

National Level Crossing Safety Strategy

2023-2032



**NATIONAL
LEVEL CROSSING**
SAFETY COMMITTEE



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Glossary

Terminology used within this Strategy is consistent with the word's common meaning. The meaning of terms specific for this Strategy are provided below.

Active level crossing

A level crossing where the movement of vehicular or pedestrian traffic is controlled by devices such as flashing lights, warning bells, boom gates (or pedestrian crossing gates), or a combination of these, where the device is activated prior to and during the passage of a train through the crossing.

Australian Level Crossing Assessment Model (ALCAM)

A comprehensive tool used for the assessment of level crossing risks.

Collision

An incident where a road user collides with a train.

Fatality

A person who dies, within 30 days, from injuries sustained directly as a result of a collision. This excludes trespass and suicide.

Incident

A near hit or a collision at a level crossing.

Interface agreement

A written agreement between a rail and road manager for managing the risks to safety at level crossing interfaces as outlined in the Rail Safety National Law.

Level crossing

Has the meaning as defined in the Rail Safety National Law and includes where a road, footpath or shared path cross a railway at substantially the same level.

Level crossing user

A person who passes over a level crossing, including road users and rail users (including train crew and passengers).

Minor injury

An injury, other than a serious injury, sustained by a person directly as a result of a collision, that receives medical treatment.

National Level Crossing Portal (NLXP)

A central data repository which contains level crossing incident data and selected data from the ALCAM Level Crossing Management (LXM) System.

Near hit (previously known as near miss)

An incident where the driver of a moving train takes emergency action, or would have if there was sufficient time, to avoid impact with a road user and no collision occurred. Emergency action includes continuous audible warning and/or brake application.

Open level crossing

A level crossing that is open to road or pedestrian traffic on which train or maintenance services are operating.

Passive level crossing

A level crossing where the movement of vehicular or pedestrian traffic is controlled by signs and devices, none of which are activated during the approach or passage of a train, and which rely on the road user including pedestrians detecting the approach or presence of a train by direct observation.

Pedestrian level crossing

A level crossing by way of a footpath or shared path, primarily for use by pedestrians and other pathway users (including bicycles and personal mobility devices).

Private or occupational level crossing

A level crossing that is located on private property often for exclusive use by the landowner and where the landowner is the private road manager.

Public level crossing

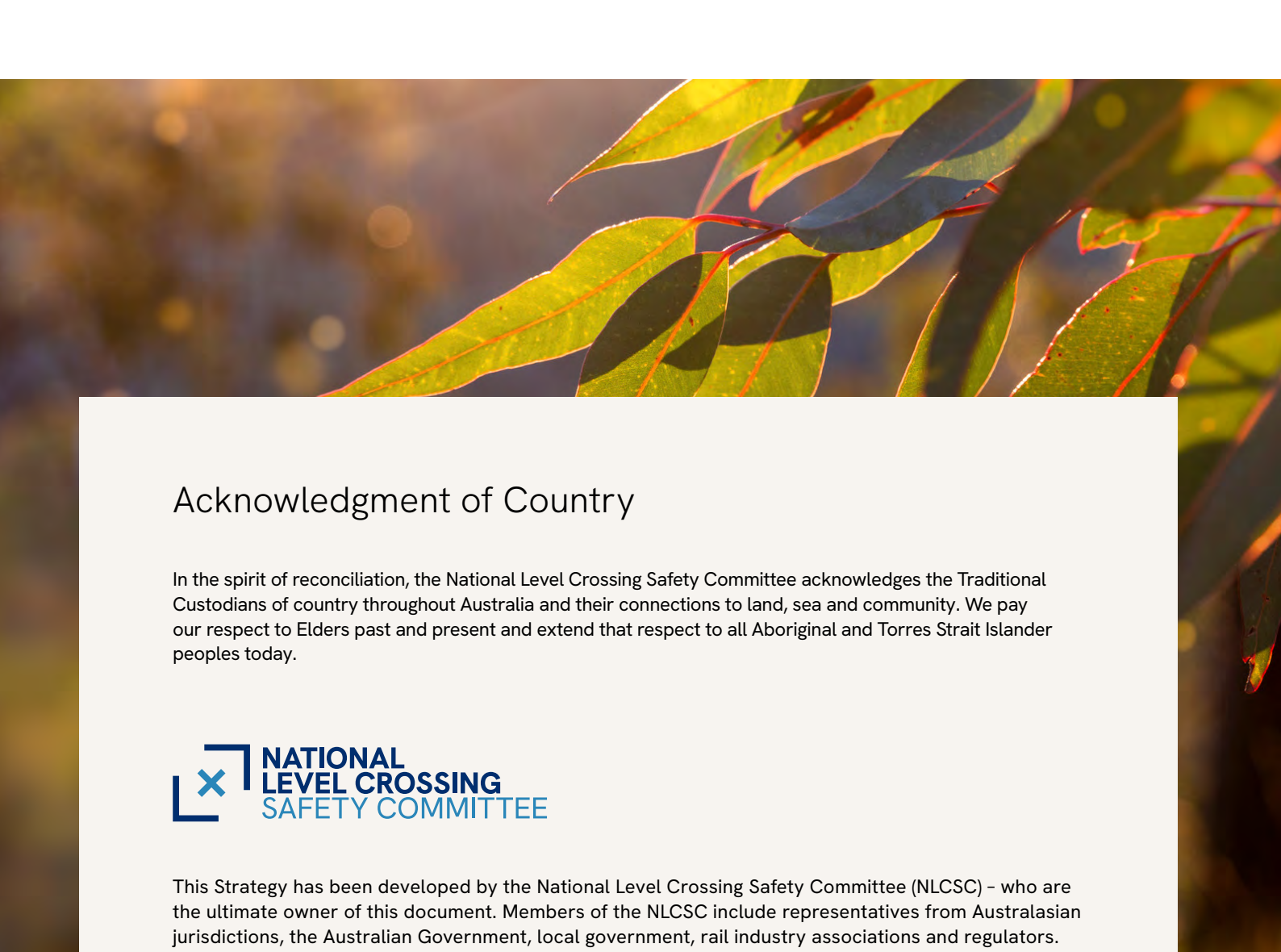
A level crossing that is open to the general public, usually located within a gazetted road reserve or easement where the state or local government authority is commonly the road manager. This may be active or passive level crossing.

Road user

A person travelling by any type of vehicle, device or on foot via a public or private road, footpath or shared path.

Serious injury

An injury, sustained by a person directly as a result of a collision, that requires immediate medical treatment due to the severity of the injury. This excludes trespass and attempted suicide.



Acknowledgment of Country

In the spirit of reconciliation, the National Level Crossing Safety Committee acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today.



This Strategy has been developed by the National Level Crossing Safety Committee (NLCSC) – who are the ultimate owner of this document. Members of the NLCSC include representatives from Australasian jurisdictions, the Australian Government, local government, rail industry associations and regulators.

The role of the NLCSC is to foster a nationally consistent, cooperative and collaborative approach to level crossing safety and provide governance and guidance over the implementation of actions at a national level in achieving reductions in the likelihood of crashes and near hits at level crossings.

NLCSC Members

- Queensland Department of Transport and Main Roads
- Transport for New South Wales
- Victoria Department of Transport and Planning
- South Australia Department for Infrastructure and Transport
- Main Roads Western Australia
- Northern Territory Department of Infrastructure, Planning and Logistics
- Tasmania Department of State Growth
- Australian Government Department of Infrastructure, Transport, Regional Development, Communications & the Arts
- Waka Kotahi New Zealand Transport Agency
- Australian Local Government Association
- Office of the National Rail Safety Regulator
- National Heavy Vehicle Regulator
- TrackSAFE Foundation
- Australasian Railway Association.

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Foreword

Renewing our commitment to level crossing safety to realise vision zero

Level crossings are weaved throughout Australia's land transport system with over 20,000 level crossings intersecting roads and pathways along more than 45,000 kilometres of railway track. While active level crossings in many cases provide a safer way to cross railway tracks, level crossings present a risk and are the most common cause of fatalities on the rail network, with the exception of suicides and trespassing.

As more rail and road infrastructure is developed to meet needs of the community, the intersection of road and rail increases. In addition, advances in technology, such as automated vehicles, present both challenges and opportunities to improve safety around level crossings and the response to address this changing environment needs to be adequate and measured.

Level crossing incidents have significant social and economic impacts on individuals, communities and business. This is exacerbated in regional Australia where most level crossings are passive and contribute to an over-representation of certain incident types such as with heavy vehicles, while pedestrians remain particularly at risk at active level crossings in more urbanised areas.

The nature of level crossings as an interface between road and rail transport is a complex environment so creating change to improve level crossing safety is a shared responsibility. While capital investment is part of the ongoing solution, strategic national collaboration is also at the forefront of actions. I am pleased to say the basis for sharing this responsibility was evident with active engagement in the development of the Strategy and I wish to thank everyone who contributed their time and effort in providing their insights and valuable knowledge.

The *National Level Crossing Safety Strategy 2023-2032* does not aim to 'reinvent the wheel' but rather build upon work achieved through the *National Railway Level Crossing Strategy 2010-2020* and the *National Railway Level Crossing Safety Strategy 2017-2020*. Over the life of the last Strategy, we achieved improvements in level crossing safety outcomes such as reducing average annual deaths resulting from vehicle collisions at level crossings by over 70% since 2001-2009 to 2014-2022, the establishment of the National Level Crossing Portal (a single national level crossing database) vital to capturing and assessing data to form evidence-based outcomes and the progression of innovative research solutions.

With the rapid advances in technology and the changing needs of our community and transport task it can be expected that the safety risks and practicable solutions may also change considerably over the life of this Strategy. So, I value the importance of creating an agile Strategy that can shift and adapt to ensure we can achieve the best outcomes. To support this approach, an action oriented, practical and focussed three-year rolling Work Plan will target actions over the short, medium and long-term and enable evaluation to measure success. The Strategy will complement the *National Rail Action Plan* and the *National Road Safety Strategy 2021-30* by acknowledging that level crossing safety is a result of complex interactions between the road and rail networks.

"I believe the National Level Crossing Safety Strategy 2023-2032 provides a renewed strategic approach to improve safety at level crossings and is a step further in realising the National Level Crossing Safety Committee's Vision Zero."



Sally Stannard
Chair, National Level
Crossing Safety Committee

Change is needed

Although we are seeing some positive results from our focus on level crossing safety we are **still not at Zero**.

Each year, people continue to lose their lives or are injured at Australia's level crossings causing significant social and economic impacts on individuals, communities and businesses. Record investment in rail and road infrastructure, combined with growing passenger traffic and freight demand is continuing to increase interactions at level crossings – we need to do more, and we need to do it collaboratively as a nation.

This Strategy represents a commitment to reducing the incidence of fatalities and injuries across Australia's level crossings.

Level crossing safety is a shared responsibility and a national priority.



Excluding suicide and trespass, level crossings are the highest public safety risk on the rail network, with **36%** of all level crossing collisions resulting in injuries or fatalities¹



The economic and human cost of level crossing collisions can be extreme, with potential for **multiple fatalities** and damage costs exceeding **tens of millions of dollars**²



Between 1 July 2014 and 31 December 2022 across Australia's level crossings, (involving either pedestrians or road vehicles), there were:

7,839 near hits

39 fatalities

322 collisions

49 serious injuries



In 2022,
79%

of Australia's 20,000+ level crossings included only passive protection (such as stop or give way signs)¹



In 2022,
35%

of level crossing risk assessments were over seven years old¹

From 1981-2021, there has been a **threefold increase** in road and rail traffic with a **doubling** of greenhouse gas emissions from these vehicles, leading to increased congestion, pollution and interactions at level crossings³.



Over-represented groups for national focus include **heavy vehicle incidents, passive level crossings and pedestrian incidents** at active level crossings



Over **70%** of pedestrian collisions at level crossings result in fatal or serious injuries¹

Average annual fatalities from collisions between road vehicles and trains have decreased from **10.0** deaths in 2001-2009 to an average **2.7** deaths per year in 2014-2022. The collision rate between road vehicles and trains has also decreased during this period from an average of **70** to **33** collisions per year^{1,2}.

¹ Statistics from 1 July 2014 - 31 December 2022 are based on data extracted from the National Level Crossing Portal, NLCSC, accessed January 2023.

² Level crossing accidents in Australia, Transport Safety Bulletin, Independent Transport Safety Regulator, August 2011. <https://nraspricms01.blob.core.windows.net/assets/documents/HistoricalResources/Transport-safety-bulletin-Issue-2-Level-crossing-accidents-in-Australia-August-20112.PDF>

³ Australian Infrastructure and Transport Statistics - Yearbook 2021.

Vision and objectives

Our vision is clear but challenging. To help realise this vision, this Strategy connects high level objectives to clear actions, realised through collaborative, focused and measured effort.



Strategy at a glance

Vision Zero



Zero harm at Australia's level crossings.

Strategy purpose



To deliver our vision through a collaborative national approach informed by high quality data and stakeholder engagement.

Informed



This Strategy is based upon national rail safety data analysis and extensive national engagement with more than 30 organisations from the community, government, road and rail industry providing expertise and insights.

Strategic objectives

Strategy focus areas

1

Improve level crossing user behaviour through education and enforcement



1. Education and Enforcement

Increase awareness of level crossings that triggers desirable behaviour change in users and reinforce compliance through improved enforcement.

2

Leverage opportunities from emerging technology and innovations



2. Assets, Technology and Innovation

Leverage a combination of asset and technology-based solutions that are cost-effective, innovative and shown to reduce the risk of harm.

3

Identify opportunities to deliver early, low cost and effective safety improvements

4

Support the development of improved data and knowledge on level crossings



3. Data Improvement and Knowledge Management

Capture level crossing data in a nationally consistent manner and share analysis that delivers insights to inform practical safety improvements and decisions.

5

Increase coordination and sharing between those responsible for level crossing safety



4. National Coordination

Develop a consistent and nationally coordinated approach to improve collaboration, share knowledge and drive actions that will be most effective if implemented nationally to reduce incidents at level crossings.

Over-represented groups of national interest

Based on recent national trends, low-cost, high-impact initiatives should be targeted at rural and regional passive level crossings, heavy vehicles and pedestrians.

Strategy implementation and involvement

To achieve the strategic objectives and deliver Vision Zero, all stakeholders need to work together, taking a shared, collaborative approach underpinned by the principles set out in this document.

A rolling three-year Work Plan will support the Strategy and vision by delivering focused actions and measurable improvements in the focus areas over the short, medium and long-term.

This Strategy and the attached Work Plan will remain agile and drive outcomes through regular review, evaluation, continuous improvement and sharing of learnings.

Context and analysis

Level crossing safety is a national priority and everyone's responsibility. The National Level Crossing Safety Strategy 2023-2032 outlines focus areas and a plan of prioritised actions informed by data and extensive stakeholder engagement. It is an agile and evolving document founded on the principle that collaboration and information sharing at a national level will accelerate delivery of our vision.

2023-2032: Resetting the future direction towards zero

The previous National Level Crossing Safety Strategy was released in 2010. In 2017, under the stewardship of the National Level Crossing Safety Committee (NLCSC), the Strategy was updated and supported by an action plan to drive outcomes. Supported by strong jurisdictional policies and strategies, the former strategies and efforts enabled:

- Overall reduction in fatalities and collisions
- Adoption of a safe system approach
- Implementation of the National Level Crossing Portal (national incident data portal).

Other noteworthy independent developments occurred with respect to the national focus on level crossing safety including:

- Establishment of the Office of the National Rail Safety Regulator (ONRSR)
- \$180m in federal government funding for the Regional Australia Level Crossing Safety Program
- ONRSR's commissioning of a national stocktake of level crossing interventions and the commitment to further develop national level crossing incident data.
- The strategy will also draw on the ONRSR commissioned reports into train conspicuity developed by MIRT and ACRI, and will continue to promote ongoing research in this field.

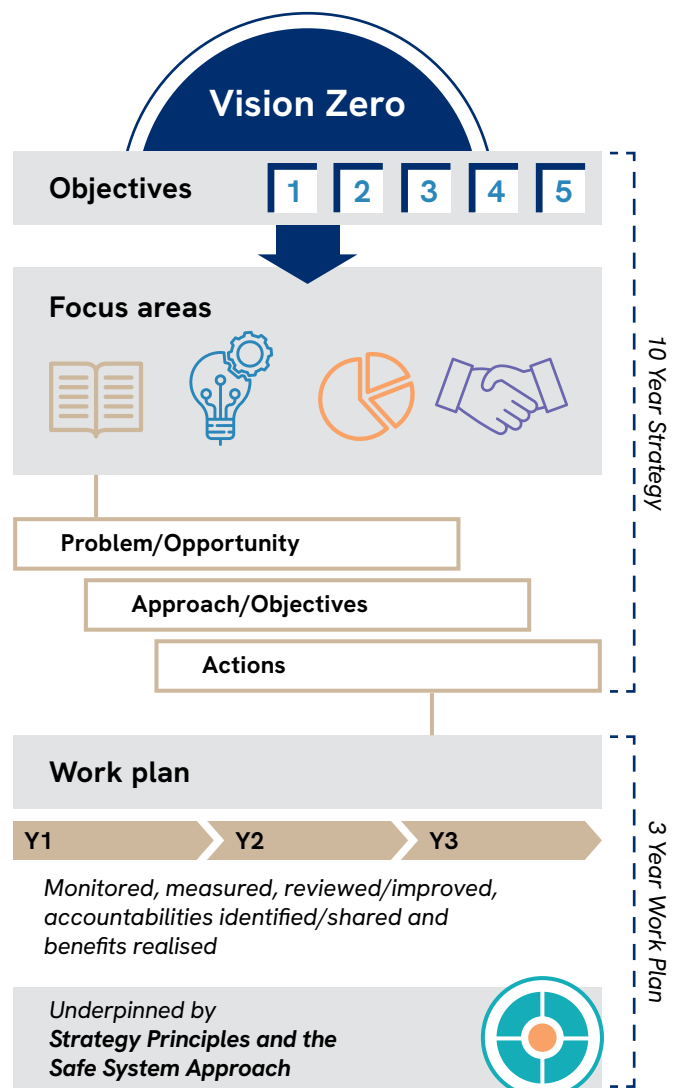
This Strategy recognises, connects to, and builds upon these strong foundations.

How the 2023-2032 Strategy works

The 2023-2032 Strategy prioritises national information sharing and collaboration to avoid 'reinventing the wheel', enable initiative cost reduction and shorten implementation timelines.

The vision is underpinned by strategic objectives which will be delivered via four focus areas. Each focus area identifies key initiatives to addresses specific challenges and opportunities.

A three-year Work Plan with actions, accountabilities and timelines supports implementation. Regular review and improvement of both the Strategy and Work Plan will drive coordinated national action on level crossing safety. During early implementation, priorities, sequencing, dependencies, ownership, and resourcing will be confirmed, leveraging short, medium and long-term goals to focus efforts and investment.



Level crossing hierarchy of controls

The level crossing hierarchy of controls is an approach to address rail interface safety using preventative and risk-based measures. Total avoidance or removal of risk by designing out or removing level crossings is preferred but either of these options is often very costly. Thus, this Strategy focuses on low-cost, high-impact initiatives that can best reduce safety risks at or around level crossings while supporting opportunities to remove and prevent level crossings at a national level.

No new level crossings, closure and consolidation

This Strategy supports no new level crossings wherever possible, consistent with ONRSR's Level Crossing Policy. This is an important consideration for new or planned railways and roads, extensions to existing railways, and expanding development areas in proximity to railways or planned railways. Opportunities for level crossing closure and consolidation while minimising adverse impacts to vehicular and pedestrian traffic, should also be actively pursued at both active and passive level crossings. To support this outcome, the Rail Industry Standards and Safety Board has developed a guideline for Consolidation of Public Level Crossings to be implemented at a state and local level. Considered relative to broader network priorities, priority should be given to removing level crossings that have limited road user utilisation, reduce risk on a broader network scale, for higher risk clusters where alternative connections are available and those on closed rail corridors.

Grade separation

Grade separation should be investigated for high-risk, high-traffic level crossings that have ongoing safety incidents and/or broader network and community impacts. The cost of grade separation weighed against its long-term safety benefit as well as other socio-economic and environmental factors should also be considered in prioritising level crossings for grade separation.

Prioritise low-cost high-impact initiatives

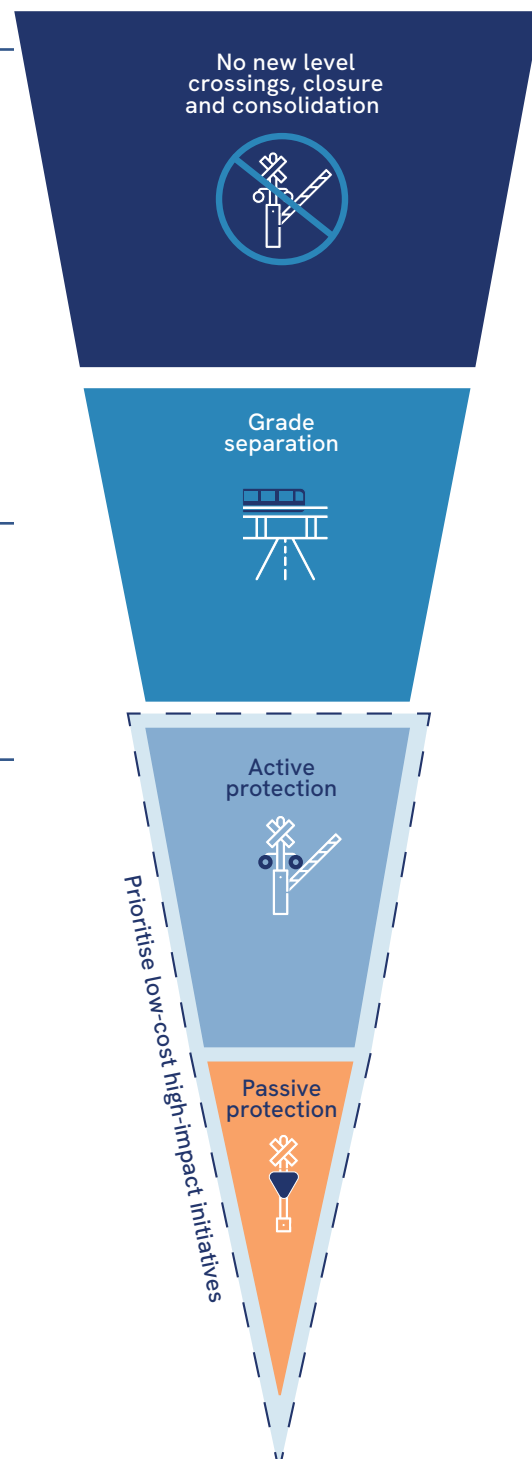
Many new lower-cost interventions, technological advancements and innovations are currently being researched, trialled or implemented with promising results, and can complement traditional active and passive controls. These approaches consider how infrastructure or behavioural interventions can be best used to influence human factors.

Active protection

The highest level crossing treatment is active protection, including boom gates, bells and flashing lights. This is preferable to passive protection which relies on the road user to determine when it is safe to cross a level crossing by considering a number of complex and variable factors including risk perception, compliance and sight limitations. Combined with innovative ways to make active controls even more effective (such as considering a traffic light approach), behavioural and enforcement interventions are particularly important in targeting further incident reductions at level crossings with active protection.

Passive protection

At passive level crossings, improving visibility - both of trains and of level crossings themselves - through 'passive-plus' controls such as stop signs with LED warning lights and street lights, offer opportunities for wide reaching impact. Where appropriate, this should be complemented by other measures, such as speed limit reductions and targeted jurisdictional programs to improve sight distances at high risk passive level crossings.



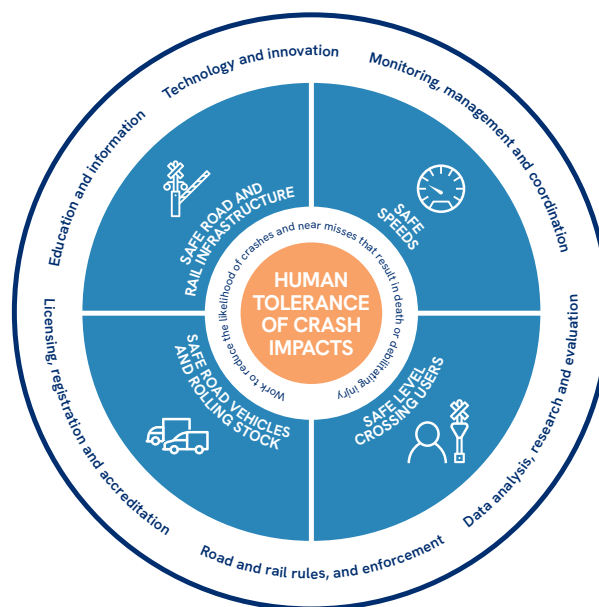
The safe system approach and shared responsibility

This Strategy commits to the safe system approach at level crossings, consistent with the National Road Safety Strategy 2021-30. This approach acknowledges human error and vulnerability, the need for system transformation, and shared responsibility for safety outcomes.

In the level crossing environment, the safe system approach is guided by the following principles:

- Safe road (including pathway) and rail infrastructure
- Safe speeds
- Safe road vehicles and rolling stock
- Safe level crossing user.

Shared responsibility and buy-in from all parties underpin the success of the safe system approach. Strong relationships are required in all stages – planning, policy-making, designing, constructing, managing, maintaining, regulating, enforcing and using level crossings, including infrastructure and vehicles. At an operational level, interface agreements facilitate a transparent, accountable and collaborative approach between the road manager and rail infrastructure manager to allocate safety responsibilities at level crossings.



Rob's story – passive rural level crossing

Rob is an experienced truck driver on his regular route. He is approaching a passive level crossing where in the past he has rarely seen a train. The road is unsealed and has widened over time through vehicles cutting the corner. It is the end of the wet season and the vegetation within the rail corridor is overgrown. Rob slows knowing the level crossing is controlled by a give way sign, however this time he fails to see the train approaching. Fortunately, the train driver sees Rob's truck approaching the level crossing and applies the emergency brake and sounds the train horn. Rob hears the braking and horn and tries to take evasive action however the train collides with the back of Rob's truck causing substantial damage to both the truck and the train.

Safe system response:

Safe road and rail infrastructure – ❌ vegetation growth was not controlled and contributed to Rob not seeing the train in time. ❌ The gradual road widening influenced the approach angle that Rob took which obscured his sighting distance. ❌ After the incident it was found that the responsibilities outlined in the interface agreement were not being performed as required

✅ **Safe speeds and rollingstock** – the train and the truck driver were travelling at the speed limit.

✅ **Safe level crossing user** – The train and the truck driver undertook appropriate actions to reduce risk as much as possible once the danger was known.

Debbie's story – active pedestrian level crossing

Debbie regularly drives to her local commuter car park to catch the train. She needs to cross a pedestrian level crossing equipped with active warning devices (gates and alarms) to reach the station. Today Debbie is running late. As she approaches the pedestrian level crossing, the alarm sounds and the gates start shutting. Debbie pushes through the closing gates as she can see her train approaching the station but does not see the train coming from the opposite direction. She knows that there is 'enough time' from when the lights flash and gates close to when her train arrives. She trips on an uneven surface at the level crossing and hurts her leg. The approaching train driver is notified of an obstruction on the track and applies the emergency brake and horn, jolting passengers. A bystander notices Debbie on the track and jumps the locked pedestrian gates to help her off the tracks. She and the bystander narrowly avoid being hit by the train.

Safe system response:

❌ **Safe pathway and rail infrastructure** – the uneven surface at the pedestrian crossing may need upgrading by the rail infrastructure manager.

✅ **Safe speeds and rollingstock** – the train was well maintained travelling at a low speed near the train station.

Safe level crossing user – ❌ Debbie's and the bystander's actions were not safe as both entered the railway when not permitted. ✅ The train driver undertook the appropriate actions to reduce risk as much as possible.

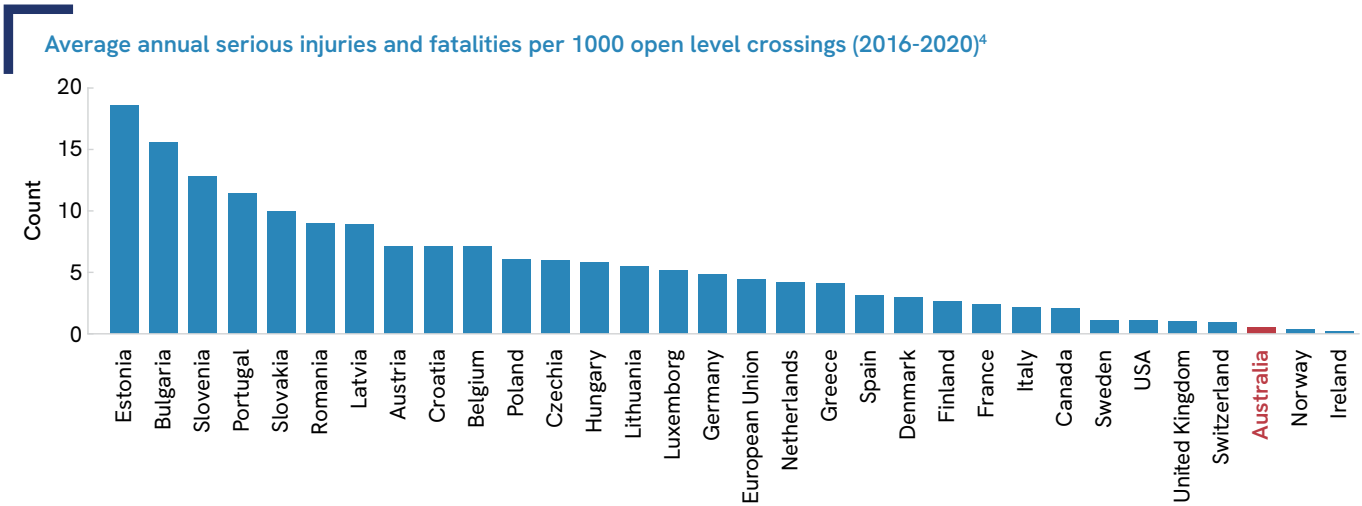
Current state

In an international context, level crossings in Australia are comparatively safe. This reflects the improvement in level crossing safety that has been achieved over the past 25 years. However, this improvement has stalled in the last decade, with collisions at level crossings remaining broadly consistent.

To continue improvements in level crossing safety, research investigating the causal links between level crossing incidents, the environment, and driver behaviour is required to ensure the development of best practice solutions.

International context

Australia has one of the lowest rates of level crossing related fatalities and serious injuries in the world on a per level crossing basis, with an average annual fatality and serious injury rate per 1000 level crossings of less than 0.5.



Long term national trends

Since the 1990s, improvements to technology, safety and awareness resulted in a significant decrease in fatalities from level crossing incidents.

While there is a long-term downward trend in level crossing collisions, people continue to die and suffer serious injuries every year as a result of level crossing collisions.

Total average annual collisions and fatalities at Australian level crossings

Period ⁵	Average annual collisions	Average annual fatalities
1997-2000	98 ⁶	35 ⁷
2001-2009*	78 ⁸	10 ⁹
2014-2022 ¹⁰	38	4

**Fatalities for 2001-2009 include road vehicle fatalities only*

4 UNECE Statistical database, Number of level crossings by type of level crossing. Eurostat data browser, Rail accidents victims by type of accident and category of persons involved. US Department of Transportation, Federal Railroad Administration, train accidents 2016-2020. Transportation Safety Board of Canada, Rail transportation occurrences. National Level Crossing Safety Committee, National Level Crossing Portal, data 2016-2022, accessed January 2023.

5 Time periods are based on limited data availability

6 Cairney P, Prospects for improving the conspicuity of trains at passive railway crossings (Road safety research report CR217), Australian Transport Safety Bureau, December 2003 [atsb.gov.au/sites/default/files/media/43398/Lev_Cross_3.pdf](https://www.atsb.gov.au/sites/default/files/media/43398/Lev_Cross_3.pdf)

7 Level crossing accident fatalities 1997-2002, Australian Transport and Safety Bureau https://www.atsb.gov.au/publications/2001/level_cross_fatal

8 Australian Rail Safety Occurrence Data 1 January 2001 to 31 December 2009, Australian Government, Australian Transport Safety Bureau

https://www.atsb.gov.au/publications?title=&field_series_number_value=&field_publication_mode_target_id=3&field_publication_type_target_id=10&field_publication_date_value%5Bmin%5D=&field_publication_date_value%5Bmax%5D=

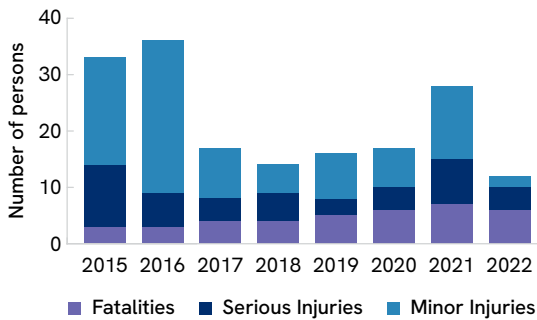
⁹ Level crossing accidents in Australia, Transport Safety Bulletin, Independent Transport Safety Regulator, August 2011 <https://nraspricms01.blob.core.windows.net/assets/documents/HistoricalResources/Transport-safety-bulletin-Issue-2-Level-crossing-accidents-in-Australia-August-20112.PDF>

¹⁰ Incident data is based on the NLXP for level crossing incidents from July 2014-December 2022, accessed January 2023

Recent national trends

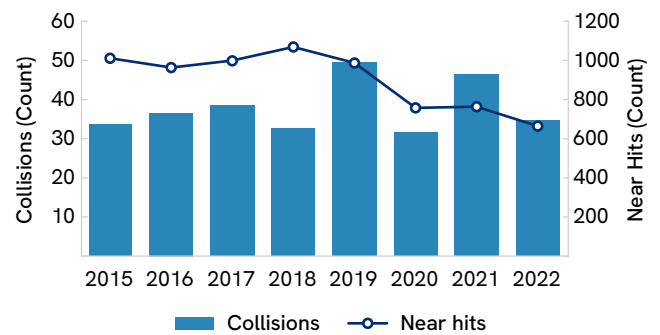
The improvements in level crossing safety witnessed since the mid 1990s has stalled in the last decade with the number of annual fatalities remaining at an average of four.

Level crossing injuries and fatalities, Australia 2015-2022¹¹



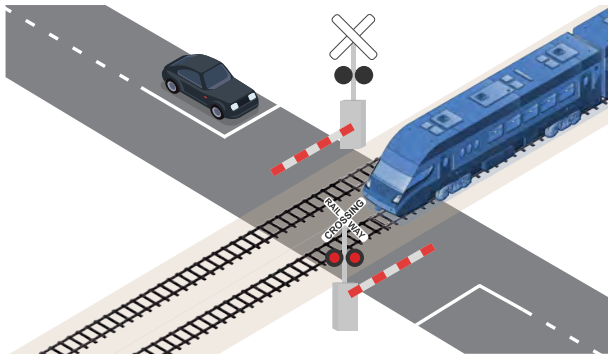
Near hits are of concern as they provide a practical indicator of the potential for collisions. Despite a reduction in near hits in recent years, the number of annual collisions has remained at over 30 from 2015 to 2022. The number of near hits on the rail network also remains high with over 1000 recorded annually from 2015-2019, with a reduction in more recent years.

Level crossing incidents, Australia 2015-2022¹¹

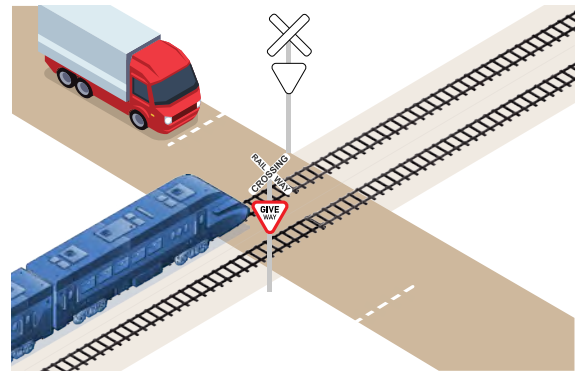


Protection at Level Crossings

Active level crossings are equipped with warning devices, such as flashing lights or gates, which are activated by a signal system to alert pedestrians and vehicles of an approaching train. Passive level crossings include only static signs to warn of the presence of a level crossing. They may be complemented by pavement marking on sealed roads, noting many passive level crossings and most private level crossings are on unsealed roads. Given passive control devices do not change whether or not a train is approaching, passive level crossings require road users to apply more vigilance.

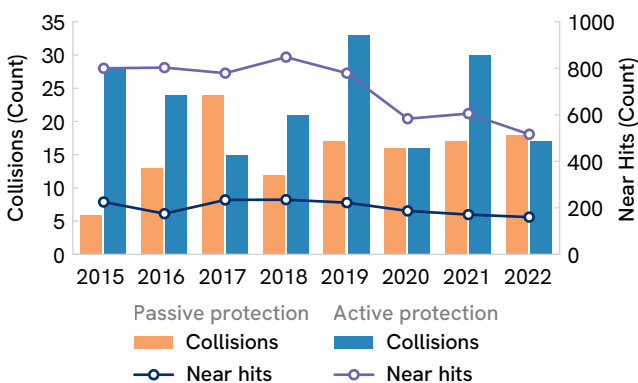


Active level crossing



Passive level crossing

Level crossing incidents by type of protection, Australia 2015-2022¹¹



Despite only 21% of Australia's 20,000+ level crossings having active protection, these level crossings have three to four times more near hits than passive level crossings, mostly due to higher train and road user volumes at these locations, and risk taking around congestion and queuing¹².

The number of collisions, however, is more evenly balanced between active and passively protected crossings, indicating an incident at passive level crossing is more likely to result in harm.

¹¹Incident data is based on the NLXP for open level crossing incidents from July 2014-December 2022 and level crossing characteristics reported in the ALCAM LXM System for open level crossings, accessed January 2023.

¹²Larue, G. S., Naweel, A., & Rodwell, D. (2018). The road user, the pedestrian, and me: Investigating the interactions, errors and escalating risks of users of fully protected level crossings. *Safety Science* (In Press).

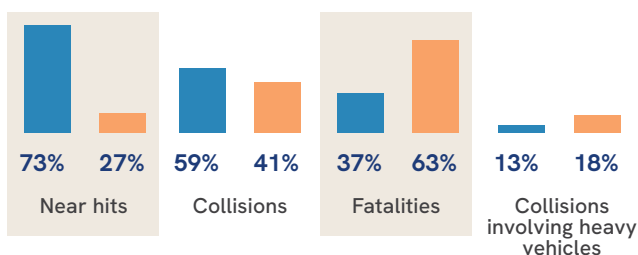
Priorities and over-represented groups

A national focus on over-represented groups will help to prioritise actions, achieve wider network benefits and further reduce level crossing incidents. Smarter low-cost infrastructure, technological solutions and innovative behavioural interventions should be targeted at passive level crossings, heavy vehicles, and pedestrians at active level crossings.

July 2014 - December 2022¹³

Vehicle incidents (excluding bicycles)

Vehicle incidents

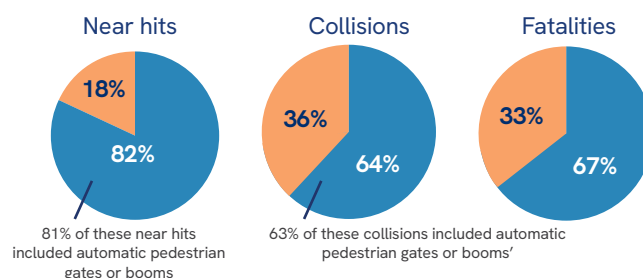


Although more incidents occur at active level crossings with larger train and road vehicle volumes, more fatalities occur at passive level crossings. Heavy vehicles are over-represented in active (13%) and passive (18%) level crossing collisions compared to the distance travelled by heavy vehicles*.

Legend

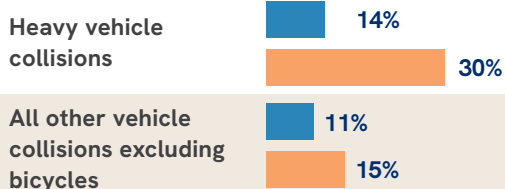
Active level crossings Passive level crossings

Pedestrian and bicycle incidents



Vulnerable road user (pedestrian and cyclist) incidents and fatalities largely occur at active level crossings with automatic controls and often in more urban areas with higher volumes of pedestrians.

Collisions resulting in fatalities or serious injuries



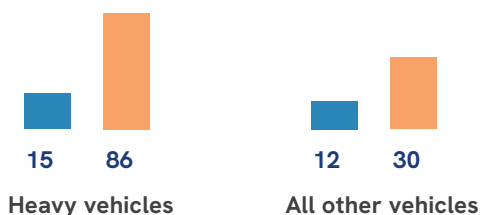
The impact of all vehicle collisions resulting in fatal or serious injuries, is higher at passive level crossings. Heavy vehicle collisions at passive level crossings are twice as likely to result in fatal or serious injuries than collisions with all other vehicles at passive level crossings or heavy vehicle collisions at active crossings.

Pedestrian and bicycle collisions



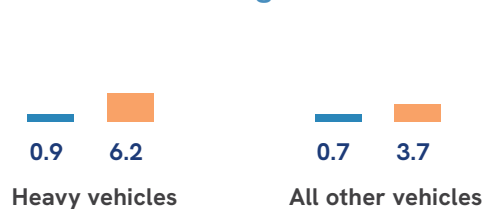
Pedestrians and cyclists are particularly vulnerable to the impacts of collisions at both passive and active level crossings.

Near hits/100 million vehicle passes of a level crossing



The rate of near hits and collisions is higher at passive level crossings, especially for heavy vehicles.

Collisions/100 million vehicle passes of a level crossing



¹³Incident data is based on the NLXP for open level crossing incidents from July 2014-December 2022 and level crossing characteristics reported in the ALCAM LXM system for open level crossings. Pedestrian and cyclist data is filtered to only include data where the type of level crossing is known, accessed January 2023. This data includes limited causal data and categorisation by location, and is limited by the currency of level crossings reported in the LXM System.

*compares to 8% heavy vehicle kilometres travelled 2019-2020 (ABS Vehicle Census, 2021)

Guiding principles for a national approach

Delivering change at a national level means that many stakeholder groups need to work together effectively and efficiently. The NLCSC has adopted the following guiding principles that were developed and tested with key stakeholders, to enable aligned and efficient decision making when delivering and reviewing the Work Plan.

1 Coordination with state jurisdictions

The Strategy provides an opportunity to link to, complement and support the strategies and work programs that each jurisdiction has in place. The NLCSC is a vehicle for close coordination with the state jurisdictions.

2 Clear governance

The NLCSC will progress promising solutions and policy reform at a national level with development and delivery supported through an Industry Reference Group.

3 Nationally consistent approach with industry and stakeholder involvement

Key initiatives will be pursued where a national approach has the potential to leverage initiatives being pursued at state level and those that can only be achieved through a national committee, with industry participation and stakeholder engagement.

4 Focus on key initiatives

The Strategy will implement a small number of higher impact initiatives with clear and identifiable benefits.

5 Evidence-based approach

The strategy will be based on objective, evidence-based analysis of risks and issues and potential benefits of proposed interventions. This will be supported by strong partnerships to expedite implementation.

6 Shared responsibility using a cooperative approach

Recognition that level crossing risk is shared between road and rail networks and collaboration is required between relevant authorities.

7 Focus areas that are underpinned by a safe system approach

A safe system approach underpins the Strategy with areas of focus in Assets, Technology and Innovation; Education and Enforcement; Data Improvement and Knowledge Management.

8 Safety innovations and emerging technologies

A Report on High-Potential Level Crossing Safety Innovations and Emerging Technologies (stocktake) will be commissioned to inform the identification and prioritisation of a pipeline of specific initiatives to be implemented and rolled out.

9 Building on existing level crossing tools

The Strategy will set direction for the maintenance, operation and further development of the National Level Crossing Portal (NLXP) and the Australian Level Crossing Assessment Model (ALCAM) which provide nationally verifiable data.

10 Development of three-year Work Plan

A rolling three-year Work Plan will be developed that sets out the key initiatives that will be pursued over that period.

Involvement

The involvement of the following high-level groups are key to the success of this Strategy:

Government

Transport Agencies

Federal and State governments that enable and prioritise investment into strategies, initiatives and controls that improve safety at level crossings.

Road Managers

State and local road managers that consider, prioritise and deliver road infrastructure and controls that can reduce risk around level crossing interfaces in collaboration with rail infrastructure managers and road users.

Rail and Road Industry

Rail Infrastructure Managers

Manage the rail infrastructure, corridor and controls to reduce risk around level crossings through design and management in collaboration with road managers and road users.

Rolling Stock Operators

Train operators that are directly impacted by level crossing incidents are a key stakeholder in the delivery of safety control measures to improve train visibility and reduce incident frequency and severity.

Road Industry

Involved in the planning, design, construction and maintenance of roads and pathways, including private sector companies, that ensure road management and infrastructure supports level crossing safety.

Regulation, Enforcement and First Responders

Rail Safety Regulator

A risk-based regulator that oversees the application of a systematic decision-making framework to prioritise regulatory activities and inform decision outcomes, based on an assessment of risks to rail safety.

Enforcement Agencies

Involved in ensuring road user compliance at level crossings and as part of education and awareness campaigns aimed at developing skills and changing road user behaviour.

Road Safety and Heavy Vehicle Regulators

Oversee a regulatory framework in relation to road safety including approval for routes used by heavy vehicles, which are over-represented in level crossing incidents.

Emergency Services

State emergency service providers are often first responders at level crossing collisions and their involvement is important for collecting evidence for data analysis purposes.



Road Users

Heavy Vehicle Users

Road freight transport vehicles are over-represented in level crossing incident data and are one of the most important road user groups to focus initiatives on and seek involvement from.

Pedestrian, vehicle and other users

Everyone who passes over level crossings via a road or pathway by any type of vehicle, device or on foot, including pedestrians and persons travelling by mobility and recreational devices, heavy and light vehicles, buses, motorcycles and bicycles. Influencing their actions and behaviour is integral.

Private Road Managers

Involved in managing private level crossing safety in collaboration with rail infrastructure managers. Their involvement is critical in ensuring private roads include measures to reduce level crossing incident risk.

Industry Support and Advocacy

Research Institutions

Universities and other research bodies that undertake critical research and trials driving innovations and testing emerging technologies to be adopted.

Investigation Agencies

Investigate the causes of collisions and improve transport safety for the greatest public benefit through independent investigations and influencing safety action.

National Industry Bodies

Provide insight into industry concerns and a united representation of industry members. They assist government and industry in pursuing matters of interest including the provision of good practice standards, guidance and advice.

Communities and Advocacy Groups

Provide voices that help inform and champion practical action that can be taken to reduce risk to the general public and within specific community areas.





STOP
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Focus Areas

Four key focus areas have been clearly identified to enable focus when delivering Vision Zero and the objectives of this Strategy over the next ten years. In this section, each focus area details the challenges, opportunities, approach and initiatives for implementation.

Analysis of level crossing incident data and qualitative stakeholder engagement findings revealed that key challenges and opportunities associated with level crossing safety could be grouped into four key focus areas.

Each focus area has component parts that are further detailed in this section. The components aim to create clarity on the need and how it will be addressed, specifically covering the following aspects:

- **Challenges or opportunities** - the underlying problems, issues and possibilities that are being addressed
- **Desired outcomes** - what success looks like in the long-term
- **Key initiatives** - summarise detailed actions that are contained within the Work Plan
- **Involved parties** - key stakeholder groups that should play a key role in delivery of the initiatives and
- **Indicators of success** - leading and lagging measures or ways to identify success and adoption beyond incident statistics.

Areas of National Interest

Other key considerations include:

- Rural and regional level crossings typically have lower (passive) protection with a higher vehicle collision rate and severity of impact
- Most incidents still occur at actively protected crossings with pedestrians particularly at risk
- Heavy vehicles are over-represented in level crossing incidents, especially at passive level crossings.

1. Education and Enforcement

Delivering sustainable change in level crossing user behaviour through education and enforcement campaigns.

2. Assets, Technology and Innovation

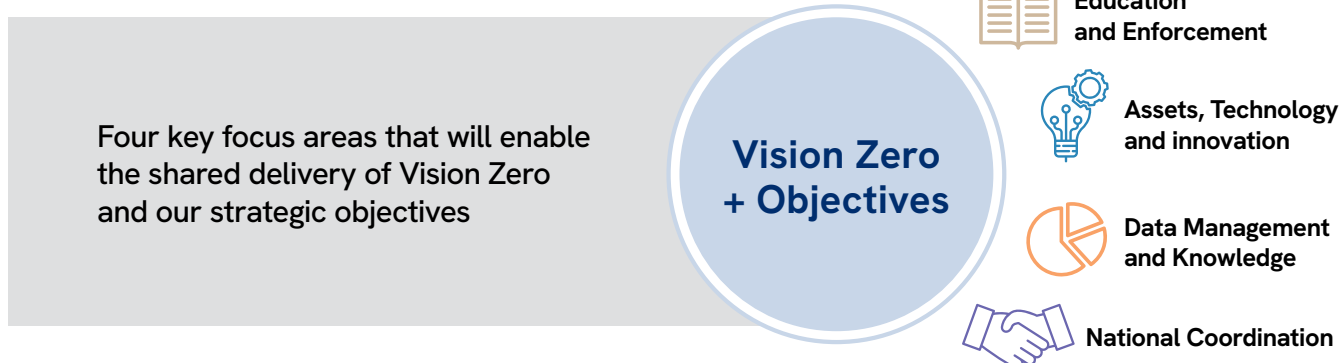
Improved safety controls, emerging technology and innovations present opportunities to cost-effectively improve level crossing safety.

3. Data Improvement and Knowledge Management

Increased accuracy, consistency and availability of level crossing data and reporting that enables strategic, tactical and operational decisions.

4. National Coordination

Improved alignment, integration, coordination and responsibility around level crossing research, Strategy, policy, standards, maintenance and implementation is required.





1. Education and Enforcement



Challenge

Driving positive change in level crossing user behaviour to reduce risk at level crossings.



Desired outcomes

- Improved level crossing user behaviour through skills development, monitoring and enforcement
- Effective educational measures are implemented that generate awareness of level crossings, establish understanding of the required behaviour by road users at level crossings and ensure users always comply with level crossing controls through ongoing enforcement.

Level crossing incidents often occur as a result of road users failing to give way to passing trains, particularly when the road user is familiar with the level crossing. Education and enforcement programs are levers that can be used to influence road users' behaviour.

Despite active level crossings providing a higher level of controls than passive level crossings, most incidents continue to occur at active level crossings due to risk-taking behaviours caused by queuing, distractions, or impatience^{14,15}. Pedestrian incidents are particularly over-represented at active level crossings, emphasising the need for behaviour change initiatives that have a significant impact on vulnerable road users. Increased enforcement or monitoring may discourage deliberate violations, while community-based initiatives could also reduce incidents by promoting public ownership and support.

In rural and regional areas, challenges such as driver complacency and risk-taking can also contribute to level crossing incidents¹⁶. Heavy vehicles are disproportionately involved in level crossing incidents, particularly at passive level crossings, and these incidents are more likely to result in death or injury. Short stacking, or a lack of space between a level crossing and an intersection, poses an additional risk, and this issue will need to be addressed in light of the increasing loads and lengths of heavy vehicles.

Rail and road regulators also have a role in overseeing and enforcing regulatory frameworks. This ensures the rail and road industry fulfils its safety obligations, including through heavy vehicle regulation and compliance with level crossing interface agreements. As part of the safe system approach, the rail and road industry has responsibilities to ensure safety management in rail and road corridors, including compliance with relevant standards, policies and regulation. This includes the provision of appropriate infrastructure and corridor maintenance, as well as operational aspects such as networking, scheduling, and employee training.

To achieve a reduction in collisions and near hits across the entire network, efforts should be focused on driving behaviour change through monitoring, enforcement, education campaigns, and skills awareness and development initiatives. The need for these measures will only grow in importance as our road and rail infrastructure assets grow - sharing what works and doesn't at a national level will reduce cost, improve implementation times and ultimately improve user behaviour at level crossings.

¹⁴ Larue, G. S., Naweed, A., & Rodwell, D. (2018). *The road user, the pedestrian, and me: Investigating the interactions, errors and escalating risks of users of fully protected level crossings*. *Safety Science* (In Press).

¹⁵ Sochon, P. & Davies, S. (2007). *Driver distraction—a factor in level crossing fatalities*. In: I.J. Faulks, M. Regan, M. Stevenson, J. Brown, A. Porter & J.D. Irwin (Eds.). *Distracted driving*. Sydney, NSW: Australasian College of Road Safety.

¹⁶ Davey, J., et al. (2008). *The experiences and perceptions of heavy vehicle drivers and train drivers of dangers at railway level crossings*. *Accident Analysis and Prevention*.

Key challenges and opportunities



Heavy vehicles are over-represented in level crossing incidents with opportunities to increase awareness around heavy vehicles and their higher risk at level crossings.



Inconsistent enforcement nationally
There are opportunities for better collaboration with enforcement agencies to encourage behaviour change.



Evidence-based campaigns
Data is not consistently used or shared with key stakeholders to identify focus areas and performance indicators that underpin education and enforcement.



Influencing human behaviours through education campaigns and targeted community initiatives.



Coordinated and focused **national messaging** to help drive behaviour change in areas of highest impact, including nationally over-represented groups.



Opportunity for **consistent safety messages** for young drivers via learner driver tests and/or school focused education campaigns.



Efficient sharing of state campaigns, such as opportunities to leverage effective state-led campaigns.

Key initiatives

1. Identify level crossing education and enforcement programs, changes or initiatives to support state programs

In collaboration with industry, the NLCSC will identify education and enforcement initiatives to leverage and support state based programs. This will draw on evidence-based analysis that identifies any complementary policy changes or national initiatives with the potential to materially reduce the risk of level crossing crashes, particularly those involving heavy vehicles.

2. Reduce heavy vehicle incidents

To address the over-representation of heavy vehicles in level crossing incidents, coordinate the development and delivery of an industry awareness and education program to be rolled out nationally.

Involved parties

- NLCSC
- Government transport agencies
- Safety regulators
- Enforcement agencies
- Rail and road industry
- Heavy vehicle regulators
- Rail and road managers
- Heavy vehicle industry
- Level crossing users
- Industry support and advocacy.

Indicators of success

- Increase in level crossing awareness by heavy vehicle industry
- Reduction in heavy vehicle representation in incident statistics
- Increase in level of community awareness
- Amount of material and campaigns shared
- Increase in number of enforcement activities
- Implementation of nationally consistent penalties for level crossing infringements
- Number of education projects identified that can be rolled out nationally.



2. Assets, Technology and Innovation



Opportunity

Improved safety controls, emerging technology and innovations present opportunities to cost-effectively improve level crossing safety.



Desired outcomes

- Safety controls and technological and innovative solutions are implemented, cost-effectively improving level crossing safety
- New engineering and technological measures alerting or guiding road users as safely as possible through level crossings are examined and trialled, and ultimately cost-effective ways to reduce level crossing incidents are identified.

Implementing low-cost, high-impact infrastructure solutions, and ongoing maintenance is critical for reducing level crossing safety risks. Technological advancements and other innovations present emerging opportunities to further reduce this risk.

Numerous trials and research are underway around Australia and internationally that are investigating new ways technology can assist in making roads and railways safer, such as new approaches to level crossing activation, vehicle communication and intelligent transport systems. These promising new solutions are being consolidated at a national level to enable a shared program for these to be rolled out.

In addition, innovative ways of more effectively and efficiently improving safety controls and reducing risk are required. Other than upgrading to active protection, promising initiatives that can improve safety at passive level crossings may include improving visibility of trains and level crossings, reduced speed limits, road treatments, smart signage and detection devices.

The ONRSR has identified regional level crossing safety as a national priority and is partnering with research institutions to investigate opportunities to improve safety at passive level crossings through technology and innovation, including trials to improve train visibility. Working with the rail and road industry, this Strategy will progress high impact initiatives such as train visibility improvements and facilitate implementation at a national level, while also investigating objective measures for prioritising level crossing removal that can be rolled out nationally, applying shared learnings from jurisdictional removal programs.

Recent incidents at private or occupational level crossings have also highlighted the need to consider how innovative and cost-effective safety measures can be implemented at these level crossings which are reliant on the owner entering into an interface agreement with the rail infrastructure manager to address level crossing safety.

Focus on reducing overall system risk load through a combination of asset, technology and innovation solutions should be prioritised.

Key challenges and opportunities



Opportunities for low-cost, high-impact interventions are required to achieve the most impact across a broader scale and across transport systems, networks and communities.



Advancements in technology and other innovations present opportunities to improve level crossing safety, awareness and vehicle communication but there is also the risk of how automated technologies will be equipped to detect hazards and how they will respond to risk.



Stocktake and shared work program

There are numerous trials ongoing throughout Australia by different jurisdictions, authorities and industry to improve level crossing safety. Sharing the outcomes of these trials is critical to ensuring they can be considered, prioritised and implemented most effectively.



Opportunities to consolidate, eliminate or prevent level crossings should be identified and considered as part of other broader level crossing controls to achieve the greatest risk reduction in the system.



Level crossing maintenance

Maintenance around level crossings is an ongoing requirement under interface agreements to reduce safety risk and is particularly important for passive level crossings. As outlined in the relevant interface agreement, road and rail managers are responsible for collaborative assessments of the hazards and controls including inspection and condition monitoring, vegetation control, maintenance of signage, road infrastructure and interface management.

Key initiatives

3. Compile and maintain a national repository of level crossing research, trials and innovations

Commission a “National Report on High-Potential Level Crossing Safety Innovations and Emerging Technologies” that includes a stocktake and assessment of the results of trials and innovations in each jurisdiction during the prior period; the research work completed and opportunities identified; and the new and emerging safety technologies; to provide a synthesised evidence-based assessment that identifies high-potential new initiatives that merit national consideration.

4. Develop a shared work program of high-potential initiatives

Develop a shared work program of a set of high-potential initiatives on which to focus at national level, including any enabling policy reform, for potential consideration by Infrastructure and Transport Senior Officials’ Committee. This will incorporate findings arising from the above Report.

Involved parties

- NLCSC
- Government transport agencies
- Rail and road managers
- Safety regulators
- Rail and road industry
- Research institutions
- Industry support and advocacy.

Indicators of success

- Maintenance of an up-to-date register of technologies and innovative trials
- Measures which show key stakeholders accessing information
- Evidence that interventions and new technologies have been adopted
- Investment in research and development.



3. Data Improvement and Knowledge Management



Challenge

Reliability, consistency and availability of level crossing data and reporting.



Desired outcomes

- Level crossing data is gathered and used more effectively
- Incidents at level crossings are captured in a nationally consistent manner, enabling improved analysis and understanding of the characteristics surrounding incidents.

This Strategy seeks to inform decision making and identify areas to focus national level crossing investment through evidence-based assessment.

This requires:

- an up-to-date database of level crossings including their infrastructure condition and safety risk
- accurate and reliable incident reporting to identify the causes of level crossing incidents.

The Australian Level Crossing Assessment Model (ALCAM) provides a nationally consistent approach to assess level crossing conditions and risk by:

- identifying key potential risks at level crossings (both road and pedestrian crossings)
- assisting in the prioritisation of crossings for upgrades and
- supporting the decision making process when determining the most cost effective treatments.

While ALCAM is an important part of level crossing analysis, challenges remain in undertaking regular surveys and ensuring information is current.

Similarly, significant improvements have been made in relation to level crossing incident data capture and reporting in recent years through the development of the National Level Crossing Portal (NLXP). There is further potential to improve this by working collaboratively with all stakeholders and exploring opportunities for wider information sharing, better data capture and richness. This is being driven by ONRSR's commitment to further develop national level crossing incident data.

A robust and comprehensive evidence base is essential for informed and targeted research to better analyse and understand level crossing incidents.

Key challenges and opportunities



Limited and inconsistent incident reporting
Rail operators lack a consistent method for defining and recording near hits and there is a general lack of causal information recorded for level crossing collisions by first responders.



Limited access to data
Access to level crossing data is currently very limited and should be expanded.



Opportunities for ALCAM
While ALCAM is a valuable assessment tool, the reported condition of level crossing infrastructure and risk score varies significantly depending on when the latest ALCAM assessment was undertaken.



Through **collaboration with stakeholders** under the shared responsibility principle there is opportunity to:

- Improve data sets
- Reconcile different reporting mechanisms and processes to improve data consistency
- Leverage the numerous research studies and trials underway nationally and internationally and sharing complementary research to focus on areas where less is known.

Key initiatives

5. Further develop the National Level Crossing Portal (NLXP) incident database

Establish a roadmap for further developing the data sources and functionality of the NLXP as a national resource for analysis of verifiable data on incidents and near misses to inform Strategy, policy, planning and investment.

6. Support continuous improvement to the Australian Level Crossing Assessment Model (ALCAM) risk assessment tool

Work with the National ALCAM committee to improve the effectiveness of the assessment tool including any recalibrations that may be beneficial, harnessing technological solutions that can assist. This will be based on verifiable evidence provided by the NLXP; and on any other linked activities that ensures the robustness of risk assessments, and the application of the verifiable evidence they provide to prioritise effective treatments.

Involved parties

- NLCSC
- Safety regulators
- Rail and road managers
- Enforcement agencies and emergency services
- National ALCAM committee
- Research institutions
- Investigation agencies
- National industry bodies.

Indicators of success

- Provision of rich data and information to inform decision-making and guide implementation
- Information to support decision-making is accessible, current and shared
- National standards are adopted for investigating and recording data related to level crossing incidents
- Consistent national requirements for reporting and undertaking of ALCAM surveys.



4. National Coordination



Challenge

Level crossing research, strategy, and policy is often undertaken independently by jurisdictions and not fully shared with opportunities to improve alignment, integration, and coordination.



Desired outcomes

- Improved knowledge sharing
- Achievement of nationally consistent and coordinated arrangements across jurisdictions, including working together to achieve common aims and goals.

Achieving Vision Zero requires a nationally coordinated, integrated and aligned level crossing safety strategy, leveraging and supporting state and local jurisdictions, industry and other key stakeholders advocating for level crossing safety.

The National Coordination focus area brings together and supports the other three focus areas of this Strategy – Education and Enforcement; Assets, Technology and Innovation; and Data Improvement and Knowledge Management – to collectively drive actions that will be most effective if implemented nationally to reduce incidents at level crossings.

Greater benefits can be achieved at a national level by leveraging and sharing successful strategies, policies or trials underway and by providing nationally consistent messaging and enforcement. This focus area strives for improved collaboration by all parties, with the understanding that level crossing safety is a complex road and rail related safety issue with many and varied root causes. Shared responsibility underpins level crossing safety, and this is the foundation of the safe system approach and level crossing interface agreements.

Acknowledging that improvements to level crossing safety will need involvement by all parties is the first step towards realising Vision Zero. Given the large number of stakeholders involvement and buy-in that is required, national coordination, leadership and direction is required with all levels of government fully engaged. The Commonwealth government will support the NLCSC in driving actions from this national Strategy.

At a practical level, the development and implementation of a national guideline to inform the design and controls at level crossings to reduce risk will assist in achieving national consistency. An initial step would be a comprehensive review of applicable standards that could be harmonised, as well as consideration of opportunities to increase alignment of level crossing design and controls with road signage conventions to simplify for road users.

Key challenges and opportunities



Coordination and consistency

Better knowledge/information sharing and consistent application of standards and processes across jurisdictions, as well as industry is required.



Shared ownership and responsibility

More involvement by all stakeholders is required, especially shared responsibility between rail and road managers. There is potential to reduce institutional and other barriers to delivering improvements to level crossing safety that have arisen due to multiple stakeholder needs.



An action-oriented governance group is required

An implementation team or task force is needed to guide the Strategy and Work Plan.



Investment

Coordinated and prioritised investment is required to guide funding and enable initiatives to be delivered.



Potential policy gaps in encouraging private organisations to implement new technologies, or restrictive standards.



National guideline on best practice level crossing design

A consistent guideline in the design and implementation of level crossing controls to reduce risk is required. This will allow the opportunity for both rail infrastructure managers and road managers to collaboratively influence road and rail aspects related to level crossing design and treatment and achieve consistency across jurisdictions.

Key initiatives

7. Develop a national model to progress highest potential initiatives

In collaboration with key stakeholders, the NLCSC will develop an agreed model for proving, scaling up and rolling out the highest potential initiatives that may offer solutions that reduce risk at level crossings.

8. Identify further opportunities to align, integrate and coordinate initiatives

The NLCSC will work with key stakeholders to align, integrate and coordinate initiatives that have potential to contribute to the reduction of crashes and near-hit incidents at level crossings at a national level.

Involved parties

- NLCSC
- Government transport agencies
- Rail and road industry
- Safety regulators
- Investigation agencies
- Rail and road managers
- Enforcement agencies
- Research institutions
- Road users
- National industry bodies.

Indicators of success

- Reduction in extent of inconsistent practices
- Identification of opportunities for coordination of activities
- Coordinated and prioritised investment.



Delivery and evaluation

The 10-year Strategy will be underpinned by a three-year Work Plan to drive actions in the short, medium and long-term. Success will hinge on the shared efforts of all parties driving actions with ongoing review and evaluation. An agile approach will ensure effort is focused where needed depending on priorities and interdependencies.

A small number of high impact actions are identified in the 2023-2025 Work Plan, including measures of success and timing within this period. This ensures that national efforts are focused on actions that can make a difference.

Keeping the Strategy relevant

To ensure the Strategy remains agile and drives appropriate outcomes, the rolling three-year Work Plan will consist of short, medium and long-term actions with the full Work Plan undergoing review and refinement on an annual basis throughout the ten year life of the Strategy. The Strategy and Work Plan will continue to evolve and to be responsive to contemporary trends in the rail and road environment.

This Strategy, including progress and outcomes, will be fully reviewed every three years (noting the final year will be resetting and development of a new Strategy). This will allow for updates to key information and importantly will provide a platform to challenge the direction at a strategic level.

Reporting and regular review of the Work Plan will be important to ensure level crossing safety efforts align with technological and environmental change, as well as remaining flexible to changing priorities and trends.



Accountability

Delivery of level crossing safety improvements will require national effort and coordination with clear accountability and shared responsibility.

The NLCSC will be accountable for guiding and coordinating the implementation of the Strategy and Work Plan by driving national level crossing safety policy and reform, coordinating initiatives, sharing knowledge and supporting stakeholder engagement.

The Work Plan provides a framework for action for the NLCSC and other key parties involved in delivering level crossing safety improvements. Involvement from other stakeholders is required to support the delivery of actions, as detailed in the Work Plan. An important element in ensuring the success of this Strategy will be ongoing participation by all parties to help achieve the objectives.

Funding and investment

Once projects under each action and initiative in the Work Plan are agreed upon, the scope and source of funding will be determined. Opportunities will be sought to leverage existing or upcoming projects, and as an add-in to existing projects, particularly where benefits are shared. Timing in the Work Plan is indicative only, subject to funding availability and other priorities.

Evaluation









The NLCSC will track progress of Work Plan actions and achievement of the strategic objectives, including annual reporting to government representatives from each jurisdiction via the Infrastructure and Transport Senior Officials' Committee on behalf of the Infrastructure and Transport Ministers.







The following performance indicators will be used to track the overall effectiveness of the Strategy and the long-term vision of zero harm at Australia's level crossings:








- Level crossing incident analysis
- Progress (including outcomes) against initiatives and strategic objectives for each focus area.

Work Plan 2023-2025

Key Initiatives		Key Actions	Measures	Timing (year)			Key parties involved
				23	24	25	
1. Education and Enforcement	1. Identify level crossing education and enforcement programs, changes or initiatives to support state programs	1.1 Undertake a national review of campaign approaches to determine the most effective ways of driving behaviour change, raising awareness and developing skills.	<ul style="list-style-type: none"> Increase in level of community awareness Number of education projects identified that can be rolled out nationally 				<ul style="list-style-type: none"> NLCSC Government transport agencies Safety regulators Enforcement agencies Rail and road industry Road users Rail and road managers Industry support and advocacy
		1.2 Investigate opportunities for level crossing safety awareness to be incorporated into driver licence testing, school and/or community focused education campaigns.	<ul style="list-style-type: none"> Amount of material and campaigns shared 				
		1.3 Identify opportunities to leverage effective enforcement opportunities through collaboration with the road safety sector and enforcement agencies.	<ul style="list-style-type: none"> Increase in number of enforcement activities 				
		1.4 Reduce overall level crossing risk load for stakeholder groups by implementing nationally consistent penalties for level crossing infringements.	<ul style="list-style-type: none"> Implementation of nationally consistent penalties for level crossing infringements 				
	2. Reduce heavy vehicle incidents	2.1 Coordinate the development and delivery of a national heavy vehicle industry awareness and education program by efficiently leveraging and sharing effective content across organisations that focuses on delivery to key stakeholders at the right time, place and frequency.	<ul style="list-style-type: none"> Increase in awareness for heavy vehicle operators Reduction in heavy vehicle representation in incident statistics 				<ul style="list-style-type: none"> NLCSC Government transport agencies Road managers Heavy vehicle regulators Road users Heavy vehicle industry Industry support and advocacy
		2.2 Identify policy, permits and enforcement mechanisms targeted to this group specifically actions noted in 1.4 and 8.3 respectively.	<ul style="list-style-type: none"> As per 1.4 and 8.3 respectively 				

Key Initiatives		Key Actions	Measures	Timing (year)			Key parties involved
				23	24	25	
2. Assets, Technology and Innovation	3. Compile and maintain a national repository of level crossing research, trials and innovations	3.1 Prepare a National Report (stocktake) on High-Potential Level Crossing Safety Innovations and Emerging Technologies.	<ul style="list-style-type: none"> Completion of a report on research, trials and innovations 				<ul style="list-style-type: none"> NLCSC Government transport agencies Safety regulators Rail and road industry Research institutions
		3.2 Develop, maintain and share an ongoing register of research, trials and innovations.	<ul style="list-style-type: none"> Maintenance of a shared up-to-date register of technologies and innovation trials 				
		3.3 Develop a National Report on Train Illumination Trials and Innovations including changes to relevant standards.	<ul style="list-style-type: none"> Completion of a report on illumination trials and innovations and changes to standards 				
	4. Develop a shared work program of high-potential initiatives	4.1 Identify objective measures for identifying and prioritising level crossing removal	<ul style="list-style-type: none"> Objective measures for level crossing removal are identified and nationally adopted 				<ul style="list-style-type: none"> NLCSC Rail and road industry Government transport agencies Rail and road managers Industry support and advocacy
		4.2 Work with Industry to implement train visibility improvements based on current research and trials, including innovations and standards identified in Action 3.3.	<ul style="list-style-type: none"> Evidence that low-cost high-impact interventions and new technologies have been adopted 				
		4.3 Investigate technological opportunities that alert road users to level crossings and intelligent transport systems that improve communication between road and rail vehicles.	<ul style="list-style-type: none"> Evidence that technological opportunities have been investigated 				
		4.4 Prioritise and implement other low-cost high-impact interventions.	<ul style="list-style-type: none"> Application of innovations 				
		4.5 Work with jurisdictions and relevant road and rail managers to identify disused level crossings and assist the development of a model for the decommissioning of disused level crossings.	<ul style="list-style-type: none"> Development of a model to decommission identified disused level crossings 				

Key Initiatives		Key Actions	Measures	Timing (year)			Key parties involved
				23	24	25	
3. Data Improvement and Knowledge Management	5. Further develop the (NLXP) incident database	5.1 Identify and address deficiencies in incident reporting, consistency of incident terminology (e.g. near hits) and the NLXP data capture.	<ul style="list-style-type: none">▪ Increase in richness of incident data capture▪ Consistency in application of near hits				<ul style="list-style-type: none">▪ NLCSC▪ Safety regulators▪ Investigation agencies▪ Rail and road managers▪ Enforcement agencies and emergency services▪ Research institutions
		5.2 Work with data owners to improve incident data availability.	<ul style="list-style-type: none">▪ Availability of level crossing data				
		5.3 Explore methods to capture environmental factors at the time of incident occurrence, and examine opportunities to incorporate environmental data into the NLXP or another suitable database.	<ul style="list-style-type: none">▪ Environmental data capture methods are investigated▪ Opportunities for inclusion in databases are identified				
		5.4 Investigate opportunities to access and incorporate investigation findings and recommendations such as from Coroners or transport investigation authorities into level crossing incident data.	<ul style="list-style-type: none">▪ Evidence that sources of investigation findings and recommendations have been identified▪ Opportunities for inclusion in databases have been identified				
	6. Support continuous improvement to the ALCAM risk assessment tool	6.1 work with the National ALCAM Committee to support the continuous improvement of ALCAM	<ul style="list-style-type: none">▪ Nationally consistent and best practice ALCAM requirements are implemented				<ul style="list-style-type: none">▪ NLCSC▪ National ALCAM committee▪ Rail and road managers▪ National Industry bodies
		6.2 Support the National ALCAM committee's ALCAM National Training Strategy	<ul style="list-style-type: none">▪ Number of level crossings surveyed under current ALCAM model				

Key Initiatives	Key Actions	Measures	Timing (year)			Key parties involved
			23	24	25	
4. National Coordination	7. Undertake a national model to progress highest potential initiatives	7.1 Undertake a concept study to identify data gaps and available sources that will inform areas of greatest need for passive level crossing upgrades nationally.				<ul style="list-style-type: none"> NLCSC Government transport agencies Rail and road industry Rail and road managers
		7.2 Considering the stocktake of research, trials, and innovations underway in Action 3.1, and identified in Action 3.3, develop an agreed model for proving, scaling up and rolling out the highest potential initiatives.				
		7.3 Identify and prioritise initiatives that maximise a reduction in broader risk load across systems, communities or sections of railway.				
	8. Identify further opportunities to align, integrate and coordinate initiatives	8.1 Coordinate activities and responsibilities between road and rail authorities and across jurisdictions and industry.				<ul style="list-style-type: none"> NLCSC Government transport agencies Rail and road industry Safety regulators Investigation agencies Rail and road managers Enforcement agencies Research institutions National industry bodies
		8.2 Develop a national guideline on best practice for level crossing design incorporating harmonisation of standards and opportunities to align level crossing design and controls with road signage conventions.				
		8.3 Address over-represented groups through collaboration between road and rail authorities.				
		8.4 Work with jurisdictions and relevant parties to promote the development of interface agreements, particularly in relation to interface agreements at occupational level crossings on privately managed land.				



Contact us

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