



SAFE RAILWAYS FOR AUSTRALIA

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The Regulator's Message

The Regulator's Message



It is with a somewhat heavy heart that I provide what will be my last introduction to an ONRSR Rail Safety Report, a publication I am genuinely proud of and one that has grown, like our organisation, to be a highly trusted source of rail safety intelligence and information. My time as Chief Executive and National Rail Safety Regulator will come to an end just as ONRSR celebrates 10 years in operation, and while there is some sadness on my behalf, there is also immense pride at what we have been able to achieve.

There is no doubt our railways are safer now than they were a decade ago. Railway-related fatalities in Australia reached a five year low in 2019–2020 and as the pages that follow demonstrate, they have remained at these historic low levels in the two years since. Furthermore, after ONRSR commenced regulation in each of the jurisdictions there has been a significant reduction in rail safety worker fatalities. While of course, one such fatality is one too many, over the last decade similar downward trends have been recorded in a range of major rail safety incident categories.

Throughout my career and my time at ONRSR I have always had a genuine passion for making sure that people are kept safe as they work and travel. That focus on people is so important because when we consider the many and detailed facts and figures that make up a report like this one, it can be easy to forget that each of them represents a person or people whose safety we all have a role in ensuring. Of course, we are not immune from incidents, some of them very serious, and it is incumbent on regulators, operators, industry bodies, governments and the general public to learn the lessons and take the action that will save people's lives.

In relation to the here and now, it is once again encouraging for me to note that Australia's railways remain predominantly safe for the people who use and work on them. Despite our varied and vast networks, the operational safeguards in place continue to protect us from major accidents, the likes of which have befallen some European and American railways in the last 12 months. I am very confident this is also in no small part due to the ongoing improvements in the quality



of rail safety data now available across Australia. The value of information like this can never be underestimated and that continues to drive ONRSR's investment in the development of more complete and robust recording and analysis via projects like the National Level Crossing Portal and the new National Data Strategy. While the benefits of these initiatives will flow more completely into future iterations of this report, an enhanced data focus is already helping ONRSR better identify national priority issues and direct national regulatory resources more efficiently and effectively. A prime example is our renewed focus on level crossing safety, particularly in regional areas. The careful examination of improved data has been important in helping ONRSR, in conjunction with a variety of stakeholders, including some of the people tragically affected by incidents at level crossings, raise awareness and facilitate new thinking where safety controls are concerned.

I am confident that the information in the ONRSR Rail Safety Report 2021–2022, can make a similar difference to many other issues, some immediate, some incremental and others longer term undertakings.

I will watch with great interest how ONRSR and the rail industry collectively tackles them all in the years to come. In the meantime, let me sign off by saying thank you to all rail safety stakeholders for your support of the unique but integral role the national rail safety regulator plays. And most importantly thank you to my fantastic team at ONRSR for the privilege of leading you for the last 8 years. Stay safe.

Sue McCarrey

Chief Executive / National Rail Safety Regulator

About the Office of the National Rail Safety Regulator

Our Vision

SAFE RAILWAYS FOR AUSTRALIA

Our Values

Integrity

Respect

Independence

Diligence

Excellence

Objectives

Under Rail Safety National Law (RSNL)¹, ONRSR's objectives are to:

- » facilitate the safe operations of rail transport in Australia;
- » exhibit independence, rigour and excellence in carrying out its regulatory functions; and
- » promote safety and safety improvement as a fundamental objective in the delivery of rail transport in Australia.

¹RSNL refers to the Rail Safety National Law (South Australia) Act 2012 and Rail Safety National Law (WA) Act 2015

About the Office of the National Rail Safety Regulator

Functions

As defined in ONRSR's Statement of Intent², ONRSR's key functions are to:

- » improve rail safety for the Australian community;
- » deliver efficient safety regulation for the rail industry;
- » provide seamless national safety regulation; and
- » enforce regulatory compliance.

Role

ONRSR performs its functions under a co-regulatory framework in which responsibility for regulation and safety is shared between industry, governments and ONRSR. The principle of shared responsibility is underpinned by specific duties defined under the RSNL. In particular, section 52 states a rail transport operator must ensure, so far as is reasonably practicable (SFAIRP), the safety of its railway operations. This duty is consistent with the principles of safety risk management generally where those responsible for safety risks must ensure all reasonably practicable measures are in place to protect people from the harm that may arise.

Regulatory Approach

ONRSR is a risk-based regulator overseeing the application of a systematic decision-making framework, which prioritises regulatory activities and informs decision outcomes, based on an assessment of risks to rail safety. It involves:

- » developing an understanding of the risks to the safety of railway operations in Australia;
- » determining which of these risks ONRSR is able to influence through its regulatory activities; and
- » designing and prioritising regulatory activities and outcomes in a way that best maintains and improves rail safety.

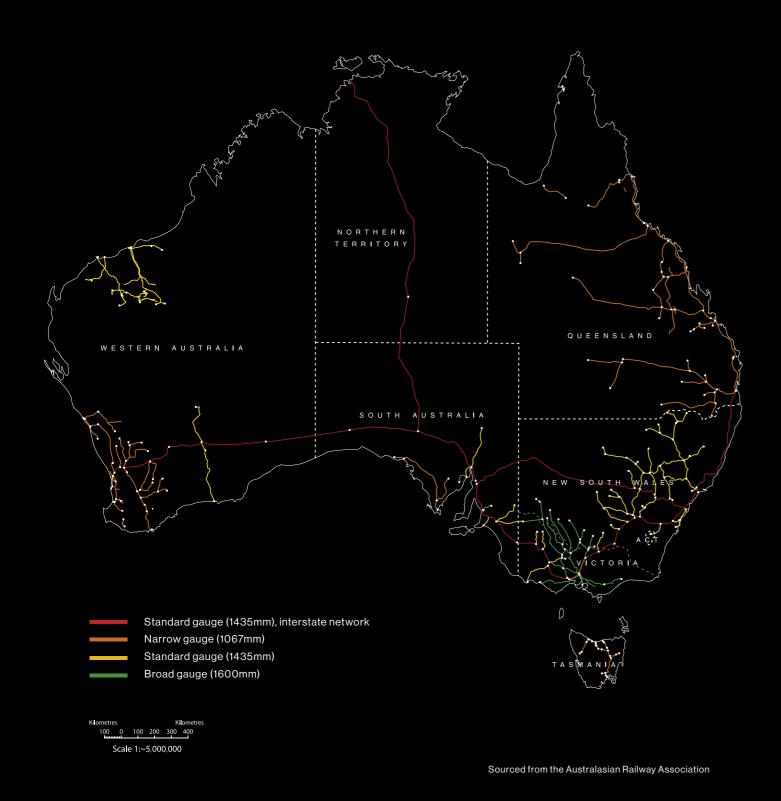
Applying a risk-based approach to regulation has parallels to the RSNL's requirement for rail transport operators to apply a risk-based approach to safety management. It also enables ONRSR to focus resources on the basis of risk and to improve the effectiveness of regulatory interactions.

The ONRSR Way³ provides further details on the key principles by which ONRSR regulates. This is supported by policies, procedures and guidelines to assist accredited parties to fulfil their obligations.

 $^{^2} Office of the \, National \, Rail \, Safety \, Regulator, Statement \, of \, Intent \, 2021 \, to \, 2024, ONRSR, \, Adelaide, \, 2021 \, to \, 2024, \, ONRSR, \, Adelaide, \, 2024 \, to \, 2024, \, ONRSR, \, Adelaide, \, 2024 \, to \, 2024, \, ONRSR, \, Adelaide, \, 2024 \, to \, 2024, \, ONRSR, \, Adelaide, \, 2024 \, to \, 2024, \, ONRSR, \, Adelaide, \, 2024 \, to \, 2024, \, ONRSR, \, Adelaide, \, 2024 \, to \, 2024, \, ONRSR, \, Adelaide, \, 2024 \, to \, 2024, \, ONRSR, \, Adelaide, \, 2024 \, to \, 2024, \, ONRSR, \, Adelaid$

 $^{{}^3}Office\ of\ the\ National\ Rail\ Safety\ Regulator,\ The\ ONRSR\ Way,\ Edition\ 2,\ ONRSR,\ Adelaide,\ 2020$

Rail networks operating across Australia

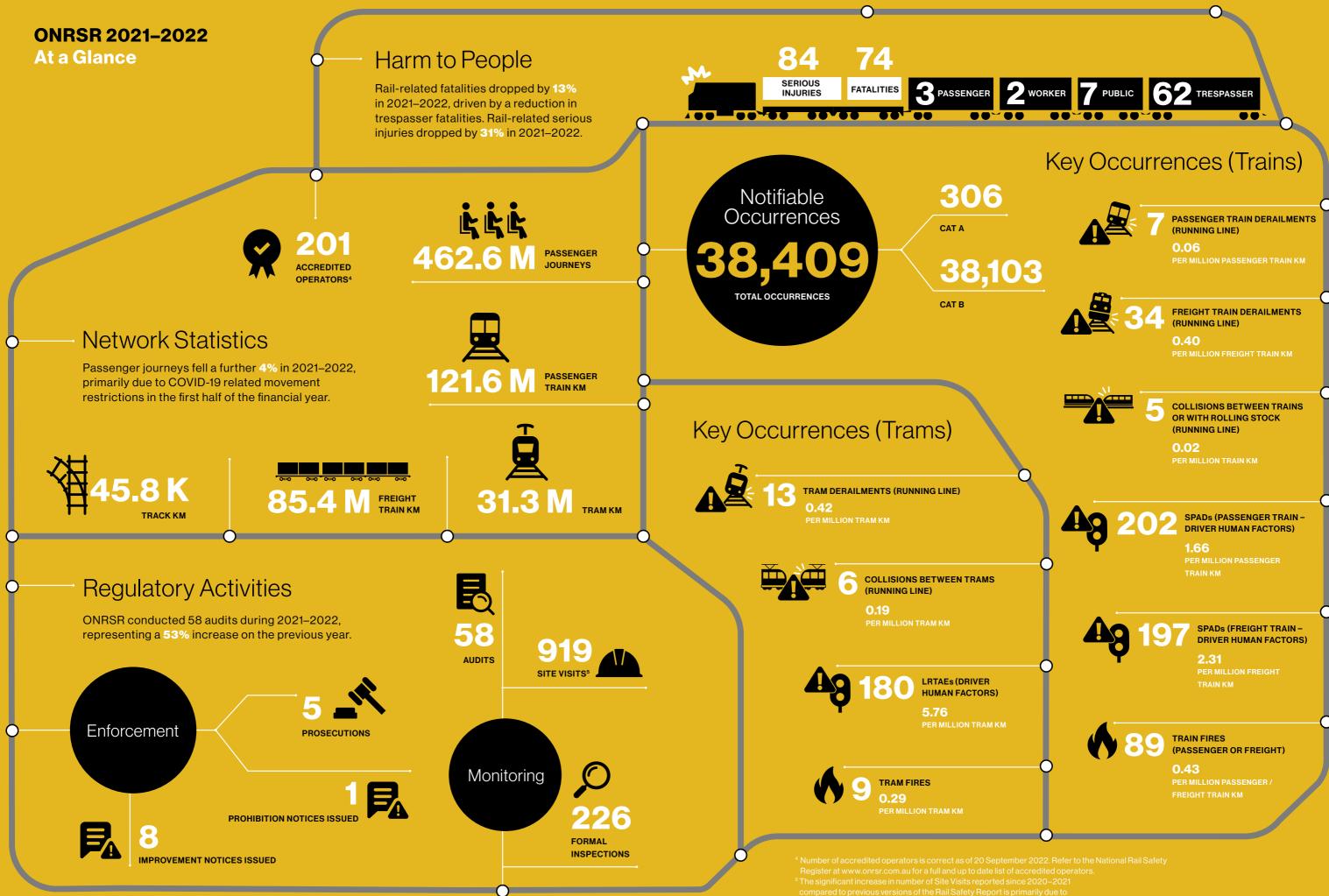


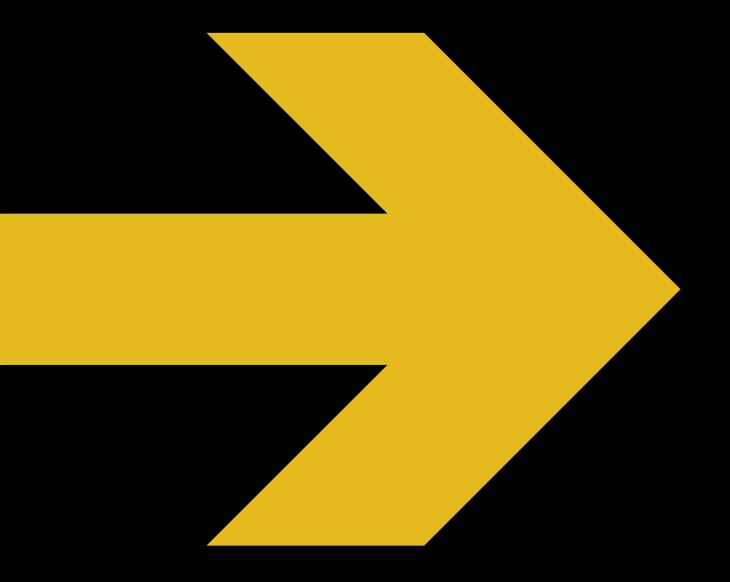
About This Report

ONRSR's Rail Safety Report provides a summary of rail safety performance in the 2021–2022 financial year. This performance is described in terms of safety statistics based on rail safety occurrences notified to ONRSR, and intelligence gathered through regulatory activities.

This report is designed to consider rail safety from a national perspective rather than to single out individual operators or specific incidents. It is an ongoing function of ONRSR to work with individual rail transport operators on issues that pertain specifically to them. ONRSR does, however, highlight specific examples of incidents where they demonstrate issues considered relevant to the wider industry, with the aim of improving rail safety.







A large part of ONRSR's regulatory intelligence is gained from the thousands of rail safety occurrences reported each year.

Some of these events lead to an immediate response by ONRSR while others are categorised and analysed over time to build a picture of safety performance in the rail industry. This performance provides insight into which safety areas require focus by ONRSR and which sectors and individual operators should be the subject of this focus.

Notifiable occurrences are an important input to ONRSR's risk-based regulatory approach. The type of events, their frequency and their actual or potential consequences, assist ONRSR in understanding the rail safety risks that exist in the industry. Some events result in more significant consequences or have the potential for greater risk and these events are the focus for presentation of occurrence statistics in this report

The statistics presented in the following sections focus primarily on the events of the 2021–2022 financial year. The report continues with several charts that have been published in previous years which show the last five years' performance in terms of incident counts and rates. Incident rates provide a more accurate picture of national safety performance than counts alone, by accounting for variations in the scale of railway operations over time.

ONRSR has once again conducted benchmarking against international performance and highlighted selected events it has judged as the more serious of the year.

Rail Safety Statistical Summary



Railway-Related Fatalities

There were 74 fatalities reported in the 2021–2022 financial year on railways across Australia. These consisted of:

- » a passenger struck by a train after falling from a station platform;
- » a passenger falling down a set of stairs at a train station;
- » a passenger suffering an injury from an earlier fall down stairs at a station overbridge, later passing away in hospital;
- » a pedestrian struck by a tram;
- » a pedestrian struck by a train at a level crossing;
- » a cyclist struck by a train at a pedestrian level crossing;
- » two occupants of road vehicles involved in collisions with trains at level crossings;
- » an occupant of a road vehicle involved in a collision with a tram;
- » a train driver found unconscious in the rear cabin of a train, later passing away;
- » a worker crushed by machinery tipping over while working at a rail construction site;
- » ten fatalities involving railway trespassers struck by trains, not at level crossings; and
- » 53 fatalities involving suspected suicide.

Figure 1:

Railway-related fatalities, July 2017 to June 2022

Non-passenger fatalities at level crossings are classified as Public if neither trespass nor suicide is suspected. Suspected suicides at level crossings are coded as Trespasser.

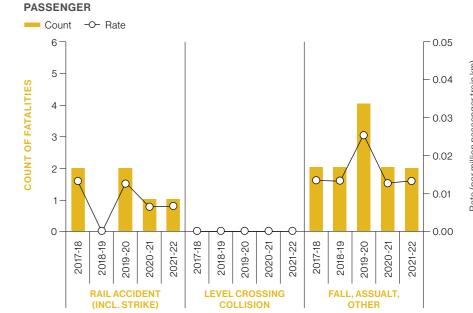
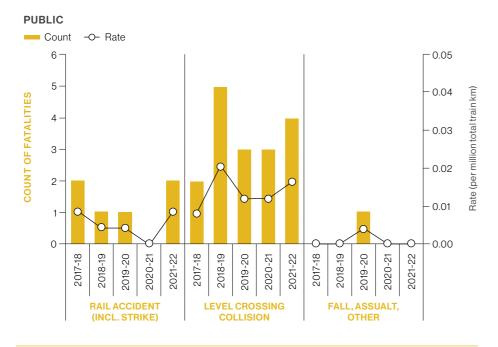
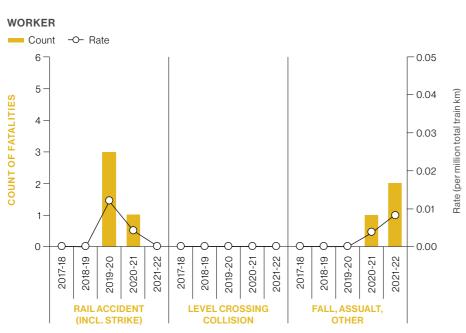
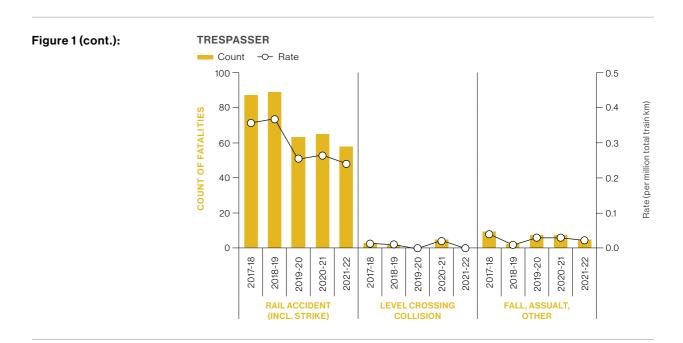


Figure 1 (cont.):





Rail Safety Statistical Summary



A comparison of the rate of fatalities between Australian railways and selected overseas railways is summarised in Table 1. The Australian data in this table is a subset of the fatalities summarised in Figure 1 to align with the overseas data definitions. For example, local data excludes suspected suicides, as these are also excluded from overseas data.

The fatality rates for Australia and Great Britain remain relatively stable in 2021–2022 and over the five-year period. While the fatality rate in Australia is marginally higher than Great Britain, it is well below the United States which saw a significant spike in 2021–2022.

Table 1:

Railway fatalities - Australia, Great Britain and United States

Fatalities involving passengers, workers, public and trespass (excluding suspected suicide). The annual reporting period for Great Britain is from April to March. Statistics for Great Britain are for mainline operations only and exclude the London Underground network, trams, metros and non-mainline networks. Statistics for the United States exclude fatalities on isolated networks, such as metropolitan transit systems that are not connected to the wider network.

		2017-18	2018-19	2019-20	2020-21	2021-22	5 YEAR
	Fatalities	18	20	17	22	21	98
Australia	Train Km (million)	243.3	242.3	248.3	246.6	241.7	1222.1
	Rate	0.074	0.083	0.068	22 2 246.6 24 0.089 0.0 21 23 454.3 503 0.046 0.0 791 97 913.1 815	0.087	7 0.080
	Fatalities ¹	42	44	31	21	23	161
Great Britain1	Train Km (million) ²	562.1	573.4	591.7	454.3	507.5	2689.0
	Rate	0.075	0.077	0.052	0.046	0.045	0.060
	Fatalities ³	796	882	868	791	975	4312
United States	Train Km (million)3	1,132.4	1,130.3	996.7	913.1	815.3	4987.8
	Rate	0.703	0.780	0.871	0.866	1.196	0.865

Sources

¹Office of Rail and Road, Rail Safety Statistics, Tables 5200 (accessed 17 October 2022)

² Office of Rail and Road, Passenger and Freight Rail Usage, Tables 1243 and 1333 (accessed 17 October 2022)

³ Federal Railroad Administration Office of Safety Analysis, 4.08 - Casualty Summary Table (accessed 7 October 2022)

Table 2:
Railway-related fatalities, excluding trespass or suspected suicide, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
3/07/2021	A cyclist wearing headphones was crossing at a pedestrian level crossing. The driver of an approaching passenger train was unable to stop and avoid a collision. The cyclist was fatally injured.	Campbellfield, Vic.
8/10/2021	A driver travelling in the rear cabin of a passenger train was found unconscious and later passed away.	Sandringham, Vic.
31/10/2021	There was a collision between a passenger train and a road vehicle that was stationary on a level crossing with boom gates lowered. The occupant of the road vehicle sustained fatal injuries.	Queens Park, WA
31/12/2021	A tram and pedestrian collided. The pedestrian was taken to hospital by ambulance where they later passed away.	Melbourne, Vic.
15/02/2022	Train staff were notified of a passenger requiring medical assistance following an earlier fall down stairs at a station overbridge. Emergency services attended and transported the passenger to hospital. The passenger later passed away in hospital.	Gailes Station, Qld.
25/02/2022	A freight train and a road vehicle collided at a level crossing with passive protection. The occupant of the road vehicle was fatally injured.	Emerald, Qld.
1/05/2022	A road vehicle and tram collided, resulting in fatal injuries to the driver of the road vehicle. The driver of the tram was taken to hospital for treatment. There were no reports of injuries to passengers on board the tram.	Camberwell, Vic.
7/05/2022	A person fell off a station platform onto the track and was unable to climb back onto the platform. The driver of an approaching passenger train was unable to stop, and the person sustained fatal injuries.	Banksia, NSW
17/05/2022	There was a collision between a passenger service and a pedestrian at a pedestrian maze on a level crossing, resulting in fatal injuries.	Alberton, SA
15/06/2022	A member of the public fell down the stairs at a train station. The person was fatally injured.	High Street Station, NSW
22/06/2022	A trailer of a heavy road vehicle tipped while unloading crushed rock at a rail construction site. A traffic management officer working in the vicinity sustained fatal injuries.	Wahring, Vic.

Rail Safety Statistical Summary



Railway-Related Serious Injuries

There were 84 serious injuries reported in the 2021–2022 financial year on railways across Australia, the majority of which were related to slips, trips or falls. This represents a 31% reduction in the number of serious injuries reported in the previous year.

This fall is driven by reductions in the numbers of passenger slips, trips and falls and trespasser-related serious injuries. This is likely due to COVID-19 related reduced patronage and people movement restrictions, particularly in the first half of the financial year.

Figure 2 presents the number of railway-related serious injuries by person type over the past five years.



Railway-related serious injuries, July 2017 to June 2022

Non-passenger serious injuries at level crossings are classified as Public if neither trespass nor attempted suicide is suspected. Level crossing collision excludes attempted suicides at level crossings, which are classified as Trespasser.

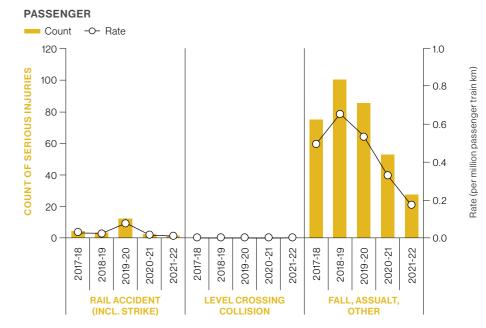
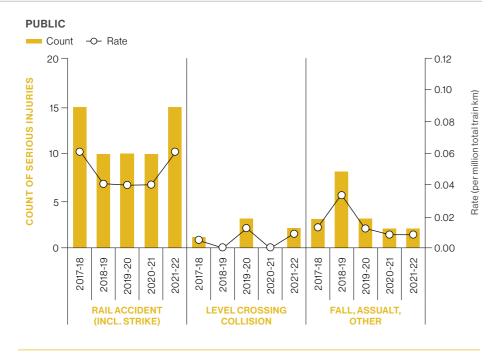
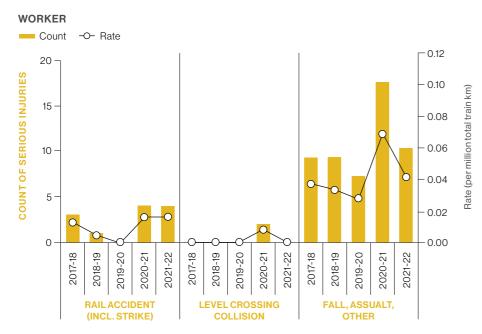


Figure 2 (cont.):





Rail Safety Statistical Summary

Figure 2 (cont.):

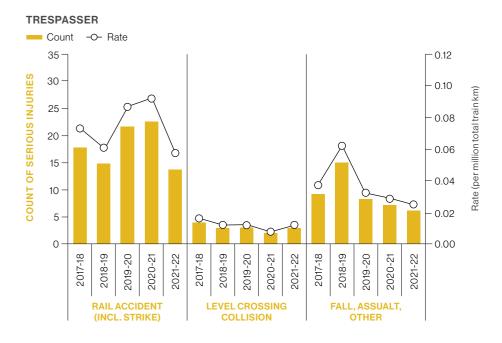


Table 3: Selected railway-related serious injuries, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
17/07/2021	A tram and cyclist collided. The cyclist was transported to hospital by ambulance with serious injuries.	Southbank, Vic.
19/07/2021	A tram and a vehicle collided head-on. Two people in the vehicle sustained serious injuries and were transported to hospital.	Coburg North, Vic.
6/08/2021	There was a collision between a tram and two pedestrians. Both people were transported to hospital by ambulance with serious injuries.	Richmond, Vic.
26/08/2021	A worker's fingers were caught between the wheel and the bogie frame when attempting to move the bogies onto the track. The injured worker was admitted to hospital.	Warwick, Qld.
29/09/2021	A freight train and heavy road vehicle collided at a level crossing with passive protection. An occupant of the vehicle was seriously injured and admitted to hospital.	Togar, NSW
27/10/2021	A road rail vehicle struck an employee within a track occupation worksite. The employee was seriously injured and transported to hospital by ambulance.	Dandenong, Vic.
29/10/2021	A freight train and a road vehicle collided at a level crossing protected by lights and bells. The driver of the vehicle was admitted to hospital with serious injuries.	Murray Bridge, SA
6/11/2021	The battery bank in an uncommissioned shunting vehicle exploded. Two contractors received serious injuries from acid burns and were transported to hospital.	Hornsby, NSW
10/02/2022	A person tripped and fell under a train as it approached the platform. The injured person was transported to hospital by ambulance.	Warwick Station, WA
6/03/2022	A regional passenger train and road vehicle collided at a level crossing protected by lights. One of the occupants of the vehicle was admitted to hospital with serious injuries.	Mardella, WA
16/03/2022	A train driver was seriously injured when a locomotive collided with a stationary rake of ore cars while shunting. The collision caused a derailment. The driver was admitted to hospital.	Port Hedland, WA
2/04/2022	A tram and cyclist collided. The cyclist sustained serious injuries and was transported to hospital by ambulance.	Windsor, Vic.
12/04/2022	A person fell onto tracks from the platform while attempting to retrieve their walking aid which had fallen onto the track. An incoming train collided with the person. The person was admitted to hospital with serious injuries.	Mosman Park Station, WA
16/04/2022	A person running for a departing train tripped and fell between the train and platform. Other members of the public assisted the injured person back onto the platform. The person was admitted to hospital.	Claisebrook Station, WA
23/06/2022	A train and a cyclist collided at a pedestrian level crossing. The cyclist was transported to hospital by ambulance with serious injuries.	North Adelaide, SA

Rail Safety Statistical Summary



Passenger Train Derailments

Passenger train derailment risk is characterised by rare events that have the potential to result in catastrophic outcomes, owing to the potentially large numbers of passengers exposed to harm.

There were seven running line passenger train derailments reported in the 2021–2022 financial year on railways across Australia, five of which involved tourist and heritage trains. While no injuries were reported for the tourist and heritage train derailments, as all were at low speed, injuries were suffered during both commercial passenger train derailments. One of the derailments resulted in a serious injury to a member of public and a minor injury to railway staff, while the other derailment resulted in two minor injuries to passengers and two minor injuries to railway staff. Both derailments were the result of level crossing collisions at crossings with active protection.

Following the 2020–2021 increase in tourist and heritage passenger train derailments depicted in Figure 3, ONRSR undertook regulatory activities with the operators involved, leading to corrective actions to help prevent future incidents. 2021–2022 saw a slight reduction in reported derailments while ONRSR continues to work with the tourist and heritage operators to refine their asset management plans.

Figure 3:

Passenger train running line derailments, July 2017 to June 2022

Derailment rates are expressed using the respective train km for each sector. Includes derailments of passenger trains on non-running lines affecting the safety of running lines.

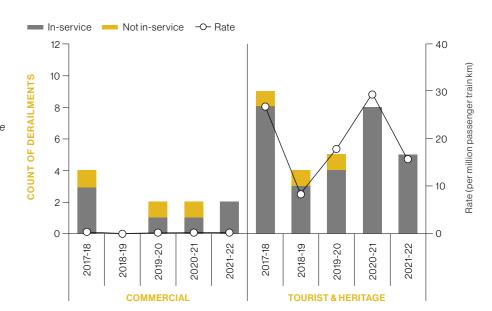


Table 4:

Passenger train running line derailments, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
12/08/2021	A passenger service and heavy vehicle collided at a level crossing protected by lights and boom gates. The train driver sustained a minor injury. The vehicle driver sustained a serious injury. Both were transported to hospital by ambulance.	Glen Iris, Vic.
26/09/2021	A heritage train had just departed from the platform when two axles on the locomotive derailed. There was no damage to the train and no injuries reported.	Whiteman, WA
20/10/2021	A regional passenger train collided with an abandoned road vehicle at a level crossing with active protection. Two passenger carriages derailed as a result. Two train crew and two passengers were transported to hospital with minor injuries.	Kembla Grange, NSW
22/11/2021	A heritage train was travelling at low speed around a sharp curve when two axles on the lead locomotive derailed. The locomotive sustained minor damage. There were no injuries.	Camp Spur, Tas.
24/12/2021	A railcar on a tourist and heritage passenger train derailed as the train traversed a series of tight curves at low speed. There were no reports of injuries.	Oliver Hill, WA
2/04/2022	A bogie on a passenger carriage of a steam train derailed while traversing a section of track where rail caps on sleepers had moved. There was no damage to the train and no injuries.	Tullah, Tas.
18/06/2022	A heritage tram travelling at low speed derailed its front axle while traversing a set of points. There was no damage to the tram and no injuries reported.	Whiteman Park, WA

Rail Safety Statistical Summary

A comparison of the rate of mainline passenger train derailments between Australian railways and the mainline railways of Great Britain and the United States is summarised in Table 5. The Australian data in this table are a subset of the derailments summarised in Figure 3 to more closely align with overseas data definitions. They include derailments involving all in-service heavy rail passenger trains, excluding those involving tourist and heritage passenger trains on isolated lines.

Table 5:

Passenger train running line derailments - Australia, Great Britain and United States

Heavy rail in-service passenger trains only, excluding tourist and heritage operations on isolated lines. The annual reporting period for Great Britain runs from April to March. Statistics for Great Britain are for mainline operations only and exclude the London Underground network, trams, metros and non-mainline networks. Statistics for the United States exclude derailments on isolated networks, such as metropolitan transit systems that are not connected to the wider network.

		2017-18	2018-19	2019-20	2020-21	2021-22	5 YEAR
	Derailments	3	0	2	2	2	9
Australia	Train Km (millions)	121.5	124.4	128.0	127.8	121.4	623.1
	Rate	0.025	0.000	0.016	0.016	0.016	0.018
	Derailments ¹	2	1	0	2	2	7
Great Britain	Train Km (millions) ²	529.2	539.7	558.4	424.3	473.7	2525.2
	Rate	0.004	0.002	0.000	0.005	0.004	0.003
	Derailments ³	7	2	5	2	6	22
United States	Train Km (millions) ⁴	182.7	183.7	165.2	131.5	159.6	822.7
	Rate	0.038	0.011	0.030	0.015	0.038	0.027

Sources:

2021–2022 ONRSR Rail Safety Report 2021–2022 ONRSR Rail Safety Report

 $^{^{1}}Of fice \, of \, Rail \, and \, Road, \, Train \, Accidents \, by \, Severity, \, Table \, 5260 \, (accessed \, 17 \, October \, 2022)$

² Office of Rail and Road, Passenger Rail Usage, Table 1243 (accessed 17 October 2022)

³ U.S. Department of Transportation, DOT Open Data Catalog (accessed 7 October 2022)

⁴ Federal Railroad Administration Office of Safety Analysis, 1.13 - Freight / Passenger Operations Ten Year Overview Table (accessed 7 October 2022)



Tram Derailments

Tram derailments are generally less severe than passenger train derailments on the heavy rail network due to typically lower operating speeds. However, catastrophic tram derailments can still happen as evidenced by the derailment of a tram in Croydon, London in the UK in November 2016, which killed seven people and left many more injured.

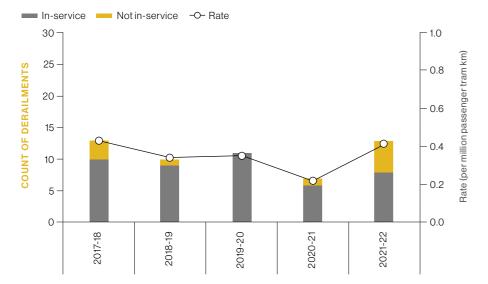
There were 13 running line derailments involving passenger trams in the 2021–2022 financial year in Australia. Common causes involved derailing while traversing over points and crossovers, following collisions between trams and road vehicles, and after hitting debris or objects on the track. Two minor injuries were reported as a result of these derailments, both of which involved road vehicle drivers and followed collision events.

While running line derailments have remained relatively steady in the previous five years, the number of derailments nearly doubled in 2021–2022 following a notable drop in 2020–2021 due to COVID-19 related movement restrictions. However, this increase mainly involved trams that were not in-service at the time.

Figure 4:

Tram running line
derailments (commercial),

July 2017 to June 2022



Rail Safety Statistical Summary

Table 6:

Tram running line derailments, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
5/08/2021	A tram derailed its centre bogie on the running line. The pantograph also became entangled in the overhead wires resulting in damage to the pantograph. There were no reports of injuries.	Port Junction, Vic.
24/09/2021	A tram collided with a planter box at the end of a terminus causing it to derail. The tram was extensively damaged. The driver sustained a minor injury and was treated at the scene by paramedics.	Glen Iris, Vic.
28/10/2021	A tram derailed as it traversed points on the running line. There was no damage to the tram and no injuries.	Caufield North, Vic.
1/12/2021	A tram derailed on the running line while turning. Heavy rain had left debris on the line. The was no damage to the tram and no injuries.	Maribyrnong, Vic.
15/12/2021	A tram derailed at points on the running line while entering a terminus. There was no damage to the tram and no injuries.	Port Melbourne, Vic.
16/12/2021	A tram derailed on the running line as a result of a collision with a road vehicle. The vehicle driver was transported to hospital by ambulance. One tram passenger sustained a minor injury. The tram received extensive damage.	Melbourne, Vic.
23/12/2021	A tram derailed on the running line while exiting a terminus. There was no damage to the tram and no injuries reported.	Melbourne, Vic.
31/01/2022	A tram derailed on the running line as a result of a collision with a road vehicle. The collision also resulted in the pantograph becoming entangled in the overhead. The tram received extensive damage. The vehicle driver was transported to hospital for observation.	Maribyrnong, Vic.
3/02/2022	The front bogie of a tram derailed on the running line due to an obstruction on the track. There were no reports of injuries or damage to the tram.	Melbourne, Vic.
21/02/2022	The middle bogie of a tram derailed at a cross-over. There was no damage to the tram and no injuries.	Parkville, Vic.
22/04/2022	The front bogie of a tram derailed on the running line. There were no reports of injuries or damage to the tram.	Essendon, Vic.
27/05/2022	The middle bogie of a tram derailed on the running line. There was no damage to the tram and no injuries. $\ \ \ \ \ \ \ \ \ \ \ \ \ $	Melbourne, Vic.
22/06/2022	A tram derailed on the running line while entering a depot. The tram was pushing a tram with a fault back into the depot. There were no reports of injuries or damage to the tram.	Kew, Vic.

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Freight Train Derailments

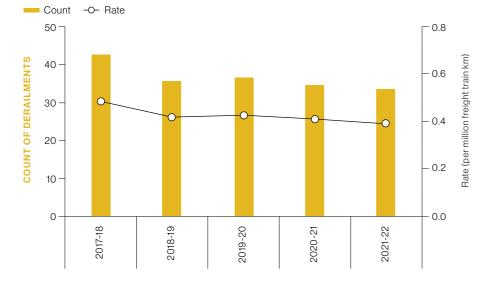
Freight train derailment risk is generally observed to have a higher frequency of occurrence but a lower consequence of event when compared to passenger train derailment. However, derailments of freight trains still expose train crews, recovery teams and, depending on the location of the derailment, members of the public to potential harm.

There were 34 running line derailments involving freight trains in the 2021–2022 financial year, marginally less than the number reported during the previous year. One of the derailments occurred after a freight train entered a washed-out section of track, resulting in a minor injury to the train driver. No other injuries were reported in relation to these derailments.

Figure 5: Freight train running

line derailments,
July 2017 to June 2022
Includes derailments of freight

trains on non-running lines affecting the safety of running lines. Excludes uncoupled rolling stock derailments such as those involving only light locomotives and wagons.



Rail Safety Statistical Summary

Table 7:
Selected freight train running line derailments, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
16/07/2021	Sixteen wagons of a loaded freight train derailed on the running line with some wagons overturning. There were no reports of injuries.	Charra, SA
29/10/2021	A freight train exiting a tunnel derailed after colliding with dirt on the track due to a landslide. There was no damage to the train and no injuries.	Rhyndston Tunnel, Tas.
30/10/2021	An empty coal train derailed on the running line. One locomotive came to rest in the lineside culvert. Twelve wagons had significant damage. There were no reported injuries.	Mt Rainbow, Qld.
6/11/2021	The lead locomotive and lead wagon of an empty coal train derailed on the running line. The train was traversing points at the time of the derailment. There were no reports of injuries or damage.	Birralee, Qld.
8/11/2021	Two wagons of a freight train derailed on the running line. There was some damage to sleepers over 780 metres. There were no injuries.	Mittagong Junction, NSW
10/11/2021	The last five wagons of a train derailed when departing a crossing loop. There were no injuries.	Naretha, WA
11/11/2021	29 wagons of a loaded ore train derailed on the running line. There were no injuries.	Lefroy, WA
13/11/2021	A wagon of a freight train derailed on a running line due to a shattered bogie. There was some damage to the track. There were no injuries.	near Snowtown, SA
4/01/2022	Two of three locomotives in a consist derailed while entering a mine balloon loop. Both locomotives remained upright. There were no injuries.	Carmichael Mine, Qld.
15/01/2022	The crew of a loaded freight train reported it had stopped due to losing air. On inspection two wagons had derailed with the freight containers separating from the wagons. There were no injuries.	Bethungra, NSW
20/01/2022	Two wagons of a freight train derailed on the running line resulting in split points. There were no injuries.	Alice Springs, NT
23/02/2022	A freight train derailed on a running line due to a track washout. Two locomotives and three wagons derailed. The driver was taken to hospital for assessment.	Cooran, Qld.
25/02/2022	The last wagon of an empty freight train derailed while setting back over points which had not been correctly set. There were no injuries.	Tibarri, Qld.
17/03/2022	The last eight wagons of a freight train derailed on the running line due to a broken axle. The derailed wagons and track infrastructure were extensively damaged. There were no injuries.	Casino, NSW
5/05/2022	A freight train derailed on the running line while departing a terminal. Several containers fell onto the track resulting in some damage to track infrastructure. There were no reports of damage to the train or injuries.	Bowmans, SA

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Table 7 (cont.):

DATE	DESCRIPTION	LOCATION
31/05/2022	The rear portion of a freight train parted and derailed resulting in substantial track damage and some damage to the derailed wagons. There were no injuries.	Cedar Point, NSW
4/06/2022	A wagon on a freight train that was being assisted by banking engines derailed as it traversed points resulting in damage to approximately 300 sleepers. There were no reports of damage to the train or injuries.	Ardglen, NSW
17/06/2022	The last four wagons of a grain train derailed on the running line while departing the loop due to the automatic operation of a derailer.	North Geelong, Vic.

Table 8:

Freight train running line derailments - Australia, Great Britain and United States

Includes derailments of freight trains on non-running lines affecting the safety of running lines. Excludes uncoupled rolling stock derailments such as those involving only light locomotives and wagons. The annual reporting period for Great Britain runs from April to March. Statistics for Great Britain are for potentially higher-risk train accidents (PHRTAs) occurring on or affecting the running line only, and with the most potential to result in serious consequences. They exclude the London Underground network, trams, metros and non-mainline networks. Statistics for the United States exclude derailments on isolated networks, such as metropolitan transit systems that are not connected to the wider network.

		2017-18	2018-19	2019-20	2020-21	2021-22	5 YEAR
	Derailments	43	36	37	35	34	185
Australia	Train Km (millions)	87.99	85.12	85.54	83.96	85.42	428.03
	Rate	0.489	0.423	0.433	0.417	0.398	0.432
Great Britain	Derailments ¹	3	9	9	9	1	31
	Train Km (millions) ²	33.0	33.7	33.3	30.0	33.8	163.7
	Rate	0.091 0.267 0.270 0.300	0.030	0.189			
	Derailments ³	279	303	270	266	274	1392
United States	Train Km (millions) ⁴	808.6	807.5	705.9	665.3	655.7	3643.0
	Rate	0.345	0.375	0.383	0.400	0.418	0.382

Sources:

¹Rail Safety and Standards Board, Annual Health and Safety Report (accessed 17 October 2022)

Rail Safety Statistical Summary



Train Collisions

Collisions involving trains have the potential to be catastrophic rail safety events. The likelihood and consequences of collisions vary according to factors such as the systems used to manage train movement, the types of trains involved and the speed the trains were travelling at the time of the collision. A major determinant of risk is the involvement of a passenger train because of the potential exposure of large numbers of passengers to harm.

There were five running line collisions between trains and with rolling stock in the 2021–2022 financial year. None of these collisions involved passenger trains. No fatalities or serious injuries were reported as a result of these train collisions.

Figure 6:

Running line collisions between trains and with rolling stock, July 2017 to June 2022

Includes collisions on non-running lines affecting the safety of running lines. Excludes commercial light rail operations. Excludes trains striking or being struck by out of gauge equipment on trains on adjacent lines. Rates are expressed using total km for the sectors represented in each reporting category.



² Office of Rail and Road, Freight Rail Usage, Table 1333 (accessed 17 October 2022)

 $^{^{3}}$ U.S. Department of Transportation, DOT Open Data Catalog (accessed 7 October 2022)

⁴ Federal Railroad Administration Office of Safety Analysis, 1.13 - Freight / Passenger Operations Ten Year Overview Table (accessed 7 October 2022)

Table 9:

Selected collisions involving trains, July 2021 to June 2022

Excludes collisions at level crossings.

DATE	DESCRIPTION	LOCATION
9/08/2021	A passenger train collided with a golf cart as it travelled through the golf course. The two occupants of the golf cart and train driver were uninjured.	Seaton, SA
12/08/2021	A tamper and a ballast regulator were travelling in convoy on a running line. As the tamper slowed, the ballast regulator slid on wet rail and collided with the tamper in front. The impact caused damage to the regulator and resulted in a derailment.	Pinjarra South, WA
17/09/2021	A heavy road vehicle tipper trailer being transported by a freight train collided with bridge infrastructure during transit resulting in damage to the trailer. The bridge was inspected and cleared for the resumption of rail traffic.	Rockhampton, Qld.
6/01/2022	A freight train was being assisted by bank engines when they parted from the main consist resulting in a loss of brake pipe air and application of brakes. The bank engines then collided with the rear of the train causing the last wagon to derail and spill grain onto the tracks. The driver of the bank engines sustained a minor injury.	Quipolly, NSW
12/01/2022	Two track machines were travelling in convoy on the running line. Both machines came to a halt. The driver of the rear machine then approached at low speed but failed to stop and collided with the leading machine. There were no injuries.	Near Parkes, NSW
13/01/2022	A collision occurred between two locomotives while shunting at low speed. There was minor damage to both locomotives. There was no damage to infrastructure or injuries.	Kangaroo Station Loop, Qld.
22/01/2022	An air filter door of a stationary freight train had opened. An oncoming passenger service struck the door resulting in minor damage. There were no injuries.	Yass Junction, NSW
20/02/2022	A road rail vehicle with an elevated work platform was being operated with two workers in the bucket. A fault caused the vehicle to move forward resulting in the bucket colliding with overhead infrastructure. One worker was taken to hospital for treatment of minor injuries.	Gawler Line, SA
25/03/2022	A regional passenger train lost brake pipe air after colliding with a sandbox which had previously fallen from another train. There was significant damage to the undercarriage of the train resulting in a diesel fuel spill. There were no injuries.	Marulan, NSW
14/04/2022	A passenger train collided with a road vehicle which was stuck on the track. The occupants of the vehicle attempted to flag down the train crew. The train driver activated emergency brakes but was unable to stop the train resulting in a collision. There were no injuries.	Coolaroo, Vic.
12/05/2022	The crew of a freight service had been given authority to enter a passing loop and was advised that another train was stationary ahead. While the train proceeded at low speed, the crew did not see the stationary train until it was a short distance away. The driver activated emergency braking. However, the train was not able to stop and collided at low speed resulting in the derailment of two wagons. There were no reports of injuries.	Glenfield, NSW
7/06/2022	The front panel of a regional passenger train came loose and struck a station platform. There were no reports of injuries or damage to the platform.	Ingleburn, NSW

Rail Safety Statistical Summary



Tram Collisions

Collisions involving trams, particularly with road vehicles and pedestrians are more common than in the heavy rail sector due to the sharing of public roadways in light rail operations. As a result of the typically lower operating speeds and lighter rail vehicles involved, such collisions tend to be less severe in consequence.

Excluding out of gauge mirror strikes, there were six running line collisions between trams reported in the 2021–2022 financial year. No fatalities or serious injuries were reported as a result of these collisions. It is suspected that the downward trend in the number of collisions between trams depicted in Figure 7 in recent years is linked to investments in the Melbourne metropolitan tram network, predominantly the phased introduction of more modern trams since 2013–2014.

There were 793 collisions reported between a tram and a road vehicle and 36 between a tram and person in the 2021–2022 financial year. While still below the pre-pandemic peak, this represents a 30% and 57% increase in collisions respectively compared to the previous year, driven by increases in pedestrian and road vehicle traffic as COVID-19 related movement restrictions eased, particularly in Melbourne and Sydney. There were two fatalities reported as a result of these collisions, one to a road vehicle occupant and one to a pedestrian. A further 13 serious injuries were reported due to these collisions, six to road vehicle occupants and seven to pedestrians.

Figure 7:
Running line collisions

between trams, July 2017 to June 2022

Includes collisions on non-running lines affecting the safety of running lines. Excludes trams striking or being struck by out of gauge equipment on trams on adjacent lines.

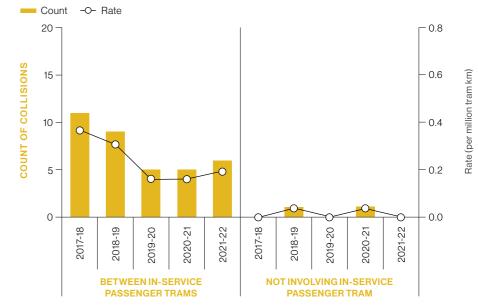
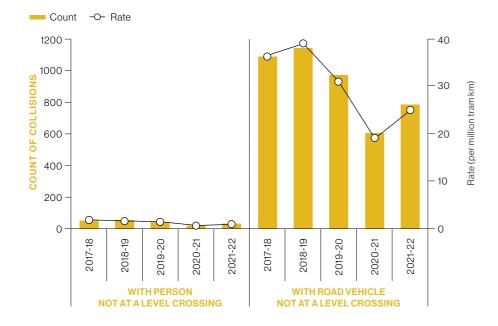


Figure 8:

Running line collisions between tram and road vehicle or person, July 2017 to June 2022

Excludes collisions at level crossings.



Rail Safety Statistical Summary

Table 10: Selected collisions involving trams, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
19/07/2021	A tram collided with a road vehicle. Both the tram and the vehicle sustained substantial damage. Tram passengers were evacuated. The tram driver and vehicle passenger received minor injuries which were treated at the scene.	Sydney, NSW
24/09/2021	A tram collided with a planter box at the end of a terminus causing it to derail. The tram was extensively damaged. The driver sustained a minor injury and was treated at the scene by paramedics.	Glen Iris, Vic.
22/12/2021	A tram undergoing a fault-finding process rolled back and collided at low speed with a stationary tram. There was no damage and no injuries.	Melbourne, Vic.
3/02/2022	A tram collided with a road vehicle. The driver of the road vehicle was admitted to hospital with serious injuries. Both the tram and vehicle were damaged.	Melbourne, Vic.
10/02/2022	A tram collided with a road vehicle. Both the tram and the vehicle sustained substantial damage. The vehicle driver was treated at the scene by paramedics.	Southbank, Vic.
15/02/2022	A tram collided with a road vehicle. The driver of the road vehicle was admitted to hospital with serious injuries. The road vehicle sustained substantial damage.	Melbourne, Vic.
17/02/2022	Two trams had a minor end-to-end collision. One received minor damage to the rear bumper and the other to the front bumper. There were no injuries.	Melbourne, Vic.
22/02/2022	Two trams had a minor collision. Both trams sustained damage to their bumper bars. One passenger reported a minor injury but declined medical assistance.	Southbank, Vic.
18/03/2022	A tram collided with a road vehicle. The driver of the road vehicle was transported to hospital with serious injuries. The road vehicle was significantly damaged, while the tram sustained minor damage.	Richmond, Vic.
1/04/2022	Two trams collided resulting in panel and bumper bar damage to both trams. There were no injuries.	Melbourne, Vic.
14/04/2022	A tram collided with a road vehicle resulting in a serious injury to the driver of the road vehicle. The tram and road vehicle sustained minor damage.	Melbourne, Vic.
1/05/2022	A tram collided with a pedestrian. The pedestrian was transported to hospital by ambulance with serious injuries.	Kew, Vic.
14/05/2022	Two trams had a minor collision. Neither tram sustained any damage. There were no injuries.	Caufield North, Vic.
17/05/2022	A tram collided with a pedestrian. The pedestrian was transported to hospital by ambulance with serious injuries.	Melbourne, Vic.
18/05/2022	Two trams had a minor rear end collision. Neither tram sustained any damage. There were no injuries.	Melbourne, Vic.
24/06/2022	A tram collided with a pedestrian. The pedestrian was wearing headphones and stepped onto the track into the path of the tram. The driver sounded the tram horn yet was unable to avoid a collision. The pedestrian was transported to hospital by ambulance with serious injuries.	Braddon, ACT



Signals Passed at Danger and Authorities Exceeded

Instances of trains exceeding the limit of their authorised movement are considered important precursors to collisions and derailments. On heavy rail signalled systems these occurrences are notified as a Signal Passed At Danger (SPAD). On light rail networks, they are notified as a Light Rail or Tram Authority Exceeded event (LRTAE).

Figure 9 depicts a reduction in SPADs involving commercial passenger trains, where the limit of authority was missed by train crew, culminating in a five-year low 201 SPADs during 2021–2022. The decrease is predominantly driven by SPADs involving urban passenger trains. The high numbers seen in recent years has resulted in a strong focus on the management of SPAD incidents involving passenger trains in various jurisdictions. ONRSR has proactively worked with operators reviewing trends and themes to assist with prevention. Regulatory activities have been undertaken in areas such as driver competency, infrastructure management and signalling systems to help combat the rise seen in 2020–2021.

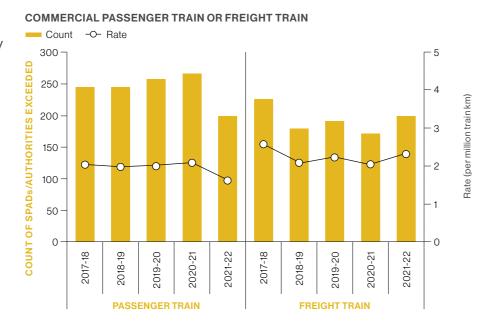
While SPADs involving freight trains have increased in 2021–2022 following a five-year low in the previous year, the rate of SPADs remains relatively steady and below the peak seen in 2017–2018.

The increase in light rail authority exceedances since 2018–2019 depicted in Figure 9 is largely explained by the testing and commissioning of new light rail networks, the expansion of existing networks, and the introduction of new reporting requirements which came into effect on 1 July 2018.

Figure 9:

Signals passed at danger / Authorities exceeded, July 2017 to June 2022

Data shown is for occurrences classified as sub-category SPAD A1: Limit of authority missed by train crew, LRTAE A2: Light rail / tram signal passed without authority, and LRTAE A4: Limit of authority missed by light rail / tram crew, as defined in the Reporting Requirements for Notifiable Occurrences⁶. Rates are expressed using train km for the sectors represented in each reporting category.

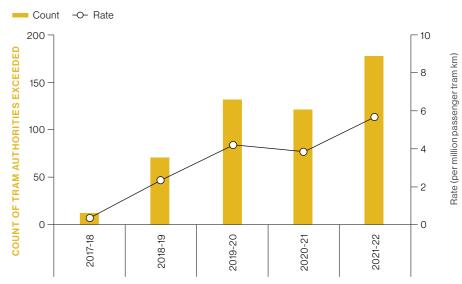


 $^{^6} Office of the National Rail Safety Regulator, Reporting Requirements for Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the National Rail Safety Regulator, Reporting Requirements for Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the National Rail Safety Regulator, Reporting Requirements for Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the National Rail Safety Regulator, Reporting Requirements for Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the National Rail Safety Regulator, Reporting Requirements for Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 and 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020 are also of the Notifiable Occurrences, Version 3, O$

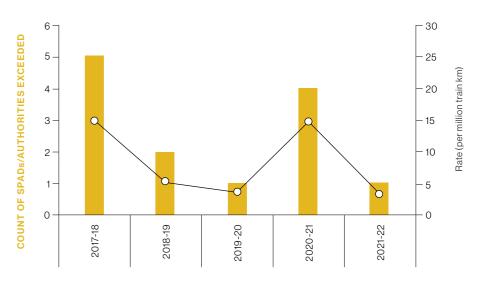
Rail Safety Statistical Summary

Figure 9 (cont.):





TOURIST & HERITAGE PASSENGER TRAIN



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Table 11:
Selected signal passed at danger / authority exceeded occurrences, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
5/07/2021	A loaded grain train passed a signal at danger by approximately 100 metres. The network controller issued an emergency broadcast for the train to stop.	Westwood, Qld.
6/07/2021	A loaded freight train had arrived at Port Waratah early. Arrangements were made to detach the locomotives from the wagons so they could be refuelled prior to the unloading of the train. After refuelling the locomotive passed a stop board without authority from network control. The network controller made an emergency call for the driver to stop.	Port Waratah, NSW
14/07/2021	A freight train passed a signal at danger by approximately 1,480 metres. The train did not have authority to pass station limits. Another train was shunting at the station at the time.	Malcolm, WA
21/07/2021	Nine wagons in a yard ran away approximately 95 metres and passed a signal at stop by four wagons. Handbrakes had been applied to all wagons but the wheels had not been chocked. There were no injuries.	Clyde, NSW
15/09/2021	The driver of a passenger train passed a signal at stop triggering an alarm at train control. The train controller made an emergency call for the train to stop. The train passed the signal at stop by approximately five railcar lengths.	Dutton Park, Qld.
21/04/2022	A tram took a wrong turn on approach to a terminus. The driver was able to stop the tram before a collision with an oncoming tram that had just departed. There were no injuries.	Melbourne, Vic.
12/05/2022	Two locomotives ran away a distance of approximately 60 metres and passed a signal at stop triggering an alarm at network control. The drivers were not on board at the time of the runaway.	Fisherman Islands, Qld.

Rail Safety Statistical Summary



Train Fires

There were 98 fires on freight or passenger trains and trams reported in 2021–2022, representing a slight decrease on the previous year. The decrease was mainly driven by an eight percent reduction in fires on freight trains, accounting for 48 of the 98 fires reported. Freight train fires in 2021–2022 were predominantly associated with locomotive and rolling stock faults.

Fires on passenger trains accounted for 41 of the 98 occurrences reported, representing a marginal drop from the previous year. These fires were primarily due to a mix of rolling stock faults and arson. Like in the previous year, there were six tram fires reported in 2021–2022.

There were no fatalities or serious injuries reported as a result of these fires.

Figure 10: Fires on trains, July 2017 to June 2022

Reported fires on maintenance trains and road rail vehicles are excluded. Rates are expressed using train km for the sectors represented in each reporting category.

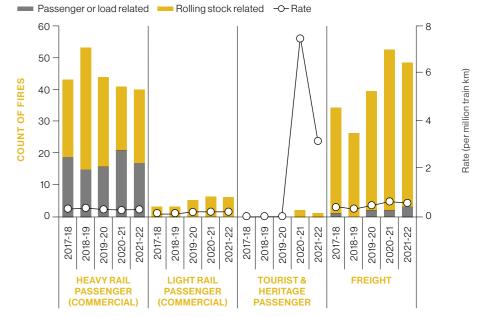


Table 12:
Selected occurrences involving fire or explosion, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
15/08/2021	A driver of a passenger train reported exhaust fumes entering the front carriage. Passengers were moved to the rear carriage and the train continued with the fumes worsening. The driver stopped the train at the next station and passengers evacuated the train.	Mitcham, SA
20/10/2021	The brakes on a regional passenger train caught alight resulting in smoke emerging from underneath the carriage. Passengers were moved to safe carriages and the train crew extinguished the fire. There were no injuries.	Gosford, NSW
2/11/2021	The traction motor of a shunting locomotive caught fire on the running line. The train crew attempted to extinguish the fire using extinguishers. Emergency services attended and extinguished the fire. There were no injuries.	Manildra, NSW
6/11/2021	The battery bank in an uncommissioned shunting vehicle exploded. Two contractors received serious injuries from acid burns and were transported to hospital.	Hornsby, NSW
15/11/2021	The driver of a regional passenger train noticed flames and smoke coming from underneath one of the carriages. The train was isolated and inspected revealing a faulty traction engine and oil leak. The fire had self-extinguished.	Little River, Vic.
12/12/2021	A passenger train experienced a loss of power due to an explosion occurring in the rear pantograph. The train came to a stop. The train was not able to be powered and was coupled to another train to be moved to the next station where passengers were evacuated.	Fortitude Valley, Qld.
16/12/2021	A fuel system fault was believed to have caused a fire on board a locomotive of a coal train as it arrived at the loading facility. Emergency services attended and extinguished the fire. There were no reports of injuries.	Bulga, NSW
16/01/2022	A slag pit reaction resulted in debris being ejected and hitting and cracking the window of a locomotive at the blast furnace. There were no injuries.	Port Kembla, NSW
6/02/2022	A spark from a heritage steam train caused a lineside grass fire. The fire was extinguished with the assistance of a helicopter.	Tullah, Tas.
7/02/2022	A locomotive of a freight train caught fire. The train crew were able to isolate the locomotive from the rest of the consist. Emergency services attended and extinguished the fire. There were no injuries.	Nana Glen, NSW
26/02/2022	Sticking brakes on the locomotive of a passenger train caused sparks resulting in a lineside grass fire. Emergency services attended with many firefighting appliances and aerial support fighting the fire which caused damage to farming paddocks and fencing. There were no injuries.	Near Ararat, Vic.

Rail Safety Statistical Summary



Other Noteworthy Occurrences

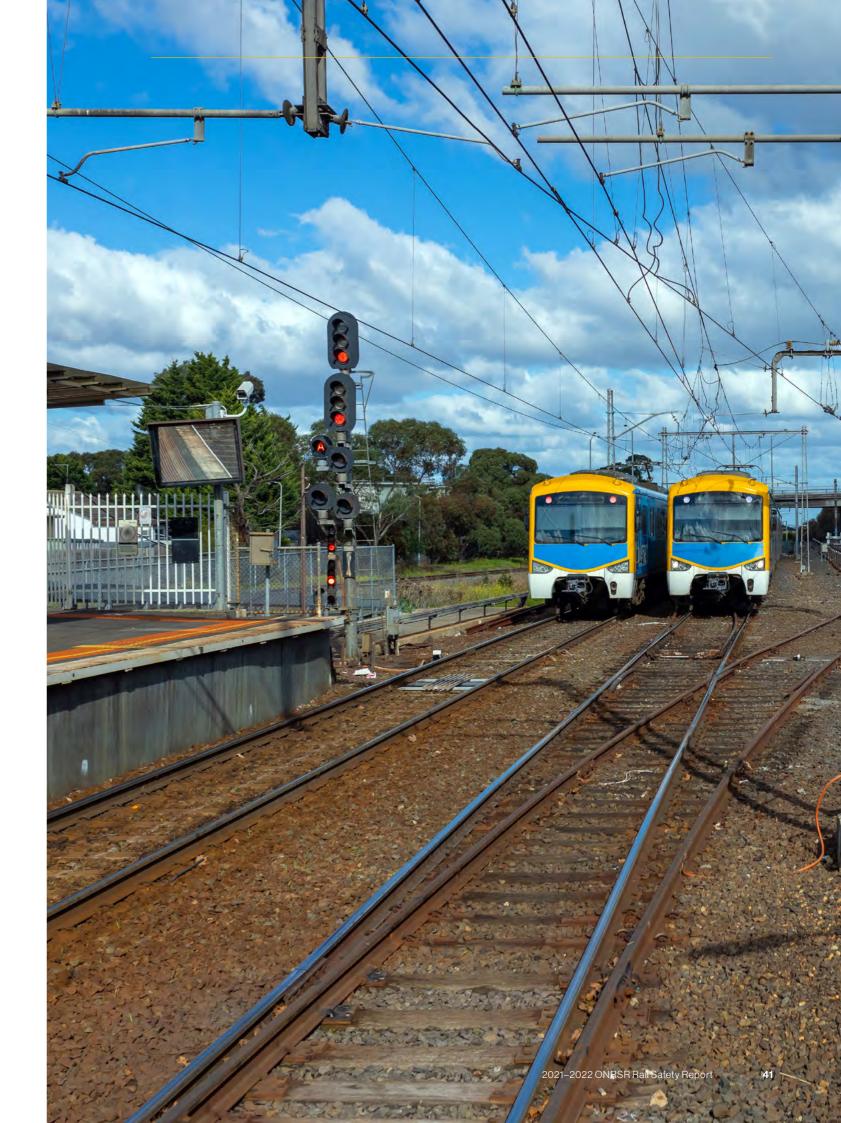
Table 13:

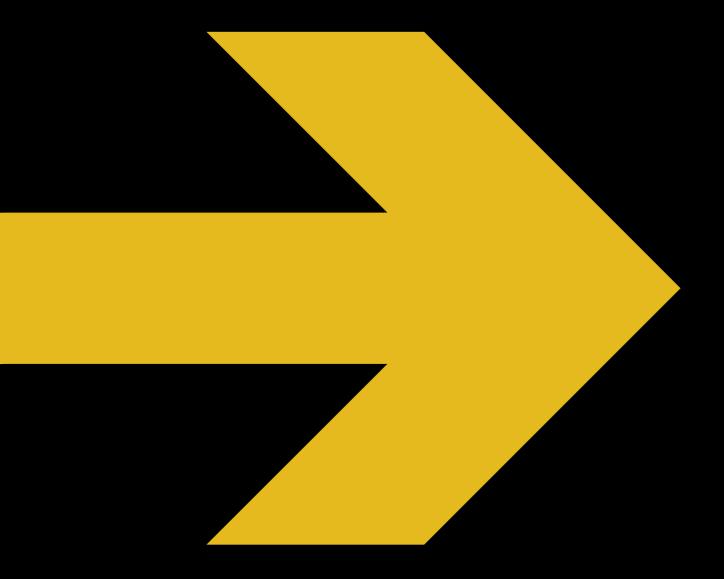
Other noteworthy occurrences, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
10/08/2021	A single freight wagon ran away a distance of approximately 950 metres at a yard. The wagon traversed a derailer prior to colliding with the end of line board and derailing. Handbrakes had been applied to the wagon.	West Kalgoorlie, WA
10/08/2021	A long-distance passenger train travelled through a level crossing protected by lights and boom gates. While flashing lights were operational, the boom gates remained in an upright position.	Hamel, WA
17/08/2021	A defect in the overhead wire caused it to be entangled in the pantograph of a passenger train. Approximately 500 metres of overhead wire was dragged to the ground. Components of the overhead infrastructure struck the side of the train carriage resulting in smashed windows. Recovery operations then commenced to safely evacuate passengers.	Berwick Station, Vic.
22/08/2021	Freight wagons were left on the running line without safeworking protection.	Boco, Tas.
14/10/2021	The crew of a freight train contacted an incorrect control board to seek authority to pass a signal at stop. The network controller did not obtain sufficient details or transfer the call to the correct control board and incorrectly gave an authority for the train to pass a signal at stop resulting in a safeworking breach.	Baal Bone Junction, NSW
21/01/2022	A passenger train came to a stop due to a fault in an underground tunnel approximately 300 metres from a station. No connection could be established with the train to enable remote troubleshooting and the control centre was unable to communicate with the passengers on board. After delays, approximately ten passengers commenced self-evacuating and began walking through the tunnel towards the next station. Recovery operations commenced and all passengers were accounted for. There were no reports of injuries.	North Ryde, NSW
30/01/2022	A guard on a passenger train identified a door had opened during transit. The doors were closed, and the train continued. Further investigation revealed the train had departed a station with the door open. The train was removed from service.	Mitchelton, Qld.
3/03/2022	A freight train came to a stop due to a fault. The train crew sought blocking protection for a worker to inspect the length of the train but after leaving the cab were notified of an approaching passenger train, and protection was not implemented as per procedure. The driver of the oncoming passenger train reported a worker in the danger zone on approach. The worker was able to move to a safe place.	Wondabyne, NSW
16/04/2022	During shunting operations a rake of 32 wagons ran away a distance of approximately 2.5km passing through a level crossing with passive protection.	Cloncurry, Qld.
26/04/2022	A temporary speed restriction of 80km/h was imposed on a section of track without any boards being erected. Later a 20km/h speed restriction was imposed. However, train crews were not notified for a period of two days.	South of Alice Springs, NT

Table 13 (cont.):

DATE	DESCRIPTION	LOCATION
16/05/2022	The driver of an empty passenger train was instructed to conduct rail cleaning of a set of points but moved the train in the wrong running direction on the mainline without authority.	Wyong, NSW
24/05/2022	A driver of regional passenger train was issued a condition affecting network advising of a temporary speed restriction. However, the incorrect location was given. As a result, the train travelled through a section of track with a 40km/h speed limit at approximately 100km/h.	Moreland, Vic.
31/05/2022	A panel fell from a regional passenger service as it was passing through a station landing on the platform within one metre of a member of the public. There were no reports of injuries.	Hallam, Vic.
5/06/2022	A loaded ore train experienced a brake pipe penalty. Once stopped the train crew applied handbrakes to some wagons but it was insufficient to prevent the train moving a small distance. The train was secured, and an investigation commenced.	Newman Line, WA
9/06/2022	A freight train exceeded a temporary speed restriction of 30 km/h and travelled through the section of track at approximately 80km/h.	Coonalpyn, SA
12/06/2022	A person fell off a station platform onto the tracks below as a train approached the station. The person attempted to return to the platform but was unable to before being struck by the train resulting in fatal injuries.	Wentworth Falls, NSW
16/06/2022	During project works to commission high voltage power infrastructure, some overhead infrastructure was commissioned without appropriate safety works and documentation. At least one work crew was working in the vicinity without being aware that overhead infrastructure had been commissioned.	Sydenham, Vic.
23/06/2022	A freight train had come to a stop due to a fault resulting in rescue locomotives being tasked to the site. A crew member from the rescue locomotive accessed the danger zone to couple the two locomotives together, shortly before an adjacent line passenger service traversed by. No adjacent line protection was in place as per the required procedure.	Booragul, NSW





National Priorities 2021-2022

At a Glance

Track Worker Safety

2016

FOCUS AREAS

ONRSR conducted a rail safety officer 'blitz', deploying rail safety officers to a wide range of metropolitan and regional rail corridors to conduct unannounced visits, assessing track work safety processes and procedures across over 130 work sites.

NUMBER OF PEOPLE WORKING AS RAILWAY TRACK WORKERS IN 2021 (SOURCE JOBOUTLOOK.GOV.AU)

TRACK WORK PROCEDURE / RULE BREACHES

10.36

The number of reported track work procedure / rule breaches increased by 8% compared to 2020-2021.

Contractor Management



2020

FOCUS AREAS

ONRSR shared and discussed a range of contractor management related safety themes and concerns identified as part of its national priority project with various operators to address any gaps in safety management systems.

Level Crossing Safety

PRIORITY SINCE

2018



LEVEL CROSSINGS

FOCUS AREAS

ONRSR co-commissioned the Australasian Centre for Rail Innovation to undertake a review of freight train visibility at passive level crossings. The published report identified 30 potential safety controls, a number of which are now being trialled.



LEVEL CROSSING EQUIPMENT FAILURES / DEFECTS

The number of level crossing equipment failures / defects reported reduced by 11% compared to 2020–2021 and reached a five-year low. Higher risk failures decreased by 12%.



LEVEL CROSSING NEAR MISSES WITH PERSON OR ROAD VEHICLE (PASSENGER / FREIGHT TRAIN)

568 near misses occurred at level crossings with active protection (77%), 164 near misses at level crossings with passive protection (22%) and 10 near misses at unprotected level crossings (1%).



LEVEL CROSSING COLLISIONS WITH PERSON OR **ROAD VEHICLE (PASSENGER / FREIGHT TRAIN)**

26 collisions occurred at level crossings with active protection (63%), 14 collisions at level crossings with passive protection (34%) and one collision at an unprotected level crossing (3%).

Control Assurance



PRIORITY SINCE

2020

FOCUS AREAS

ONRSR has developed control assurance education material for the tourist and heritage sector and other less complex operators.



A national priority for ONRSR is defined as a rail safety area of regulatory focus that applies to multiple jurisdictions and operators and warrants a sustained period of regulatory attention. ONRSR targets its priority areas using tailored regulatory solutions, typically through operator-centric national compliance projects or industry-wide, education and information sharing programs.

This section of the report covers ONRSR's national priorities current in 2021–2022:

- » Level Crossing Safety
- » Track Worker Safety
- » Contractor Management
- » Control Assurance



National Priorities



Level Crossing Safety

There are more than 20,000 level crossings in Australia and at all of them there exists a level of risk to safety – indeed, other than suicide and trespass, accidents at level crossings are the primary cause of railway related fatalities among the general public.

There were 38 level crossing collisions between a passenger or freight train and road vehicle reported in the 2021–2022 financial year, resulting in three fatalities and three serious injuries:

- » two of the fatalities were road vehicle occupants and one was a cyclist;
- » all three of the serious injuries were road vehicle occupants; and
- » 66% of the collisions occurred at crossings protected by active controls, such as lights and boom gates, representing an increase of 56% from 2020–2021.

There were three level crossing collisions between a freight train, passenger train or tram and person reported in the 2021–2022 financial year, resulting in one fatality and two serious injuries to pedestrians. One of the three collisions took place at a crossing protected by active control devices, such as automatic gates, visual alarms or adjacent active road crossing controls.

All rail safety stakeholders, rail operators, governments and the general public, have a role to play in improving safety at level crossings and ONRSR continues to advocate for improvements to help reduce the rate of fatalities and serious injuries. ONRSR also continues to support the work being done by governments and industry to remove level crossings and their commitment to a policy of no new level crossings wherever possible.

ONRSR's Focus

In 2022 ONRSR announced its intention to focus its level crossing national priority work in regional Australia. The change coincided with the results of a review of current research and best practice, both in Australia and internationally, on freight train visibility that highlighted possible controls that could be applied to address train conspicuity at passive level crossings which are more prevalent in regional areas. The first trials of these controls by industry will be completed in late 2022.

Elsewhere ONRSR has welcomed a range of level crossing safety initiatives by governments including crossing upgrades and educational activities. The efforts of all rail safety stakeholders, including those members of the public working hard to advocate for level crossing safety improvements, is a great reflection of the shared roles and responsibilities we all have to drive change for the better in this space.

Level crossing equipment failures and defects

ONRSR was notified of a five-year low 117 level crossing equipment failures and defects during 2021–2022. ONRSR's risk-based analysis of these occurrences is presented in Figure 13, which highlights the higher risk occurrences that accounted for 26% of all failures and defects reported. These involve equipment failures or defects resulting in:

- » complete failure of active warning devices;
- » late activation of warning devices; or
- » premature deactivation of warning devices.

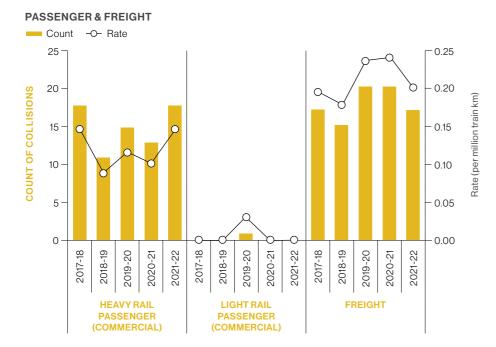
Examples of other level crossing equipment failures and defects reported to ONRSR include:

- » failure of road boom(s) to fully lower but other active warning devices operational;
- » failure of pedestrian gate(s) to close or boom(s) to lower;
- » partial failure of flashing lights (individual lamp failures);
- » failure of audible warning devices (bells, sirens);
- » damaged / missing passive warning devices (e.g. signs);
- » defective locking mechanism on emergency escape gates; and
- » failure of pedestrian 'don't walk' warning light(s).

Figure 11:

Level crossing collisions between train and road vehicle, July 2017 to June 2022

Rates are expressed using train km for the sectors represented in each reporting category. Includes collisions reported at both public and private access road crossings.



National Priorities

Figure 11 (cont.):

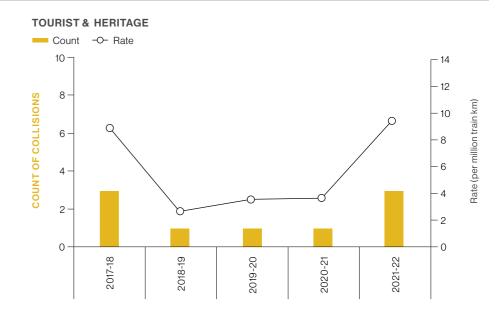


Figure 12:

Level crossing collisions between train and person, July 2017 to June 2022

Rates are expressed using train km for the sectors represented in each reporting category. Includes collisions reported at both public and private access crossings.

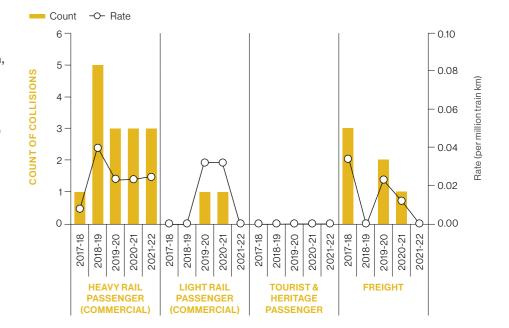
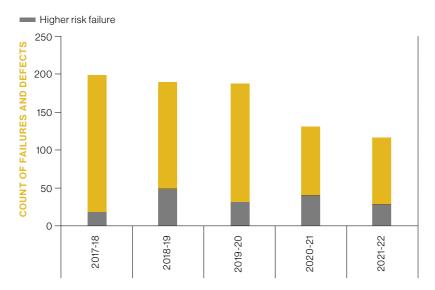


Figure 13:
Level crossing equipment failures and defects,
July 2017 to June 2022



National Priorities

Table 14:
Selected level crossing-related occurrences, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
3/07/2021	A cyclist wearing headphones was crossing at a pedestrian crossing. The driver of an approaching passenger train was unable to stop and avoid a collision. The cyclist was fatally injured.	Campbellfield, Vic.
24/07/2021	A freight train and road vehicle collided at a level crossing protected by lights and boom gates. The driver of the vehicle was transported to hospital for observation.	Port Hedland, WA
29/09/2021	A freight train and heavy road vehicle collided at a level crossing with passive protection. An occupant of the vehicle was seriously injured and admitted to hospital.	Togar, NSW
13/10/2021	A freight train and a road vehicle collided at a level crossing protected by flashing lights. The driver of the vehicle was transported to hospital by ambulance.	Balhannah, SA
20/10/2021	A regional passenger train collided with an abandoned road vehicle at a level crossing with active protection. Two passenger carriages derailed as a result. Two train crew and two passengers were transported to hospital with minor injuries.	Kembla Grange, NSW
29/10/2021	A freight train and a road vehicle collided at a level crossing protected by lights and bells. The driver of the vehicle was admitted to hospital with serious injuries.	Murray Bridge, SA
24/11/2021	A regional passenger train and road vehicle collided at a level crossing with passive protection. Emergency services attended and assisted two occupants of the road vehicle. There were no injuries.	Moorland, NSW
19/12/2021	A heritage passenger train and road vehicle collided at a passive level crossing. Emergency services attended. The driver of the vehicle sustained minor injuries.	Victor Harbor, SA
30/01/2022	An urban passenger train and a road vehicle collided at a level crossing protected by lights and boom gates. The driver of the vehicle sustained minor injuries.	Runcorn, Qld.
25/02/2022	A freight train and a road vehicle collided at a level crossing with passive protection. The occupant of the road vehicle was fatally injured.	Emerald, Qld.
6/03/2022	A regional passenger train and road vehicle collided at a level crossing protected by lights. One of the occupants of the vehicle was admitted to hospital with serious injuries.	Mardella, WA
11/03/2022	A freight train and a road vehicle collided at a level crossing protected by lights. There were no injuries.	Three Ways, NT
12/05/2022	A freight train and a road vehicle collided at a level crossing protected by lights. There were no injuries. The train locomotive sustained minor damage.	Nairne, SA
15/06/2022	A shunting movement was taking place across a level crossing in a siding. A member of the rail crew was protecting the crossing and instructed the driver of an approaching heavy road vehicle to stop. After stopping briefly, the heavy road vehicle continued forward and collided with the rear wagon of the train resulting in a fire and spillage of chemicals. Emergency services attended the scene. There were no reports of injuries.	Kooragang, NSW
28/06/2022	A freight train and a road vehicle collided at a level crossing protected by stop signs. The train's fuel tank was ruptured causing fuel to leak over a distance of three kilometres. There were no injuries.	Goobang Junction, NSW



Track Worker Safety

There were no instances of track workers being fatally struck by trains as a result of worksite protection breaches on railways across Australia in 2021–2022. However, ONRSR was notified of 477 occurrences involving breaches of worksite protection rules and procedures, which represents an 8 percent increase on the previous year. The rate for breaches is calculated on incidents per thousand track kilometres. However, this does not take into account the volume of work being undertaken around Australia.

As in past years the breaches notified in 2021–2022 represented a wide range of circumstances in terms of the nature of failures and the potential for harm. Examples of more serious types of incidents are summarised in Table 15.

ONRSR's Focus

In May 2022, ONRSR heralded its operational emergence from the COVID-19 pandemic with a carefully planned rail safety officer 'blitz'. The Big Week Out, as it was dubbed, was ONRSR's largest ever coordinated regulatory activity and saw rail safety officers deploy to a wide range of metropolitan and regional rail corridors to conduct unannounced visits. A key focus was assessing the processes and procedures accredited rail transport operators have in place to ensure the safety of track workers. Over 50 officers from all ONRSR offices were deployed, both day and night, across all major railways covering every state and territory in Australia. In all more than 130 work sites were visited, with a series of common issues being identified including:

- » rail safety workers not being in possession of an appropriate competency card, either physically or digitally;
- » protection officers not checking the competencies for the workgroup;
- » minor discrepancies in the protection paperwork and paperwork not being completed correctly; and
- » inconsistent application of rules around rail traffic entering and leaving worksites.

While improvements are being made and more and more operators and workers are doing the right thing, in recognition of the need to be agile and to remain vigilant in this space, ONRSR has once again reframed the track worker safety national priority. Rather than a singular, broad all encompassing 'track worker safety' national priority we now have more narrowly defined specific national priorities encompassing:

- » Rail safety worker competency
- » Safety critical communications
- » Altered working arrangements

National Priorities

Figure 14:
Track work
safeworking rule and
procedure breaches,
July 2017 to June 2022

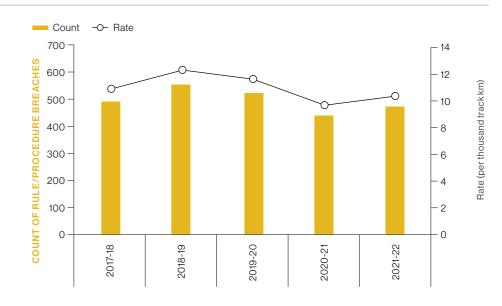


Table 15:
Selected track work procedure / rule breaches, July 2021 to June 2022

DATE	DESCRIPTION	LOCATION
4/07/2021	A driver of a passenger train reported seeing workers on track without lookout protection in the correct location. The train driver applied brakes and sounded the train horn. There were no injuries.	Clyde, NSW
12/07/2021	A protection officer had used absolute signal blocking and fulfilled the authority when subsequently completing a track inspection on a section of track without the appropriate level of track protection. The protection officer had mistakenly believed the protection was still in place.	Woodville, SA
21/07/2021	A train controller issued an absolute signal blocking authority while a passenger train was in the block. Five workers were on track but were able to clear without any incident.	Lonsdale, SA
22/07/2021	An Electrical Access Permit was granted for a 23-hour period involving multiple shifts and excavation of a high voltage cable within a defined section of track. The excavation was undertaken outside the time period and location specified in the permit resulting in a safeworking breach. Works were ceased and the area made safe.	Mooroolbark, Vic.
1/08/2021	The train crew of a freight train noticed a worker on track approximately 200 metres ahead and sounded the horn. The worker was able to escape to a safe place in time. Other workers were nearby next to a vehicle in the corridor.	Archer, Qld.
23/08/2021	A freight train crew reported workers in the danger zone without appropriate lookout workers or notification of a 40km/h temporary speed restriction. The train approached at 70km/h and the train driver sounded the train horn. There were no injuries.	Keysbrook, WA
1/10/2021	A track protection officer set up worksite protection on the incorrect section of track. During the prestart briefing a freight train approached with the train crew applying emergency braking to stop before the stop board. There were no injuries.	Ogmore, Qld.

Table 15 (cont.):

DATE	DESCRIPTION	LOCATION
5/10/2021	A driver of a passenger train reported a near miss with two workers on track after the end of works. The train driver applied emergency brakes and was able to stop clear of the workers. There were no injuries.	Williams Landing, Vic.
23/02/2022	Two road rail vehicles were placed on track approximately 200 metres outside the limits of track protection. A train was approaching at low speed and was able to stop approximately 100 metres from the vehicles.	Muswellbrook, NSW
6/03/2022	Two track machines were coupled together to form a single consist to prepare for travel. A worker accessed the machines to attach safety chains when an operator moved the machines. The worker was able to avoid being struck. There were no reports of injuries.	Pragueland, Qld.
20/04/2022	A crew of a freight train had authority to travel a section of track when the driver noticed incorrectly facing points. The driver was able to stop the train. A protection officer had clipped and locked the points in reverse to protect a worksite in a siding.	Spring Ridge, NSW
31/05/2022	The driver of a passenger train reported a near miss with three workers on track walking facing away from the track. The driver applied braking and sounded the horn, and the workers were able to clear the track. There were no injuries.	Footscray, Vic.



Contractor Management

Following the successful completion of stages one (contractor information) and two (contractor engagement), 2021 – 2022 ushered in stage three (operator engagement) of ONRSR's four-stage approach to this national priority.

The sharing of a range of safety themes and concerns identified through the initial stages of the project has allowed ONRSR to discuss with operators how it intends to conduct more formal educational activities before officially embarking on stage four (compliance) in the next 12 months. Initially these discussions are being held with individual operators to address any gaps in safety management systems and to provide advice and guidance on how to comply with the obligations they have for contractor management under *Rail Safety National Law*. These sessions will be complemented by the availability of educational resources on the ONRSR website.

Phase four will officially begin in the first half of 2023 with ONRSR increasing its regulatory activities in this space and continuing to work with operators to further opportunities for improvement in contractor management. At the conclusion of this final phase, this issue will be finalised as an ONRSR national priority.

National Priorities



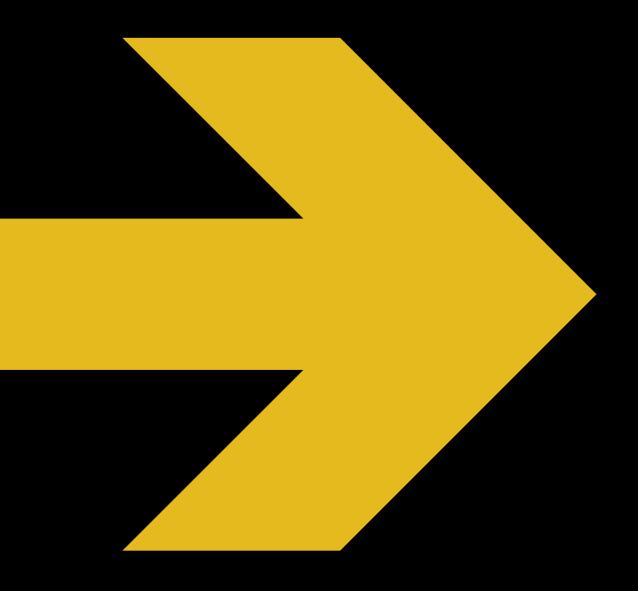
Control Assurance

ONRSR continues to be encouraged by indications of a relative strong understanding and application of control assurance among rail transport operators across Australia. This is in some part a result of the development of useful resources for industry that have proven successful in ensuring operators are aware and informed of control assurance requirements from a regulatory perspective.

While the performance is generally sound across industry, some operators within the tourist and heritage sector have struggled with the concept of control assurance and require additional assistance. ONRSR is providing this extra guidance in the form of education that is tailored to the sector and designed to aid operators in developing a control assurance strategy and integrate control assurance in their overarching safety management system.

Indeed, ONRSR will continue to work with all sectors to encourage further development of control assurance strategies that clearly outline what assurance activities are being undertaken to assess risks and if the risk controls are working properly. The assurance strategy should be supported and implemented throughout all levels of the organisation, allow senior management to monitor and review the key risks and key controls within the organisation and facilitate appropriate and decisive corrective action when necessary.

ONRSR is satisfied that the work done to raise awareness and rectify issues associated with control assurance has been successful and has now retired control assurance from its active national priority program.

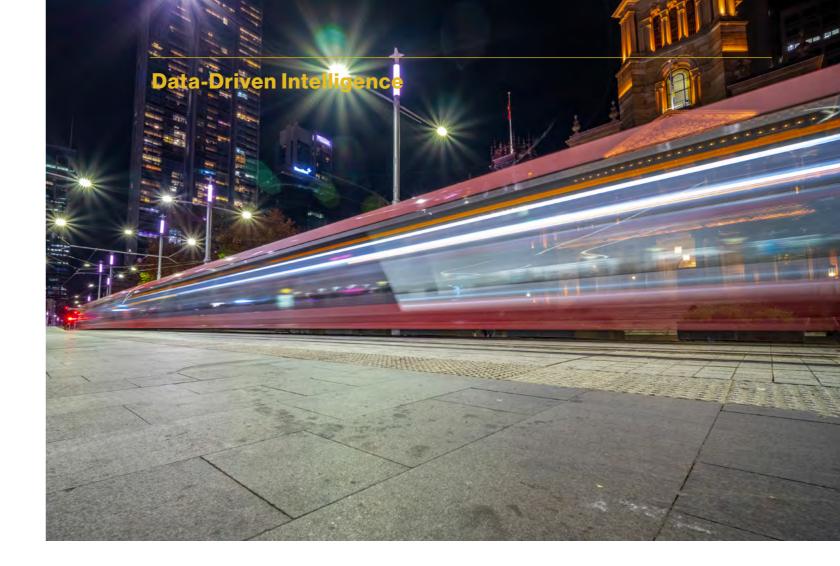


Data-Driven Intelligence

Data-Driven Intelligence

The statistics and summaries presented in the previous chapters provide a snapshot of the rail industry's safety performance over the last financial year. This information is important for monitoring and reporting safety performance across the rail industry, acting as a key source of regulatory intelligence used to direct ONRSR's resources and attention.

This chapter continues the series of articles presented in previous issues of the ONRSR Rail Safety Report, providing an update on ONRSR's progress to further enhance the data-driven element of its risk-based approach to regulation.



National Rail Safety Data Strategy

On July 1, 2022, the Office of the National Rail Safety Regulator and the Australasian Railway Association (ARA) celebrated a major milestone with the official launch of Australia's new rail safety data reporting scheme.

All accredited operators now report under the terms of the National Rail Safety Data Strategy (NDS), a purpose-built system designed to deliver a relevant, consistent and quality national data set readily available to all stakeholders.

The new arrangements are now delivering focussed national data and comparability, a refined set of occurrence types that operators are required to report, and a greater focus on collecting data that directly impacts rail safety.

Development of the NDS was only made possible by extensive engagement with a range of rail safety stakeholders over several years which included oversight by a Steering Committee co-chaired by ONRSR and the ARA

This collaborative approach between the regulator and industry means Australia now has a truly national and consistent rail safety data set that will better inform safety decisions and is yet another example of national regulation at work.

As always some issues have been encountered in the early stages of this new system however, enhancements and updates will be released on a regular basis.

Data-Driven Intelligence

Case Study – How ONRSR Identified Its New National Priorities

Throughout early 2022, ONRSR conducted a comprehensive review of its national priorities. A structured, evidence-based risk assessment process was used to ensure ONRSR was able to successfully identify its national priority areas for regulatory focus. Certain defining characteristics were identified using a process of analysis, nominations, scoring and final review. Assuming the priority area met each of the characteristics, it was selected as a national priority.

The 2022 review also saw enhancements made to the assessment process by bringing in nominations related to findings from ONRSR's investigations analysis function, introduced in August 2021, thus expanding the sources of regulatory information drawn upon. The purpose of this analysis function is to routinely capture findings on the contributing factors to rail safety incidents, as described in rail safety investigation reports ONRSR receives as part of its day-to-day regulatory function. The aggregation, coding and analysis of findings from these reports provide an opportunity to identify patterns and trends in the systemic contributors to adverse events across rail operations.

A further enhancement involved the validation of all nominations from the various regulatory information sources against both the investigations analysis function findings and notifiable occurrence data.

This structured, evidence-based risk assessment has resulted in the identification of some new national priorities and the refining and refocusing of some existing priorities such as track worker safety and level crossing safety.

Data-Driven Intelligence

SAFETY CRITICAL COMMUNICATIONS

ONRSR incident investigations have identified poor safety critical communications as a contributing factor to an increasing number of extremely serious occurrences across all sectors of the industry, ranging from authority irregularities to conflicting train movements, runaways and near-hits. Safety critical communications include both verbal and written communication and are essential to ensuring safe railway operations. Of particular concern is the use of casual or informal language - creating confusion and misunderstandings that lead to poor decision making that can have serious consequences. Safety critical communications' importance to the safe operation of all railway operations is reflected in its relevance to the full spectrum of rail safety workers including train drivers, network controllers, protection officers and track workers. ONRSR will work closely with rail transport operators to ensure they have properly designed, tested and executed processes, procedures and protocols in relation to operational communications.

RAIL SAFETY WORKER COMPETENCY

With adherence to procedures and network rules so critical to safety in the industry, the competency of rail safety workers is of paramount importance. Incident analysis reveals that both a lack of worker competency and the poor management of systems designed to record qualifications and knowledge, can lead to an increased risk of hazardous events. Via this new national priority, ONRSR will devote significant regulatory resources to seek assurance that rail transport operators have appropriately skilled, trained and experienced rail safety workers on their staff and suitable competency management systems that can be applied appropriately and thoroughly when engaging contractors. This is an area very much impacted by the skills shortage being experienced in the rail industry.

ALTERED WORKING ARRANGEMENTS

Departures from accepted practices, in particular the reversion to dated, sometimes paper-based working arrangements – often due to last minute decisions, external pressures and/or unforeseen events, are becoming widely recognised precursors to a range of incidents. The issue has been raised to national priority status for the first time in a bid to address failures to identify and manage risks associated with degraded conditions and altered working arrangements. ONRSR will be targeting rail transport operators to assess workers' competency and training in these often ad-hoc processes and to make sure they understand the flow on effects of changes to working arrangements, particularly when this kind of working exposes workers to high demand tasks for extended periods of time.

Data-Driven Intelligence

Data-Driven Intelligence

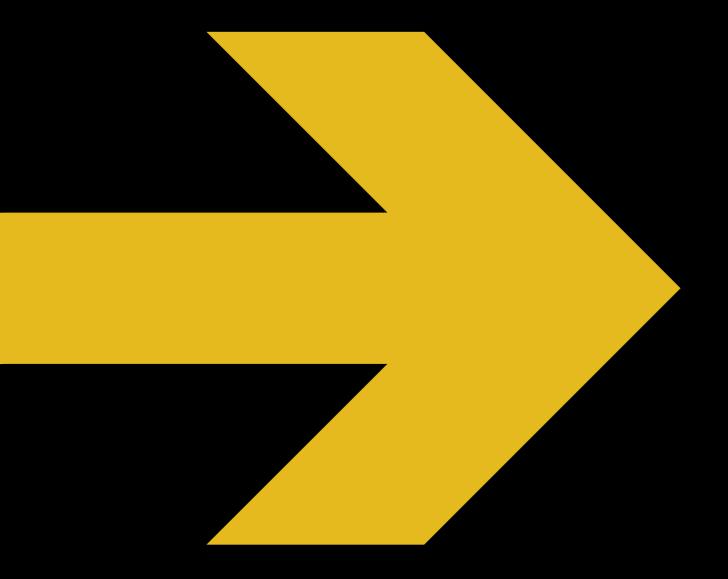
LEVEL CROSSING SAFETY - REGIONAL

ONRSR will now focus resources in relation to this priority on the issue of train conspicuity, infrastructure and public education to improve safety at regional crossings. This follows our commissioning of the Australasian Centre for Rail Innovation's review of research and best practice in this area, and our ongoing oversight, in conjunction with the Monash Institute of Railway Technology, of trials by the freight industry of possible train visibility controls. ONRSR will be engaged with the Regional Australia Level Crossing Safety Program and support activities under the National Railway Level Crossing Safety Strategy while also monitoring State Government investigations of technology solutions and the use of big data to identify hotspot locations. ONRSR also continues to support the work being done by both governments and industry to remove level crossings and to commit to a policy of no new level crossings.

CONTRACTOR MANAGEMENT

Under the *Rail Safety National Law*, safety is a shared responsibility of all stakeholders (operators, workers and ONRSR) as well as those who supply or provide services. The increasing use of contractors in the Australian rail industry, their vulnerability to breaches of the law and tendency to be involved in accidents remains a serious concern for ONRSR. A national priority since 2020, the issue is being addressed via a 4-phase program of works covering information gathering, contractor engagement, operator engagement and overall compliance. Phases 1 and 2 are complete and over the next two years, the remaining phases will be rolled out, culminating in targeted compliance activities, including audits and inspections that will drive improved safety performance in this area.





Appendix A – Network Statistics

Appendix A - Network Statistics

Figure 15:

Commercial passenger and freight train kilometres, July 2017 to June 2022

The falling trend in heavy rail passenger train kilometres in 2021–2022 is likely due to COVID-19 related restrictions on movement, particularly in Melbourne and Sydney, which resulted in a reduction of passenger train services. Industrial action in NSW also resulted in reduced metropolitan and regional passenger services.

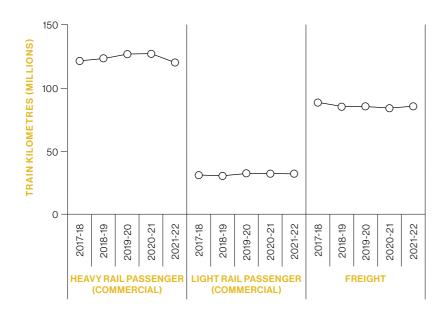
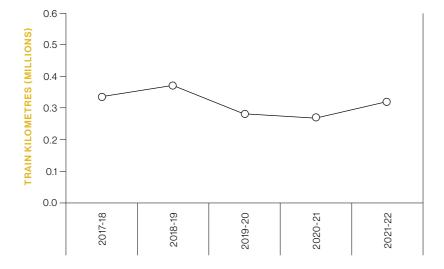


Figure 16:

Tourist and heritage passenger train kilometres, July 2017 to June 2022

The reduction in tourist and heritage passenger train kilometres reported in the 2019–2020 and 2020–2021 financial years is due to COVID-19 restrictions, which led to the suspension of several operations. Passenger train kilometres reported by tourist and heritage operators in Victoria that transitioned under ONRSR's regulatory oversight on 2 December 2019 are included from December 2019 only.



Appendix A - Network Statistics

Figure 17:

Maintenance vehicle kilometres, July 2017 to June 2022

Accredited operators are required to provide monthly reports of the total kilometres travelled by any self-propelled infrastructure maintenance vehicles such as a track maintenance train or road rail vehicle. Maintenance vehicle kilometres reported by tourist and heritage operators in Victoria that transitioned under ONRSR's regulatory oversight on 2 December 2019 are included from December 2019 only.

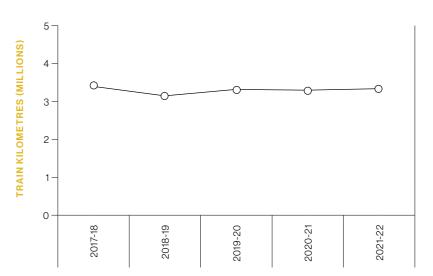
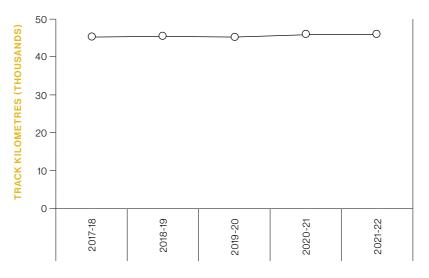
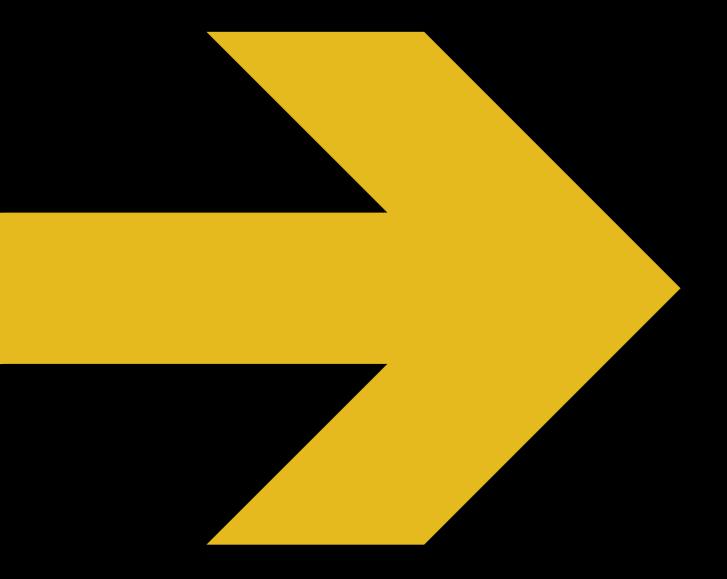


Figure 18:

Track kilometres, July 2017 to June 2022

Accredited operators are required to provide monthly reports on the length of track over which they have effective management and control. This chart depicts the total length of track reported for the month of June in each financial year. Track kilometres reported by tourist and heritage operators in Victoria that transitioned under ONRSR's regulatory oversight on 2 December 2019 are included from 2019–2020 period only.





Appendix B – Scope and Methods

Appendix B - Scope and Methods

The scope and methods used for the presentation of data in this report are described below.

Reporting Period

Where available, statistical trends of incident counts and rates are presented over a five-year period, from 1 July 2017 to 30 June 2022. The incident descriptions summarised in this report apply to the period 1 July 2021 to 30 June 2022.

Geographic Coverage

Descriptions and statistics in this report cover all railway operations in Australia.

Data Sources

The information presented in this report is principally based on notifiable occurrences — the initial written advice of a rail safety incident that a rail transport operator submits to ONRSR in accordance with section 121 of the RSNL.

Activity data (for example, train kilometres travelled) is based on monthly returns supplied by rail transport operators in accordance with section 120(3) of the RSNL. The specific information to be provided is defined in clause 56 of the National Regulations.

Consistent activity data for tourist and heritage operators in Victoria (Vic.) that transitioned under ONRSR's regulatory oversight on 2 December 2019 is unavailable prior to this date. Exclusion of this data has no material effect on the statistics presented within this report as it is expected to comprise only three tenths of one percent of total activity data over the missing period.

Data collected by previous state regulators prior to ONRSR and used in this report were collected under different legislative regimes. A review of this data was undertaken to ensure comparability with ONRSR collected data. This applies to the data outlined below:

» Vic. – From 1 July 2017 to 1 December 2019, the following data was collected by Transport Safety Victoria: notifiable occurrence and activity data for the Melbourne metropolitan tram network; and notifiable occurrence data for tourist and heritage operators that transitioned under ONRSR's regulatory oversight on 2 December 2019.

Appendix B - Scope and Methods

Definitions

Statistics are predominantly based on the incident definitions in the Reporting Requirements for Notifiable Occurrences⁷.

Some of the statistics presented are based on definitions specific to this report to support a more meaningful risk-based analysis of critical events. In such cases these definitions are presented in the body of the report.

Disclaimer

ONRSR advises the following:

Internal consistency

Statistics for a given incident category may differ between sections of this report because definitions and top-event conventions vary according to need. For example, international benchmarking statistics have different definitions to ONRSR and hence the scope of ONRSR incidents used in these comparisons have been aligned to the benchmarking definitions.

Data comparability

Issues of consistency are relevant both within the report and between this report and other information products.

The statistics in this report may differ to other sources that utilise the same data and coding specifications. This will be due in part to the data collection and preparation methods used to generate the tables and charts in this report which included identification and correction of errors in historical data.

Past and future releases

The statistics presented in this report are subject to review and amendment as more information becomes available through investigation or inquiry or as ONRSR refines its systems for data capture, validation and reporting. This may result in variation between historical and future reports.

 $^{^7}$ Office of the National Rail Safety Regulator, Reporting Requirements for Notifiable Occurrences, Version 3, ONRSR, Adelaide, 2020



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