



STOP
ON RED
SIGNAL



LEVEL
CROSSING
SAFETY
STRATEGY
2022-27



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FOREWORD

TasRail provides a critical network for the transport of freight across our State. Wherever our tracks meet a road or footpath, a unique set of safety hazards come together.

While they do not occur often, any incident at a railway crossing can cause service disruptions, motorist delays, property damage and, in the most serious cases, injury or death. The impacts on communities and the economy, as well as the loss of confidence in the rail transport system, can be significant and far-reaching.

Even a collision with a low-speed train can result in considerable damage, serious injury or death, particularly for pedestrians.

Each incident is a reminder of the risks present at level crossings and the need for drivers, motorcycle riders, cyclists and pedestrians to obey the road rules and approach crossings with care.

TasRail recorded five collisions and 204 near misses at level crossings between July 2018 and June 2022. All incidents have an immeasurable effect on train drivers, other railway employees, and emergency services including their families.

As humans, we are all capable of making mistakes – and we do – every day. Recognising this helps us create a more forgiving road and rail network to minimise harm and ensure that those mistakes do not result in death or severe injury.

TasRail has made significant safety improvements to railway crossings over the past decade. We will continue to implement initiatives to reduce risk.

Such initiatives include: engineering and infrastructure improvements, warning signals, upgraded signage, improving sightlines, and education and enforcement.

However, as in other states and territories, TasRail will work cooperatively with road owners to investigate the potential for reducing the number of public road crossings, including via grade separation, and will actively discourage new crossings. This strategy has the greatest potential to achieve our objective of reducing the likelihood of collisions and near misses at TasRail’s managed level crossings.

The fewer opportunities for people and vehicles to meet at a level crossing, the safer and more reliable our network will be.

Working with the community, we will build a better and more integrated approach to improving safety at level crossings.

TASRAIL'S OBLIGATIONS

As a rail infrastructure manager and rolling stock operator, TasRail must operate in compliance with the *Rail Safety National Law 2012* (RSNL) and all associated regulatory frameworks, including national standards and the *Rail Infrastructure Act 2007* (Tas). TasRail also has an obligation to the community to work to improve safety at level crossings.

Responsibility for managing railway crossing safety is jointly shared with public road managers, namely local councils and the Tasmanian Government (Department of State Growth).

Under RSNL, 'safety interface agreements' (SIA) between TasRail and each road manager must be formally documented. They set out the responsibilities of each party, including how they will share information and identify and manage risks at railway crossings to improve safety.

Private level crossings, including stock crossings, are subject to interface management requirements. TasRail manages this via license agreements with private land owners.

TASRAIL'S RESPONSIBILITIES

TasRail's responsibilities include, but are not limited to, the following functions:

- Identify, assess and manage level crossing risks.
- Provide and maintain suitable signage at each level crossing, complying with AS1742.7.
- Maintain clear sightlines at each level crossing, complying with AS1742.7.
- Maintain the pavement surface between the rails and to a minimum of 0.6m on either side (to ensure correct alignment of the rail and the adjoining road surface).
- Maintain active level crossing equipment.
- Report and investigate incidents at level crossings.
- Install and maintain mazes, signage and 'tactiles' at pedestrian level crossings.
- Maintain level crossing data and information to help manage risk.
- Regular engagement with public road managers

TasRail also has obligations for level crossings on non-operational lines. There the focus is on safe pavement surfaces for road and pedestrian traffic.

ROAD MANAGER'S RESPONSIBILITIES

The relevant public road manager is responsible for the following functions:

- Identify, assess and manage level crossing risks.
- Provide and maintain suitable advanced warning signage at each level crossing, complying with AS1742.7.
- Provide and maintain suitable road marking at each level crossing, complying with AS1742.7.
- Provide and maintain 'automated advanced warning signalised' (AAWS) equipment, complying with AS1742.7. (Note: Currently only the Dept of State Growth operates AAWS on State Roads)
- Maintain the road pavement surface from 0.6m from each rail.
- Regular engagement with TasRail (rail infrastructure manager).

The TasRail Level Crossing Strategy has been developed by the TasRail Level Crossing Steering Committee. It is to guide existing and future programs of work.

EXPECTATIONS OF THE OFFICE OF THE NATIONAL RAIL SAFETY REGULATOR (ONRSR)

"Every year, right around Australia, people die needlessly at level crossings. Reducing safety risks at crossings and preventing these tragedies is a collective community responsibility. Be it members of the public, rail transport operators, the broader rail and road transport industries, governments, emergency services or safety regulators, everyone has a vital role to play."

- *ONRSR Policy on Level Crossings*

PUBLIC RESPONSIBILITIES

- Abide by relevant road rules near level crossings.



GOVERNANCE

From a business perspective, the accountability for level crossings on the operational and non-operational rail corridors is shared between departments in TasRail.

The Level Crossing Steering Committee advises and makes recommendations to the TasRail Executive on policy direction, management and standards for railway level crossings on the TasRail-managed network.

The main TasRail departments, and their accountabilities and responsibilities for level crossing safety, are:

ASSET MANAGEMENT

- Develop and own the level crossing strategy.
- Inspect and maintain public level crossings to ensure they comply with AS1742.7.
- Inspect and maintain all level crossings on the operational network to ensure they comply with internal maintenance standards.
- Manage SIAs with each public road manager.
- Assess the impact of change of use of level crossings.
- Construct new or upgraded level crossings, and remove level crossings.
- Do ALCAM assessments for existing and proposed public level crossings.
- Notify road managers of work coming up on level crossings.
- Manage the pavement and signage for private level crossings.
- Be an active member of the National ALCAM Committee.
- Be an active member of the National Level Crossing Safety Committee.
- Inspect and maintain non-operational public level crossings.
- Provide post-incident data from locomotives and active level crossings.
- Manage public crossings.

PROPERTY AND COMPLIANCE

- Maintain current SIAs with each public road manager.
- Review and assess applications for proposed level crossings in consultation with the Infrastructure Assets Manager and the Signalling Asset Manager.
- Review and assess all planning applications within 50 metres of the railway to protect sightlines and to assess and mitigate any risk from a change in conditions.
- Manage the TasRail permit process for road managers undertaking works in the rail corridor.
- License private level crossings and stock crossings.

SAFETY, HEALTH AND ENVIRONMENT

- Report notifiable occurrences to ONRSR.
- Submit notification of change requests to ONRSR.

CORPORATE RELATIONS

- Manage the interface with the general public, including post-incident.
- Promote level crossing safety in the community.

TASRAIL'S MANAGED LEVEL CROSSINGS

THE OPERATIONAL NETWORK

There are almost 200 authorised public access level crossings across the operational network, including over 105 active level crossings and 85 passive level crossings, plus a significant number of private and stock crossings.

The safety risks at each crossing vary depending on train speed, road speed, traffic volume, vehicle type and crossing type.

Over half of the public access level crossings are equipped with active controls, which include flashing lights and bells (one crossing is also fitted with boom gates). The other public road crossings are passively protected by Stop or Give Way signage and other safety controls including road markings and advanced warning signage.

THE NON-OPERATIONAL NETWORK

TasRail's responsibilities for rail crossings across the non-operational network include maintaining safe pavement surfaces between the rails and to 0.6 metres from the outer rail, and ensuring that all rail lines not in use display the appropriate signage consistent with AS1742.7.

STRATEGIC INFRASTRUCTURE CORRIDORS

TasRail is not responsible for the parts of non-operational rail corridors that have been declared Strategic Infrastructure Corridors or otherwise removed from Schedule One of the *Rail Infrastructure Act 2007*.

ASSESSING RISK

Level crossing safety is a priority for TasRail, which is reflected in its strategic planning and infrastructure investment. TasRail is an active member of the Australian Level Crossing Assessment Model (ALCAM) committee.

ALCAM is the preferred assessment tool for identifying risks and risk ratings at level crossings. It helps TasRail prioritise which level crossings to upgrade or which new safety controls to implement. ALCAM is used for assessing risks on both road and pedestrian level crossings and to help work out the most effective treatments.

ALCAM, originally known as the 'Risk Scoring Matrix', was developed in 1999. In 2002 the matrix was renamed ALCAM, and a national committee was set up to make sure it was developed and used in a consistent way. In 2004, a Microsoft Access database was developed (Level Crossing Management System – LXM) to maintain data and run assessments. This LXM system was adopted formally by the ALCAM committee. In 2014 the LXM system was redeveloped into a web application.

ALCAM has been significantly redeveloped over the last three years. It has a new Traffic Exposure Model, Infrastructure Model, and Consequence Model, which have all been accepted by the national committee.

Where ALCAM is needed to assess existing crossings, third-party development, or request for new or relocated rail crossing, TasRail will engage the services of a suitably qualified but independent professional.

Data continues to be a key input to an evidence-based approach to reducing risk at level crossings. TasRail's locomotive drivers are diligent in reporting near-miss incidents and public behaviour not consistent with local road rules and regulations.

To this end, TasRail maintains level crossing information in the ALCAM Level Crossing Management System database that continues to be used to focus efforts on reducing risk and saving lives at level crossings.

From 2021, this information is also available via the National Level Crossing Reporting Portal (NLXP), which is an initiative of the National Level Crossing Safety Committee and has been developed by the Office of the National Rail Safety Regulator (ONRSR).

TYPES OF RISK AND MITIGATION

While there are risks at all railway crossings, some crossings are potentially less safe than others. Level crossings on busy roads, for example, can involve long wait times at crossing signals, leading to traffic delays and potentially frustrated motorists taking risks.

In addition, a large number of level crossings with only passive safety controls rely on the motorist seeing an approaching train and taking action (Stop or Give Way).

TasRail will continue to work with each public road manager to assess level crossing risks and ensure appropriate control mechanisms are in place to reduce risk so far as is reasonably practicable (SFAIRP) using ALCAM.

SIGHTING

Level crossings with low traffic volumes and good sighting distances typically have passive controls (Stop or Give Way signs).

On some roads, safe sighting distances can be quite long and difficult to achieve. Removing obstructions such as vegetation may improve sighting. In some situations, realigning minor roads or installing active controls may be necessary.

VEHICLES QUEUING OVER THE TRACKS

Queuing presents the greatest safety risk at urban road level crossings. Risk occurs when vehicles stop on the tracks at a crossing because other vehicles have stopped ahead due to nearby traffic signals or drivers turning right.

SHORT-STACKING

Short-stacking occurs when a long vehicle, such as a semi-trailer, does not have enough space to clear a crossing.

Such scenarios underpin the importance of TasRail working with road managers to identify and control risks. Extra controls such as left-turn acceleration lanes, short-stacking warning signs, or restrictions based on vehicle length may be considered in order to improve safety. Other options may include grade separation or alternative routes.

RAILWAY CROSSINGS ON HIGH-SPEED RURAL ROADS

TasRail will work with road managers to assess the risks on high-speed rural roads where applicable. Reducing road speed limits and using AAWS equipment on the approach to level crossings are options for alerting motorists to a hazard ahead.

DRIVER BEHAVIOUR

Lack of awareness of the risks, complacency, impatience and inattention contribute to some drivers failing to obey road rules at level crossings. Unsafe behaviour typically involves running red lights or ignoring signage and attempting to cross in front of a train.

PEDESTRIAN CROSSINGS

Most pedestrian crossings have passive controls that rely on individuals seeing an oncoming train. Those adjacent to a road level crossing may also have bells to warn pedestrians.

TasRail will work with pedestrian crossing owners/managers to assess risk and implement controls so far as is reasonably practical (SFAIRP), including potentially relocating or closing a crossing or constructing grade separation.

Consulting with local government and the community is important for maintaining safe routes for pedestrians and cyclists.

LEVEL CROSSING GEOMETRY

While newer level crossings are designed to ensure that road approaches to a railway are aligned to the same level, some older crossings have partial or full convex road approaches. This means that there is a risk of longer road vehicles 'bottoming out' on the crossing and becoming stuck. Road reprofiling can reduce this risk. However, for some level crossings, the only way to mitigate the risk is by limiting the type of vehicles that can use the crossing.

PAVEMENT CONDITION

The condition of the road and/or pavement at level crossings has a significant impact on the safety of users. The upgrade to concrete slabs/encased rail at priority level crossings has delivered a safer pavement surface for road users and pedestrians. The slab track innovation reduces whole-of-life maintenance costs for the crossing.



PUBLIC BEHAVIOUR

– LEVEL CROSSING INCIDENTS

Between July 2018 and July 2022, TasRail recorded 188 incidents at level crossings, including four collisions as shown in the table below.

INCIDENT TYPE	2018-19	2019-20	2020-21	2021-22
Level crossing near miss - active	65	21	31	18
Level crossing near miss - passive	16	10	9	12
Level crossing near miss - pedestrian	4	1	3	2
Collision – all crossing types	2	1	1	1
TOTAL	87	33	44	33

*6 months of data only

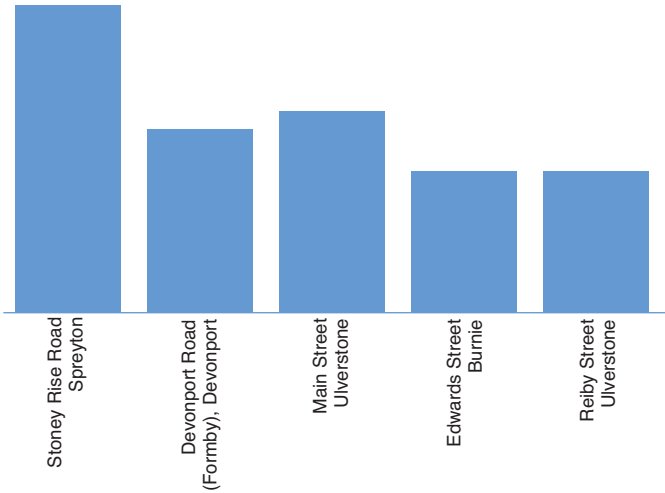
TasRail has made significant safety improvements to railway crossings over the past decade. It is pleasing to see a reduction in the number of events since 2018-19. Initiatives to reduce risk will continue to be implemented.

Of most concern is the percentage of incidents that are occurring at active level crossings where some drivers are consciously choosing to ignore the visual and audible warning.

A detailed analysis of these events shows that most incidents occur in clusters, with the majority occurring in areas of high frequency train movement like the north-west coast. Pedestrian crossing near-miss events follow a similar pattern.

The following graphs show the top 10 worst locations for near-miss events at both active and passive level crossings.

Active Level Crossing Fail to stop
Top five worst crossings
JULY 2018 - JUNE 2022



LEVEL CROSSING RELIABILITY

TasRail maintains its active level crossings to a standard based on a combination of manufacturer recommendations, industry best practice, and historical reliability information.

FAIL SAFE

Active level crossings are designed to be inherently fail-safe, which means that the failure of any one component in the system causes the lights to operate. TasRail analyses each fail-safe event to improve maintenance practices or upgrade components.

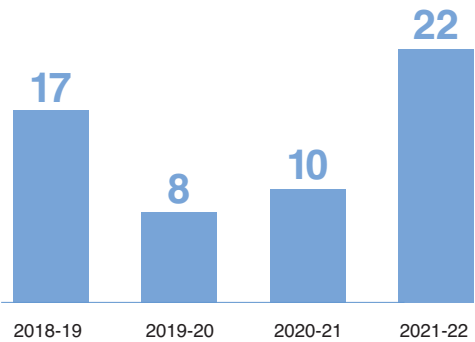
FAIL UNSAFE

While rare, fail-unsafe events occur where there are multiple system failures or human error. In a fail-unsafe event, the lights fail to activate when a train approaches the level crossing. TasRail takes any fail-unsafe event very seriously, implementing learnings to improve outcomes after each event.

VANDALISM

Vandalism of level crossing equipment – removal of signs, damage to signs, forced activation of lights, or theft of active crossing equipment – poses a significant risk to the public. Cabinets at all active level crossings are fitted with security alarms linked to TasRail’s Network Control. TasRail regularly inspects each level crossing to ensure that signage is in place and in good condition. The general public is encouraged to report incidents of vandalism.

Level Crossing - Vandalism
JULY 2018 - JUNE 2022



STRATEGIES TO REDUCE RISK

Strategic initiatives to improve level crossing safety have been a key focus for TasRail since its inception on 1 December 2009. Such improvements have included upgrading passive level crossings to active, replacing outdated incandescent flashing lights with more reliable LEDs, using concrete slabs at crossings to improve pavement condition, and continuing to focus on sightline improvement works for passive crossings.

TasRail has identified several strategic initiatives that will be implemented during the 2022-27 period that will further enhance level crossing safety. These include:

- Continue to target high-risk railway crossings for upgrade based on incident data, ALCAM surveys, traffic volumes and congestion, subject to available funding, so far as is reasonably practical.
- Work with road managers to investigate the potential to close level crossings where other alternatives may exist.
- Continue to advocate for no new level crossings.
- Identify high-risk level crossings where installing cameras may help change road user behaviour by monitoring risky behaviour and, where required, providing information to law enforcement.
- Work collaboratively with road managers to holistically improve level crossing safety.
- Engage with industry about installing low-cost technology solutions to improve level crossing safety, including for passive crossings and crossings over roads with higher speed limits.

- Engage with road managers to investigate the feasibility of reducing speed limits on the approach to railway crossings on roads with a speed limit of 100km/h or more.
- Ensure appropriate controls, including tactiles, signage and safety barriers, are installed at pedestrian crossings.
- Increase remote monitoring of active level crossings, including battery low voltage and isolation.
- Continue upgrading active level crossing controls to provide real-time condition monitoring.
- Review older crossings to ensure warning times are consistent.
- Maintain active membership of key groups such as the National ALCAM Committee, National Level Crossing Safety Committee, Road Safety Advisory Committee and TrackSAFE.
- Maintain data in the ALCAM database.
- Proactively improve public awareness of level crossing safety (refer to the following section for further detail).
- Continue analysis of fail-safe events for active level crossings to look for trends and implement necessary changes.
- Implement a workforce plan to ensure the signalling team is resourced and trained for both the immediate and longer term.

EDUCATION AND ENFORCEMENT

In general, motorists and pedestrians do not register the inherent risks of level crossings.

Raising awareness and understanding of the risks and road rules related to railway crossings is critical to improving safety and compliance. Education is most effective when coinciding with visible police presence and enforcement efforts.

STRATEGIES

- Undertake targeted education campaigns in areas with high near-miss statistics.
- Provide targeted education to schools.
- Raise awareness within the heavy vehicle industry about the risks at level crossings.
- Promote and play an active part in national railway crossing education programs and campaigns.



DEFINITIONS

ACTIVE CROSSING – Where vehicle and pedestrian traffic are controlled at railway level crossings by devices such as flashing light signals, bells or other audible warning devices, boom gates, or a combination of these. The device is activated prior to and during the passage of a train.

ALCAM – The Australian Level Crossing Assessment Model which is used to assess and identify existing and potential risks at level crossings.

AS1742.7 – The Standards Australia 'Manual of uniform traffic control devices Railway crossings'. The manual specifies traffic control devices to be used to control and warn traffic at and in advance of railway crossings at grade.

FAIL SAFE – Active level crossings are inherently designed to be fail safe which means that should one component within the control system fail, that the system operates turning on the lights and bell to provide notification of the failure.

FAIL UNSAFE – A fail unsafe event is defined as a failure within the level crossing control system that causes the whole system to fail without detection, resulting in the crossing failing to operate when required with no notification of the failure.

LEVEL CROSSING – An area where a road and a railway meet at the same level, whether or not there is any level crossing sign on the road or at any of the entrances to the area.

LEVEL CROSSING STEERING COMMITTEE – TasRail's Level Crossing Steering Committee exists to advise and makes recommendations to the TasRail Executive on policy direction, management, and standards for railway level crossings on the TasRail managed network.

NEAR MISS – Where the driver of a moving train takes emergency action or would have if there was sufficient time, to avoid impact with a person, vehicle, or other obstruction, and no collision occurred. Emergency action includes a continuous audible warning and/or brake application.

NLCSC – National Level Crossing Safety Committee is an initiative of the Australasian rail industry. It operates as an inter-agency forum to coordinate national efforts for safer level crossings and reports to the Transport and Infrastructure Senior Officials Committee (TISOC).

NLXP – National Level Crossing Portal is an initiative of the National Level Crossing Safety Committee (NLCSC) and has been developed by the Office of the National Rail Safety Regulator (ONRSR). The NLXP is a tailor-made data analytics software program that has been designed to help governments and industry make better informed planning and investment decisions on level crossing safety treatments.

ONRSR – Office of the National Rail Safety Regulator as established under RSNL. ONRSR has responsibility for regulatory oversight of rail safety in every Australian state and territory, to promote and improve national rail safety and ensure the safety of the community.

PASSIVE CROSSING – Where vehicle and pedestrian traffic are controlled at railway level crossings by signs or devices that rely on the user detecting the approach or presence of a train by direct observation.

PRIVATE CROSSING – A level crossing that is provided to permit access to private property or to extend access between parts of private property.

RAIL INFRASTRUCTURE ACT – The Rail Infrastructure Act was enacted in 2007 and ultimately governs the operation of TasRail as a Rail Infrastructure Manager and Rail Operator.

RAIL INFRASTRUCTURE MANAGER – As defined under RSNL. Is a person with effective management and control of rail infrastructure (TasRail).

ROAD MANAGER - As defined under RSNL. Road managers of public roads must seek to enter into interface agreements with rail infrastructure managers to manage risks to safety arising from their road crossings. Road managers of private roads are required to enter into interface agreements if the responsible rail infrastructure manager has determined that risks to safety must be managed in conjunction with the relevant road manager.

RSNL – Rail Safety National Law was enacted in 2012 and aims for a seamless and coordinated national approach to rail safety regulation in Australia. RSNL was developed with the principles of shared responsibility and accountability.

SAFETY INTERFACE AGREEMENT – An agreement between the Road Manager and Rail Infrastructure Manager to manage the risks at a level crossing as required under the Rail Safety National Law.

SFAIRP – So Far As is Reasonably Practicable is a framework aiming to ensure that all “reasonably practicable” precautions are put in place to manage safety. It is threshold test for safety risk management in safety legislation in many jurisdictions.

TRACKSAFE - The TrackSAFE Foundation, established by the Australasian Railway Association and UGL in 2012, is Australia's only harm prevention charity focused on reducing deaths, injuries and near hits on the rail network.

