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## Preface

This standard was prepared by the Railway Infrastructure - Signage Development Group, overseen by the RiSSB Infrastructure Standing Committee.

## Objective

The objective of this Standard describes requirements for the whole of life management of railway operational signage.

This documentation may be used to promote a consistent approach to be incorporated into the design, construction, inspection, monitoring, maintenance and decommissioning of railway signage across the Australian rail industry.

## 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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## Section 1 Scope and general

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### 1.1 Scope

This Standard covers rail networks as classified in AS 7630.

This Standard is not specifically intended to cover light rail networks, cane railways, or heritage railways operating on private reservations, but items from this Standard may be applied to such systems as deemed appropriate by the relevant Rail Infrastructure Manager (RIM).

This Standard applies to permanent and temporary railway infrastructure signs that provide information and directions for network users. These include:

- (a) Instruction signs for items such as:
  - (i) permanent speed restrictions;
  - (ii) temporary speed restrictions; and
  - (iii) track possessions for engineering or other works.
- (b) Warning and caution signs for items such as:
  - (i) limit of shunt; and
  - (ii) limited clearance.
- (c) Information signs for items such as:
  - (i) change of operations system or operational parameters; and
  - (ii) structure, equipment and location identification signs including station identification and kilometre posts.

This document does not address the requirements for signs:

- (d) on trains;
- (e) in public areas outside the operational safety zone, except for those dealing with operational safety; and/or
- (f) pertaining to the operation of a station, or customer wayfinding.

This Standard is intended to be used in conjunction with AS 7631.

### 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 1428.1, *Design for access and mobility*
- AS 1743, *Road signs - specifications*
- AS 1744, *Standard alphabets for road signs*
- AS 2700 *Colour standards for general purposes*
- AS 7507, *Rolling stock outlines*
- AS 7531, *Lighting and rolling stock visibility*
- AS 7630, *Railway infrastructure - Track classification*
- AS 7631, *Railway infrastructure - Sighting*
- AS 7633, *Railway infrastructure - Clearances*
- AS/NZS 1906.1, *Retro reflective materials and devices for road traffic control purposes - Retro reflective sheeting*

- HB – 59, *Ergonomics - The Human Factor. A practical approach to work systems design.*
- AS IEC 62508:2011, *Guidance on human aspects of dependability*

**NOTE:**

Documents for informative purposes are listed in a Bibliography at the back of the Standard.

**1.3 Defined terms and abbreviations**

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

**1.3.1****backplate**

plate material on which a sign is mounted. Also known as a backing plate

**1.3.2****limited clearance**

location where the clearance between an object such as a sign or abutment and the structure gauge of the adjacent track is reduced and potentially infringing

**1.3.3****perception-reaction time**

time taken from the instant the object is visible to the instant when the required action to safely mitigate any hazards or risks outlined by the object is applied

**1.3.4****reaction time**

time elapsing between the beginning of the application of a stimulus and the beginning of a person's reaction to it

**1.3.5****primary user**

person or group who would most frequently need to sight the information shown on a sign

**1.3.6****readability**

ease with which the information shown on a sign can be read and understood

**1.3.7****sighting**

ability of a primary user to see a sign

**1.3.8****sighting distance**

distance over which a person/s from a specified height or position at a particular speed has visibility of stationary or moving objects in order to safely perceive/react as necessary to those objects

**1.3.9****visibility**

state of being able to see or to be seen and the distance required to be in this state as determined by light and weather conditions

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



## Section 2 Design and rating

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### 2.1 General

Signs are a supplement to, and not a substitute for, the required measures for eliminating or reducing risks on the railway.

Signs may be temporary or permanent.

This Standard differentiates between the following types of messages conveyed by railway infrastructure signage:

- (a) Danger warnings: these signs are intended to warn users of danger and to inform them of its nature.
- (b) Caution warnings: these signs are intended to warn users of potential hazards and alert them to action or provide regulatory information to mitigate any potential dangers.
- (c) Regulatory: these signs are intended to inform users of any obligations, restrictions or prohibitions with which they are required to comply with.
- (d) Informative: these signs are intended to provide users with information.

All signs shall be appropriately assessed by taking into account whether their content accurately conveys the intended meaning.

Where a sign is required for a purpose that is within the scope of this document but is not included in the appendices, the new design shall satisfy the requirements of this Standard and the sighting requirements of AS 7631.

See Appendix B for a general flow chart to assist in the assessment and selection of the appropriate sign.

Whenever suitable opportunities arise, for example re-signalling or an alteration to an infrastructure layout, replacement or amendment of obsolete signs should be considered.

New or nonstandard signs should not be introduced unless they are required for bespoke situations, or they improve detection and/or recognition.

Where defined in this Standard in Appendix C, harmonized sign designs should be used.

During the design stage redundant signs should be identified for removal, and appropriate preparations for their removal included in the design planning and safety in design process.

Sign design shall review and assess the requirements for:

- (e) the composition of the elements of the sign to deliver the message (e.g. red octagon with white border and white word "stop" in the centre)
- (f) the specific dimensions of the sign.

The layout should be fixed for delivering the message, but the dimensions may change depending on the specific location or usage.

Where there is a requirement to change a sign's dimensions, the design review shall assess if there is any effect by these changes on the readability, visibility, message comprehension or understanding of the sign.

## 2.2 Design considerations

### 2.2.1 General

The design of railway signage shall review and assess:

- (a) shape, size and thickness of signs;
- (b) colours;
- (c) use of borders and backplates;
- (d) lettering and symbols;
- (e) readability;
- (f) reflectivity;
- (g) need for unobtrusive positioning of bolt holes and fixings;
- (h) earthquake, storm and other relevant environmental factors;
- (i) strong winds and cyclones;
- (j) whole of life considerations in the selection of materials;
- (k) weight and overall dimensions of the sign;
- (l) handling, transportation, storage and packaging;
- (m) position, or positioning, of signs in relation to optimum sighting requirements for the primary user;
- (n) passage of rail traffic including out of gauge loads;
- (o) needs of the primary user and other users;
- (p) footings and foundations;
- (q) underground services; and
- (r) the impact of learned recognition.

Prior to the design of a new sign, the primary users shall be identified.

On identification of the primary users, their location when viewing the sign and required perception-reaction time shall be determined.

Factors affecting the perception-reaction times when identifying the position of optimum viewing arrangements shall be assessed in accordance with AS 7631.

Wherever practicable, all signs should be designed to provide the maximum resistance to graffiti.

### 2.2.2 Shape, size, and thickness of signs

#### 2.2.2.1 General

Signs shall be of a suitable size and construction to meet their requirements, taking into account the need for consistency and the avoidance of confusion. Signs intended for rail traffic personnel shall be as large as practical to allow clear sighting and interpretation by rail traffic crews travelling at maximum track speed.

Where signs are to be observed at a distance, they shall be of a suitable size and layout for the information to be imparted at that distance.

Where a sign is required to be read close to and at a distance, the design shall allow for legibility in both situations.

### 2.2.2.2 Size

Sign size should take into account the expected distance and place from which the sign will be viewed.

The size of the sign shall be dependent upon the size of lettering required and the length of the message.

Sign panels with dimensions less than 1,800 mm by 1,200 mm should wherever practicable be constructed from a single sheet of material. Where a sign panel is made up from more than one sheet it should be constructed from the minimum number of pieces.

Position of text and/or symbols shall be ordered logically and balanced over the face of the sign.

Spacing between lines and text shall be such that the sign is legible from a distance.

Spacing between lines for mixed text shall ensure that the vertical strokes down below the line shall not interfere with the upward strokes of the text below.

The background shall be such that the sign message is always clearly distinguishable.

In certain circumstances, for example where there is limited clearance from or between tracks, around the exit or entrance to tunnels, or in cuttings, the locations for installing signs of a certain size can be constrained by limited space and limitations of the sign support structure. In these cases the location of the sign should be reviewed and amended if possible. If this is not practical, then the dimension and shape of the sign may be reduced to suit the constraints. AS 7507 and AS 7633 should be reviewed in relation to clearances.

Where the size of a sign is varied from the standard dimensions the size of the text shall also be varied to ensure it remains in proportion with the size of the sign.

In such circumstances, any reduction in size or change in shape of the sign shall require the completion of an appropriate risk assessment, and approval by the RIM.

### 2.2.2.3 Thickness

The thickness of a sign is dependent upon the required size, location and material the sign is constructed from. The design thickness should also take into account whether the sign will be one piece or made up of multiple pieces.

Design thickness of the sign shall not compromise the required functionality and structural integrity of the sign.

Unless otherwise approved by the RIM, signs constructed out of aluminium plate, stainless steel or non-conductive material, should be at least 1.6 mm thick.

## 2.2.3 Colours of signs

### 2.2.3.1 General

When signs are distinguished by a unique colour code and/or shape they become useful tools to help protect the health and safety of personnel in the workforce by:

- (a) warning personnel of potential hazards;
- (b) providing a deterrent for unauthorised personnel to gain access or perform unauthorised activities in the area;
- (c) meeting any legal obligation arising from duty of care to the public and staff;  
and
- (d) meeting the requirements of Australian standards.

The use of specific colours such as red, yellow and green can convey specific safety messages at a glance.

Colour codes are specified in AS 2700.

Colour and the way it is used for specific applications shall be reviewed and applied as appropriate.

When proposing new colours and signs the use of common conventions shall be reviewed for consistency and familiarity. Refer to AS 1319 for common conventions on colours and shapes for a range of Occupational Safety Sign functions.

Where white is specified for lettering or background colour N14 White shall be specified:

- (e) Code sRGB 242, 243, 233; and/or
- (f) HEX code #F2F3E9

### 2.2.3.2 Safety danger

Red shall be used to indicate STOP and danger.

Colour R13 Signal Red shall be specified:

- (a) Code sRGB 183, 61, 55; and/or
- (b) Hex: #B73D37.

See Appendix B for common examples of existing railway safety danger signs authenticating these principles.

Stop signs for road vehicles shall be R1-1 style in accordance with AS 1743.

### 2.2.3.3 Cautionary advisory or cautionary information

Unless otherwise approved by the RIM, signs providing cautionary information or advice shall have:

- (a) a yellow retroreflective background; and
- (b) black text or symbol.

Colour Y15 Sunflower shall be specified:

- (c) Code RGB 255, 162, 0; and/or
- (d) HEX code #FFA200

### 2.2.3.4 General advisory: (non-regulatory restriction)

Unless otherwise approved by the RIM, signs providing general advisory information shall have:

- (a) a white background; and
- (b) black text or symbol.

See Appendix D for common examples of existing railway general advisory and information signs authenticating these principles.

### 2.2.3.5 Operational advisory

Unless otherwise approved by the RIM, signs providing operational advisory information shall have:

- (a) a blue background; and
- (b) white text or symbol.

Colour B23 Bright Blue shall be specified:

- (c) Code RGB 0, 93, 140; and/or

- (d) HEX code #005D8C

#### 2.2.3.6 Rear colour

The rear of signs, when visible, shall be black or left unfinished in such a manner that they do not cause confusion or distraction to railway staff or the public.

Rear of signs shall not detract from the intent of other signs in the vicinity.

Wherever possible, and where it does not compromise the intent of the sign or other signs, the rear of signs should be consistently coloured.

#### 2.2.4 Use of borders, backgrounds and backplates

##### 2.2.4.1 Definitions

The difference between borders, backgrounds, and backplates is shown below. Borders and backgrounds are shown in Figure 1. Figure 2 shows a background with a backplate.



Figure 1 Hazard signage



Figure 2 Protective signage

#### 2.2.4.2 Borders

Sign visibility is enhanced when there is a predominant colour contrast with background colour of immediate surroundings. Use of borders and backplates can assist with this contrast.

The inclusion of a border, and the size of that border, shall be based on specific requirements, for example, to assist with distinguishing from the immediate surroundings.

Border colours used on signs shall be appropriate for the situational application. For example, the use of red borders should be avoided in areas such as the Pilbara where a combination of red soil and fading due to extreme sunlight causes a reduction in tonal contrast between the border of the sign and the surrounding environment.

### 2.2.4.3 Backgrounds

The effect of the background colour of the sign on visibility and readability of the message, especially when designing new signs should be taken into account.

The background colour should extend sufficiently so as to avoid any merging of colour of the text/symbol onto the backplate or border, which can compromise the clarity of the symbol.

### 2.2.4.4 Backplates

A backplate is an additional, slightly larger plate that the primary sign is mounted to. Backplates may be added to a sign in order to improve the visibility of the illuminated face or text/symbol by introducing a controlled-contrast background. The improved visibility can then be made more conspicuous by framing the backplate with a retro reflective border.

Backplates should be consistently coloured, visually distinct and in contrast from the immediate surrounds and infrastructure.

The backplate size should allow extension of backplate colour beyond the symbol/text sufficiently to allow the text/symbol and background colour to be clearly distinguishable and to allow enough backplate colour for the sign to be readily recognised at a distance.

All backplate colour and the use of retro-reflective material for all signs shall comply with AS 1906.1.

### 2.2.5 Lettering and symbols

The recommendations provided in AS 1744 should be used for the design of textual and digital instructions.

Font and symbol size shall be determined based on:

- (a) perception factors requirements;
- (b) recommendations outlined in AS 7631; and
- (c) the sighting distance requirements of the primary user.

Typeface types should be selected for their ease of readability and visibility to the primary user group, and suitability for the sign purpose.

Recommended typeface for railway signage is AS 1744 Modified Series E.

Any proposed typeface used shall be approved by the RIM prior to use.

Font colour and form should be chosen to maximise contrast and legibility.

The legibility of the sign can be further enhanced by the use of sentence case text<sup>1</sup>.

The layout of text within a new sign design may be based upon a grid system<sup>2</sup>.

Text and symbols should be kept away from the edge of the sign to allow differentiation of text/symbol from the border and/or backplate colour and immediate surrounds.

### 2.2.6 Readability

Current human factors research in terms of maximising readability and visibility shall be reviewed and assessed for application in the design of all new signs.

Signs shall be designed and positioned to achieve required legibility and readability.

<sup>1</sup> Sentence case uses an upper-case letter at the beginning of the first word and any proper nouns. All other letters are lower case.

<sup>2</sup> As signs vary in size depending on application, the grid system allows flexibility for elements to be positioned, and the radius of corners to be chosen, in proportion to the size of any individual sign.

AS 7631 shall be referenced for the design requirements in relation to the perception-reaction time for the primary user group.

Signs in public areas shall be made in accordance with AS 1428.1 in relation to readability.

### **2.2.7 Reflectivity**

To meet the readability requirements, the front of signs shall be retro-reflective or illuminated during the hours of darkness.

Retro-reflective material shall conform to the requirements of AS 1906.1. Reflectivity should meet the requirements of Class 400 as described in AS 1906.1.

The readability shall be assessed in accordance with the luminance requirements of rail vehicle headlights under clear night-time conditions.

Where retro-reflective symbol/text is used it should be equal to, or less than, the background brightness to minimise the symbol/text merging with the background.

The standard luminance requirements for train headlights is given in AS 7531.

Retro-reflective signs intended for rail traffic crew of approaching rail traffic shall be angled such that glare and spectral effects do not arise when the sign is within the reading distance<sup>34</sup>.

### **2.2.8 Environment**

When determining visibility, any specific environmental conditions such as dust or pollution in the area of the sign, shall be assessed in specifying the design and positioning.

When considering wind and cyclone risks, an appropriate probability in exceedance of the design wind speed should be used to produce results that are acceptable to both design life and railway safety.

### **2.2.9 Whole of life considerations**

Design considerations shall assess environmental conditions and the likelihood of degradation of a sign when in service.

### **2.2.10 Handling, transportation, storage and packing**

Consideration of transportation and manual handling issues is particularly important for signs planned for placement in locations where vehicular access to the signage location is possibly not feasible.

### **2.2.11 Learned recognition**

Learned behaviour of the primary user, both from their occupational environment and through cultural application of standards such as AS 1319, shall be reviewed in the design of new railway infrastructure signs.

New signs should not conflict with existing sign designs which could result in their meaning being confused<sup>5</sup>.

If conflict does arise the affected rail transport operator's change management process shall be followed to determine the most appropriate way forward.

<sup>3</sup> In highway applications a retro-reflective sign is often placed facing away from the highway at an angle of 10 degrees from the sightline of approaching traffic. This is to ensure that the drivers of road vehicles are not dazzled as they approach then pass the sign.

<sup>4</sup> For railway applications it is important to ensure that the positioning of any retro-reflective signs does not cause any adverse impacts for the rail traffic crew on tracks adjacent to the one to which the sign applies.

<sup>5</sup> For example, when recognition of signs is highly automated, such as a road stop sign for road vehicle drivers, unlearning of these signs can take time and the association may never be removed.



## Section 3 Fabrication

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### 3.1 General

All railway signage shall be fabricated by appropriately authorised persons and approved by the RIM.

The fabrication of signs shall align with safe railway requirements, specifications, and provide for:

- (a) safe transport, storage and handling;
- (b) safe installation given site conditions and the likely or recommended method of work;
- (c) resistance to unauthorised removal and sabotage; and
- (d) all sharp edges to be removed.

Track signage shall be fabricated such that it complies with all relevant drawings, manufacturers' material specifications and specifications of the RIM.

Fixing arrangements shall not degrade the information displayed on the sign e.g. through rust staining, nor compromise the clarity of information shown on the sign.

### 3.2 Integrity of Formation

The installation of signs shall not degrade or reduce the integrity of the formation.

## Section 4 Placement and Installation

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### 4.1 Permanent signs

#### 4.1.1 Installation

All signs shall be placed where they can be clearly seen by primary and secondary users.

Installation of signs shall be undertaken in compliance with the manufacturer's requirements and in accordance with railway safety requirements.

Each installation shall be assessed to determine the requirements for:

- (a) positioning, based on sighting and other requirements;
- (b) proximity of other infrastructure and potential hazards, including electrical hazards;
- (c) suitability for the environment, taking into account all reasonably foreseeable conditions;
- (d) resistance to vandalism, deliberate defacement, movement and rotation;
- (e) method of fixing and removal;
- (f) control of vegetation to prevent the sign being obscured; and
- (g) required maintenance.

Positioning for optimum sighting arrangements shall be in line with the sighting requirements of AS 7631.

Signs that are not yet in service shall be suitably hooded, crossed or otherwise obscured until they are commissioned.

Signs shall be securely positioned to minimise damage or defacement.

Signs shall be constructed and erected so that they do not create an additional hazard.

In deciding where to position signs the following shall be assessed:

- (a) proximity of other structures or elements and their potential to detract from the intent of the sign(s).
- (b) possibility of being obscured (including by persons working on or near the line).
- (c) presence of overhead power lines.
- (d) Risk of touch potential or electrical shorting when a sign on a metal post is installed in the vicinity of overhead wiring structures with isolation or insulation.
- (e) presence of buried services for example:
  - (i) electricity supply cables;
  - (ii) telecommunication services;
  - (iii) fuel pipelines; and
  - (iv) water pipelines.
- (f) any risks that the sign could create if used as a climbing aid.

Where a sign is to be installed in a vulnerable location such as in a vehicle turning area, appropriate protection measures for the sign should be used where practicable.

#### **4.1.2 Footings and foundations**

Depth and size of footings shall be designed for the appropriate soil category, based on height, dimensions and position of the sign.

Before breaking ground for the erection of any signs, an assessment of potential below ground services shall be undertaken. This can include the use of services such as Before You Dig Australia to ascertain what buried services could be in the locality.

A combination of simple field identification and laboratory test parameters should be used to determine soil category.

Footings should be set using concrete.

#### **4.1.3 Mounting of signs**

Signs may be erected by any suitable means, provided the mounting is secure and the sign is securely attached to the mounting. To reduce deflection or breakage additional reinforcement or bracing should be included where required.

Where a sign is to be installed on existing infrastructure (for example, bridges, tunnel walls, signal gantries), any restrictions for installation of additional infrastructure on the structure shall be complied with.

Installation of signage mounting infrastructure shall not affect the structural integrity of the existing structure.

#### **4.1.4 Visibility and position along the track**

Signs shall be placed and orientated perpendicular to the normal line of sight, subject to compliance with the requirements of AS 7631.

Signs shall be positioned so that they are visible and attract the appropriate attention from the primary user and any secondary users as required.

Signs shall be located in such a manner that the sign is not obscured by adjacent infrastructure within the sighting distance for the primary user. The following additional readability requirements shall also be assessed:

- (a) Potential for the signs to be obscured by staff or by passengers on a platform.
- (b) The location chosen does not compromise or prejudice the intent of the sign.

Signs shall not be positioned where they can possibly obscure other information or distract from other safety signs and/or signals.

The way the sign will be read, understood and acted upon by all primary and secondary users shall be assessed as required when designing the position of the sign

Sighting distances shall, as far as is reasonably practicable, be in alignment with perception-reaction requirements of AS 7631.

An assessment shall be undertaken to optimise the installation of signs, based on human factors requirements.

Periodic assessments should be undertaken to ensure that the sighting of the signs continues to meet the requirements of AS 7631, as well as relevant current human factors, visibility requirements, and guidelines.

Where a sign is intended for rail traffic crew, relevant specific sighting issues, such as rail traffic speed, effects of glare from adjacent road traffic and the like shall be assessed.

Where a sign is not intended for rail traffic crew, the sign should be positioned such that it is not a distraction for the rail traffic crew. Hazards associated with the placement of these signs should be assessed and risks mitigated so far as is reasonably practicable.

Where a sign is removed to enable out of gauge vehicles to operate the sign shall be replaced.

#### **4.1.5 Rail traffic crew ergonomics**

The arrangement of signs along the trackside for the control of the movement of trains shall include a review of any activities that rail traffic crew can possibly be required to undertake on the approach to the signs.

The sequence of information shall be arranged so that the effect on the workload of the rail traffic crew is acceptable and in line with safe working and human factors guidelines and practices.

#### **4.1.6 Clearances**

All signs shall be placed in accordance with AS 7633.

Signs should be positioned and maintained so that:

- (a) they do not infringe on the kinematic envelope;
- (b) minimum safety clearances for personnel are provided;
- (c) minimum electrical clearances are provided; and
- (d) walkways are not obstructed.

#### **4.1.7 Vertical position**

The vertical position of signs shall be determined in accordance with AS 7631 and AS 7633

The potential effect of other signs, signals and infrastructure in the vicinity shall be assessed.

In calculating the vertical position to optimise sighting requirements, the activities and position of the primary users shall be assessed.

#### 4.1.8 Lateral position

In addition to meeting minimum sighting requirements, the lateral positioning of all signs shall be compliant with AS 7507, AS 7633, and clear of the kinematic envelope for the safe passage of rail traffic. The kinematic envelope shall be as determined by AS 7633 and the RIM.

Where appropriate, the lateral positioning of signs should cater for the safe passage of out-of-gauge loads.

#### 4.1.9 Effect of the sun

The movement of the sun and its potential impact on the readability and reflectivity of signs shall be assessed when choosing the orientation and location of those signs.

When considering the positioning of retro-reflective signs the effect of the shade from the sun on the readability and appearance of the sign shall be assessed.

#### 4.1.10 Ambient lighting

Locations at which signs are proposed to be installed shall be assessed to determine hazards arising from the effects of ambient lighting and other light sources, for example street or traffic lights, in the vicinity of the sign.

Ambient lighting which is not under the RIMs control shall not be used to obtain the required visibility and readability of railway signs.

### 4.2 Temporary signs

#### 4.2.1 General

Temporary signs, by their nature, will not form part of the normal route knowledge gained by rail traffic crew, and can possibly appear in the corridor without prior notification.

The information conveyed by temporary signs will often be of a safety critical nature.

All temporary signs shall meet the requirements of this Standard.

#### 4.2.2 Method of fixing temporary signs

The method of fixing of temporary signs should provide for:

- (a) safe portability and ease of use;
- (b) resistance to vandalism and unauthorised removal; and
- (c) stability, especially on ballast or other uneven surfaces and in the presence of passing trains or high wind.

The fixing of retro-reflective material shall be in alignment with requirements of AS 1906.1.

#### 4.2.3 Power supply for illumination of temporary signs

Where temporary signs are illuminated, the power supply shall meet at least the following operational requirements:

- (a) shall not allow unauthorised operation; and
- (b) shall provide a means of checking the condition of the power supply for the illumination.

Any indicators on the power supply shall not emit a light in a direction which could distract the operator of rail traffic.

#### 4.2.4 Installation and maintenance

Temporary signs can be installed with minimal notice depending on operational requirements, for example temporary speed signs installed to reduce speed over a track defect.

Temporary signs should be installed based on the requirements of Section 4.1 of this Standard.

## Section 5 Maintenance

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### 5.1 General

All railway signs shall be:

- (a) maintained in such a manner as to enable them to continue to be fit for the intended purpose;
- (b) subject to a planned general inspection, regular patrol inspection and scheduled monitoring regime; and
- (c) subject to a regular maintenance program that includes visibility, graffiti removal and replacement as soon as it becomes necessary.

No sign shall be declared redundant before the arrangements for its decommissioning are complete and approved by the RIM.

An asset register providing information on all permanent operational signs shall be established and maintained. All monitoring and maintenance activities shall be carried out with reference to this register and the RIMs maintenance plan.

Signs should be repaired when necessary and as specified and approved by the RIM.

Information recorded in the asset register should include:

- (d) type and identify of sign;
- (e) position or location, and the reasons for the choice of position;
- (f) the need addressed by the sign;
- (g) maintenance arrangements; and
- (h) maintenance history.

Any changes in environment or surrounds which can possibly impact the function and purpose of the sign shall be noted and a reassessment undertaken to ensure the sign continues to be able to be used for its intended purpose.

### 5.2 Inspection and assessment

#### 5.2.1 Scheduled patrol inspections

The interval between patrol inspections of permanent and temporary operating signs shall be specified by the RIM. Particular attention should be given to temporary signs.

Patrol inspections shall keep a lookout for defects and conditions (i.e. indicators of a defect) that can possibly cause signs to not be performing the function intended including:

- (a) damaged, missing or unreadable signs;
- (b) locations where sight distances are deficient, or the view by the train crew of the sign can possibly be obscured; and
- (c) fallen trees or new vegetation growth.

The speed at which the inspection is carried out should be consistent with the local conditions and the full scope of the inspection being carried out (e.g. the type and number of other infrastructure elements being inspected).

### 5.2.2 General inspections

General inspections shall be undertaken by visual means for all permanent and temporary operating signs to ensure they are:

- (a) to standard;
- (b) visible and conspicuous; and
- (c) performing the function intended.

The inspection shall include the tasks of the patrol inspection in addition to:

- (d) the identification of defects;
- (e) condition of signs; and
- (f) note any new distractions or changes in the environment which can possibly impact the intended use of the sign.

Inspection of line of sight and readability shall be carried out with respect to the requirements and position of the primary user of the sign.

For all signs to be sighted by operators of rail traffic, inspections shall include an on-rail assessment at the specified distance as near as practicable to the operator's normal operating position (e.g. the operator's cab).

For all signs, the inspection shall include an assessment of whether the sign has moved from its original position or orientation, or whether the intent of the sign has changed.

General inspections should be carried out at intervals not exceeding 3 years or as otherwise specified by the RIM.

General inspections should be carried out when suspected defects are identified from information collected during patrol inspections.

The creation and use of a standard checklist will ensure that inspections are undertaken thoroughly and to a consistent standard.

Completed checklists shall be filed appropriately and retained for all general inspections.

General inspections and associated checklist outcomes shall be recorded in a suitable register.

### 5.2.3 Assessment

All signs shall be assessed to ensure compliance with the required legislative requirements and standards for material condition, installation and structural integrity.

Where the sign does not comply, appropriate action shall be taken to ensure the immediate safety of operations.

### 5.2.4 Assessment of sightline

Assessment of sighting and readability shall be undertaken from the sightline of the primary user of the sign, and in accordance with current safety regulations and human factors guidelines (such as HB 59 and AS IEC 62508) and AS 7631.

Where it is assessed that the sightline is obstructed, appropriate action shall be taken to ensure the immediate safety of operations.

Follow up action shall then be taken to ensure that the sightline is restored without delay to ensure compliance with legislative requirements and standards.

Where the sightline is permanently obstructed for the maximum operating speed then either:

- (a) the sign shall be relocated;
- (b) advance warning to rail traffic crew shall be provided; or
- (c) operational restrictions shall be imposed.

The appropriate risk profile and hierarchy of hazard controls shall be implemented to minimise or eliminate any exposure to hazards caused by any obstructions to the sign sightline.

### 5.2.5 Temporary signs

Scheduled track patrols shall include the inspection of temporary signs to ensure signs are secure, correctly placed, and visible in accordance with this Standard and RIM requirements.

## Section 6 Decommissioning and disposal

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### 6.1 General

Any signs that have been decommissioned and are not in service shall be obscured.

Any signs that have been decommissioned and are not in service should be removed as soon as practicable.

### 6.2 Decommissioning

The following shall be taken into account prior to the decommissioning, dismantling and disposing of signs:

- (a) The work can be carried out without risks to health and safety, so far as is reasonably practicable.
- (b) All possible hazards inherent in the process of decommissioning and dismantling the signs (for example, the risk of poles falling over the railway) are identified, and appropriate mitigation processes put in place.

Signs should be dismantled in accordance with designers and manufacturers instructions, where they exist.

Appropriate notification processes, as approved by the RIM, shall be followed before any signs are removed.

### 6.3 Disposal

Appropriate precautions need to be implemented when undertaking the decommissioning and disposal of railway signage. Older signs could have been made of or coated with hazardous materials such as asbestos or lead based paints, or have accumulated such materials from passing rail traffic or infrastructure maintenance activities.

Activities and processes associated with decommissioning and dismantling should include inspections to ensure, so far as is reasonably practicable, that any risks of exposure to hazardous substances and/or materials are identified, and appropriate mitigation measures put in place prior to disposal.

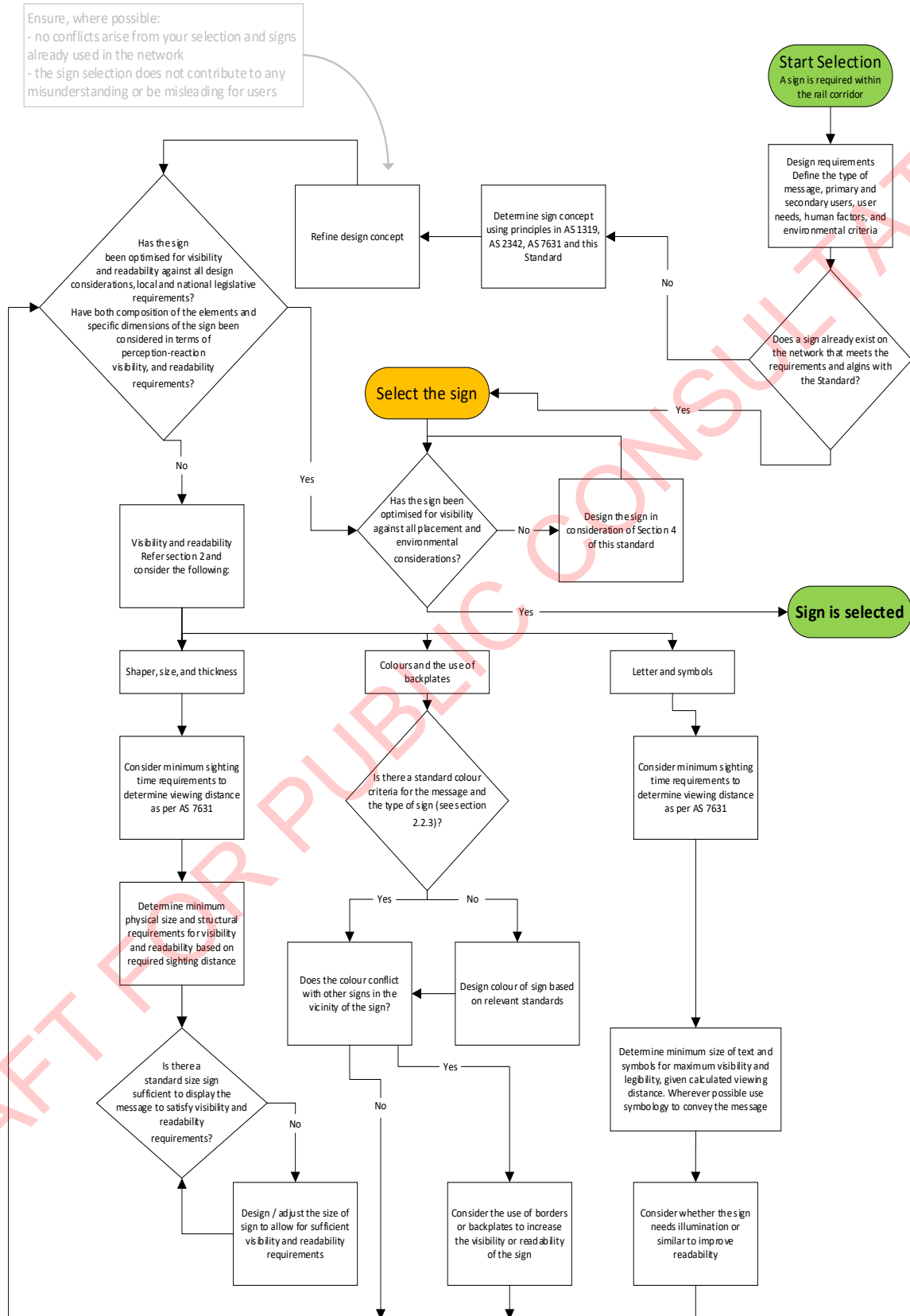
In disposing of hazardous material, consultation shall be undertaken with appropriate waste disposal authorities or organisations to ensure safe handling, transportation and disposal of all such materials.

## Appendix A Hazard register (Informative)

Hazard Number	Hazard
5.2.1.6	Harm to infrastructure by rolling stock - Wayside structures infringing rolling stock kinematic envelopes causing collision with wayside structures
9.10.1.11	Signals infrastructure – Misreading signals
7.3.1.10	Damage caused by vandalism
5.29.1.11	Wayside structures (Objects blown over by wind)



## Appendix B Assessment of sign selection (Informative)



Appendix Figure B-1 Flowchart for the assessment of the appropriateness of selection of signs

## Appendix C Harmonized signs (Normative)

### C.1 Harmonization

The following signage should be used for new installations to improve harmonization of signage in the Australian railway industry. When existing signs require replacement, these signs should be used as the replacement.

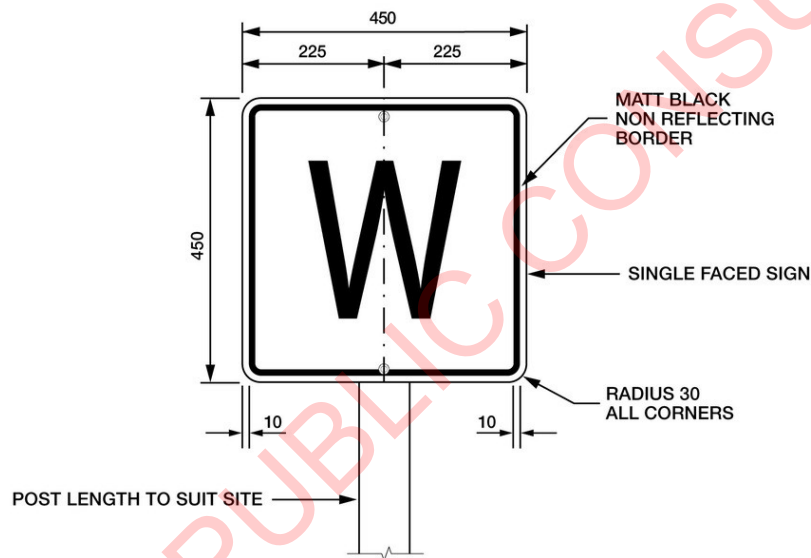
### C.2 Whistle board

Whistle board should have a white background, black border, with a black "W".

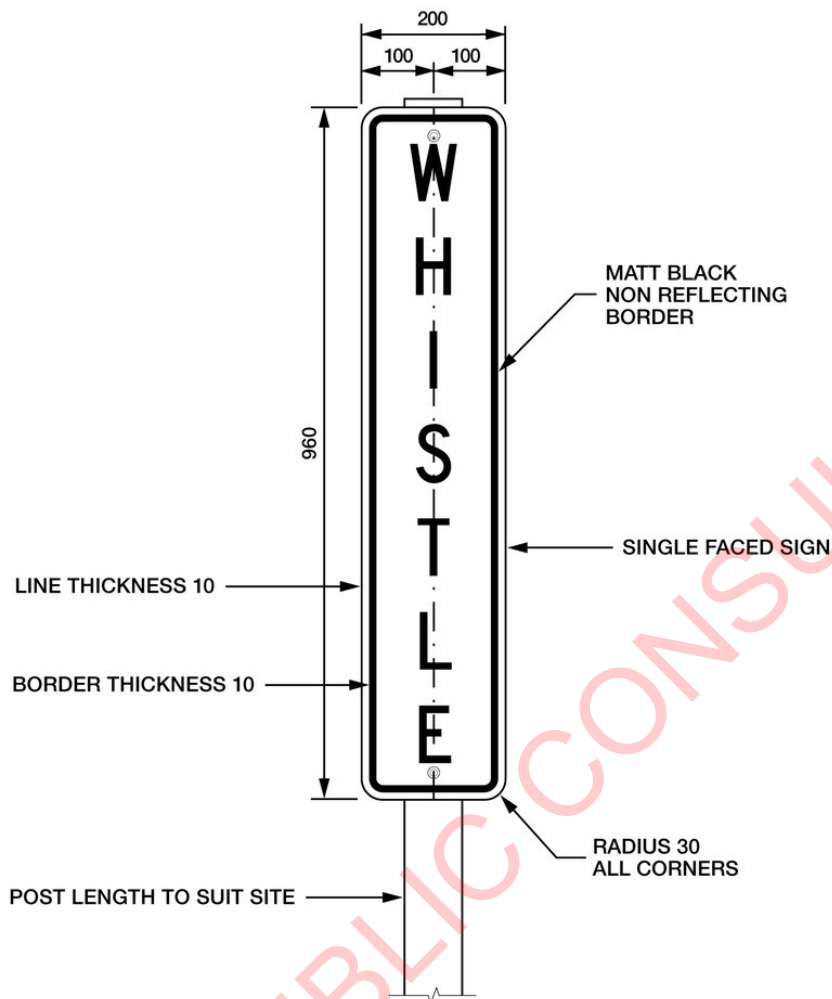
Whistle board should be 450 mm x 450 mm.

Vertical whistle boards should be 200 mm x 960 mm.

A recommended whistle board drawing is shown below



Appendix Figure C-1 Whistle board drawing



*Appendix Figure C-2 Vertical whistle board drawing*

### C.3 Derail or catch point sign

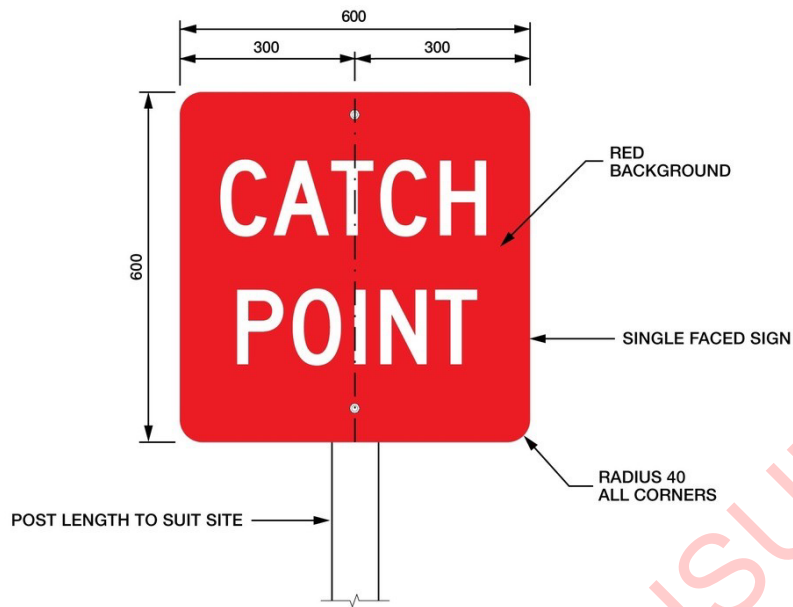
Derail signs and catch point signs are usually placed on or adjacent to derailing devices to warn rail traffic crews of a derailing device.

Derail and catch point signs should have a red background with white lettering.

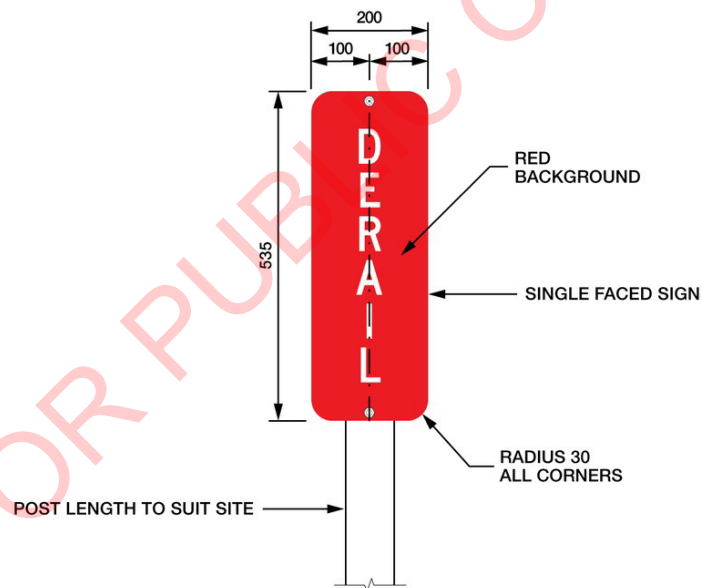
Derail and catch point signs should be 600 mm x 600 mm.

Vertical derail and catch point signs should be 200 mm x 535 mm.

Example catch point and derail signs are shown below. The wording derail or catch point can be used on either square or vertical boards.



Appendix Figure C-3 Catch point board drawing



Appendix Figure C-4 Vertical derail board drawing

#### C.4 Stop signs

Stop signs are used to advise rail traffic crew that movement beyond that point is not permitted without further instruction.

Stop signs can be permanent or temporary.

Stop signs shall be red in colour with white lettering.

Stop signs for work sites should:

- (a) clamp to the rail;

- (b) have a centrally mounted red light above the stop sign.

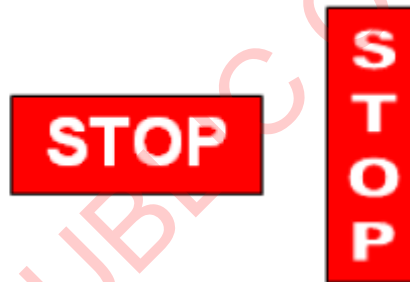
If the stop sign cannot be clearly seen by rail traffic crews during the hours of low light or darkness a red light shall be mounted above the stop sign.

See figure B.5 for an example track work stop sign.



*Appendix Figure C-5 Example track work stop sign*

Stop signs used for purposes other than track work should be rectangular as shown in figure B.6



*Appendix Figure C-6 Example stop sign*

## Appendix D Bibliography (Informative)

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The following referenced documents are used by this Standard for information only:

- AS 7721, *Lineside signals, Indicators, and Signal Signage*

DRAFT FOR PUBLIC CONSULTATION