



RiSSB

RAIL INDUSTRY SAFETY AND STANDARDS BOARD

Train Horn Use

Code of Practice

Train Horn Use
Code of Practice
Draft for public comment

This Rail Industry Safety and Standards Board (RISSB) product has been developed using input from rail experts from across the Rail Industry. RISSB wishes to acknowledge the positive contribution of all subject matter experts and development group representatives who participated in the development of this product.

The RISSB Development Group for this Code of Practice consisted of representatives from the following organisations:

Queensland Rail	Sydney Trains	Aurizon
Queensland University of Technology	ARTC	Transdev NZ
QUBE Logistics	Metro Trains Melbourne	TasRail
Central Queensland University	Arcadis	

Development of this Code of Practice was undertaken in accordance with RISSB's accredited processes. It was approved by the Development Group, endorsed by the Standing Committee, and approved for publication by the RISSB Board.

I commend this Code of Practice to the Australasian rail industry as it represents industry good practice and has been developed through a rigorous process.

Deb Spring
Chief Executive Officer
Rail Industry Safety and Standards Board

Notice to users

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

Keeping Codes of Practice up to date

To maintain their currency, Codes of Practice developed by RISSB are periodically reviewed, and new editions published when required. Between editions, amendments can be issued.

It is important that readers assure themselves that they are using a current RISSB Codes of Practice. Information about RISSB Codes of Practice, including amendments, can be found by visiting www.rissb.com.au.

RISSB welcomes suggestions for improvements and asks readers to notify us immediately of any apparent inaccuracies or ambiguities, please contact us via email at info@rissb.com.au or write to Rail Industry Safety and Standards Board, PO Box 518, Spring Hill, QLD 4004, Australia.

RISSB product can be found at: <http://www.rissb.com.au/products/>.

Document control

Document title	Version	Date
Train Horn Use - Code of Practice	PC Draft	

Document history

Publication version	Date	Reason for and extent of changes
PC Draft	24/01/2022	Draft for public consultation

Approval

Name	Date
Rail Industry Safety and Standards Board	

Copyright

© RISSB

All rights are reserved. No part of this work can be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of RISSB, unless otherwise permitted under the Copyright Act 1968.

Contents

1	Introduction	2
1.1	Purpose	2
1.2	Scope	2
1.3	Code of Practice	3
1.4	Defined terms and abbreviations	3
1.5	References	4
2	Train horns	5
2.1	General	5
2.2	Categorization of train horn use	5
2.3	Factors influencing train horn use	6
2.4	Legislative context	6
2.5	Types of train horn	7
2.6	Train horn signals	7
3	Managing the risk	8
3.1	General	8
3.2	Understanding the risks	8
3.3	Assessing the risk	9
3.4	Ensuring safety so far as is reasonably practicable	10
4	Train horn network rules	11
4.1	General	11
4.2	Training and compliance	11
4.3	Reviewing network rules	11
4.4	Driver discretion	12
5	Whistle boards	12
5.1	Location of whistle boards	12
5.2	Train horn use restrictions	13
6	Train horn use	13
6.1	Sounding the train horn	13
6.2	Train horn intensity	14
6.3	Train horn use in an emergency	14
6.4	Location and activities for train horn use	14
6.5	Train horn used for communications	16
7	Noise management of train horn use	16
7.1	General	16
7.2	Train horn noise impact	16
7.3	Minimizing the impact of train horn noise	17
7.4	Policies	17
8	Level crossings	17
8.1	General	17
8.2	Excessive use	18
8.3	Active level crossings	18
8.4	Crossings located close together	18
8.5	Stopping point after the whistle board	18
8.6	Level crossing removal	19
8.7	Interaction at level crossings	19

Appendix Contents

Appendix A Rail transport operator responsibilities 20
 Appendix B Influences involved in train horn use 21
 Appendix C Minimizing train horn use through alternative systems and methods..... 22
 Appendix D National and international approaches 24

Tables

Table 1: Categorization of train horn use 6
 Table 2: Railway noise guidelines 7
 Table 3: Train horn signals 8
 Table 4: Train horn controls the risk..... 9
 Table 5: Train horn is the source of the risk 9
 Table 6: Assessment methods..... 10
 Table 7: Reverse so far as is reasonably practicable 10
 Table 8 Train horn use..... 15
 Table 9: Level crossing approach 19
 Table A1: Rail transport operator responsibilities 20
 Table B1: Influences involved in train horn use..... 21
 Table C1: Potential alternatives to minimize train horn use..... 22
 Table D1: National and international approaches 24

Train Horn Use
Code of Practice
Draft for public comment

1 Introduction

1.1 Purpose

This Code of Practice (Code) details the recommendations and requirements for using train horns to support the safe operation of trains on the Australian rail network.

The recommendations and requirements aim to:

- a) ensure safety so far as is reasonably practicable (SFAIRP) within the Rail Safety National Law;
- b) standardize the use of train horns;
- c) minimize the use of train horns where opportunity exists;
- d) minimize the noise impact of train horns on the community where opportunity exists.

1.2 Scope

The scope of this Code covers the use of train horns on the Australian rail network for specific actions to mitigate safety risk, including guidance on:

- a) managing train horn use;
- b) managing train horn noise;
- c) network rules for train horns use;
- d) managing the interaction with train horns;
- e) opportunities to identify alternative technologies and methods to minimize train horn use.

The practices in this Code apply to rail transport operators (RTO), including contractors and third parties.

Out of Scope

This Code does not cover:

- a) automated railway operations where the use of the train horn is applicable;
- b) the design requirements for train horns¹;
- c) road rail vehicles that operate on the railway network;
- d) trains used on light rail, cane railway and monorail networks².

¹ For details on the design of the train horn, refer to AS 7532 Railway Rolling Stock - Audible Warning Devices.

² Items from this Code may be applied to such systems as deemed appropriate by the relevant organizations.

1.3 Code of Practice

A code outlines provisions for meeting a higher-level requirement and provides guidance to support the content. The following factors were considered in the development of this Code:

- a) Current practices for using train horns (national view) and the intended risk mitigation.
- b) Current regulatory requirements.
- c) Available research relating to the use and/or effectiveness of train horns.
- d) Relevant research about potential community impacts.
- e) Network rules governing train horn use.
- f) Alternative risk controls.

1.4 Defined terms and abbreviations

In addition to the terms and definitions below, generic rail industry terms and definitions are provided in the RISSB Glossary of Terms.

active control

the control of the movement of vehicular or pedestrian traffic across a level crossing by devices such as level crossing flashing signals, gates or barriers, audible warning devices, or a combination of these, where the device is activated before and during the passage of a train through the level crossing

communities

a unified body of individuals that live in a specified location and may include residents, schools, hospitals, places of worship, recreational areas, and businesses

discretion

the power or right to decide or act according to one's judgment

high horn

a horn with a sound intensity equal to that of a Country Audible Warning Device defined in AS 7532:2016

horn intensity

the audible sound level of a train horn, usually measured in decibels (dB)

intended receiver

the person or group to whom the train horn warning is intended to inform

low horn

a horn with a sound intensity equal to that of a town audible warning device defined in AS 7532:2016

network rule

the minimum mandatory requirement or action to be applied by workers within the rail corridor or those managing a rail network to reduce risk SFAIRP

passive control

the control of the movement of vehicular or pedestrian traffic across a level crossing by signs and devices only, none of which are activated during the approach or passage of a train and rely on the level crossing user detecting the approach or presence of a train by direct observation

SFAIRP

so far as is reasonably practicable.

shall

where used indicates that a statement is mandatory

should

where used indicates that a statement is a recommendation

train horn

a warning device fitted to trains to emit an audible warning

train horn signal

an allocated time over which the train horn is sounded, known as a short, long, or continuous sound

whistle board

a sign marking a location where a driver is required to sound the train horn. Legacy reference when steam trains used whistles as an audible warning device

The Macquarie Dictionary definition applies where terms are not defined within the RISSB Glossary.

1.5 References

1.5.1 Normative

The following documents are referenced in the body and used to formulate the content of the Code:

- AS 7532 Railway rolling stock - Audible warning devices.
- AS 7658 Level crossings - Rail industry requirements.
- AS 7470 Integration of human factors.
- Guideline - Meaning of duty to ensure safety SFAIRP - ONRSR 2021.
- RISSB Guideline - Consolidation of public level crossings.
- RISSB Guideline – Safe decisions.
- Rail Safety National Law.

1.5.2 Informative

The following are informative references that are relevant in supporting the development of this Code:

- RISSB Code of Practice Development and maintenance of network rules.
- Track Worker Safety Options Report, ONRSR, RISSB and ACRI.
- Quantifying the Impact of Train Horn Noise – RISSB (UK), July 2006.
- Industry Discussion Paper: Train Whistles - Understanding the risk and opportunities - Holistic Systems and Assurance, 05 February 2021.
- Investigating the use of train horns at rail level crossings, effects of train horn boards and wind - ACRI, 06 July 2021.
- On the horns of dilemma: Key factors informing train horns use at level crossings - Anjum Naweed, Rebecca Keane, Gregoire S Larue, Christopher Watling, Ioni Lewis, June 2021.

- Loud and Clear? Train horn practice at railway level crossings in Australia - Gregoire S Larue, Sepehr G Dehkordi, Christopher Watling, Anjum Naweed, April 2021.
- The health effects of environmental noise, 12214, 2018 Commonwealth of Australia as represented by the Department of Health.
- The road user, the pedestrian, and me: Investigating the interactions, errors, and escalating risks of users of fully protected level crossings, Grégoire S. Laruea, Anjum Naweed, David Rodwell, Queensland University of Technology (QUT), 2018.
- Interim Guideline Operational Railway Noise and Vibration Government Supported Transport Infrastructure March 2019.

2 Train horns

2.1 General

The use of train horns on the Australian rail network is a safety risk mitigation used to control the risk of train collision:

- a) with road vehicles or pedestrians at level crossings; and
- b) with workers and the public elsewhere on the network, including yards, depots and within worksites.

In addition to the train horn used as a warning, it may also be used as a means of communication (see section 6.5).

Trains that operate on the Australian rail network are generally required to have at least one horn fitted and operational. Typically, trains can produce two distinct horn levels, which differ in intensity. The requirements for these train horn intensity levels are stipulated in AS 7532.

Rolling stock with a single train horn³ fitted will not be able to apply the high or low-intensity horns as detailed in this Code. To meet the recommendations and requirements of this Code, opportunities to retrofit an additional train horn to rolling stock should be investigated. Retrofit horns shall meet the specifications of AS 7532.

The responsibilities for the management of train horn use may be allocated to the rail infrastructure manager (RIM) or the rolling stock operator (RSO), or both as the rail transport operator (RTO). Further information is detailed in Appendix A.

2.2 Categorization of train horn use

Train horn use can be separated into two specific categories. These categories can be described as:

- a) when trains are approaching level crossings, either:
 - i. at the whistle board, if fitted, or
 - ii. when approaching the level crossing, or
 - iii. on the level crossing.
- b) other train movements on the network, including worksites, depots, and maintenance facilities.

³ The single train horn produces a similar sound to the high horn intensity of trains capable of producing two sound level intensities.

Table 1 describes the elements of the two categories. These elements provide a high-level description of the categories used throughout this Code. The emergency use of the train horn covers both categories where required.

Table 1: Categorization of train horn use

Level crossings	Other train movements
Active control crossing	Shunting movements
Passive control crossing ⁴	Communications (relaying operational messages)
Pedestrian crossing either combined with a road crossing or as a standalone	For testing and maintenance purposes
	Any other train movement listed in section 6.4, table 8

2.3 Factors influencing train horn use

Although the RIM decides the rules governing train horn use according to risk management principles, several factors can influence this decision. Train horn use requirements can be influenced by a range of factors, such as:

- a) government (authority) through investment in rail infrastructure (level crossing removal);
- b) regulators (rail safety and environment) through applicable Acts and Regulations;
- c) organization (RTOs) through systems and process (design and rules);
- d) application (driver and other workers) by instructions and individual perceptions.

With many RTOs operating in the Australian rail network, the primary opportunity to standardize train horn use is the RTOs achieving harmonization through this Code.

Appendix B provides further details of the decision levels involved in train horn use.

2.4 Legislative context

Rail Safety National Law does not explicitly prescribe a train horn as a risk control. The RTO is responsible for defining the use of the train horn to ensure safety so far as is reasonably practicable (SFAIRP).

Under section 46 of the Rail Safety National Law, duty holders are required:

- a) to eliminate risks to safety so far as is reasonably practicable; and
- b) if it is not reasonably practicable to eliminate risks to safety, to minimize those risks so far as is reasonably practicable.

The above duties are referred to in the ONRSR Guideline - Meaning of duty to ensure safety so far as is reasonably practicable. To ensure safety SFAIRP shall be the responsibility of the RTO (see section 3.4).

RISSB has produced a Guideline – Safe decisions, to support the SFAIRP principles. This document provides information on making a safety impact decision and how the RTO must first decide whether it has a legal duty to act. It also considers that business decisions are optional where they are considered to go beyond what is reasonably practicable to ensure safety.

⁴ Passive level crossing examples include gated crossing (manual gates operated by the user), private crossing (private property access may have gates) and temporary crossing for track work and/or access to worksites locations.

To manage noise, each authority within Australia has environment protection legislation, which details the requirements for noise, although noise obligations vary. There is no specific law for train horn use, but many authorities have guidelines or policies for railway noise. Table 2 provides examples of documents produced by several authorities.

Table 2: Railway noise guidelines

Document	Authority
Environment Protection Authority Guidelines for the assessment of noise from rail infrastructure, April 2013.	South Australia
Interim Guideline Operational Railway Noise and Vibration Government Supported Transport Infrastructure, March 2019.	Queensland
Road and Rail Noise Guideline, September 2019.	Western Australia
Rail Infrastructure Noise Guideline, EPA 2013/0018, May 2013 Noise Policy for Industry, EPA 2016/0524, January 2000.	New South Wales
Passenger Rail Infrastructure Noise Policy, April 2013.	Victoria

2.5 Types of train horn

For the train horn to achieve its intended purpose, it shall be designed to be audible and distinctive (i.e., from road vehicle horns) and to a level where the intended receiver can hear it and understand its meaning. It is intended to be heard above the general background noise and other potential distractions, such as:

- a) plant and machinery at worksites and depots; and
- b) personal devices and background noise at level crossings.

The train horn can emit different intensity levels to aid with audibility and is referred to as:

- a) high; and
- b) low.

The sound power level and fundamental frequency requirements are detailed in AS 75325.

Some trains are fitted with an additional depot train horn which provides a lower sound level. These depot train horns are used to minimize the noise at yards, depots, and maintenance facilities.

2.6 Train horn signals

The train horn signal should be relevant to the warning it communicates and applied where the train horn is used. Defining the train horn signal provides the driver with supporting instructions when using the train horn.

Omitting guidance on a train horn signal can lead to deviations in the duration of the train horn signal resulting in inconsistency and reduced effectiveness. Research⁶ undertaken identified the allocated time applied for train horn signals at the sampled whistle boards ranged from 0.2 seconds to 2.3 seconds.

⁵ In AS 7532, the high and low horn intensities are referred to as the "Country Audible Warning Device" and "Town Audible Warning Device", respectively.

⁶ Investigating the use of train horns at rail level crossings, effects of train horn boards and wind - ACRI, 06 July 2021.

To achieve consistency in the use of train horns, the RTO should assign a train horn signal to each train horn use within their operations. Table 3 provides details of the time allowance for each train horn signal.

Table 3: Train horn signals

Train horn signal description	Allocated time for the train horn signal
Short	Approximately one second.
Long	Approximately two seconds.
Continuous	For an amount of time necessary to gain attention (usually an emergency).

3 Managing the risk

3.1 General

This section provides information on managing the risks where the train horn is the control. The only requirement by the Office of the National Rail Safety Regulator (ONRSR) is for the RTO to ensure safety SFAIRP (see section 2.4).

Applying the train horn network rules is the primary means for ensuring the train horn is used correctly and mitigating the risks (see section 4).

3.2 Understanding the risks

The ONRSR Guideline Meaning of duty to ensure safety so far as is reasonably practicable details the following:

Sections 52, 53 and 54 of the Rail Safety National Law (RSNL) provide that rail transport operators and associated industry participants (contractors, manufacturers, designers, and suppliers) – referred to collectively as duty holders – have an obligation to ensure the safety of railway operations. These statutory duties do not require safety at any cost. Duties to ensure safety are qualified by the statement 'so far as is reasonably practicable (SFAIRP).

The RTO shall identify where the train horn can mitigate risk for the network they manage and/or operate over. In conjunction with other controls, the use of train horns to mitigate several top-level events is described in Table 47.

⁷ Table 4 and 5 based on source Train Whistles – Understanding the risk and opportunities, Holistic Systems and Assurance.

Table 4: Train horn controls the risk

Risk	Train horn role
Collision with other trains	Train horn can alert other drivers of the potential collision
Collision at a level crossing with a road vehicle	Train horn can alert the user of a road vehicle to the presence of a train
Collision at a level crossing with a pedestrian	Train horn can alert the person to the presence of the train
Collision with animals (livestock) on or near the track	Train horn can alert animals (livestock) to the presence of the train to make them move away from the track
Collision with the public on or near the track (trespassing)	Train horn can alert the person to the presence of the train
Collision with workers on or near the track or within depots, yards, or siding	Train horn can alert workers to the presence of the train
Collision with workers vehicles and plant on or near the track or within depots, yards, or siding	Train horn can alert the user of a work vehicle or plant to the presence of a train
Collision with passengers at station platforms	Train horn can alert the passenger to the presence of the train. (People may step back from the platform and allow a train to arrive or travel through)
Collision with obstruction on the track	Train horn can alert adjacent traffic about an obstruction within the rail corridor and hopefully stop the other trains before an incident

Table 5 provides examples where the train horn noise presents a potential health and safety risk or a significant impact on communities or individuals.

Table 5: Train horn is the source of the risk

Risk	Train horn role
Community and individual impact	Train horn can impact communities and individuals
Worker undertaking work	Train horn can impact workers close to the train horn when sounded.

3.3 Assessing the risk

When taking a risk-based approach to using train horns to ensure safety SFAIRP on the rail network the approach only considers the railway and the public within the railway. This approach does not typically consider the impact of the train horn in the broader community or environment. In assessing the risks being mitigated using the train horn, the RTO should utilize all available information that can be sourced. Examples of information are detailed in Table 6.

Table 6: Assessment methods

Method	Outcome
Train data loggers	Downloads of on train data loggers (for statistical analysis, not monitoring drivers).
Near-miss data and incident investigations	Instances where the train horn is used or not used and the outcomes in both scenarios.
Assurance activities	Undertaking assurance activities to ensure train horn volumes are appropriate and that they are being used in accordance with requirements.
Audibility assessment	Qualitative and/or quantitative for the intended receiver.
Assessing whistle boards	Whistle boards positioning and effectiveness.

The RTO should use available data, including assessment findings, to review existing rules and develop improvement programs. These may be:

- a) driver briefings on consistency and appropriate use of the train horn;
- b) level crossing reviews to increase or decrease risk controls;
- c) reviewing the effectiveness of the train horn for the intended receiver;
- d) reducing train horn use in locations where there is excessive train horn use.

3.4 Ensuring safety so far as is reasonably practicable

The RTO shall ensure the identified safety risks are eliminated SFAIRP, or if not eliminated, minimized SFAIRP. This approach is detailed in the ONRSR Guideline - Meaning of duty to ensure safety so far as is reasonably practicable.

If the RTO wants to take steps to reduce or eliminate the use of train horns from their current practices, the RTO shall demonstrate a safety argument by applying 'reverse SFAIRP'. A reverse SFAIRP argument should demonstrate one of the requirements described in Table 7⁸.

Table 7: Reverse so far as is reasonably practicable

Requirement	Consideration of the requirements
The cost of the control has substantially increased.	Train horns have been and remain part of train design, and there is no demonstration that they have become more costly.
The reduction of risk by the control has been reduced due to the addition of other controls.	If an alternative approach can replace the role of the train horn, then it may be possible to justify train horn reduction/elimination.
The risk control adversely impacts another risk control.	Train horns do create an environmental noise hazard. However, this is difficult to quantify and compare. While this argument is theoretically possible, it is significant to demonstrate that the adverse impacts outweigh the safety benefits.
The control is demonstrated to be redundant.	Train horns provide safety benefits in specific contexts. However, if these contexts of use are found not to be safety-related, then the use of train horns could be challenged.

⁸ Table 7 sourced from information in train whistles – Understanding the risk and opportunities, Holistic Systems and Assurance.

4 Train horn network rules

4.1 General

Network rules are the primary means to provide instructions on train horn use. The network rules shall instruct the driver to use the train horn at specified locations and for authorized activities, including instructions for:

- a) testing train horns, and
- b) the actions necessary by other workers when responding to the train horn.

To ensure rules provide clear instructions and address the primary purpose of train horn use, the RIM shall ensure that rules provide instructions on:

- a) where to sound the train horn;
- b) when to sound the train horn;
- c) the actions required when the train horn is sounded;

The RIM should also provide instructions on:

- d) train horn intensity;
- e) train horn signals;
- f) where required, the number of times the train horn is sounded.

The RSO shall provide further guidance to drivers in applying train horn use to support the rules.

4.2 Training and compliance

Based on the information and guidance provided for the train horn use, the RTO shall evaluate the consistency of train horn use by the driver. If the train horn is not being consistently used, it may reduce the effectiveness of the warning. Alternatively, the excessive sounding of the horn is unnecessary and adds to the impact on communities.

The RTO shall ensure that drivers are instructed:

- g) of the importance of using the train horn consistently in accordance with network rules; and
- h) of any changes to train horn use at locations; and
- i) to be attentive to the impacts of noise on communities near the rail corridor and not sound the train horn beyond the safety requirements.

The RTO should undertake regular briefings on the importance of using train horns and why the train horn is sounded from a risk perspective to support the consistent application of the rules.

4.3 Reviewing network rules

The network rules for train horn use should be continually reviewed to ensure they effectively control risk. The RIM shall ensure that the rules are network-specific and rationalized by removing outdated (legacy) and obsolete instructions where new primary risk controls (i.e., technology) have been implemented. Network rule changes should be undertaken in accordance with the RISSB Development and management of network rules Code of Practice.

4.4 Driver discretion

Driver discretion is an essential component in the safe operation of the railway. However, personal experience and perceptions vary between drivers, resulting in:

- a) inconsistency;
- b) non-standardization of use;
- c) miscommunication to the intended receiver;
- d) excessive use.

Where a situation occurs outside the standard requirements of train horn use, the driver should use the train horn appropriate for that situation. To standardize train horn use, the RTO should review the driver discretion rule and provide instructions limiting the use to emergencies and situations outside the standard requirements. A clear definition of train horn use for an emergency should be included (see section 6.3).

5 Whistle boards

5.1 Location of whistle boards

Whistle boards are typically located within the rail corridor on the approach to high-risk locations. The driver sounds the train horn at the whistle board to warn workers and the public about the approaching train. Examples of where whistle boards are located are on the approach to:

- a) level and pedestrian crossings;
- b) significant curves;
- c) entrances to a tunnel or bridge.

Special whistle boards can also be used at designated train horn testing locations.

Whistle boards shall be set at a distance from the hazard determined by the RIM. Where they are fitted, the RSO shall ensure train horns are used.

Where whistle boards are not fitted, the RTO should provide further instruction or guidance on the start location for the train horn use.

To ensure that whistle boards remain effective for warning workers and the public, the RIM should have a process for:

- a) periodically assessing the positioning of whistle boards and any changes to the surrounding area adjacent to the rail corridor; and
- b) monitoring and recording illegible, missing, or displaced whistle boards during scheduled track inspections.

Refer to section 8 for further information on level crossings and whistle boards.

5.2 Train horn use restrictions

In some locations, whistle boards or signs are placed to minimize the impact of train horns on the community. Where opportunity allows, the RIM should assess the feasibility of whistle boards or signs that provide additional instructions to minimize the following:

- a) use of the train horn; or
- b) intensity (low rather than high) of the train horn; or
- c) duration of sounding the train horn (see train horn signals, section 2.6).

Restricted whistle boards or signs are used to constrain train horn use and may apply to:

- a) trains that are not stopping at interim stopping points before a level crossing or crossings, such as station platforms (i.e., nonstop/express trains only); or
- b) types of trains and speed of approach to a level crossing, such as heavy haul travelling at low speed towards a crossing (i.e., over 35km/h only); or
- c) where clear sightlines are provided at level crossings and no vegetation overgrowth or obstructions are located on approach; or
- d) specific times for not sounding the train horn other than for emergencies (i.e., between 2200 and 0600 only).

All the above restrictions shall not limit the sounding of the train horn in an emergency.

6 Train horn use

6.1 Sounding the train horn

Sounding the train horn typically provides for three scenarios⁹:

- e) warning of train movements to workers, passengers, and the public;
- f) a means of communication for acknowledgment such as workers handsignals, completion of shunting movements;
- g) testing to make sure the train horn is operational.

The sounding of the train horn will vary based on the nature of the operations, location, operational risk, and impact within communities. The RTO shall review these factors when applying the requirements of this Code.

Typical locations that describe operations are:

- h) metro operations, which are often in built-up areas such as cities and outer suburbs;
- i) regional operations, which are often further from the cities with more considerable distances between communities;
- j) remote operations are often further from regional locations. They have limited or no communities on the route, such as in mine locations (Pilbara location) or for a large part of long-distance passenger train journeys and freight trains (across the Nullarbor).

⁹ The RTO may use the train horn for special or local signals based on operations and identified safety risk.

6.2 Train horn intensity

The high and low train horn intensities shall be employed as follows:

- k) The low horn is used as the primary horn mode for non-emergency and/or mandatory horn use scenarios (i.e., the low horn is everyday horn), and
- l) The high horn is used for emergency scenarios or when the driver determines that the high horn is required to avoid an emergency.

6.3 Train horn use in an emergency

The RTO should provide a clear definition for using train horns in an emergency to apply a standard approach. The RTO should use the definition provided by this Code as follows:

'Where an unplanned event may result in an incident or accident and the use of the train horn may mitigate the impact of the unplanned event, where normal controls have not sufficiently controlled the risk'.

The guidance on emergency train horn use should consider the following:

- a) Collision with the public encroaching onto the track via a level crossing, platform, or unauthorized entry point.
- b) Collision with animals or livestock.
- c) Collision with rail personnel not clear of the track when the train is approaching.
- d) Collision with a train, road vehicle or plant equipment.
- e) Warning approaching trains of obstructions.
- f) When the driver identifies an imminent danger.

Other than for an emergency, the train horn shall only be used at the specified locations and for activities as detailed in the network rule for train horn use.

6.4 Location and activities for train horn use

Train horns are applied as a risk control measure in a range of scenarios within the Australian rail network. Table 8 describes the required and optional train horn use for identified scenarios.

The RTO shall align with their risk profile and operations where the train horn use scenario is detailed as a requirement in the table. Where the train horn use scenario is considered optional in Table 8, the RTO should minimize or remove its use by reviewing the opportunity to use the systems or methods detailed in the alternative controls column. Any changes must consider the requirements of network rules, and any potential changes shall be proposed to the RIM in accordance with section 4.3 of this Code.

The items detailed in the alternative controls column in Table 8 are possible alternatives to the train horn use scenario that are currently available. Where there is an option detailed for train horn use scenario, the RTO can select one, a combination of, or all alternative controls aligned to the individual train horn use scenario listed to minimize or eliminate train horn use for the location or activity.

Further options are detailed in Appendix C: minimizing train horn use through alternative systems and methods.

Each item listed in the table still allows the driver to use a train horn in an emergency.

Table 8 Train horn use

#	Use of train horn scenario	Train horn use	Alternative controls
1	Active level crossings	Optional	Complete level crossing active warning equipment (includes barriers, bells, and lights)
2	Passive level crossings	Requirement	None
3	Active pedestrian crossings		
4	Pedestrian crossings (passive or standalone)	Requirement	None
5	Warning trespassers near or on the track	Requirement	None
	Warning rail personnel near or on the track	Optional	Automatic track warning systems
7	Passing a train at a level crossing	Requirement	None
8	Testing the horn	Requirement	None
9	Emergency	Requirement	None
10	Acknowledging rail personnel	Optional	Visual checks Flash headlights
11	Starting movements at a station platform	Optional	Announcements Door warning alarms Automatic doors
12	Starting train movement at a signal	Optional	Visual checks
13	Before a movement in a loading facility	Optional	Radio
14	Starting movements in a worksite	Optional	Radio
15	Passing a stopped train on the adjacent track	Optional	Visual checks
16	Commencing a propelling/setting back	Optional	Radio
17	Warning passengers at platforms where a train is nonstop	Optional	Announcements
18	Before a movement in a yard or depot	Optional	Radio Ground-based system
19	Entering and exiting a depot shed/workshop	Optional	Depot protection
20	Before traversing a defective active level crossing	Optional	Road traffic management
21	Entering a tunnel	Optional	Track protection methods
22	Exiting a tunnel	Optional	Track protection methods
23	Entering a restricted clearance area	Optional	Track protection methods

6.5 Train horn used for communications

Although the practice of using the train horn for communicating is limited, the RTO shall review the conditions for use. Examples of communications may include:

- a) train ready to depart;
- b) shunt move complete;
- c) worksite clear;
- d) rear locomotive attached/detached.

When the train horn is used as a means of communication, it shall be minimized. The RTO should only use the train horn as a means of communication if there is no alternative for conveying the communication. These alternatives may be:

- a) handsignals using flags, lights, or hands/arms;
- b) verbal communications by radio or another communications device;
- c) visual indications using train lights;
- d) other available technology.

7 Noise management of train horn use

7.1 General

The impact on communities will also be dependent on the type of operations in specific locations (see section 6.1).

For example, freight train operations are often conducted in metro areas when passenger train operations are reduced and there is more capacity on the railway network¹⁰. In this scenario, the train horn noise may be less frequent due to fewer trains but more noticeable during the night due to less background noise.

In these circumstances, the RIM should consider minimizing the train horn noise by applying quiet zones or establishing night-time quiet times, as detailed in Appendix C.

7.2 Train horn noise impact

Train horn noise can have a negative impact on communities adjacent to the railway. The impacts are primarily on the approach to and at level crossings. Still, other locations should also be considered, such as:

- e) the tunnel entrances and exits;
- f) depots for night movements and start-up tests and movements;
- g) track work, where train horns are sounded for work train movements.

Where these locations or activities are subject to a high degree of complaints, the RTO should have a process to allow affected parties to document any issues and the RTO to address the complaints. The RTO shall collate the information and use the data to assess train horn use in the identified locations.

¹⁰ In regional locations and dedicated freight lines freight trains operate more frequently

7.3 Minimizing the impact of train horn noise

As a potential benefit in standardizing the use of train horns, there could be opportunities to minimize the impact of noise on rail personnel and the public. This may include removing legacy instructions, where the train horn was introduced before introducing alternative technologies.

The RTO should assess the impact on the community and investigate the feasibility of measures for minimizing and managing train horn noise as much as possible using a range of available noise management measures and advanced technologies. Suggested alternative systems and methods are provided in Appendix C.

To minimize the current use of the train horn requires an assessment (see section 3.3). The first step should be for the RTO to review their current documented procedures for train horn use and reassess the effectiveness. Where it is identified that the train horn no longer manages a safety risk, or other controls adequately manage the safety risk, the RTO should review the application to either:

- a) improve the risk management application; or
- b) remove the requirement for the train horn.

Examples of national and international approaches to minimizing train horn use are described in Appendix D.

7.4 Policies

A consistent approach should be applied across the Australian rail network. For this to occur, the RTO should consider developing an internal policy on the use of train horns that aligns with this Code. The policy should detail their strategic approach to minimize train horn noise and include details on:

- a) managing community noise impacts associated with train horn use;
- b) identifying and trialling new technologies or methods to minimize horn use;
- c) liaising with relevant RIM(s) or RSO(s) on improving community outcomes while maintaining safety SFAIRP;
- d) training and regular review of requirements or rules relating to horn use.

Reviewing policies in adjoining jurisdictions would provide the potential for a standard approach to train horn use and improve the potential to minimize the noise impact for communities.

8 Level crossings

8.1 General

Level crossings are identified as high-risk locations where road and rail interface at grade. This section provides additional information specific to level crossings. In alignment with AS 7658, level crossings are described as active and passive controlled.

Research¹¹ within metro locations has identified a significant variability for train horn use at whistle boards, both in duration and loudness, reflecting differences in usage by drivers. It also found that the train horn is used around half the time at whistle boards (50.3 % of their observations).

¹¹ Investigating the use of train horns at rail level crossings, effects of train horn boards and wind - ACRI, 06 July 2021

8.2 Excessive use

Generally, instructions only require the train horn to be sounded at the whistle board (where placed). However, trains approaching level crossings may sound the train horn at one or more of the following locations¹²:

- a) at the whistle board;
- b) during the approach to the crossing (7-20 seconds before);
- c) at the crossing (1 -7 seconds before);
- d) on the level crossing.

The use of train horns on several occasions when approaching and at the level crossings can be deemed excessive. The RSO shall provide clear instructions for drivers on using train horns at level crossings and assess opportunities with the RIM to standardize and minimize train horn use.

8.3 Active level crossings

At active level crossings, the RIM should undertake a risk-benefits analysis to understand opportunities to remove or minimize the train horn use at these locations. The risk-benefit analysis should be applied based on a priority system for identified level crossings considering the impact on nearby communities.

Where trains pass on active level crossings, the train horn should be used to ensure that level crossing users know other train movements at the level crossing are being undertaken.

8.4 Crossings located close together

When there are several level crossings in proximity, there may be an opportunity to minimize train horn use by assessing the train horn intensity and effectiveness. This approach would eliminate the requirement to sound the train horn at each level crossing.

If the assessment identifies the intended receiver at the furthest point (last level crossing) can confirm the train horn is audible when sounded at the first level crossing, the RIM should apply the appropriate change to minimize the train horn use by applying restrictions (see section 5.2).

8.5 Stopping point after the whistle board

Where trains stop at a stopping point (i.e., station platform) after the whistle board but before the level crossing, an assessment should be undertaken to evaluate if it is necessary to sound the train horn at the whistle board.

Where the opportunity provides, the RTO should consider locating a whistle board or sign with additional instructions (see section 5.2) aimed at express/nonstop trains only. Table 9 describes where the train horn should be used when stopping after the whistle board but before the level crossing.

¹² Investigating the use of train horns at rail level crossings, effects of train horn boards and wind - ACRI, 06 July 2021.

Table 9: Level crossing approach

Stopping point scenario	When to sound the train horn
Trains stopping at the station platform	When leaving the station platform if no clear view of crossing
Trains not stopping at the station platform	At whistle board or sign
Trains stopping at a signal (signal at stop) before the crossing (if located)	When the signal provides a proceed aspect if no clear view of crossing
Trains not stopping at signal (signal at proceed) before the crossing (if located)	At whistle board or sign

8.6 Level crossing removal

Removing the level crossing eliminates the risk the train horn is controlling and therefore removing the need for train horn use. RIMs in Australia and overseas are removing level crossings based on safety risks. Where the RIM is considering this approach, they should refer to the RISSB Guideline - Consolidation of public level crossings.

8.7 Interaction at level crossings

Cognisant of the changing environment/landscape, the RIM should consider current and future impacts on the effectiveness of the train horn use with the public at level crossings and look towards alternative systems and methods. When considering alternative systems and methods, the RIM should utilize human factor assessments aligned with AS 7470.

Based on RISSB (UK) research¹³, the increase now and in the future of noise-cancelling headphones will reduce the effectiveness of train horns at level crossings where the public interacts. Although risky behaviour from the public will continue, the RTO should recognize that train horns rely on how the intended receiver reacts to its use, so understanding what the sound means to the intended receiver is critical to ensure the objective is met.

AS 7658 details that train horns shall be sounded by all trains approaching level crossings whenever risky level crossing user behaviours are observed, regardless of whether whistle boards are installed or as instructed by rules and procedures¹⁴.

¹³ Quantifying the Impact of Train Horn Noise – RISSB (UK), July 2006

¹⁴ Risky level crossing user behaviours may be interpreted differently by each individual driver.

Appendix A Rail transport operator responsibilities

The following table details the responsibilities of the joint or individual operators concerning train horn use. The term rail transport operator (RTO) will be used where the responsibility falls across both operators. Rail infrastructure manager (RIM) and rolling stock operator (RSO) responsibilities are provided where it is an individual responsibility. Note that RIMs have management over track vehicle/work train drivers and shall be responsible for applying recommendations and requirements as applied to RSO drivers (freight, passenger, and heavy haul).

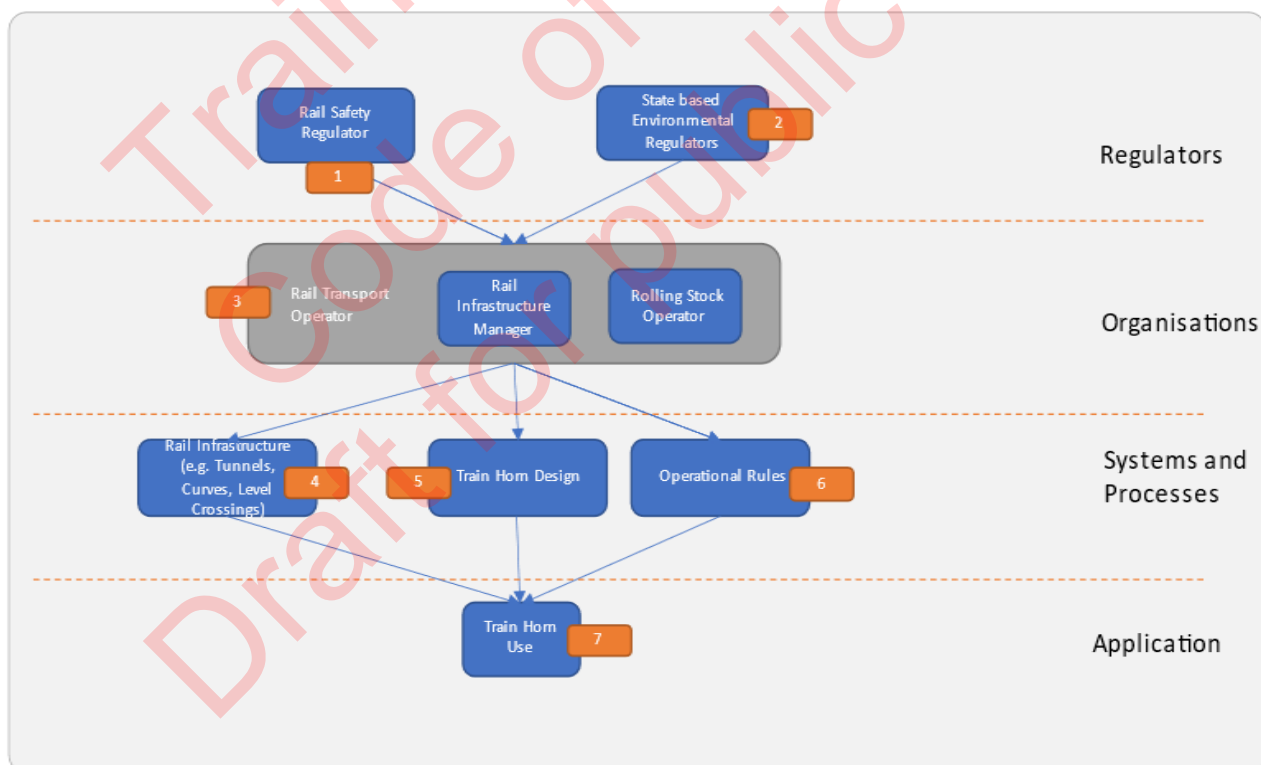
Table A1: Rail transport operator responsibilities

Responsibility	RTO	RIM	RSO
Place whistle boards and train horn use signs.	N/A	Yes	No
Provide network rules and procedures.	N/A	Yes	No
Provide training and briefings on train horn use to drivers/staff.	Yes	N/A	N/A
Level crossing interface and equipment.	N/A	Yes	No
Supporting guidance on the train horn use.	Yes	N/A	N/A

Appendix B Influences involved in train horn use¹⁵

Table B1: Influences involved in train horn use

#	Number information
1	There is a consistent requirement for RTOs to demonstrate management of risks SFAIRP, and the RTO may use the train horn.
2	Due to the differences in environmental legislation, the approaches and degree of influence on train horn noise by state environmental regulators differ.
3	Train horn use needs to involve both Rolling Stock Operator (RSO) and Rail Infrastructure Manager (RIM). The RIM will establish the rules (and where train horns must be used), but the RSO must comply with the rules. As such, any train horn use change must be clearly communicated between the RIM and RSOs affected.
4	Rail Infrastructure: Current level crossing standards provide the option to install whistle boards on approach to level crossings, requiring train horns to be used. Train horn use is also required where other risk controls may not be sufficient (e.g., around curves, tunnels) to warn workers of an approaching train.
5	Standards for train horn design prescribe dB level and include a 'low vs. high' sound.
6	Many operational rules have been historically established, with few correctly understanding the original intent. If the intent is adequately understood, alternative approaches (and perhaps non-administrative controls) can be applied.
7	Typically train horn use is instructed by the operational rules, but these are moderated by driver experiences (i.e., near misses) at locations and knowledge of noise issues at the location such as time of day.



¹⁵ Sourced from Train Whistles – Understanding the risk and opportunities, Holistic Systems and Assurance.

Appendix C Minimizing train horn use through alternative systems and methods

Table C1: Potential alternatives to minimize train horn use

This table provides the RTO with information on potential alternatives to minimize train horn use. Although these items are provided for consideration in support of the purpose and scope of this Code, RTOs shall assess the impact against their operational risk profile.

#	Alternative	Information
1	Removal of level crossings	Level crossing removal programs aim to remove or close level crossings considered high risk or low use in accordance with <i>RISSB</i> Guideline Consolidation of Public Level Crossing should be considered for this alternative.
2	Level crossing restrictions	Identify opportunities to minimize train horn noise use through risk assessing each level crossing and considering the following: <ul style="list-style-type: none"> • If sounding the train horn can be withdrawn. • Sounding the train horn at the crossing can be reduced or eliminated for certain train movements.
3	Trackside horns	Providing the train horn sound at the localized crossing and removing the whistle board on approach or instructions to sound the train horn on approach.
4	Establish quiet zones	Identifying specific locations where train horn use is eliminated or restricted using a risk-based approach based on the use and impact. Consideration should be given to the following: <ul style="list-style-type: none"> • A location risk assessment to confirm if quiet zones can be introduced. • Train horns may still be used in emergencies or comply with other regulations or operating rules. See the following link for detailed information https://railroads.dot.gov/highway-rail-crossing-and-trespasser-programs/train-horn-rulequiet-zones/train-horn-rule-and-quiet
5	Train Horns	Reverting to quieter but compliant train horns. i.e., a modified night train horn, using the low tone and the high tone only when necessary.
6	Night-time quiet period	To restrict the use of the train horn at night during specified hours (for example, 2200-0600hrs). This approach shall consider the local characteristics of crossing and other assessed risks at the location, including the risk of community noise impacts.
7	Crossing visual signage	Using visual signs for road users to substitute any train horn use provides information to indicate the imminent arrival of trains and the direction of travel. Visual signage may be more effective (specifically illuminated) based on the impairments of people using noise-reducing headphones, soundproofed road vehicles or other noise distractions. The warning bells at the crossing would still be an audible control.
8	Whistle boards and Signs	There is an opportunity to focus on the whistle board to understand if minor changes could minimize the train horn noise. Any changes may be undertaken through a maintenance program or upgrades. In any case, there shall be a consideration to risk in terms of audibility for the intended receiver and sufficient warning time based on train speed. The following are examples: <ul style="list-style-type: none"> • Be removed based on slower track speeds or further vegetation clearance that provide control. • The location of boards placed in the most effective location and considering limiting the effects on residential areas.

#	Alternative	Information
		<ul style="list-style-type: none"> The whistle board provides direction on the specific train horn-tone required to ensure consistency when sounded. Whistle boards with train horn restrictions.
9	Yards and depots	<p>Minimize the use and noise of train horns should be evaluated with consideration to the following:</p> <ul style="list-style-type: none"> Using handsignals or lights at night instead of train horns. Open radio channels during movements Strategically placing yard horns on trains (lower noise broadband 'quacker' style horns). Ground-based warning systems (audio speaker warning system and strobe lighting).
10	Training	<p>Provide information for drivers on how to apply the train horns considering the following:</p> <ul style="list-style-type: none"> The availability of quiet periods. Being consistent in use, time of use, or train horn signal selection. Excessive use of the train horn and impact to the community.
11	Technology warning systems	<p>Identify and implement alternative currently available technology and may provide additional benefits other than minimizing or removing train horn use:</p> <ul style="list-style-type: none"> Geo-fencing to alert workers of oncoming trains. Automatic train warning system (ATWS) to alert workers of oncoming trains. Obstacle detection systems (https://www.railengineer.co.uk/advanced-solutions-to-obstacle-detection/)

Train Horn Use Code of Practice Comment
Draft for public

Appendix D National and international approaches

Table D1: National and international approaches

Approach	Where	Discussion
Level crossing removals	All	The removal of a level crossing eliminates one of the primary needs for train horn use. Programs, such as the Level Crossing Removal Program in Victoria, are actively reducing the number of crossings in Victoria (https://levelcrossings.vic.gov.au/). One example shows that where an entire section of line (9 road level crossings removed along with associated pedestrian crossings) it was estimated that train horn use would halve (Level Crossing Removal Authority. (May 2016). CD9 Preliminary Noise Report: P03-000-CTD-REP-XEV-0101. Victoria).
Quiet zones	USA, Canada	<p>Quiet zones are a defined area of a rail network where train horns are not to be used, except in emergency scenarios. The process to establish a quiet zone must be initiated by the responsible local government (not the RTO), who must then work with the RTO to identify the necessary controls and changes to ensure ongoing safety. Notably, the local government must bear the cost to implement quiet zones, and increased risk due to no train horn must be mitigated.</p> <p>The process to establish quiet zones, including the steps necessary to take, is documented in https://tc.canada.ca/en/rail-transportation/grade-crossings/apply-stop-train-whistling-public-grade-crossing. Part of the process is the identification of the minimum standard of infrastructure (including level crossings) which must be met to allow for a quiet zone creation. There is a focus on ensuring if train horns are removed that equivalent controls are put in their place. Notably, the controls must also account for the specific crossing context.</p> <p>A study by the FRA in 2000 (RISSB, July 2016 Quantifying the impact of train horn noise) reported a 62% increase in accidents at crossings where train horns were banned (but this was before the 'quiet zone' process was established, which required specific mitigations to be in place). A 2017 report (United States Government Accountability Office Quiet Zone Analyses and Inspections https://www.gao.gov/products/GAO-18-97) indicates that quiet zones are as safe as they were before being made quiet zones. This is caveated that crossing characteristics over time (train speeds, frequency, crossing use) were not accounted for in the analysis.</p>
Freight noise attenuation program	New South Wales	<p>The NSW Freight Noise Attenuation Program (https://www.transport.nsw.gov.au/projects/programs/freight-noise-attenuation-program) aims to minimize the impact of freight noise on homes and 'sensitive use community buildings (e.g., schools) near NSW Government managed rail corridors. To minimize the impact, the program provided noise reduction treatments to homes and buildings that meet the criteria—the program launched in 2015 and is a \$50m ten-year initiative.</p> <p>Not to detract from the program and benefits, one criterion used for eligibility is the average noise levels measured during the day (7 am-10 pm) and night (10 pm – 7 am). As a result, train horns may not necessarily be addressed through this program, given they tend to be short.</p>
Driver discretion at level crossings	New Zealand	Established practice within Australia is to have train horn boards associated with every level crossing, meaning that drivers must sound train horns on approach to level crossings. KiwiRail (New Zealand) only requires train horns at certain crossings with known risk factors. In other circumstances, drivers are to use their discretion (based on prior experience, at-risk behaviours observed). Note that the use of train horn boards in association with level crossings, as described in <i>AS 7658 – Level Crossings – Rail Industry Requirements</i> , is consistent with the application in New Zealand. However, RTOs and safeworking experts engaged as part of this work indicate that the standard practice in Australia is always to have these installed.

Approach	Where	Discussion
Night-time quiet periods	United Kingdom	<p>Night-time quiet periods remove the requirement for a driver to sound the train horn on approach to specific level crossings to reduce the impact on residents nearby while they are sleeping. The original approach saw quiet periods from 23:00-7:00, but this was subsequently reduced to 23:59-6:00 as a study found that 64% of near-miss incidents were occurring on the 'shoulder hours'. Interestingly, prior research conducted by the RISSB (T668 Train Horns Risk Review) suggested that incidents at night are 15.4 times more frequent per moment (i.e., the person using x train numbers) than daytime. This same report noted that some locations would contribute more to this risk than others, and individual crossing characteristics (including usage profile) need to be well understood and quiet periods implemented locally. It is noted that the RISSB have found that night-time quiet periods did not cause an increase in near misses or lead to incorrect usage (RISSB Quantifying the impact of train horn noise).</p>
Operational rule reviews – train horns	NSW, Vic	<p>Around 2008 RailCorp (as it was known) undertook a review of operational practices for sounding train horns 2008. A key focus of this review was to identify when and why the train horn was being used, with the intent to eliminate non-safety purposes. This review led to the elimination of the need to sound a train horn when departing platforms. (Note that this was initiated as part of RailCorp's Environmental Protection License).</p> <p>Conversely, in 2014 Metro Trains Melbourne explored the risk associated with not sounding a train horn on departure and found that removing the requirement to sound the train horn on departure from the platform would likely increase the risk. The difference between RailCorp and Metro Trains Melbourne outcomes can largely be attributed to the nature of infrastructure. A key factor noted that many Melbourne stations are adjacent to level crossings and that the Melbourne network is unfenced. The NSW metro network has very few level crossings adjacent to stations and is primarily fenced.</p> <p>These approaches both focused on train horns or no train horns and did not explore alternative controls that could replace train horn use in specific uses. For example, a train horn at level crossings intends to warn road users and pedestrians, which can be achieved through wayside horns. Similarly, it is possible to question whether using the train horn to communicate between drivers and rail safety worker is the best and most effective approach in the context of technologies available today.</p>
Trackside horn	South Australia	<p>A trial (Moore, S. (2012). Wayside horn noise investigation. Proceedings of Acoustics, 2012 – Fremantle. 21-23 November 2012) was undertaken in South Australia, exploring the potential for wayside horns to replace train horn use. This trial was formed because the train horn is intended to warn road users of a train. If this function could be transferred to the wayside horn (which can better direct sound towards road vehicles), it would reduce environmental noise.</p> <p>The trial demonstrated that wayside horns do "provide a significant improvement to the audibility of the train horn at the existing level crossing. Also, an improvement compared to the audibility of a train sounding its train horn at the whistle board of most other level crossings" while also reducing the environmental noise impacts.</p>

RISSB

RAIL INDUSTRY SAFETY AND STANDARDS BOARD

ABN 58 105 001 465

For information regarding products developed by RISSB contact:
Rail Industry Safety and Standards Board

Brisbane Office
Level 6, 200 Creek Street
Brisbane, QLD, 4000

PO Box 518
Spring Hill, QLD, 4004

T +61 7 3724 0000
E Info@rissb.com.au

Train Horn Use
Code of Practice
Draft for public comment

