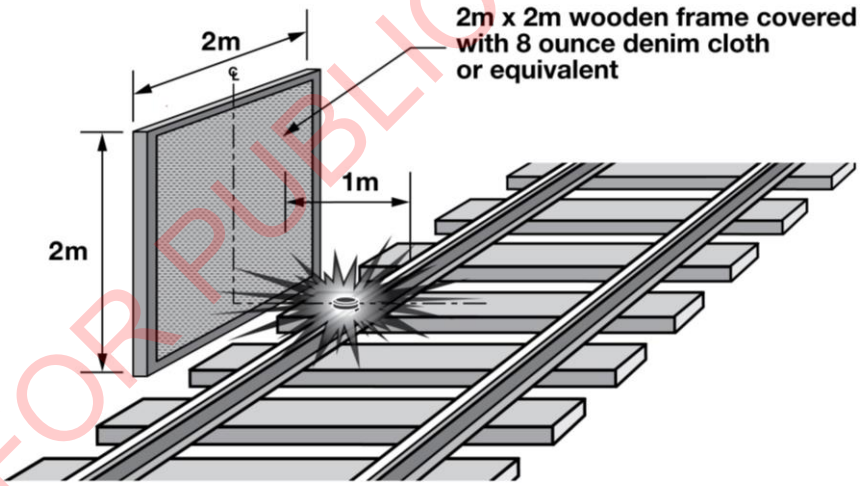

Figure 2 The testing arrangement for a railway track signal

The detonation of a railway track signal should create a peak sound level of at least 150 dB on the linear peak hold scale at a distance of 6 m from the device and 1.2 m to 1.5 m above ground level.

Railway track signals should be capable of withstanding temperatures of up to 70°C from the manufacture date to the expiry date.

Railway track signals should remain fully functional after being immersed in 150 mm deep water for 24 hours.

2.3 Track circuit shorting devices

The quantity of railway track circuit shorting devices to be carried on referenced rolling stock shall be agreed by the RSO and RIM for the network(s) they will operate on using sound risk-based methodology.

Commentary *C2.3*

Typical minimum quantity is three.

Track circuit shorting devices should be stored in a suitable container along with instructions for proper use. The track circuit shorting device shall be designed so that once installed it does not come detached.

An example design of a track circuit shorting clip is shown in Figure 3.

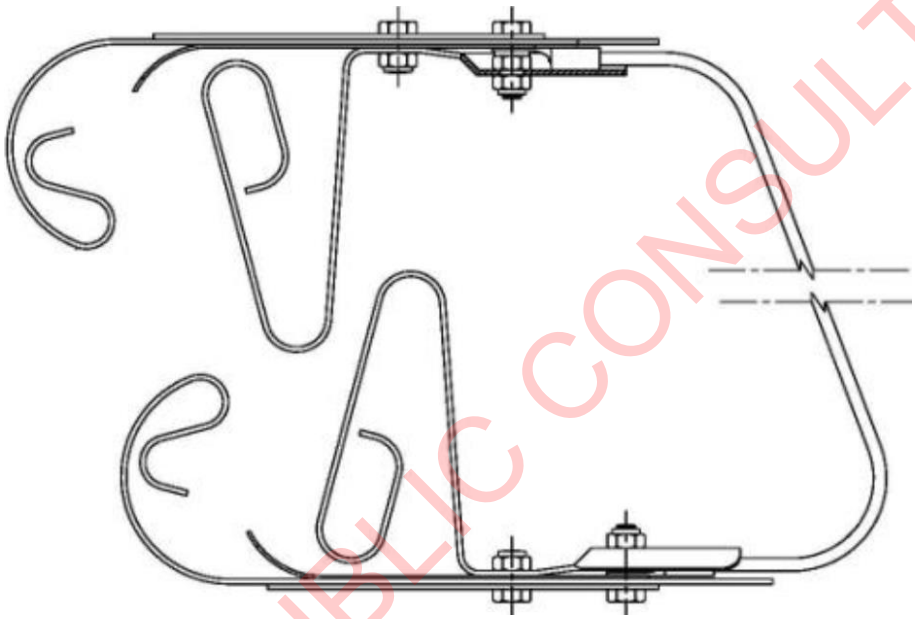

Figure 3 Example track circuit shorting device

NOTE:

The diagram is for concept purposes only and is not necessarily to scale.

Track circuit shorting devices shall have a DC electrical resistance between rail contact surfaces not greater than 10 mΩ, measured with a voltage source no greater than 300 mV.

2.4 Train immobilisation

The quantity of wheel chocks to be carried on referenced rolling stock shall be agreed by the RSO and RIM for the network(s) it will operate on using sound risk-based methodology. Reference rolling stock should carry a minimum of four wheel chocks.

Figure 4 is an example design for a wheel chock, exact design will vary depending on wheel diameter.

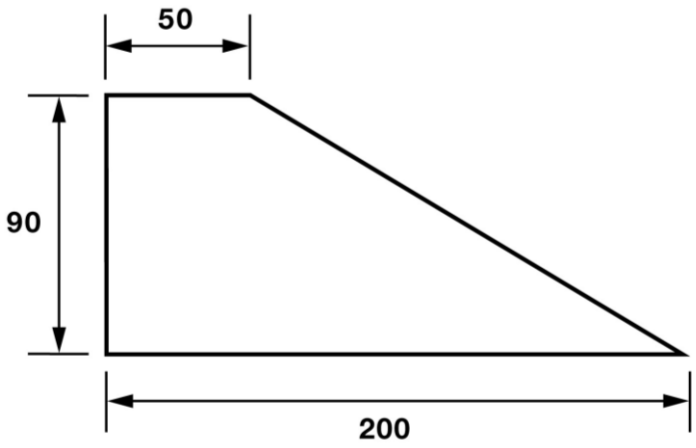

Figure 4 Example chock wheel design

NOTE:

The diagram is for concept purposes only and is not necessarily to scale.

Wheel chocks should be made from a material that will resist the movement of an initially static locomotive without traction power on a grade up to 1:30.

Wheel chocks should destruct if a vehicle under traction power moves against it.

Suitable wheel chock materials include timber or synthetic materials such as nylon.

Wheel chocks are often fitted with a removable handle to facilitate inserting it in front of a wheel without the user moving under the train.

Section 3 End-of-train markers

Locomotives should carry a spare end-of-train marker as agreed with the RIM.

End-of-train markers should incorporate a means of attaching it to the train.

End-of-train markers shall comply with the tail light luminance requirements given in AS 7531.

Section 4 First aid equipment

Referenced rolling stock should carry a first aid kit. Typically, for rail services in metropolitan and outer metropolitan areas, first aid equipment is provided on stations rather than on-board rolling stock.

A first aid kit should contain at least the items for a Size B kit in AS 2675 unless issued to traincrew as part of their personal equipment.

First aid kits shall have a tamper-evident seal and a visible use-by date.

The location of first aid equipment should be identified by signage containing Sign No. 471 to AS 1319.

Additional drinking water may be included with first aid equipment where this is considered appropriate.

The addition of a defibrillator to the first aid equipment on-board the referenced rolling stock should be considered based upon the outcome of an appropriate risk assessment.

Section 5 Zero or low emission (ZE) traction and ZE power sources

Where an RSO is operating ZE or low emission rolling stock or ZE power sources, the RSO shall undertake a risk assessment to consider what additional emergency equipment is required to mitigate additional hazards imported as a result of the ZE traction equipment or ZE power sources.

Section 6 Fire

Refer to AS 7529 for requirements on portable firefighting equipment.

Section 7 Evacuation

Refer to AS 7522 for requirements on portable evacuation equipment.

Section 8 Recovery

Referenced rolling stock should carry the following equipment for use in recovery operations:

(a) Towing chain suitably sized for recovery application.

(b) Shackles suitably sized for recovery application.

Refer to AS 7520 for requirements on towing fixtures.

Refer to AS 7524 for requirements on adaptor couplings. Appropriate pneumatic hoses and electrical jumpers to allow operation should be included with an adaptor coupling.

Section 9 Emergency alert beacons

Referenced rolling stock can carry a satellite monitored distress beacon (EPIRB or PLB) for activation in emergencies, subject to due consideration of operational needs.

EPIRBs shall comply with AS/NZS 4280.1. PLBs shall comply with AS/NZS 4280.2.

Section 10 Communication

Communication equipment shall be installed to allow communication along the entire length of the route that the referenced rolling stock operates on.

Refer to AS 7504 for requirements on portable communication equipment.

Section 11 Maintenance and testing

11.1 General

All emergency equipment should be tested and maintained in accordance with appropriate standards.

Referenced rolling stock should carry tools appropriate for the geography over which it operates.

Section 12 Tools required on a locomotive

12.1 Typical tools

A typical potential list of tools is as follows:

(a) 1 medium shifting spanner

(b) 1 medium cold chisel

(c) 1 hacksaw and two spare hacksaw blades

(d) 1 medium wood saw

(e) 1 small crowbar
(f) 1 large crowbar
(g) 1 14 lb sledgehammer
(h) 1 brake pipe continuity tester
(i) 1 shovel
(j) 1 small axe
(k) 1 pin punch
(l) 1 rope
(m) 1 spray can penetrating lubricant
(n) 1 grease gun with grease
(o) 1 battery charge cable
(p) 1 screwdriver set
(q) 1 pliers
(r) 1 ring and open-ended spanner set
(s) 1 copper hammer
(t) 1 wheel & tyre gauge
(u) 1 side bearer clearance gauge
(v) 1 pinch bar
(w) jumper coupling
(x) “D” links
(y) ball pein hammer
(z) wrecking/podger bar
(aa) roll wire
(bb) hose reducing nut
(cc) split pins
(dd) stillsons wrench
(ee) Brake pipe dump device – see Figure 5
(ff) Heat gun/infrared thermometer - for checking hot wheels/bearings after asset protection alarm

Figure 5 Brake pipe dump device

12.2 Tools required on self-propelled passenger rolling stock

A list of typical potential tools is as follows:

(a) 1 medium shifting spanner
(b) 1 ball pein hammer
(c) 1 medium cold chisel
(d) 1 hacksaw and two spare hacksaw blades
(e) 1 medium wood saw
(f) 1 small crowbar
(g) 1 large crowbar
(h) 1 14 lb sledgehammer
(i) 1 shovel
(j) 1 small axe
(k) 1 pin punch
(l) 1 rope
(m) 1 spray can penetrating lubricant
(n) 1 grease gun with grease
(o) 2 wooden bungs
(p) 1 handbrake brace
(q) 1 handbrake spanner
(r) 1 pantograph hand crank
(s) 1 battery charge cable
(t) 1 screwdriver set
(u) 1 pliers
(v) 1 ring and open ended spanner set
(w) 1 copper hammer
(x) 1 pinch bar

12.3 Tools required on infrastructure maintenance rolling stock

A list of typical potential tools is as follows:

(a) 1 medium shifting spanner
(b) 1 ball pein hammer
(c) 1 medium cold chisel
(d) 1 crowbar
(e) 1 shovel
(f) 1 spray can penetrating lubricant

Section 13 Spares and repair items

13.1 General

Referenced rolling stock should, either keep on board or have issued to all train drivers, spare parts and equipment appropriate for the geography over which it operates.

13.2 Spares and repair items required on a locomotive

A list of typical potential spare parts and equipment is as follows:

(a) 1 set spare batteries for hand lamp
(b) 1 set spare batteries for torch
(c) 2 spare globes for hand lamp
(d) 2 spare globes for torch
(e) 2 spare globes for rolling stock marker lights (if they can be safely changed from inside the locomotive)
(f) 2 air hoses 25 mm diameter (complete with heads assembled)
(g) 2 air hoses 32 mm diameter (complete with heads assembled)
(h) 1 tub quick-setting putty for temporary fuel tank and other repairs.
(i) 1 tube grease
(j) 2 spare headlight globes
(k) 2 spare low visibility (ditch) light globes
(l) 2 spare internal and access light globes
(m) 2 pipe plugs for brake pipe
(n) 1 roll of insulation tape
(o) 1 spool of stiff wire (>3 mm diameter)
(p) 1 spill kit
(q) Spare ECP cable
(r) ECP bypass cable
(s) Spare knuckle
(t) Knuckle carrier bar

13.3 Spares and repair items required on self-propelled passenger rolling stock

A list of typical potential spare parts and equipment is as follows:

(a) 1 set spare batteries for hand lamp
(b) 2 sets spare batteries for torch
(c) 2 hacksaw blades
(d) 2 spare globes for hand lamp
(e) 2 spare globes for torch
(f) 2 spare globes for rolling stock marker lights (if they can be safely changed from inside the passenger train)
(g) 2 air hoses 25 mm diameter (complete with heads assembled)
(h) 2 air hoses 32 mm diameter (complete with heads assembled)
(i) 1 tub quick-setting putty for temporary fuel tank repairs.
(j) 1 tube grease
(k) 1 trip hose
(l) electric fuses

13.4 Spares and repair items required on infrastructure maintenance rolling stock

A list of typical potential spare parts and equipment is as follows where not carried on an accompanying road vehicle:

(a) 1 set spare batteries for hand lamp

(b) 1 set spare batteries for torch

(c) 2 spare globes for hand lamp

(d) 2 spare globes for torch

(e) 1 tub quick-setting putty for temporary fuel tank and other repairs

(f) 1 spill kit

Section 14 Documents

Referenced rolling stock should carry documentation, whether electronic or paper based, that describes the emergency operational instructions, rules and regulations required by the rail infrastructure manager.

Referenced rolling stock should carry documentation that:

(a) lists the emergency equipment on board and where it is stored;

(b) describes correct use of emergency equipment; and

(c) contains troubleshooting guides for relevant emergency equipment/systems.

Section 15 Storage and maintenance

Maintenance and inspection of emergency equipment shall be included in maintenance plans for the rolling stock.

Emergency equipment should be stored in designated brackets, compartments or lockers.

Emergency equipment lockers should be installed in areas only accessible to train crew or other authorized personnel.

Emergency equipment lockers on infrastructure maintenance rolling stock should be installed in areas only accessible to operating crew or other authorized personnel and secured with a lock or have a tamper-evident seal.

Commentary *C13*

The intent is to protect from theft without limiting accessibility in an emergency.

Appendix A Hazard Register (Informative)

Hazard number	Hazard
5.3	Harm to persons
5.4	Harm to Rolling Stock
5.5.1.61	The ability to locate rolling stock
5.11.1.7EG:	Insufficient Number of hand/park braked wheelsets so that brakes cannot hold trains on steep grades.
5.43.1.16	Audible Track Warning Devices

Bibliography (Informative)

- AS 7501, *Rolling stock compliance certification*
- AS 7504, *Brake Blocks*
- AS 7520 (all parts), *Railway Rolling Stock - Body structural requirements*
- AS 7522, *Access and egress*
- AS 7524, *Coupler and draw gear*
- AS 7529 (all parts), *Australian Railway Rolling Stock - Fire Safety*