2017-2018

// RAIL SAFETY REPORT

OFFICE OF THE
**national rail
safety regulator**

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.
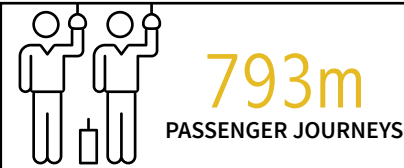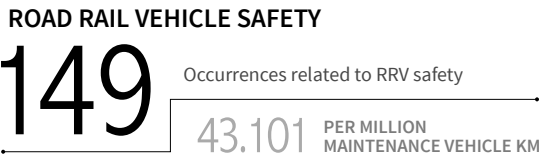
safe railways for Australia

// CONTENTS

ONRSR 2017-2018
// AT A GLANCE

NETWORK STATISTICS

ONRSR'S REGULATORY OVERSIGHT EXPANDED BY OVER 11,000 TRACK AND 47 MILLION TRAIN KM IN 2017-18

793m PASSENGER JOURNEYS

88m FREIGHT TRAIN KM

44k TRACK KM

186 ACCREDITED OPERATORS

136m PASSENGER TRAIN KM

NOTIFIABLE OCCURRENCES

41,036 CAT B

41,383 TOTAL OCCURRENCES

347 CAT A

ONRSR'S NATIONAL PRIORITIES

ONRSR IS TARGETING ITS NATIONAL PRIORITIES WITH TWO COMPLIANCE PROGRAMS AND THREE SAFETY IMPROVEMENT PROJECTS
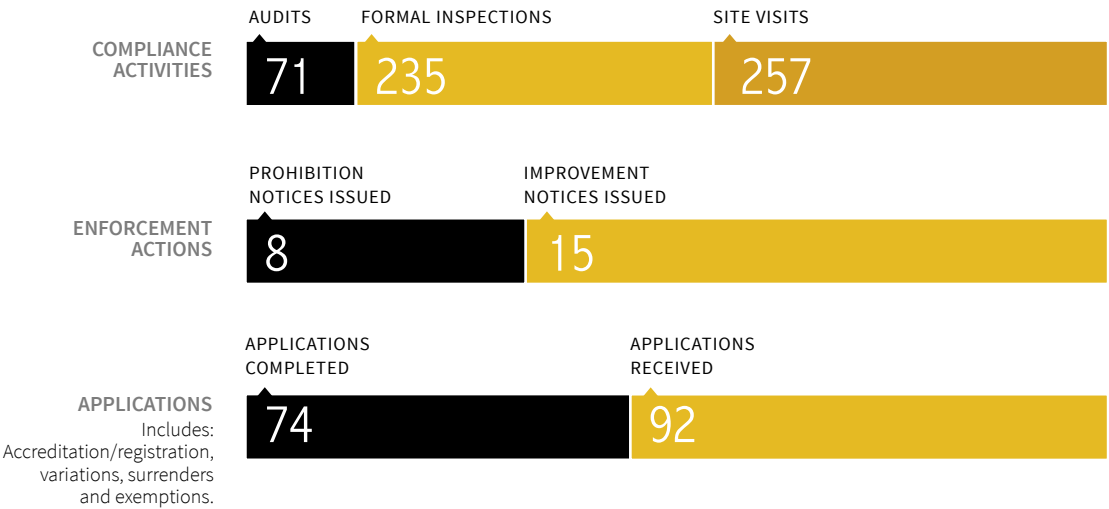
LEVEL CROSSING SAFETY
185 Unsafe railway crossing equipment failures/defects
47.656 PER 1000 ACTIVE RAILWAY CROSSINGS

ROAD RAIL VEHICLE SAFETY
149 Occurrences related to RRV safety
43.101 PER MILLION MAINTENANCE VEHICLE KM

TOURIST & HERITAGE SECTOR, SAFETY MANAGEMENT CAPABILITY
21 Running line collisions, derailments, SPADs / PAEs
48.532 PER MILLION T&H TRAIN KM

TRACK WORKER SAFETY
501 Track work safeworking rule / procedure breaches
11.313 PER 1000 TRACK KM

HARM TO PEOPLE

THERE WERE NO WORKFORCE FATALITIES REPORTED TO ONRSR IN 2017-18

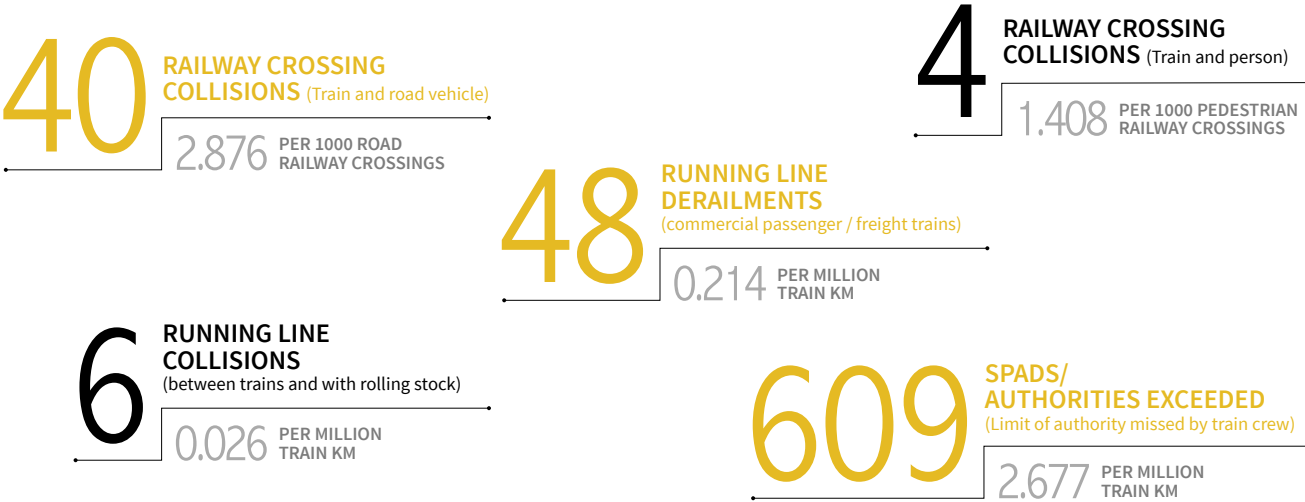| SERIOUS INJURIES	FATALITIES	PASSENGER	WORKER	PUBLIC	TRESPASSER
90	104	4	0	5	95

REGULATORY ACTIVITY

ONRSR IS TARGETING ITS NATIONAL PRIORITIES WITH TWO COMPLIANCE PROGRAMS AND THREE SAFETY IMPROVEMENT PROJECTS

COMPLIANCE ACTIVITIES

AUDITS	FORMAL INSPECTIONS	SITE VISITS
71	235	257

ENFORCEMENT ACTIONS

PROHIBITION NOTICES ISSUED	IMPROVEMENT NOTICES ISSUED
8	15

APPLICATIONS Includes: Accreditation/registration, variations, surrenders and exemptions.

APPLICATIONS COMPLETED	APPLICATIONS RECEIVED
74	92

KEY OCCURRENCES

ON AVERAGE THERE ARE OVER 10 SPADS PER WEEK REPORTED ACROSS AUSTRALIA (WHERE THE LIMIT OF AUTHORITY WAS MISSED BY THE TRAIN CREW)

40 RAILWAY CROSSING COLLISIONS (Train and road vehicle)
2.876 PER 1000 ROAD RAILWAY CROSSINGS

4 RAILWAY CROSSING COLLISIONS (Train and person)
1.408 PER 1000 PEDESTRIAN RAILWAY CROSSINGS

48 RUNNING LINE DERAILMENTS (commercial passenger / freight trains)
0.214 PER MILLION TRAIN KM

6 RUNNING LINE COLLISIONS (between trains and with rolling stock)
0.026 PER MILLION TRAIN KM

609 SPADS/ AUTHORITIES EXCEEDED (Limit of authority missed by train crew)
2.677 PER MILLION TRAIN KM

// THE REGULATOR'S MESSAGE

There can be no denying these are times of great achievement and anticipation in the Australian rail industry. Record levels of investment in transformational projects and the continued emergence of new technologies that drive elemental changes to the way our industry operates, are behind the waves of optimism and opportunity.

But as I reflect on the safety of our sector in the last 12 months, I can't help but think that amid the flurry of activity and the clamour for a competitive edge, there is a place for a timely reminder that whatever we dream, build or develop, we forget the basics at our peril.

It's a message I've been only too willing to spread throughout 2018 as I firmly believe that getting back to basics is some of the most valuable advice a risk-based regulator can provide, particularly at a time when there is so much going on in the industry.

And it reinforces why the Office of the National Rail Safety Regulator's Rail Safety Report is a really important rail safety resource – one that for the first time provides a truly national perspective thanks to the inclusion of data from Queensland, available following the start of ONRSR operations there in July 2017.

As we have through the first five editions of this report, this year we once again provide an opportunity for rail transport operators to take stock and reflect on our industry's performance and in doing so recommit to the basics of rail safety. Because while the following pages once again demonstrate that Australia's rail system remains a fundamentally safe one, they also provide plenty of evidence that things can and do go wrong - particularly when rudimentary safety practices are overlooked.

Of course as a regulator we must practice what we preach and I hope you will also take from this report a clear understanding of not only the exciting projects and developments we are driving, but how they complement our in-field activities and our constant focus on getting the basics right.

Those activities are once again headlined by our national priorities, along with the developments we have and continue to make in optimising the use of data and modernising the exchange of information between ourselves and our accredited rail transport operators.

ONRSR produces this report for all rail safety stakeholders and whether you are building city-shaping rail projects or preserving an historic travel experience, I trust the information provided is an invaluable source of intelligence and can promote important considerations for you when managing the safety risks associated with your operation.

At ONRSR we are as excited by the potential of the Australian rail industry as every other stakeholder, particularly because it is underpinned by such strong performance and commitment to safety. But, ensuring we never forget the basics that have got us to this enviable position is the only way we'll truly capitalise.

Sue McCarrey
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 and Excellence

FUNCTIONS

The functions of ONRSR are legislated in the *Rail Safety National Law* (RSNL)[1] and described in ONRSR's Statement of Intent[2]. In summary they include:
> working with rail transport operators, rail safety workers and others involved in railway operations to improve rail safety nationally
> facilitating and providing advice, education and training in relation to rail safety
> conducting research, collecting and publishing information relating to rail safety
> monitoring, investigating and enforcing compliance with the RSNL.

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

As defined in ONRSR's Statement of Intent 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
> 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. ONRSR uses various sources of intelligence to inform its risk-based decision making, including notifiable occurrence data, investigation reports from the Australian Transport Safety Bureau (ATSB), Rail Voluntary and Confidential Reporting Scheme (REPCON) reports, rail transport operator safety performance reports and the outcomes of ONRSR led investigations, audits, inspections and other regulatory activities.

The ONRSR Way[3] 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.
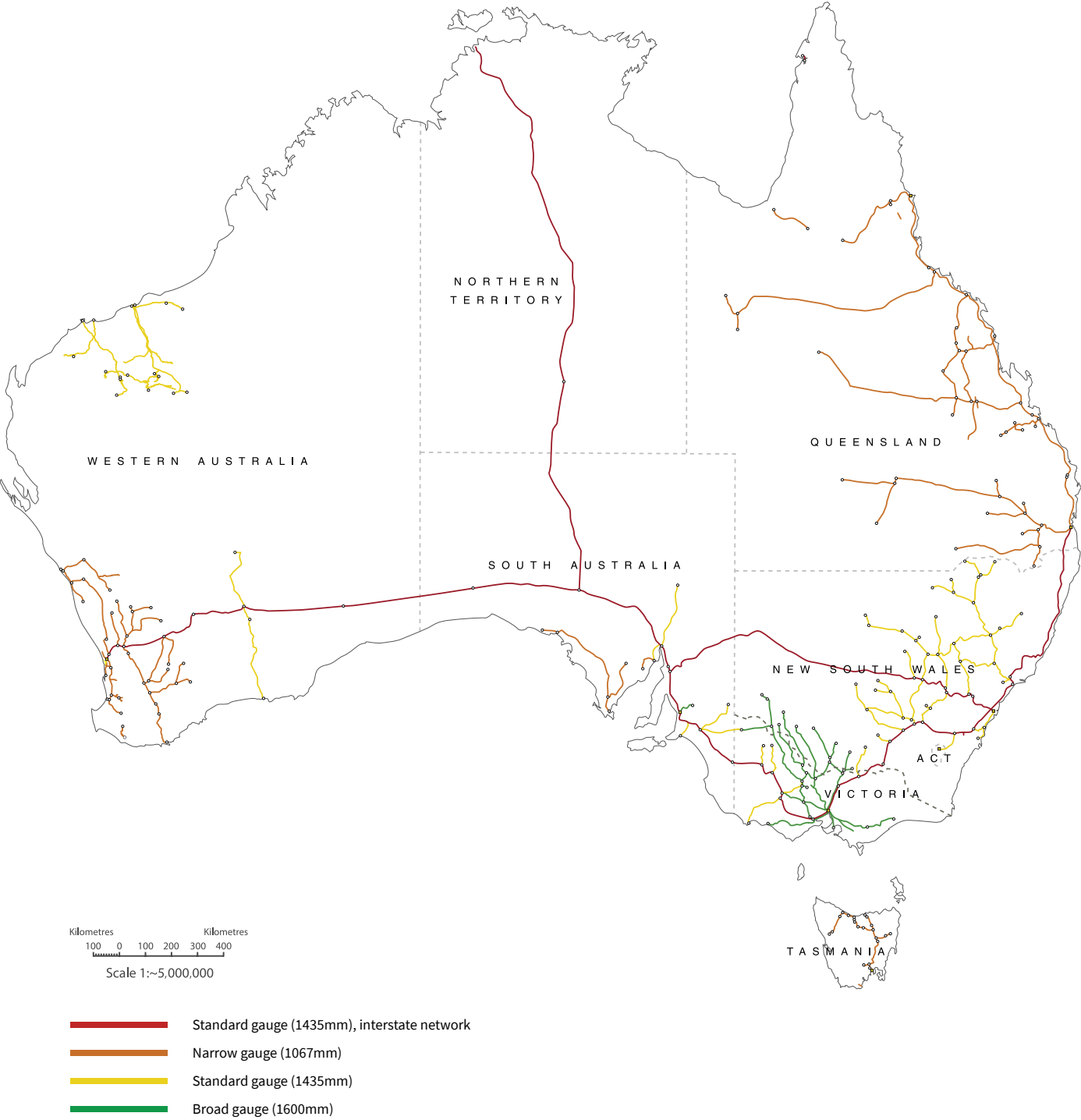
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[1] RSNL refers to the *Rail Safety National Law (South Australia) Act 2012* and *Rail Safety National Law (WA) Act 2015*
[2] Office of the National Rail Safety Regulator, Statement of Intent 2018 to 2021, ONRSR, Adelaide, 2018
[3] Office of the National Rail Safety Regulator, The ONRSR Way, Edition 1, ONRSR, Adelaide, 2018

FIGURE 1:
RAILWAY NETWORKS
OPERATING ACROSS AUSTRALIA.

Sourced from the Australasian Railway Association

Standard gauge (1435mm), interstate network
Narrow gauge (1067mm)
Standard gauge (1435mm)
Broad gauge (1600mm)

ABOUT // THIS REPORT

ONRSR's Rail Safety Report provides a summary of rail safety performance in the 2017–2018 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. ONRSR also summarises some of the key areas that have been the focus of regulatory attention. Analysis of these sources provides the focus areas for compliance and safety improvement in the coming year. 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.

SCOPE AND METHODS

The scope and methods used for the presentation of data are described in Appendix A. The general approach is outlined below.

GEOGRAPHIC COVERAGE
Except where explicitly stated, all descriptions and statistics in this report apply only to those railways within ONRSR's area of operation. For the 2017–2018 financial year this includes railway operations in all states and territories, with the exception of some operators in Victoria. All tramways operating in Victoria, including the metropolitan tram operator in Melbourne and several tourist and heritage railways are regulated under Victorian local law and are therefore not subject to the RSNL.

REPORTING PERIOD
A minimum reporting period of 1 July 2017 to 30 June 2018 applies to this report. A longer period of data is considered where appropriate and available for analysis.

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.

Unlike previous versions of the report, data tables are not presented in the appendices. Instead, a complete set of the data presented can be downloaded from the National Safety Data[4] area of ONRSR's website.

DEFINITIONS
Most statistical summaries in this report are based on the incident definitions within ONRSR's reporting requirements for notifiable occurrences[5]. Some statistics are based on definitions specific to this report to support a more meaningful risk-based analysis of critical events, and in such cases these definitions are presented.

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[4] The national safety data area of ONRSR's website presents statistics to allow operators to benchmark their safety performance against industry and sector averages <https://www.onrsr.com.au/publications/national-safety-data>
[5] Office of the National Rail Safety Regulator, Reporting Requirements for Notifiable Occurrences, Version 2.1, ONRSR, Adelaide, 2018.

RAIL SAFETY
STATISTICAL SUMMARY

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 rail 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 2017–2018 financial year. The report continues, and adds to, a number of charts that have been published in previous years which show the last five years' performance. ONRSR has once again conducted benchmarking against international performance and highlighted selected events it has judged as the more serious of the year.

For the first time, incident rates are included throughout the Rail Safety Report. This paints a more accurate picture of safety performance over time by accounting for variations in ONRSR's geographic and operational coverage. This is particularly important for the 2017–2018 reporting period, which saw ONRSR's regulatory oversight expand by over 11,000 kilometres of track and 47 million kilometres of train operations when it began regulating in Queensland on 1 July 2017.

RAILWAY-RELATED FATALITY

There were 104 fatalities in the 2017–2018 financial year on railways regulated under the RSNL. These consisted of:
> two instances of passengers falling from a platform and being struck by a train
> a passenger falling down an escalator
> a passenger who fell inside a train
> a member of the public being struck by a train
> four fatalities to members of the public involved in railway crossing collisions between a train and a road vehicle
> a trespasser electrocuted in the rail corridor
> seven incidents involving trespassers struck by rolling stock
> 87 incidents involving suspected suicide.

FIGURE 2:
RAILWAY-RELATED FATALITIES, JULY 2013 TO JUNE 2018

SA, NSW, NT, Tas. and Vic. data is for full period, ACT data is from 1 July 2014 onwards, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017 onwards. Rates available from 2015-16 only. Non-passenger fatalities at railway crossing are classified as Public if neither trespass nor suicide is suspected. Railway crossing collision excludes suspected suicide at railway crossings, which is coded as Trespass: Rail accident.
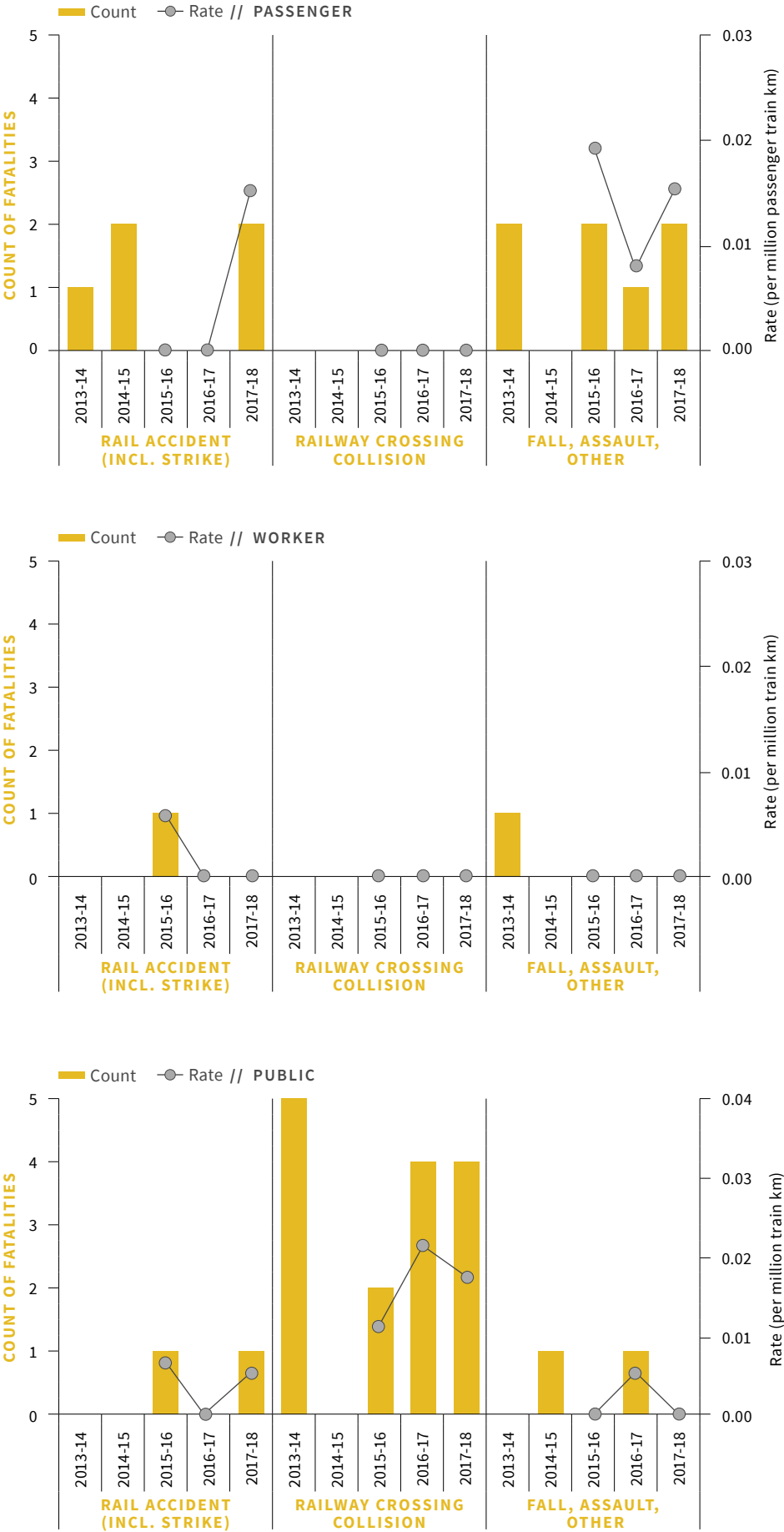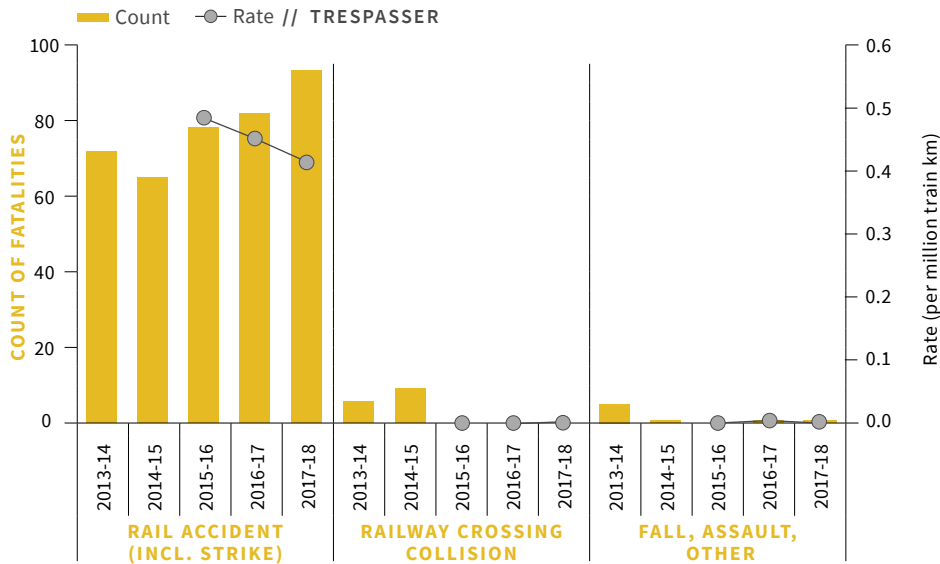
A comparison of the rate of fatality between ONRSR-regulated railways and selected overseas railways is summarised in Table 1. The ONRSR-based data in this table is a subset of the fatalities summarised in Figure 2 to align with the overseas data definitions. For example, local data excludes suspected suicide as these are also excluded from overseas data.

TABLE 1:
RAILWAY FATALITIES – AUSTRALIA, GREAT BRITAIN AND UNITED STATES

SA, NSW, NT, Tas., Vic. and ACT data for full period, WA data from 2 November 2015, and Qld. data from 1 July 2017. Fatalities involving passengers, workers, public and trespass (excluding suspected suicide).

		2015–16	2016–17	2017–18	3 YEAR
Australia (ONRSR regulated railways)	Fatalities	12	16	17	45
	Train Km (million)	159.6	180.4	227.5	567.5
	Rate	0.075	0.089	0.075	0.079
Great Britain	Fatalities[1]	45	39	49	133
	Train Km (million)[2]	556.7	572.2	577.3	1706.2
	Rate	0.081	0.068	0.085	0.078
United States	Fatalities[3]	779	846	857	2482
	Train Km (million)[3]	1,133.8	1,135.2	1,132.8	3401.8
	Rate	0.687	0.745	0.757	0.730

[1]Source: Rail Safety and Standards Board, Annual Safety Performance Report 2017/18, RSSB, UK, 2018
[2]Source: Rail Safety and Standards Board, Rail KM on request (provided 22 August 2018), RSSB, UK, 2018
[3]Source: Federal Railroad Administration Office of Safety Analysis: online database query (accessed 6 September 2018)
 http://safetydata.fra.dot.gov

The comparison is most valid for the Great Britain (GB) statistics because information on individual GB incidents is available to confirm consistency of scope with local data. GB is also a suitable benchmark to compare with ONRSR data because of its comparatively high rail safety performance. The United States (US) data is less reliable because of uncertainties in data collection methods.

The fatality rate for ONRSR's area of operation over the three-year period (0.079 fatalities per million train km) is marginally higher than that of GB (0.078) but well below that of the US (0.730). A review of the US figures by individual incident type suggests the rate reflects a significantly higher proportion of trespass and level crossing-related fatalities in the US compared to the figures within ONRSR's area of operation.

TABLE 2:
RAILWAY-RELATED FATALITIES, EXCLUDING TRESPASS OR SUSPECTED SUICIDE, JULY 2017 TO JUNE 2018

Railway operations regulated under the RSNL. Excludes fatality associated with trespass or suspected suicide.

DATE	DESCRIPTION	LOCATION
12/08/2017	A passenger fell from a platform and was struck and fatally injured by an oncoming train.	West Ryde Station, NSW
20/08/2017	A passenger fell down a station escalator and was fatally injured.	Parliament Station, Vic.
29/08/2017	The driver of a truck was fatally injured in a collision between the vehicle and a freight train at a railway crossing protected by stop signs.	Wagoora, Qld.
29/09/2017	A passenger riding a motorised tricycle fell from a platform and was struck and fatally injured by an oncoming train.	Greenwood Station, WA
24/10/2017	A passenger fell inside a train and subsequently died on a station platform.	Newcastle Interchange, NSW
3/11/2017	The driver of a road vehicle was fatally injured in a collision between the vehicle and a passenger train at a railway crossing protected by give way signs.	Werneth, Vic.
30/01/2018	The driver of a road vehicle was fatally injured in a collision between the vehicle and a passenger train at a railway crossing protected by flashing lights.	Brunswick Junction, WA
18/02/2018	A member of the public was fatally injured when struck by a freight train at a railway crossing protected by flashing lights.	Piccadilly St, Kalgoorlie – Leonora, WA
22/04/2018	A member of the public was fatally injured when they were struck by a passenger train at a train station.	Oatley, NSW

RAILWAY-RELATED SERIOUS INJURY

There were 90 serious injuries in the 2017–2018 financial year on railways regulated under the RSNL. Almost 50% of these related to slips, trips and falls while just over 20% related to attempted suicide.

FIGURE 3:
RAILWAY-RELATED SERIOUS INJURIES, JULY 2016 TO JUNE 2018

SA, NSW, NT, Tas., ACT, Vic. and WA data is for full period, Qld. data is from 1 July 2017 onwards. Non-passenger serious injuries at railway crossings are classified as Public if neither trespass nor attempted suicide is suspected. Railway crossing collision excludes attempted suicide at railway crossings, which is classified as Trespass: Rail accident (incl.strike). Historically comparable serious injury data is only available from 1 July 2016 due to a change in the way serious injuries were classified in June 2016.
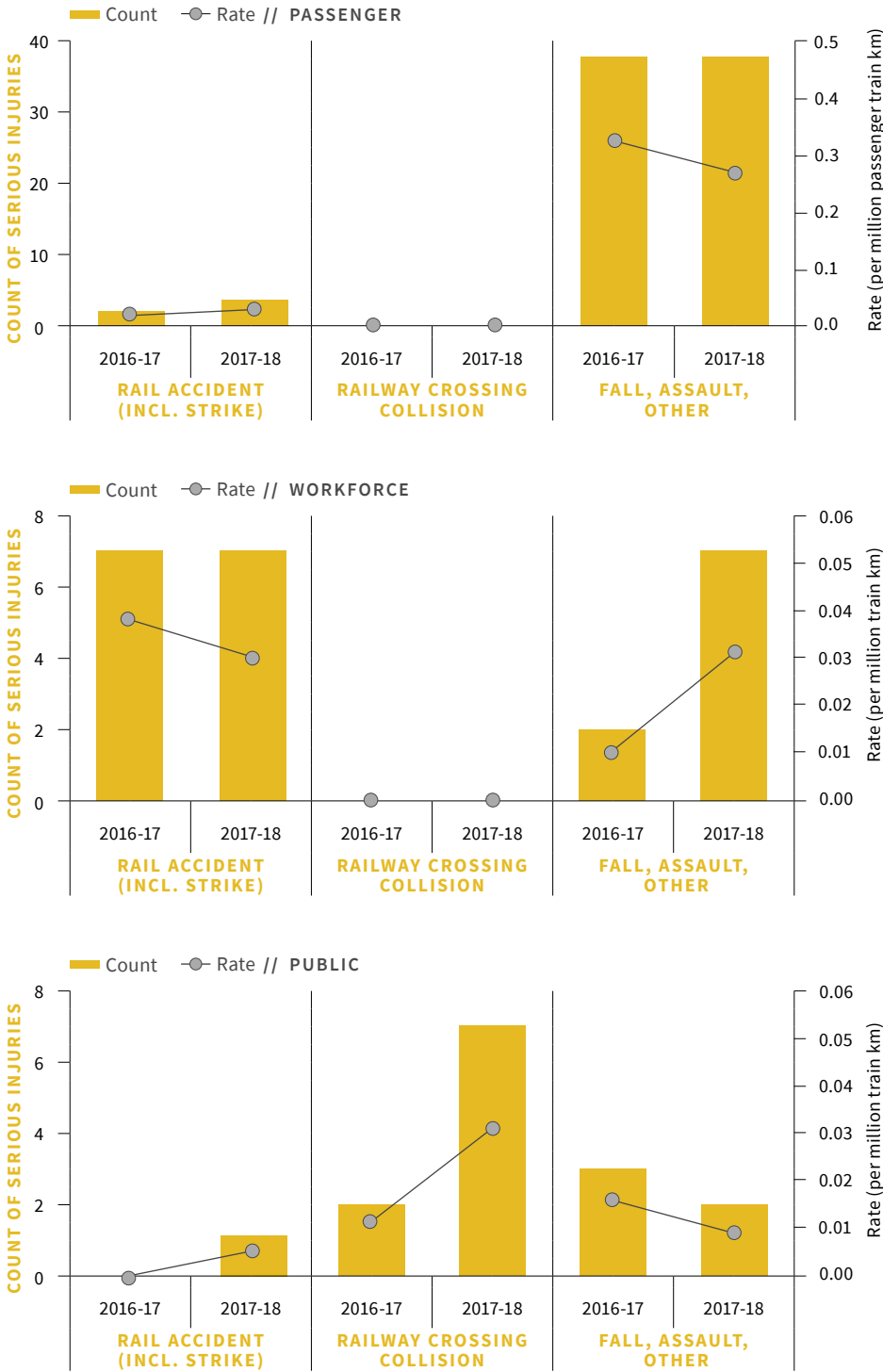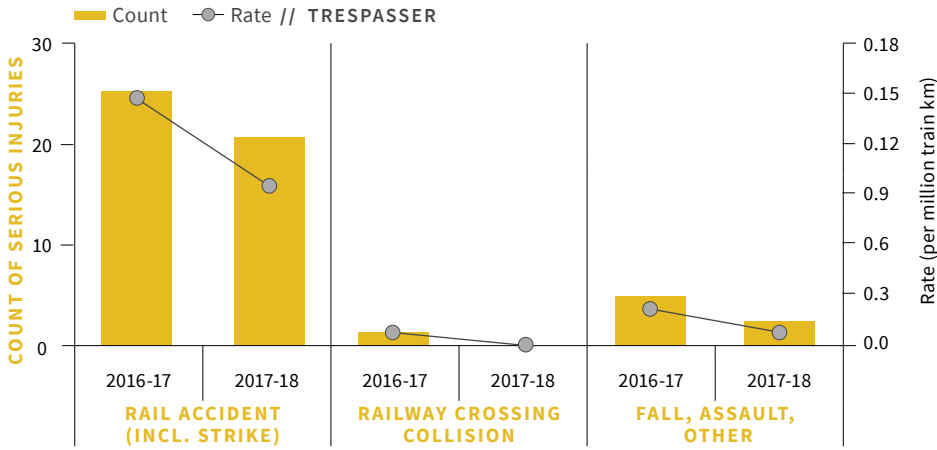

TABLE 3:
SELECTED RAILWAY-RELATED SERIOUS INJURIES INVOLVING PASSENGERS, WORKERS AND MEMBERS OF THE PUBLIC, JULY 2017 TO JUNE 2018

Railway operations regulated under the RSNL.

DATE	DESCRIPTION	LOCATION
5/08/2017	A railway employee was struck by an air hose on a wagon as he was preparing it for connection to other wagons.	Acacia Ridge Yard, Qld.
6/09/2017	The driver of a road vehicle was injured in a collision between the road vehicle and a passenger train at a railway crossing protected by lights and boom gates.	Seaford Line, SA
8/10/2017	Two road vehicle occupants were injured in a collision between the road vehicle and a tourist and heritage passenger train at a railway crossing protected by give way signs.	Mount Compass – Goolwa, SA
18/10/2017	The driver of a track machine was injured when he applied the brakes and another unit following behind in convoy collided with the rear of his machine.	Drayton Junction to Newdell Junction, NSW
23/01/2018	Two road vehicle occupants were injured in a collision between the road vehicle and a passenger train at a railway crossing protected by flashing lights.	Collins Ave, Cairns, Qld.
20/04/2018	A passenger was injured when they approached a departing train and fell between the train and platform.	Southern Cross South Station, Vic.
26/04/2018	A member of the public was injured when struck by a passenger train at a railway crossing protected by flashing lights and boom gates.	Armadale Line, WA
1/06/2018	A passenger was injured after falling from a station platform and being struck by a passenger train.	Strathfield, NSW
13/06/2018	A passenger was injured after falling from a station platform and being struck by a passenger train.	Virginia, Qld.
23/06/2018	A railway employee working on an overline bridge fell from the bridge to a footpath below, sustaining multiple injuries.	Macdonaldtown, NSW

PASSENGER TRAIN DERAILMENT

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 13 running line passenger train derailments in the 2017–2018 financial year on railways regulated under the RSNL, nine of which involved tourist and heritage trains.

FIGURE 4:

PASSENGER TRAIN RUNNING LINE DERAILMENT, JULY 2013 TO JUNE 2018

SA, NSW, NT, Tas. Vic. data is for full period, ACT data is from 1 July 2014 onwards, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017 onwards. Derailment rates are expressed using the respective train km for each sector. Rates available from 2015-16 only. Includes derailments of passenger trains on non-running lines affecting the safety of running lines.
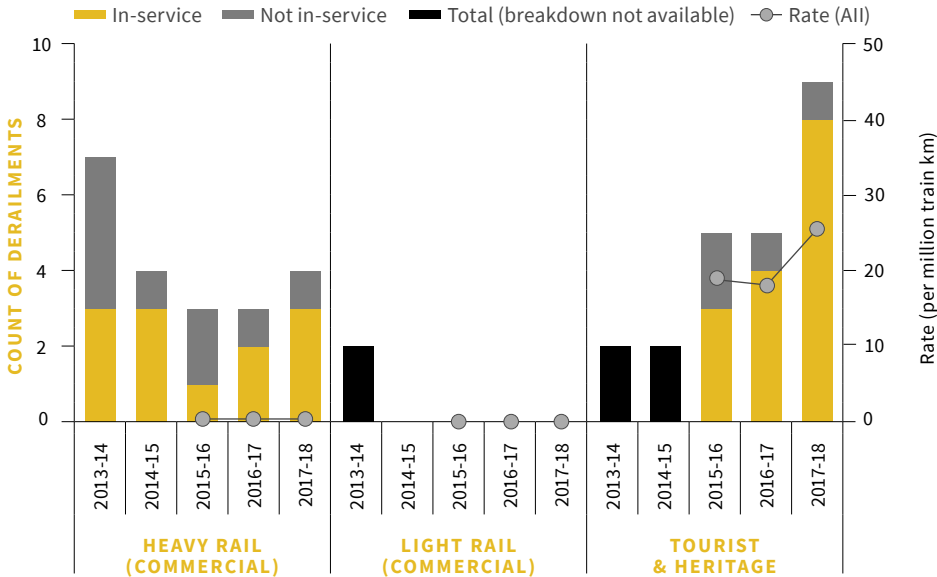

TABLE 4:

PASSENGER TRAIN RUNNING LINE DERAILMENTS, JULY 2017 TO JUNE 2018

Railway operations regulated under the RSNL. Includes derailments of passenger trains on non-running lines affecting the safety of running lines.

DATE	DESCRIPTION	LOCATION
8/07/2017	A tourist and heritage train carrying passengers derailed on a bend. No injury or damage was reported.	Busselton Jetty, WA
16/07/2017	One bogie of a carriage on a steam-hauled tourist and heritage passenger train derailed. No injuries were reported.	Marina Mirage Station, Port Douglas, Qld.
16/07/2017	A tourist and heritage locomotive derailed on a crossing loop. No injuries were reported.	Victor Harbor, SA
6/09/2017	The first bogie of an out-of-service electric urban passenger train derailed when it was entering a yard. No injuries were reported.	North Melbourne, Vic.
10/11/2017	The Ghan passenger train derailed a carriage carrying road vehicles while travelling at low speed. No injuries were reported.	Torrens Junction, SA
26/11/2017	The Indian Pacific passenger train derailed a car carrier while departing the East Perth Terminal. No injuries were reported.	East Perth Terminal, WA

TABLE 4:

(CONTINUED)

DATE	DESCRIPTION	LOCATION
24/12/2017	Two passenger carriages of a steam-hauled tourist and heritage train derailed. One passenger sustained minor injuries alighting the train and was taken to hospital.	Cobdogla, SA
1/01/2018	A passenger carriage of a tourist and heritage train derailed. The carriage was empty and no injuries were reported.	Dwellingup, WA
22/01/2018	An electric urban passenger train derailed when it struck a buffer stop at a speed of approximately 35 km/h. 16 people from the train were treated at the scene, including the train driver and guard. A total of 15 people were transported to hospital for further treatment.	Richmond Station, NSW
15/02/2018	The locomotive of a tourist and heritage train derailed when it struck a small tree branch laying across the track. Passenger carriages did not derail and no injuries were reported.	Ida Bay, Tas.
12/03/2018	The leading passenger carriage of a tourist and heritage train derailed. No injuries were reported.	Moonta, SA
18/04/2018	The rear passenger carriage of a tourist and heritage train derailed. No injuries were reported.	Moonta, SA
22/06/2018	The locomotive of a tourist and heritage train derailed after travelling over a set of points. Passenger carriages did not derail and no injuries were reported.	Ida Bay, Tas.

A comparison of the rate of mainline passenger train derailments between ONRSR regulated railways and the mainline railways of GB and the US is summarised in Table 5. The ONRSR data in this table are a subset of the derailments summarised in Figure 4, and only includes derailments involving in-service commercial heavy rail passenger trains together with mainline tourist and heritage passenger operations.

TABLE 5:

PASSENGER TRAIN RUNNING LINE DERAILMENTS - AUSTRALIA, GREAT BRITAIN AND UNITED STATES

SA, NSW, Tas., Vic. And ACT data is for full period, WA data is from 2 November 2015, and Qld. data is from 1 July 2017. Heavy rail in-service passenger trains only, including tourist and heritage mainline operations. Includes derailments on non-running lines affecting the safety of running lines.

		2015–16	2016–17	2017–18	3 YEAR
Australia (ONRSR regulated railways)	Derailments	1	2	3	6
	Passenger Train Km (million)	104.3	111.6	135.8	351.8
	Rate	0.010	0.018	0.022	0.017
Great Britain	Derailments[1]	3	2	2	7
	Passenger Train Km (million)[2]	521.8	529.2	505.6	1556.6
	Rate	0.006	0.004	0.004	0.004
United States	Derailments[3]	9	11	10	30
	Passenger Train Km (million)[3]	174.9	179.1	182.6	536.6
	Rate	0.051	0.061	0.055	0.056

[1] Source: Rail Safety and Standards Board, Annual Safety Performance Report 2017/18, RSSB, UK, 2018
[2] Source: Rail Safety and Standards Board, Rail KM on request (provided 22 August 2018), RSSB, UK, 2018
[3] Source: Federal Railroad Administration Office of Safety Analysis: online database query (accessed 6 September 2018) http://safetydata.fra.dot.gov

FREIGHT TRAIN DERAILMENT

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 44 running line derailments involving freight trains in the 2017–2018 financial year. No serious injuries were reported for any of these incidents.

FIGURE 5:
FREIGHT TRAIN RUNNING LINE DERAILMENTS, JULY 2013 TO JUNE 2018

SA, NSW, NT, Tas. and Vic. data is for the full period, ACT data is from 1 July 2014 onwards, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017 onwards. Rates are available from 2015-16 onwards. Includes derailments of freight trains on non-running lines affecting the safety of running lines. Excludes rolling stock derailments such as light locomotives and wagons.
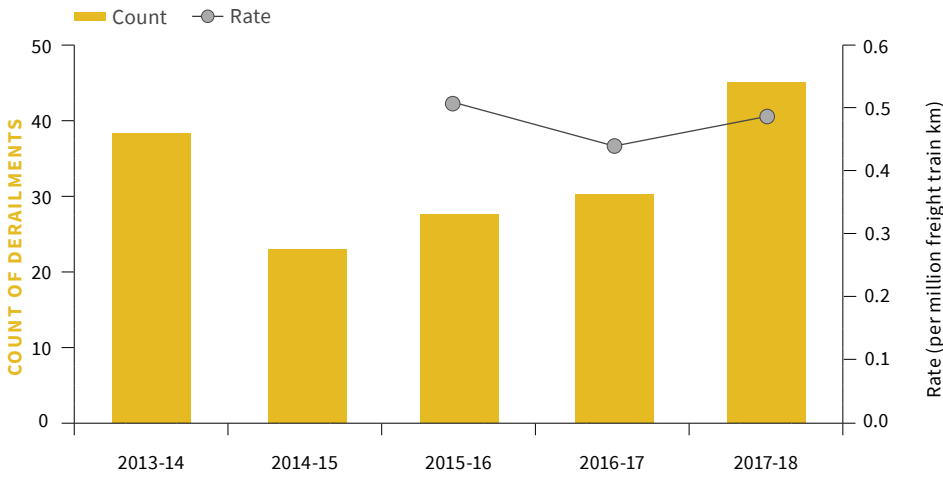

TABLE 6:
SELECTED FREIGHT TRAIN RUNNING LINE DERAILMENTS, JULY 2017 TO JUNE 2018

Railway operations regulated under the RSNL.

DATE	DESCRIPTION	LOCATION
21/07/2017	Both locomotives and 18 wagons of a coal train derailed. The derailment resulted in the destruction of about 300 metres of track.	Oakey, Qld.
28/07/2017	An undetected rail defect developed due to impurities in its manufacture. The passage of an earlier train over this defect caused the rail to break. A 2-metre section of rail fragmented when a later train passed over the break, resulting in the last three wagons of the train derailing.	Dry Creek, SA
18/08/2017	The bogie of a coal train wagon collapsed, resulting in the derailment of the wagon and damage to approximately 2 km of track.	Blackwater, Qld.
16/09/2017	Four wagons of a freight train derailed when travelling over points, one of which struck another wagon stabled on another road. Major track damage was reported.	Appleton Dock Junction, Vic.
28/09/2017	The axle of a freight wagon carrying sulphuric acid broke, derailing the wagon. There were no injuries or product spill reported. The track sustained minor damage.	Kimburra, Qld.

TABLE 6:
(CONTINUED)

DATE	DESCRIPTION	LOCATION
1/10/2017	Eleven wagons of a wheat train derailed, with nine wagons on their side and two remaining upright. There were no injuries but there was substantial damage to the wagons and track.	Narwonah – Wyanga, NSW
11/02/2018	Ten loaded ore wagons of a freight train derailed, with damage to track and wagons reported. No injuries were reported.	Tom Price Line, WA
15/06/2018	Three wagons of a freight train derailed when travelling over points, with one wagon striking a stationary locomotive on another track. No injuries were reported.	Melbourne Operations Terminal, Vic.

TABLE 7:
FREIGHT TRAIN RUNNING LINE DERAILMENTS - AUSTRALIA, GREAT BRITAIN AND UNITED STATES

SA, NSW, NT. Tas., Vic. and ACT data is for full period, WA data is from 2 November 2015, and Qld. data is from 1 July 2017. Includes derailments of freight trains on non-running lines affecting the safety of running lines. Excludes rolling stock derailments such as light locomotives and wagons.

		2015–16	2016–17	2017–18	3 YEAR
Australia (ONRSR regulated railways)	Derailments	28	30	44	102
	Freight Train Km (million)	52.5	65.4	88.0	205.9
	Rate	0.533	0.459	0.500	0.495
Great Britain	Derailments[1]	6	3	2	11
	Freight Train Km (million)[1]	34.9	38.6	37.0	110.5
	Rate	0.172	0.078	0.054	0.100
United States	Derailments[2]	248	266	271	785
	Freight Train Km (million)[2]	810.5	789.7	808.8	2409.0
	Rate	0.306	0.337	0.335	0.326

[1] Source: Rail Safety and Standards Board, Annual Safety Performance Report 2017/18, RSSB, UK, 2018
[2] Source: Federal Railroad Administration Office of Safety Analysis: online database query (accessed 27 October 2017) http://safetydata.fra.dot.gov
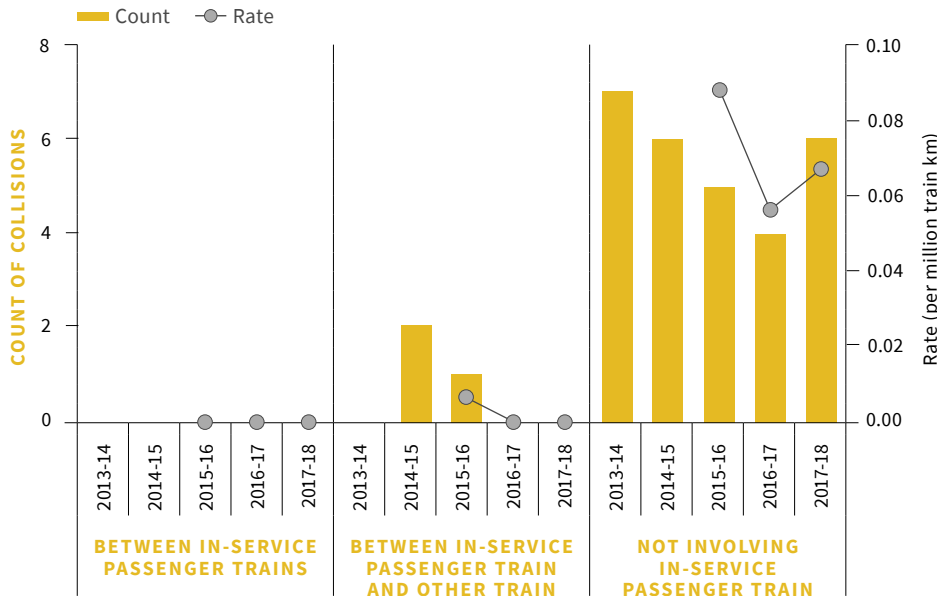
COLLISION BETWEEN TRAINS AND WITH ROLLING STOCK

Collisions between trains and with rolling stock 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 (for example, signal-based, train order working), 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 six running line collisions involving rolling stock in the 2017–2018 financial year on railways regulated under the RSNL, none of which involved in-service passenger trains.

FIGURE 6:

RUNNING LINE COLLISIONS BETWEEN TRAINS AND WITH ROLLING STOCK, JULY 2013 TO JUNE 2018

SA, NSW, NT, Tas. and Vic. data is for full period, ACT data is from 1 July 2014 onwards, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017. Rates are available from 2015-16 onwards. Includes collisions on non-running lines affecting the safety of running lines. 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.

TABLE 8:

RUNNING LINE COLLISIONS BETWEEN TRAINS AND WITH ROLLING STOCK, JULY 2017 TO JUNE 2018

Railway operations regulated under the RSNL. Includes collisions on non-running lines affecting the safety of running lines. Excludes trains striking or being struck by out of gauge equipment on trains on adjacent lines.

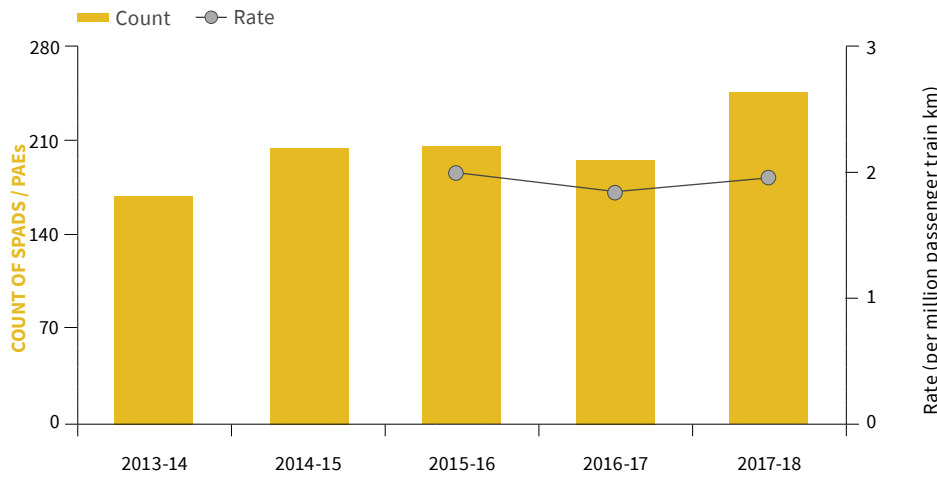| DATE	DESCRIPTION	LOCATION
1/07/2017	A track machine travelling in convoy to a worksite collided with the unit ahead which had come to a stop. Both machines sustained minor damage. No injuries were reported.	Nyngan to Cobar, NSW
1/08/2017	A train was being divided to form two sets. After separation, the front set rolled back 2 metres and struck the stationary rear set. No injuries were reported.	Werris Creek Station, NSW
18/10/2017	A track machine travelling in convoy collided with the unit ahead which had come to an abrupt stop. The track machine driver sustained a head injury and was transported to hospital.	Drayton Junction to Newdell Junction, NSW

TABLE 8:
(CONTINUED)

DATE	DESCRIPTION	LOCATION
18/01/2018	A road rail excavator collided with the rear of a road rail inspection vehicle while travelling in convoy. No injuries were reported.	Cairns Railway, Qld.
27/02/2018	The locomotive of a freight train travelling at low speed struck and derailed the last wagon of another freight train sitting foul of the line. No injuries were reported.	Oonoomurra Yard, Qld.
23/04/2018	A crew van rolled away from a stationary position and collided with a freight wagon being shunted in the yard. The crew van derailed. No injuries were reported.	Wirrida Yard, SA

SIGNALS PASSED AT DANGER AND OTHER PROCEED AUTHORITY EXCEEDANCES

Instances of passenger trains exceeding the limit of their authorised movement are considered important precursors to collisions and derailments. On signalled systems these occurrences are notified as a signal passed at danger without authority (SPAD).

FIGURE 7:

**SIGNALS PASSED AT DANGER / AUTHORITY EXCEEDED - PASSENGER TRAINS, JULY 2013 TO JUNE 2018**

SA, NSW, NT, Tas., and Vic. is for full period, ACT data is from July 2014 onwards, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017. Rates are available from 2015-16 onwards. Data shown is for occurrences classified as sub-category SPADA1: Limit of authority missed by train crew only. Data excludes tourist and heritage and light rail operations. Up until June 2015 the data is limited to top-event occurrence categories, from July 2015 all events are included regardless of top-event status.
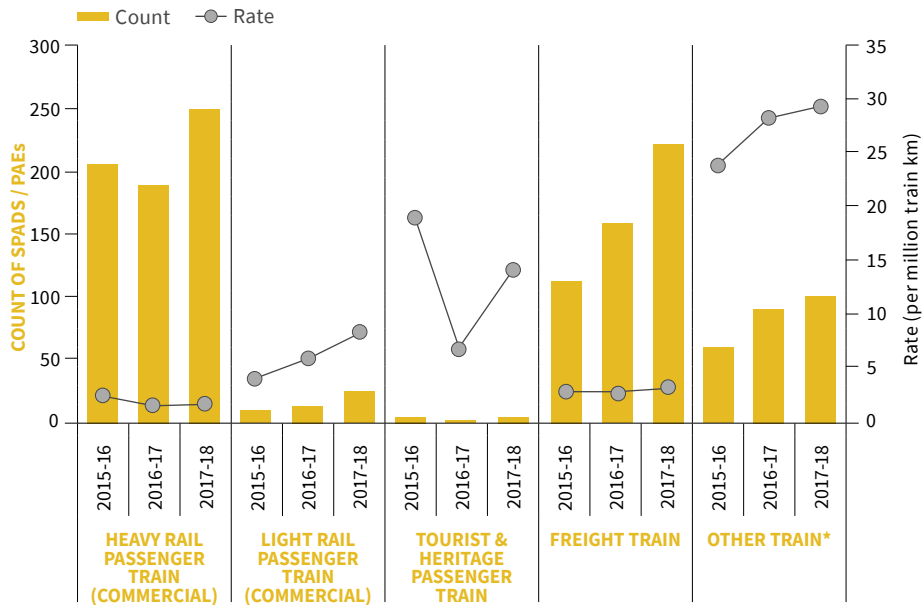
*Other train consists of track maintenance trains, Road Rail Vehicles and all other movement of rolling stock

OTHER NOTEWORTHY OCCURRENCES

DATE	DESCRIPTION	LOCATION
26/08/2017	A suburban passenger train passed a signal at danger by approximately 30 metres, entering an active worksite.	Bowen Hills, Qld.
30/09/2017	A freight train parted leaving 21 wagons behind, including five containing dangerous goods. After inspecting the train the driver continued on and only realised the train had parted after a second inspection.	Kinkuna – Goodwood section, Qld.
12/12/2017	A roll-by inspection of a freight train leaving Kooragang Coal Terminal identified a wagon with a fractured bogie frame and the wheels collapsing in.	Kooragang Coal Terminal, NSW
2/01/2018	An empty passenger train passed two signals at danger, entering a single line section without authority. There was an opposing train movement in the single line section. The trains were safely brought to a stand with a separation distance of around 900 metres.	Marshall, Vic.
30/03/2018	A passenger train service made an emergency stop when the driver observed an obstruction on track. The obstruction was identified as a large steel coil that had fallen from a freight train that had passed through the area earlier.	Glenrowan to Benalla, Vic.
6/06/2018	Two locomotives shunting in a yard collided with the rear fuel tanker of a train resulting in the release of approximately 15,000 litres of fuel. The loss of containment was restricted to the yard.	Kwinana Yard, WA

INCIDENT RESPONSE

ONRSR is structured and geographically located to ensure it can respond efficiently to rail safety incidents across Australia, such as those summarised in this report. It has a variety of different regulatory tools at its disposal, that are used to respond to incidents in the most appropriate manner.

Individual incidents are generally managed at a local level by rail safety officers. Officers ensure they obtain and analyse all information available regarding the circumstances of an incident including the review of the rail transport operator's response to the incident. This information may be gathered using statutory notices compelling rail transport operators to provide information related to the incident. This is done to examine if the rail transport operator has demonstrated an understanding of the factors that led to the incident, and that actions have been taken to give confidence that a similar incident is unlikely to reoccur.

If the information obtained and analysed raises concerns, the issue is escalated to a compliance investigation which entails a formal investigation into a potential breach of the RSNL.

ONRSR continuously monitors the data collected in relation to rail safety incidents and if concerning trends are identified there are a range of responses. These include education and targeted regulatory activities to assist rail transport operators to improve safety performance and comply with the legislation.

Education is a valuable instrument to raise industry awareness of safety issues that exist or are emerging within the rail industry.

Regulatory activities, such as audits, inspections and site visits are used to directly monitor specific safety issues or scrutinise how individual operators are addressing highlighted concerns.
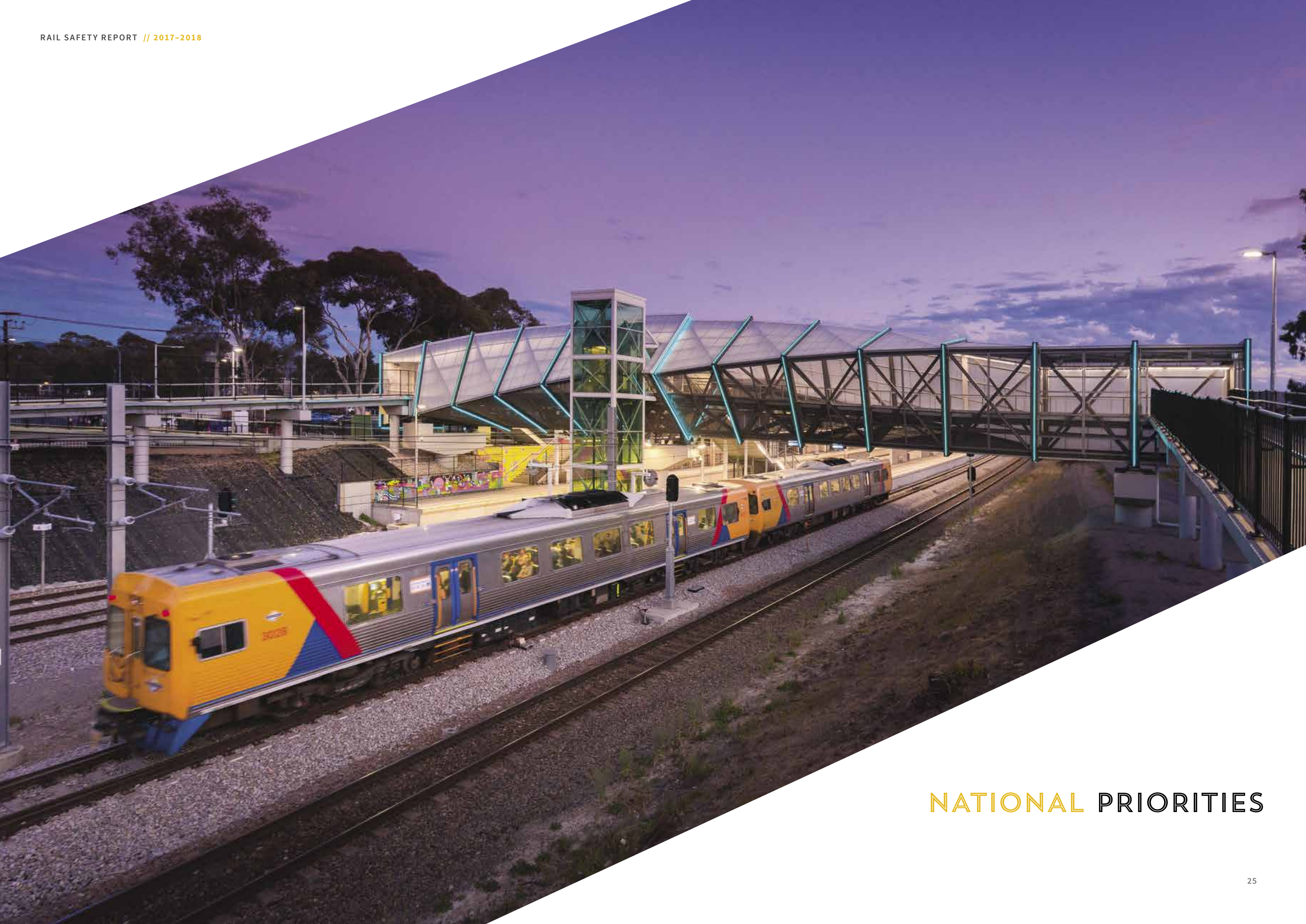
NATIONAL PRIORITIES

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 applies a structured, evidence-based, risk assessment process to review and identify its national priorities and then targets them through operator-centric regulatory activities or industry-wide safety improvement projects.

This section of the report provides an update on ONRSR's four current national priorities: level crossing safety, track worker safety, tourist and heritage sector safety management capability, and road rail vehicle (RRV) safety.

LEVEL CROSSING SAFETY

ONRSR national priority since 2018. Ongoing.

Level crossings are the primary means by which the general public may legitimately traverse the rail corridor and they present a unique set of safety hazards.

Despite a pleasing overall reduction in unsafe level crossing equipment failures and defects over the past three years, level crossing accidents still account for a large number of railway-related fatalities across Australia. ONRSR's view of level crossing safety as a national safety priority remains firm.

There were 40 railway crossing collisions between train and road vehicle, and four collisions between train and person in the 2017–2018 financial year on railways regulated under the RSNL.

RAILWAY CROSSING EQUIPMENT FAILURES AND DEFECTS

ONRSR was also notified of 231 reportable railway crossing equipment failures and defects, of which 185 were identified as unsafe. ONRSR's risk-based analysis of these occurrences is presented in Figure 11 in accordance with the following criteria:

Category 1 (highest risk) – An equipment failure or defect resulting in:
> Complete failure of active warning devices;
> Late activation of warning devices; or
> Premature deactivation of warning devices.

Category 2 – An equipment failure or defect resulting in:
> Failure of road boom(s) to fully lower but other active warning devices operational; or
> Failure of pedestrian gate(s) to close or boom(s) to lower.

Category 3 (lowest risk) - An equipment failure or defect resulting in:
> 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; or
> Failure of pedestrian don't walk warning light(s).

There is positive work underway by industry and governments to address safety risks at level crossings and to remove crossings altogether, and ONRSR continues to provide its full support.

During 2017–2018 ONRSR has made improvements to the quantity and quality of level crossing-related occurrence data reports it provides to level crossing committees in a number of Australian jurisdictions, better informing the safety-related decisions made by these committees. With Queensland now part of the regulatory fold, ONRSR is now offering truly national level crossing data to decision makers and continues to investigate options for better sharing of information.

ONRSR also works with the National Level Crossing Safety Committee to maintain the profile of level crossing safety as a priority safety issue for Australian railways. During 2017–2018 this has involved supporting the committee with the development of a prototype online level crossing information dashboard for stakeholders to access, interrogate and analyse level crossing safety data.

An ONRSR safety improvement project to support industry and government to promote improvements in national level crossing safety is progressing with full delivery expected by late 2019.

FIGURE 9:
RAILWAY CROSSING COLLISIONS BETWEEN TRAIN AND ROAD VEHICLE, JULY 2015 TO JUNE 2018

SA, NSW, NT, Tas., Vic. & ACT data is for full period, WA data is from 2 November 2015 onwards, Qld. data is from 1 July 2017. Private or public road crossing access is determined using ALCAM data where available. Where this is not available, a determination has been made based on the information provided by the operator.

Other consists of track maintenance, Road Rail Vehicles and any other movement of rolling stock

FIGURE 10:

RAILWAY CROSSING COLLISIONS BETWEEN TRAIN AND PERSON, JULY 2015 TO JUNE 2018

SA, NSW, NT, Tas., Vic. & ACT data is for full period, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017. Private or public crossing access is determined using ALCAM data where available. Where this is not available, a determination has been made based on the information provided by the operator.
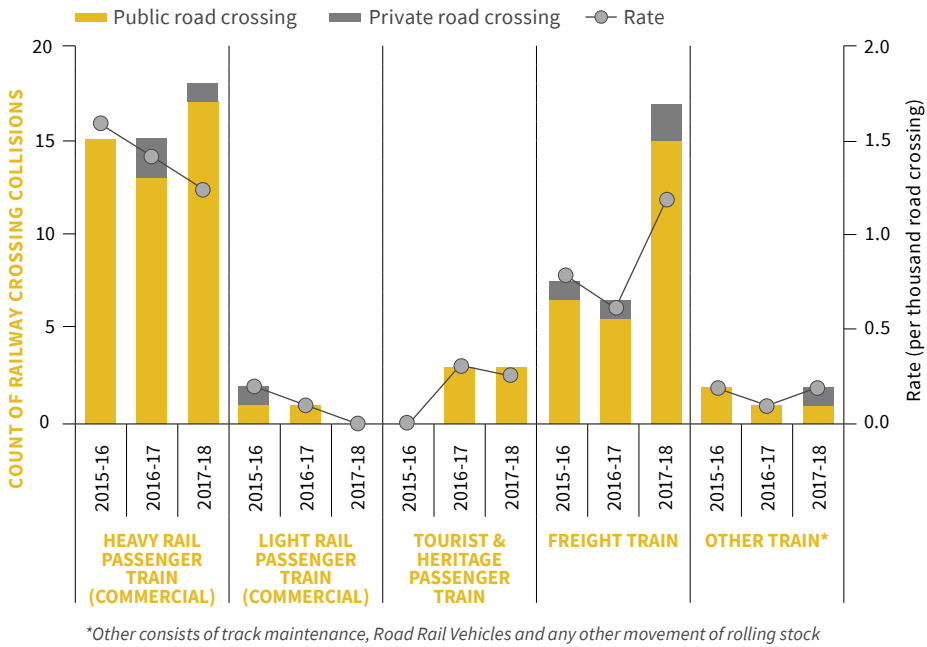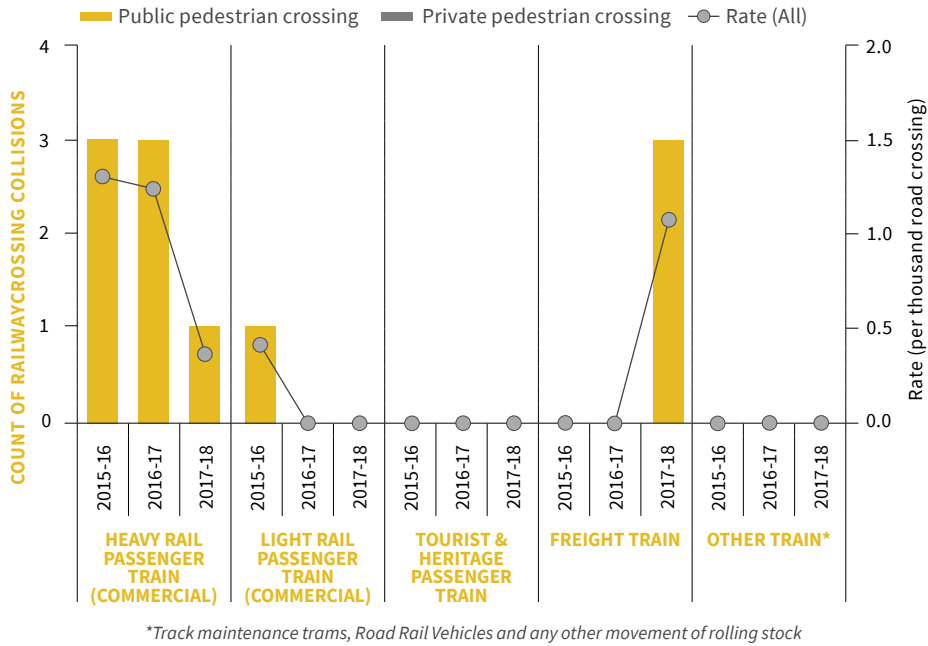

*Track maintenance trams, Road Rail Vehicles and any other movement of rolling stock

FIGURE 11:

UNSAFE RAILWAY CROSSING EQUIPMENT FAILURES AND DEFECTS, JULY 2015 TO JUNE 2018

SA, NSW, NT, Tas., Vic. & ACT data is for full period, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017. Data shown is that classified as occurrence category, Railway Crossing Equipment Failure/Defect, regardless of top-event, and includes only those failures and defects that resulted in the railway crossing failing in such a way that it does not provide the intended level of protection to users of the crossing.
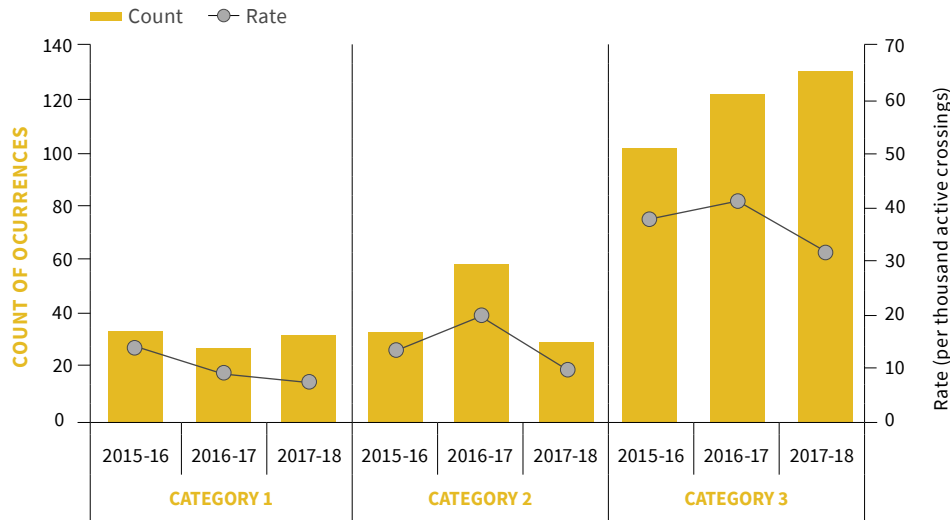

TABLE 10:

SELECTED RAILWAY CROSSING COLLISIONS, JULY 2017 TO JUNE 2018

Railway operations regulated under the RSNL.

DATE	DESCRIPTION	LOCATION
6/07/2017	Collision between freight train and road vehicle towing a horse float at a railway crossing protected by stop signs. Extensive damage to the front of the locomotive was reported. Train driver and motor vehicle occupant were taken to hospital.	Glenore Road, North Coast Line, Qld.
11/07/2017	Collision between freight train and road train at a railway crossing protected by flashing lights. No injuries were reported.	Cobb Highway, Bogan Gate Junction To Broken Hill, NSW

TABLE 10:

(CONTINUED)

DATE	DESCRIPTION	LOCATION
13/07/2017	Collision between freight train and semi-trailer at a railway crossing protected by give-way signs. No injuries were reported.	Cooks River Rail Terminal, NSW
15/07/2017	Collision between passenger train and a road vehicle at a crossing protected by stop signs. Minor injuries to three road vehicle occupants were reported.	William Street, North Coast Line, Qld
16/08/2017	Collision between freight train and person with mobility aid at a railway crossing protected by flashing lights and boom barriers. The person suffered minor injuries.	Cavendish Road, Qld.
29/08/2017	Collision between freight train and truck at a railway crossing protected by stop signs. The truck driver was fatally injured.	Wagoora, Qld.
1/09/2017	Collision between freight train and B-Double at a railway crossing protected by stop signs. No injuries were reported.	Condobolin, NSW
8/10/2017	Two road vehicle occupants were seriously injured in a collision between a tourist and heritage passenger train and road vehicle at railway crossing protected by give way signs.	Mount Compass – Goolwa, SA
3/11/2017	The driver of a road vehicle was fatally injured in a collision between their vehicle and a passenger train at a railway crossing protected by give way signs.	Werneth, Vic.
23/12/2017	Freight train struck and fatally injured a person at a railway crossing protected by boom barriers and flashing lights.	Kingdon Street, Scone, NSW
23/01/2018	Collision between a passenger train and a road vehicle at a railway crossing protected by flashing lights. Two serious injuries were reported.	Collins Ave, Cairns, Qld.
30/01/2018	Collision between a passenger train and a road vehicle at a railway crossing protected by flashing lights. A road vehicle occupant was fatally injured.	Brunswick Junction, WA
18/02/2018	Freight train struck and fatally injured a person at a railway crossing protected by flashing lights.	Piccadilly St, Kalgoorlie – Leonora, WA
6/03/2018	Collision between a tourist and heritage passenger train and a bus at a railway crossing protected by flashing lights. No injuries were reported.	School Rd, Gembrook Line, Vic.
4/06/2018	The locomotive of a freight train derailed on colliding with a semi-trailer at a railway crossing protected by flashing lights. No injuries were reported.	Manildra, NSW

TRACK WORKER SAFETY

ONRSR national priority since 2016. Ongoing.

Track worker safety remains a major safety concern for ONRSR and industry. Occurrence data indicates a steady and concerning rate of track work procedure and rule breaches over the past three years.

In the 2017–2018 financial year approximately 1 in 6 breaches posed a significant level of threat, involving failures of a type that could have directly led to workers being struck if the circumstances were slightly different. In a small number of cases, an accident was averted only through the emergency action of an individual such as a train driver applying emergency brakes or a worker jumping from the path of an approaching train.

While there were no instances of track workers being struck by trains as a result of worksite protection breaches in 2017–2018, the significant risks serve to keep track worker safety among ONRSR's national safety priorities.

To help address track worker safety risks ONRSR is:
> gathering better quality data from operators through occurrence reports related to track worker safety
> focusing regulatory activities on track worker protection arrangements, including risk management
> exploring innovative options for promoting and improving track worker safety, and educating track workers on how to stay safe.

To support these goals ONRSR is developing new internal tools for rail safety officers in the field, strengthening its national audit approach, and refining data capabilities to better identify track worker safety hot spots.

In an effort to increase safety awareness among rail safety workers, particularly track workers, ONRSR will facilitate the delivery of a safety improvement program of interactive workshops targeted at rail safety workers across the country. Following a format successfully employed in safety-critical industries in Australia and abroad, these interactive theatre-based workshops act out a track worker safety scenario and focus on personal responsibility, safety conversations, risk-taking, rule-breaking, and consequences.

As there remains a concerning number of track worker safety incidents on Australia's rail network ongoing vigilance by ONRSR and operators is required.

SAFETY CONCERN: LABOUR HIRE TRACK WORKERS

With increasing investment in rail in Australia and the large number of major rail projects currently underway, there is heightened potential for track workers to be exposed to safety risks.

Labour hire workers are of particular concern, especially those working for contracting companies who are not themselves accredited but provide rail safety workers to accredited organisations on track work projects.

These workers are still bound by the *Rail Safety National Law* and the associated risks to these workers must be managed through the accredited organisation's safety management system. ONRSR reminds operators, contracted organisations and labour hire workers themselves of the need to identify and manage track worker safety risks – including ensuring labour hire track workers have the level of competence required for the type of rail safety work they are doing.

ONRSR released a Safety Bulletin and Fact Sheet on labour hire in July and October 2017, respectively. These publications are available at www.onrsr.com.au.

SAFETY CONCERN: EMERGENCY TRACK WORK

Unplanned and emergency works present a significant risk to safe rail operations around Australia. Regardless of the urgency, the best way to ensure safety when time and resources are at a premium is to prepare for, and carry out, these activities in accordance with a safety management system.

Safety management systems must include appropriate network rules and procedures that detail a process allowing track maintenance staff safe access to the rail corridor to carry out repairs, whether it is for planned work or responding to an infrastructure failure that requires immediate attention.
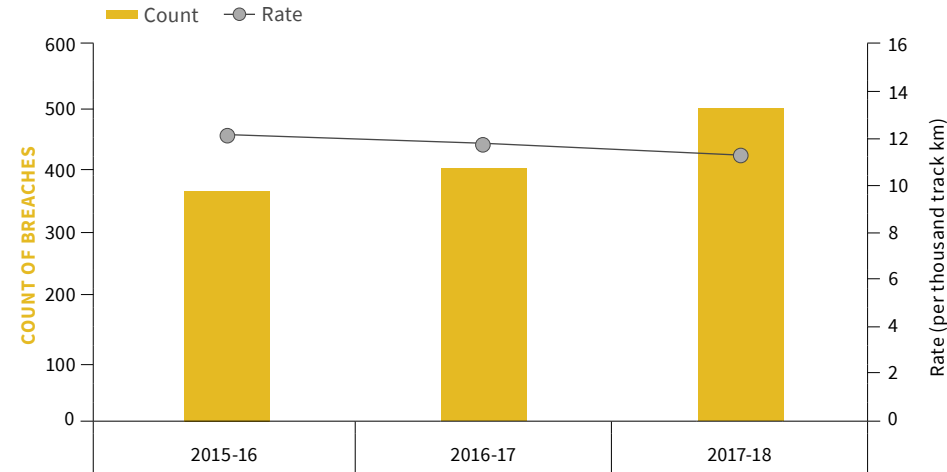
ONRSR released a Safety Bulletin about this issue in March 2018 and it is available at www.onrsr.com.au.

FIGURE 12:

TRACK WORK SAFEWORKING RULE AND PROCEDURE BREACHES, JULY 2015 TO JUNE 2018

SA, NSW, NT, Tas., Vic. & ACT data is for full period, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017.

DATE	DESCRIPTION	LOCATION
26/03/2018	Worksite protection was established without accounting for a coal train already in the section. Track workers saw the approaching train and remained clear of the track.	Drayton Junction to Newdell Junction, NSW
06/04/2018	A work crew operated road rail vehicles and deconstructed track for approximately one hour without permission to start work.	Frankston Line, Vic.
03/05/2018	A worksite protection officer allowed a track excavator onto a track without any protection in place for the track section.	Hesso, SA
22/06/2018	After completing an inspection and clearing the track, a work group observed a passenger train on the track they believed was protected. One of the signals used for protection was not controlled by the signaller that set up the protection.	Sunbury, Vic.

TOURIST AND HERITAGE SECTOR, SAFETY MANAGEMENT CAPABILITY

ONRSR national priority since 2018. Ongoing.

With operations as diverse as hobbyists running section cars, museums providing short ride experiences and scenic railway lines carrying high frequency passenger trains, ONRSR continues to focus on the safety management capability of the tourist and heritage rail sector.

ONRSR is aware of the challenges that tourist and heritage operators face with identifying, assessing and treating risks associated with the scope and nature of their operations given their often limited resources. However, with their tens of thousands of recreational passengers each year, tourist and heritage operators must place safety management at the centre of everything they do.

Working with the Association of Tourist and Heritage Rail Australia (ATHRA), ONRSR will deliver a safety improvement program to help improve the safety management maturity of tourist and heritage operators. The program will provide tourist and heritage railway staff with practical information on the importance of safety governance, accountability, leadership, and organisational safety culture as well as safety management systems and risk management.

Complementing the safety improvement program will be an increased focus on providing improved safety education and support to operators during in the field interactions with ONRSR's rail safety officers.

With the scope and nature of Australia's accredited tourist and heritage operators varying widely, ONRSR aims to encourage individual tourist and heritage operators to tailor risk management controls and safety management systems to the scope and nature of their specific railway operations and risk profiles.

TABLE 11:

**SELECTED TRACK WORK SAFEWORKING RULE AND PROCEDURE BREACHES, JULY 2017 TO JUNE 2018**

Railway operations regulated under the RSNL.

DATE	DESCRIPTION	LOCATION
14/07/2017	The driver of a terminating passenger train applied emergency brakes to avoid hitting a contractor working on a set of points ahead of the train. The train stopped short of the worker who had moved clear of the track.	Greensborough Station, Vic.
31/07/2017	A lookout was distracted and failed to warn workers of an approaching train. The train driver sounded the horn and applied emergency brakes. The workers had approximately five seconds to reach a safe place.	Tempe, NSW
08/09/2017	The driver of freight train reported a near miss with a work group's front-end loader on the track at a railway crossing. The train driver applied emergency brakes and the loader was moved from the track prior to the train passing the site.	Coorparoo, Qld.
30/09/2017	The driver of a passenger train approaching a station reported a near miss with a track worker working on cabling next to the track. The driver applied emergency brakes.	Toowong Station, Qld.
06/11/2017	The driver of bank locomotives reported a near miss with track workers maintaining a set of points. The driver sounded the train's whistle and the workers moved clear of the track.	Pilbara, WA
02/12/2017	The driver of a passenger train reported a near miss with a track worker crossing tracks 10 metres in front of the train. The worker was pulled back from the train's path by a colleague.	Summer Hill, NSW
22/03/2018	The driver of a freight train observed three workers on a bridge ahead and applied emergency brakes, stopping 20 metres short of the bridge. Two workers were not clear of the bridge, which had no walkways.	Menindee, NSW

DATE	DESCRIPTION	LOCATION
12/03/2018	The leading passenger carriage of a tourist and heritage train derailed. No injuries were reported.	Moonta, SA
18/04/2018	The rear passenger carriage of a tourist and heritage train derailed. No injuries were reported.	Moonta, SA
28/04/2018	A tourist and heritage passenger train and a road vehicle collided at a railway crossing protected by give way signs. The driver of the road vehicle sustained a minor injury.	Main Goolwa to Mount Barker, SA
22/06/2018	The locomotive of a tourist and heritage train derailed after travelling over a set of points. Passenger carriages did not derail and no injuries were reported.	Ida Bay, Tas.

FIGURE 13:
OCCURRENCES INVOLVING TOURIST AND HERITAGE OPERATORS, JULY 2015 TO JUNE 2018

SA, NSW, NT, Tas., Vic. and ACT data is for the full period, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017 onwards. Includes all train types. SPAD / PAE occurrences are SPAD A1: Limit of Authority Missed by Train Crew classifications only.
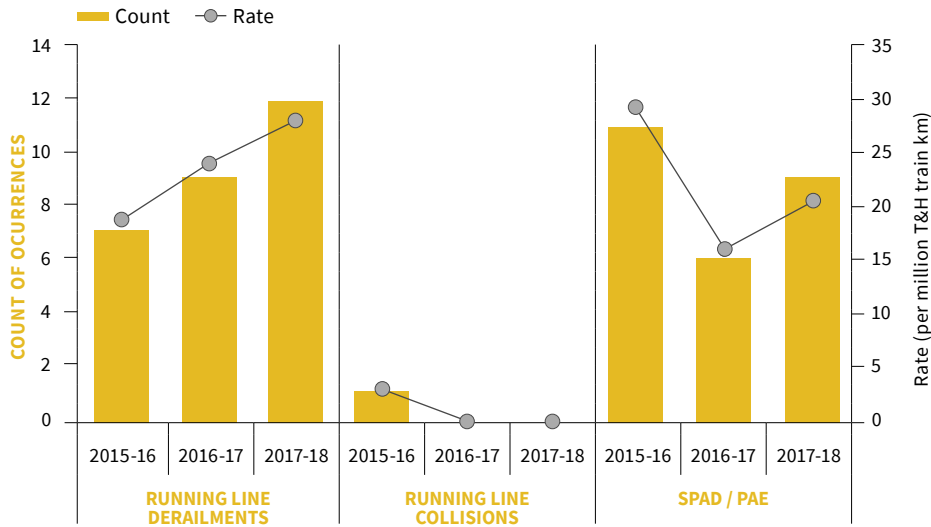
TABLE 12:
SELECTED OCCURRENCES INVOLVING TOURIST AND HERITAGE OPERATORS, JULY 2017 TO JUNE 2018

Railway operations regulated under the RSNL.

DATE	DESCRIPTION	LOCATION
8/07/2017	A tourist and heritage train carrying passengers derailed on a bend. No damage or injury was reported.	Busselton Jetty, WA
16/07/2017	The bogie of a carriage on a steam-hauled tourist and heritage passenger train derailed when travelling over points. No injuries were reported.	Marina Mirage Station, Port Douglas, Qld.
16/07/2017	A tourist and heritage locomotive derailed on a crossing loop due to a spread track. No injuries were reported.	Victor Harbor, SA
18/08/2017	A tourist and heritage passenger train and road vehicle collided at a railway crossing protected by flashing lights. One of the road vehicle occupants sustained a minor injury.	Cairns Railway, Qld.
8/10/2017	Two road vehicle occupants were seriously injured in a collision between a tourist and heritage light locomotive and a road vehicle at a railway crossing equipped with give way signs.	Mount Compass – Goolwa, SA
24/12/2017	Two passenger carriages of a steam-hauled tourist and heritage train derailed. One passenger sustained minor injuries and was taken to hospital.	Cobdogla, SA
1/01/2018	A passenger carriage of a tourist and heritage train derailed. The carriage was empty and no injuries were reported.	Dwellingup, WA
15/02/2018	The locomotive of a tourist and heritage train derailed when it struck a small a tree branch laying across the track. Passenger carriages did not derail and no injuries were reported.	Ida Bay, Tas.
6/03/2018	A tourist and heritage passenger train and bus collided at a railway crossing protected by flashing lights. No injuries were reported.	School Rd, Gembrook Line, Vic.

ROAD RAIL VEHICLE SAFETY

ONRSR national priority since 2015. Ongoing.

Although an important tool for rail network maintenance, road rail vehicles (RRVs) carry substantial safety risks and remain a national rail safety priority for ONRSR. Occurrence data from the past three years does not indicate a reduction in the rate of incidents related to RRV safety on the Australian network, and while operators have demonstrated improvements in some areas, ongoing vigilance and improvement is required.

During 2017–2018 ONRSR's RRV safety national compliance project focused on how operators maintain effective management and control of RRV operations on their networks.

Anchored by a national program of audits, the year's activities revealed a pleasing uptake of Australian standard *AS/RISSB: 7502 Road Rail Vehicles,* with all audited operators incorporating the RRV certification and registration requirements into their safety management systems and complying with the specified requirements.

Also reassuring is that all operators audited as part of this project during 2017–2018 have prohibited the use of friction drive RRVs that do not have at least one braked axle in contact with the rail during on-tracking and off-tracking.

SAFETY CONCERN: CERTIFICATION OF CONTRACTOR-PROVIDED RRVS

In order to allow RRVs onto their networks, operators are required to put into place processes to manage the safety of RRV operations. They are strongly encouraged to:

> ensure RRV certification, registration and compliance to appropriate standards, such as Australian standard *AS/RISSB:7502 Road Rail Vehicles*

> engage an independent competent person (ICP) to undertake engineering assessment of the RRV

> review, assess and accept the ICP's report and impose limitations or restrictions on the RRV operations specific to network conditions
> regularly audit the competencies of any ICPs used to certify RRVs
> manage RRV recertification at regular intervals and also in response to any configuration change or substantial modification
> manage compliance to scheduled maintenance plans and defect tracking
> manage the process control on the traceability of rail guidance systems
> ensure contractual arrangements adequately cover certification, auditing and maintenance requirements for network access
> audit contractor-provided RRVs to check for evidence of network certification, including field inspections and checks on functioning of safety systems
> assess RRV-specific project risks
> undertake corrective actions including the ongoing review of risks and risk controls, taking into account internal and external audits and RRV-related safety occurrences.

While the majority of operators make use of their own RRV equipment, a key area of risk arises from the substantial number of contractor-provided RRVs operating under operator accreditation - particularly in large construction projects. These scenarios typically involve significant reliance on RRVs provided by unaccredited contracted organisations.

The safety of contractor-provided RRVs is primarily managed through contractual agreements which document the RRV's certification and registration requirements as well as the accredited operator's right to monitor and audit.

In these instances operators rely on ICPs to certify the contractor-provided RRVs. This raises an issue around how the ICPs themselves are certified, and ONRSR is concerned that operators lack processes to regularly audit the competence of ICPs.

A further concern is an apparent over reliance on stickers and labels as evidence of RRV certification.

ONRSR's first five RRV-focused audits in early 2018 identified a lack of formal process for operators to engage directly in checking the compliance of contractor-provided RRVs with scheduled maintenance or defect management plans. Instead, audited operators were leaving this to be reviewed by the ICPs or the approved assessors and relying on the RRVs being certified as labelled.

Rail infrastructure managers should employ auditing controls to ensure each RRV's ongoing working condition beyond initial certification as assumptions that RRVs are certified exactly as labelled, particularly when combined with poor record keeping, raise significant safety concerns.

FIGURE 14:
OCCURRENCES RELATED TO ROAD RAIL VEHICLE SAFETY, JULY 2015 TO JUNE 2018

SA, NSW, NT, Tas., Vic. & ACT data is for full period, WA data is from 2 November 2015 onwards, and Qld. data is from 1 July 2017. Selected occurrence categories only. Occurrences involving operators that do not currently report maintenance vehicle km are excluded from the rate calculation.
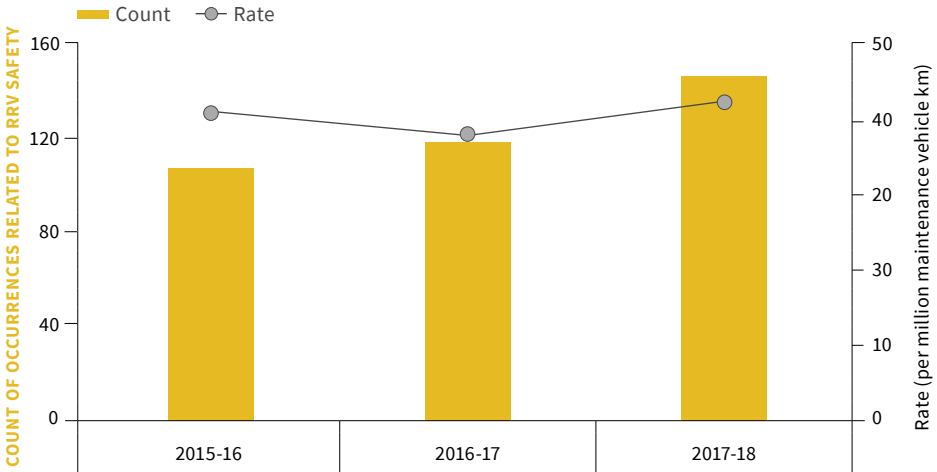
TABLE 13:
SELECTED OCCURRENCES RELATED TO ROAD RAIL VEHICLE SAFETY, JULY 2017 TO JUNE 2018

Railway operations regulated under the RSNL.

DATE	DESCRIPTION	LOCATION
24/08/2017	A RRV derailed and the driver was injured after hitting their head on the windscreen.	Katherine, NT
13/09/2017	A RRV derailed while travelling at 50 km/h. No injuries were reported, though the vehicle was damaged.	Ballimore, NSW
28/10/2017	A contractor's RRV ran out of control, nearly hitting workers on track who had to jump out of the way to avoid being struck. The RRV was eventually stopped.	Fassifern, NSW
27/11/2017	A RRV derailed when one of its wheels fell off the axle. Two employees suffered minor injuries.	Geelong Line, Vic.
18/01/2018	A RRV collided with another RRV while travelling in convoy. Minor damage was sustained to the vehicle and no injuries were reported.	Cairns, Qld.
19/01/2018	A RRV reversed into another RRV. There were no reported injuries.	Maryborough – Ararat, Vic.
8/03/2018	A RRV derailed while travelling at approximately 75-80 km/h due to ballast on the track. No injuries were reported, but the vehicle was left unfit for rail use.	Cook - West Kalgoorlie, WA

DATA-DRIVEN
INTELLIGENCE
TO SUPPORT
RISK-BASED
REGULATION

The statistics and incident summaries presented in the previous chapters provide a snapshot of the rail industry's safety performance over the last year. This information not only provides an insight into how safe the industry is, but also acts as a key source of regulatory intelligence that ONRSR uses to direct effort and resources in line with its risk-based approach to regulation. This chapter provides an update on ONRSR's progress to further enhance its risk-based approach to regulation through better use of data.

Data is an increasingly important element in ONRSR's risk-based decision making and, in keeping with the approach outlined in The ONRSR Way, is a focus area for continual improvement. Progress over the past 12 months has focussed on the following areas:
> enhancing data exchange
> improving ONRSR's delivery of data
> improving ONRSR's data analytics capability
> identifying future data needs.

THE ONRSR WAY
ONRSR published The ONRSR Way in early 2018, formally setting out our risk-based approach to regulation – including the importance of collecting and analysing regulatory data to inform our risk-based decisions. The ONRSR Way is available to download at www.onrsr.com.au.

ENHANCING DATA EXCHANGE – THE ONRSR PORTAL

Behind the scenes, ONRSR has moved its core information management and technology platform to a more contemporary open architecture platform. This allows ONRSR to more efficiently exchange and access information across a range of data management solutions and systems.

A key example of this new capability is the release of the ONRSR Portal. The ONRSR Portal is ONRSR's new, secure, online information exchange solution. It will be available to all accredited rail transport operators from December 2018 for the purpose of submitting:
> notifiable occurrences
> monthly track and train kilometre and drug and alcohol testing returns
> notifications of change (including a more streamlined process for updating key contact and organisational details).

While the current version of the ONRSR Portal handles many of the more common operator-to-regulator reporting and submission activities, it provides a platform for enhanced future information exchange between the regulator and operators. Already introduced is the ability for operators to manage the areas of the ONRSR Portal that their users will have access to, and the communication mechanisms to handle queries regarding information exchanged between the operator and ONRSR.

While the ONRSR Portal has not changed the underlying requirements and expectations for reporting to ONRSR, it has introduced the ability to validate the accuracy or completeness of data at the time of submission. Over time, this change will facilitate significant improvements in the quality and consistency of data being submitted to ONRSR.

The next development steps for the ONRSR Portal are to make ONRSR-generated information readily available (e.g. notices of accreditation, audit and inspection reports), and to consult with industry on potential future functionality to improve operator – regulator information exchange.

IMPROVING ONRSR'S DELIVERY OF DATA

In addition to the safety data in ONRSR's annual Rail Safety Report, ONRSR publishes national rail safety data online at www.onrsr.com.au. Statistics are updated every six months and allow operators to benchmark their safety performance against industry and sector averages. Recent website improvements have seen a move to a more interactive data display, enabling a richer look at rail safety occurrences.

ONRSR has also made improvements to the data it delivers to level crossing committees in a number of Australian jurisdictions, better informing their safety-related decision making. More recently, work has begun with the National Level Crossing Safety Committee on developing an online level crossing information dashboard.

IMPROVING ONRSR'S DATA ANALYTICS CAPABILITY

ONRSR has begun exploring different approaches to data analytics with the goal of maximising the value of the regulatory data currently available. To date, this has included:
> text mining applications enabling the information captured in historic audit, inspection and investigation reports (as examples) to be unlocked and used to identify safety issues not visible through incident analysis
> machine learning techniques to assist in the classification and escalation of data relating to notifiable occurrences and regulatory activities.

The latter has already shown promise with early work demonstrating that machine learning algorithms can correctly predict the classification of a notifiable occurrence based on an analysis of the incident description to a reasonable level of accuracy. This has the potential to significantly improve the way in which ONRSR collects and validates data by assisting with the classification task, improving data quality and reducing the reporting burden on industry.

IDENTIFYING FUTURE DATA NEEDS

As a regulator working in a co-regulatory framework, ONRSR does not necessarily need more data but it does need better focussed, richer data. For example, ONRSR does not need detailed track condition data to inform track maintenance decisions as this is the task of the operator. Instead, ONRSR needs data to determine how well an operator is managing the risks to safety associated with track condition and to determine whether track condition is an area that warrants greater regulatory attention.
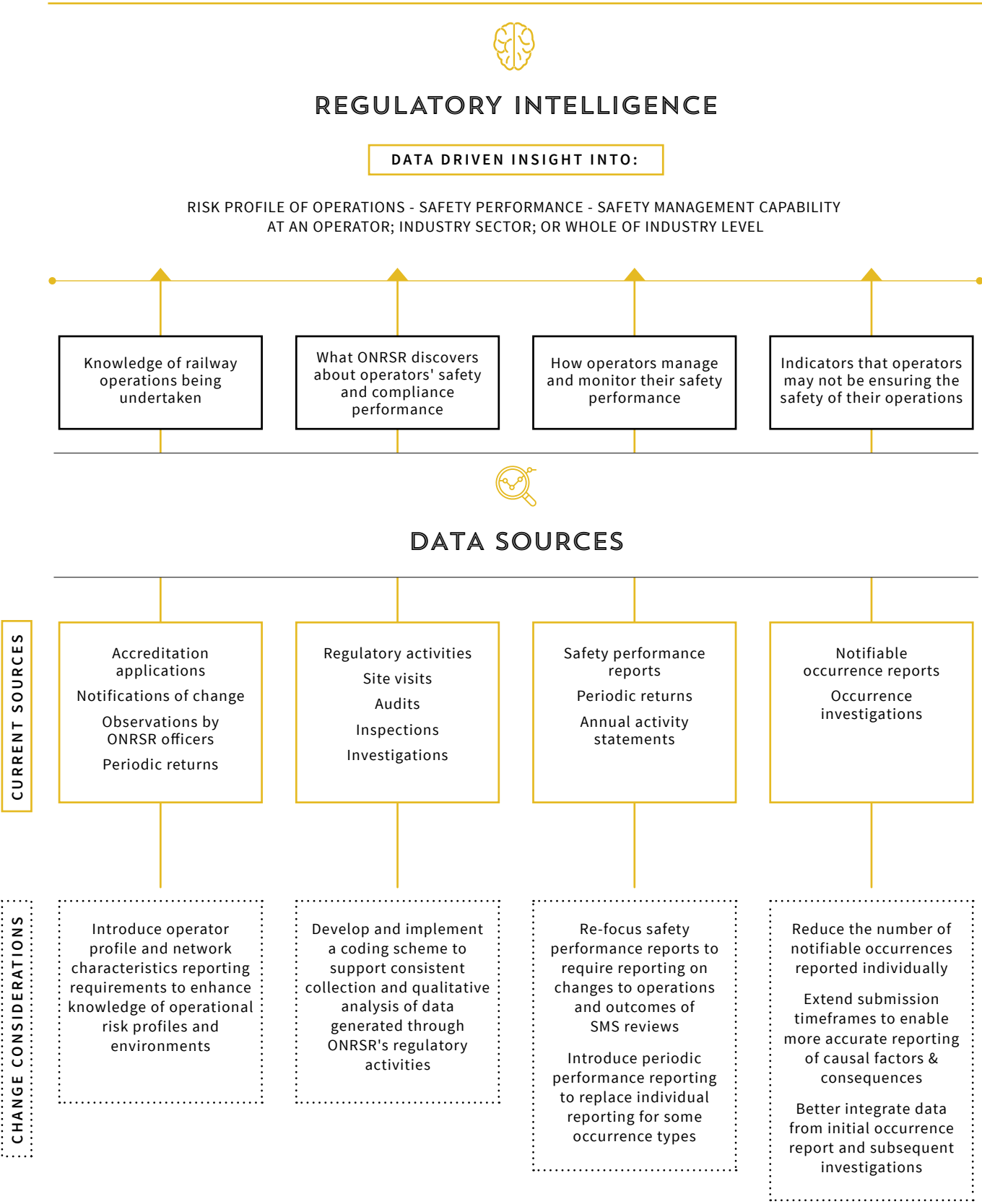
With this in mind, ONRSR continues to review its data needs and reporting mechanisms to ensure it has access to the data it requires to effectively fulfil its functions and facilitate safe railways for Australia. Refer to Figure 15 for examples of the changes currently under consideration.

A key challenge ONRSR faces in seeking access to a richer set of data is to do so whilst simultaneously reducing the reporting burden on industry. To overcome this challenge, ONRSR's work in this space will be underpinned by the following principles:
> ONRSR will only collect or access data required to effectively fulfil its role and functions
> ONRSR will be flexible when setting data requirements by being prepared to tailor data needs and expectations to industry sectors
> ONRSR will examine opportunities to limit reporting burden through the implementation of more efficient systems for information exchange and analysis
> ONRSR will work with industry to progress a national approach to the collection and use of data for rail safety purposes, to the benefit of all of its stakeholders.

These concepts, change considerations and principles will form the backbone of ONRSR's input into the delivery of the National Rail Safety Data Strategy.

NATIONAL RAIL SAFETY DATA STRATEGY
The National Rail Safety Data Strategy and action plan is jointly lead by ONRSR and the Australasian Railway Association on behalf of all of industry. It presents an exciting opportunity to critically review the safety data needs across the Australian rail industry and to set new direction and approaches that better meet the safety data requirements for all rail industry participants.

FIGURE 15:
CURRENT ONRSR DATA SOURCES AND CHANGE CONSIDERATIONS

REGULATORY INTELLIGENCE

DATA DRIVEN INSIGHT INTO:

RISK PROFILE OF OPERATIONS - SAFETY PERFORMANCE - SAFETY MANAGEMENT CAPABILITY
AT AN OPERATOR; INDUSTRY SECTOR; OR WHOLE OF INDUSTRY LEVEL

Knowledge of railway operations being undertaken	What ONRSR discovers about operators' safety and compliance performance	How operators manage and monitor their safety performance	Indicators that operators may not be ensuring the safety of their operations

DATA SOURCES

CURRENT SOURCES

Accreditation applications	Regulatory activities	Safety performance reports	Notifiable occurrence reports
Notifications of change	Site visits	Periodic returns	Occurrence investigations
Observations by ONRSR officers	Audits	Annual activity statements	
Periodic returns	Inspections		
	Investigations		

CHANGE CONSIDERATIONS

Introduce operator profile and network characteristics reporting requirements to enhance knowledge of operational risk profiles and environments	Develop and implement a coding scheme to support consistent collection and qualitative analysis of data generated through ONRSR's regulatory activities	Re-focus safety performance reports to require reporting on changes to operations and outcomes of SMS reviews	Reduce the number of notifiable occurrences reported individually
		Introduce periodic performance reporting to replace individual reporting for some occurrence types	Extend submission timeframes to enable more accurate reporting of causal factors & consequences
			Better integrate data from initial occurrence report and subsequent investigations

APPENDICES

APPENDIX A:
SCOPE AND METHODS

REPORTING PERIOD

A minimum reporting period of 1 July 2017 to 30 June 2018 applies to this report. Longer term data, from 1 July 2013 to 30 June 2018, was used when available in order to present trends of incidents over time.

GEOGRAPHIC COVERAGE

Descriptions and statistics in this report apply only to those railways within ONRSR's area of operation, which has expanded over the five year period that applies to parts of this report:
> Data for railways in South Australia, New South Wales, Northern Territory, Tasmania and Victoria is included for the full period, 1 July 2013 to 30 June 2018.
> Data for railways in the Australian Capital Territory is included from 1 July 2014 to 30 June 2018.
> Data for railways in Western Australia is included from 2 November 2015 to 30 June 2018.
> Data for railways in Queensland is included from 1 July 2017 to 30 June 2018.

RAILWAY OPERATIONS

The statistics cover all railway operations within the aforementioned geographic bounds with the exception of Victoria. There are a number of railways which continue to be regulated under local Victorian law and are therefore not subject to *Rail Safety National Law.* These comprise the metropolitan tram operator and several standalone tourist and heritage railways.

DATA AND SOURCES

The statistics in this report are 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 and *Rail Safety National Law National Regulations 2012 (SA)* and *Rail Safety National Law (WA) Regulations 2015* (National Regulations). The specific information to be provided is defined in clause 57 of the National Regulations.

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.

Railway crossing numbers and access types are sourced from the Australian Level Crossing Assessment Model (ALCAM)[6].

Unlike previous versions of the report, data tables are not presented in the appendices. Instead, a complete set of the data presented can be downloaded from the National Safety Data area of ONRSR's website.

DEFINITIONS

Statistics are predominantly based on the incident definitions of the national occurrence classification guideline which is date dependent. For the majority of data (1 July 2013 to 7 June 2017 inclusive), incident definitions are based on those in the Occurrence Classification Guideline (OC-G1), 2013[7]. For data collected since 8 June 2017, and for all SPAD/PAE data, incident definitions are based on the Reporting Requirements for Notifiable Occurrences[8]. For definitions of specific terms used in this report please refer to Appendix B: Glossary.

RISK-BASED ANALYSIS

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.

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[6] ALCAM Level Crossing Management System (LXM)
[7] Office of the National Rail Safety Regulator· Classifying Notifiable Occurrences· Occurrence Classification Guideline (OC-G1), Version 1.1, ONRSR· Adelaide· March 2013.
[8] Office of the National Rail Safety Regulator· Reporting Requirements for Notifiable Occurrences· Version 2.1, ONRSR, Adelaide, 2018.

APPENDIX B:
GLOSSARY

Ballast: is a stone or aggregate material spread on the ground for the purpose of holding the track in line laterally and longitudinally and also to provide drainage.

Buffer stop: is a structure erected across the end of a track at main line terminals or dead end sidings which is intended to stop rolling stock.

Fatality: a person who dies, within 30 days of a notifiable occurrence, from injuries sustained as a result of that occurrence.

Foul: in a position to obstruct rail traffic on an adjacent line or track.

Freight train: a train that is designed and used for carrying freight, such as coal and minerals, grain, fuel, livestock and containers, whether or not it is carrying freight at the time. It also refers to a train operated in conjunction with maintenance activities such as a ballast train.

Heavy rail passenger train (commercial): a passenger train, other than a tram or a tourist & heritage passenger train. See also **Train, Tram** and **Tourist & heritage passenger train.**

Level crossing: is an area where a road and railway meet at substantially the same level, whether or not there is a level crossing sign on the road at all or any of the entrances to the area, as defined in section 4 of the RSNL – see also **Railway crossing.**

Light rail passenger train (commercial): a passenger tram or light rail passenger vehicle, other than a tourist & heritage passenger train. See also **Train, Tram** and **Tourist & heritage passenger train.**

Minor injury: an injury other than a **serious injury,** sustained by a person as a result of a notifiable occurrence, that receives medical treatment. In general this will exclude injuries that only require first aid.

Near miss: is an occurrence where the driver of a moving train takes emergency action, or would have if there was sufficient time, to avoid impact with a person, vehicle or other obstruction and no collision occurred. Emergency action includes continuous audible warning and/or brake application.

Notifiable occurrence: as defined in section 4 of the RSNL is as an incident associated with railway operations:
> that has, or could have, caused significant property damage; serious injury; or death; or
> that is, or is of the class that is, prescribed by the national regulations to be a notifiable occurrence or class of notifiable occurrence;
> that does not include an incident, or class of incident, that is prescribed by the national regulations not to be a notifiable occurrence.

Passenger: a person travelling or intending to travel on a train. Such a person may be a member of the public or an off-duty railway employee that is (regardless of whether they hold a valid ticket or authority to travel):
> travelling, boarding or alighting from a train; or
> on railway premises (other than a railway station car park) before and after travel.
It does not refer to:
> a trespasser, a stowaway or a person travelling on the outside of a train or in a location on a train not authorised for passenger travel; or
> a railway driver or on-duty railway employee travelling to a place of work at the time of an occurrence.

Pedestrian crossing: railway crossing provided for the exclusive use of pedestrians who may be people travelling on foot, by bicycle (dismounted, where required) or by mobility aid (e.g. wheelchair, scooter).

Points: a set of points permit rail traffic to change from one track to another. Points are normally referred to as left or right hand denoting the turnout direction as viewed from the toe end.

Public: persons who are authorised to be in a designated area of the railway premise but are not there for travel by train. This may include:
> persons passing through a concourse or station, or bystanders;
> persons on a railway crossing, bridge or adjacent to railway premises affected by a notifiable occurrence; and
> emergency services personnel.

Rail corridor[9]: the area of land reserved for railway operations typically everywhere within 15 metres of the outermost rails or:
> the boundary fence where boundary fences are provided and are closer than 15 metres, or
> if the property boundary is less than 15 metres, the property boundary, or
> a permanent structure such as a fence, wall or level.

Rail infrastructure manager: defined in section 4 of the RSNL, is the person who has effective control and management of the rail infrastructure of a railway, whether or not the person:
> owns the rail infrastructure; or
> has a statutory or contractual right to use the rail infrastructure or to control, or provide, access to it.

Rail safety worker: an individual who has carried out, is carrying out, or is about to carry out, rail safety work as defined in section 8 of the RSNL.

Rail transport operator: rail infrastructure manager, rolling stock operator or both.

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[9] Some Operators may define the 'rail corridor' differently. For example, in WA the 'rail corridor' can be defined as 50 meters from the centre of the track.

Railway: guided system designed for the movement of rolling stock which has the capability to transport passengers, freight, or both on a railway track with a gauge of 600 millimetres or more. It also comprises of all associated infrastructure, sidings and rolling stock. Common types of railways include heavy and light railways, monorails and tramways – refer to section 4 of the RSNL for further examples. The RSNL does not apply to certain railways listed under section 7, including slipways, aerial cable operated systems and railways used only by a horse-drawn tram.

Railway crossing: defined under section 4 of the RSNL as a level crossing; or any area where a footpath or shared path crosses a railway at substantially the same level. A railway crossing may either be a pedestrian crossing or a road crossing. See also **Pedestrian crossing, Road crossing** and **Level Crossing.**

Railway operations: includes all activities related to the performance of a rail transport operator as defined in section 4 of the RSNL, namely:
> the construction of a railway, railway tracks and associated railway track structures;
> the construction of rolling stock;
> the management, commissioning, maintenance, repair, modification, installation, operation or decommissioning of rail infrastructure;
> the commissioning, use, modification, maintenance, repair or decommissioning of rolling stock;
> the operation or movement, or causing the operation or movement by any means of rolling stock on a railway (including for the purposes of construction or restoration of rail infrastructure);
> the movement, or causing the movement, of rolling stock for the purposes of operating a railway service; or
> the scheduling, control and monitoring of rolling stock being operated or moved on rail infrastructure.

Worker (railway worker): a person (whether full or part time) who works for or at the direction of a railway organisation and is not off duty. This includes a person who is:
> a permanent or temporary employee (including a trainee or apprentice;
> a contractor, (sub) contract worker or a person supplied by an employment agency; or
> a volunteer.
Work that may be undertaken by such a person includes:
> rail safety work (including as a shunter, a driver, a guard, a controller or signaller, station staff and the maintainer of rolling stock or rail infrastructure);
> work on the office and technical staff; and
> work on the infrastructure staff and freight centre staff.

Road crossing: railway crossing, where a railway line and road intersect permitting road users to travel through the area.

Road rail vehicle (RRV): vehicle which can operate under its own power, both on rail and road, and which can transition from one mode of operation to the other. Such a vehicle may or may not have the ability to travel on a public highway and may or may not be road registered.

Rolling stock: vehicle, whether or not self-propelled, that operates on or uses a railway including a locomotive, carriage or monorail vehicle. Refer to section 4 of the RSNL for more examples. It does not include a vehicle that is designed to operate on the track and road when it is on the road.

Running line: is a railway track used primarily for the through movement of trains, as defined in section 4 of the RSNL. Turnbacks or reversing tracks are considered to be part of the running line by ONRSR, unless specified as a siding by the railway infrastructure manager since their primary use is for terminating passenger trains and not usually for the long term stabling of trains.

Serious injury[10]: an injury requiring the person to have:
> Immediate treatment as an in-patient in a hospital; or
> Immediate treatment for:
  • Amputation of any part of his or her body; or
  • Serious head injury; or
  • Serious eye injury; or
  • Serious burn;
  • Separation of his or her skin from an underlying tissue such that tendons, bones or muscles or exposed (such as degloving or scalping); or
  • Spinal injury
  • Loss of a bodily function;
  • Serious lacerations;
> Medical treatment within 48 hours of exposure to a substance, such as chemicals, animal or human blood and airborne contaminates.

Shunting: movement of trains or rail vehicles for the purposes of marshalling or altering their consist.

Signal: a visual display device which conveys instructions or provides prior warning of instructions regarding the driver's authority to proceed.

Strike: For the purposes of this report a strike is a train or rolling stock colliding with a person.

Tourist and heritage passenger train: passenger train, including a tram, which is in service primarily for nostalgia, leisure and tourism purposes such as a heritage steam train.

Track: combination of rails, rail connectors, sleepers, ballast, points and crossings, or substitute devices, if used.

Track maintenance train: special type of train that is designed and used for track inspection and maintenance work.

Train: one or more units of rolling stock coupled together, at least one of which is a locomotive or other self-propelled unit that is designed to run on a railway, as defined in section 4 of the RSNL. Common types of trains are: passenger trains (urban, regional / non-urban and tourist & heritage), trams, freight trains, track maintenance trains, light locomotive(s), monorails and inclined railways.

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[10] Note this definition incorporates elements of section 36 of the Work Health and Safety Act 2011 (Cth).

Tram: type of passenger train that runs on light rail and is typically designed to travel short distances in an urban setting.

Trespasser: a person who is on a railway premise (including land and rolling stock) without the necessary permission or authority, whether intentionally or negligently. Trespassers on a railway premise include:
> persons who commit suspected suicides;
> stowaways and persons travelling on places not authorised for their use e.g.
  outside trains;
> persons who disobey warning signs or signals or stray away from the normal route of the
  railway crossing;
> persons who cross the track anywhere other than at an authorised crossing point (such
  as passengers or members of the public that use a recognised 'staff only' crossing at a
  station without authority);
> persons electrocuted while dangling or throwing objects from a position that is not on
  railway premises, onto overhead line equipment/conductor rails at bridges etc.;
> persons deliberately falling or jumping from a platform i.e. where not caused by illness,
  platform congestion or other incident; and
> persons carrying out illegal activities.
However, the following persons will not be considered trespassers on a railway premise:
> pedestrians crossing the road where tram tracks run within the road; and
> persons with the requisite authority to be on a railway premise.

safe railways for Australia