Australian Government
Australian Transport Safety Bureau

Collision between two road rail vehicles

Rinadeena, Tasmania | 4 June 2013

Investigation

ATSB Transport Safety Report
Rail Occurrence Investigation
RO-2013-014
Preliminary – 15 August 2013

Cover photo: ATSB

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office: 62 Northbourne Avenue Canberra, Australian Capital Territory 2601
Telephone: 1800 020 616, from overseas +61 2 6257 4150 (24 hours)
Accident and incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117, from overseas +61 2 6247 3117
Email: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

Addendum

Page	Change	Date

Safety summary

What happened

On 4 June 2013, track workers were preparing a road rail vehicle to travel to a worksite near Rinadeena Station on the West Coast Wilderness Railway, Tasmania, when the vehicle unexpectedly started to roll backwards down a 1:20 grade. The driver was unable to slow the vehicle, so he and the passenger jumped clear, sustaining minor injuries.

The now unmanned out-of-control vehicle continued to accelerate down the steep grade, heading towards a second road rail vehicle containing four track workers. Two passengers of the second vehicle jumped clear, sustaining minor injuries, but a third passenger and the driver were still inside when the unmanned road rail vehicle collided with theirs. The passenger sustained minor injuries but the driver was trapped and seriously injured in the collision. He was subsequently removed from the vehicle and air lifted to hospital. Both road rail vehicles were extensively damaged.

What the ATSB has found so far

The preliminary ATSB investigation has found that the vehicle's rear road-going tyres were lifted from the track during an inspection of the rear rail guidance wheels. As a result, the braking force provided by them was lost and the vehicle began to roll down the grade.

The investigation has also found that West Coast Wilderness Railway had not considered all of the risks associated with operating road rail vehicles on the steep railway.

What's been done as a result

Immediately after the incident, West Coast Wilderness Railway suspended all road rail operations and initiated a full review of its management of the safety of these vehicles. This has led to the development of updated procedures and training and a review of suitable on/off tracking points.

Safety message

All rail organisations operating road rail equipment should consider the advice in safety alert RISN Number 7/2012 *Risk associated with Hirail Operations* (issued by the Department of Infrastructure, Energy & Resources, Tasmania) and review their management of the risks associated with these operations.

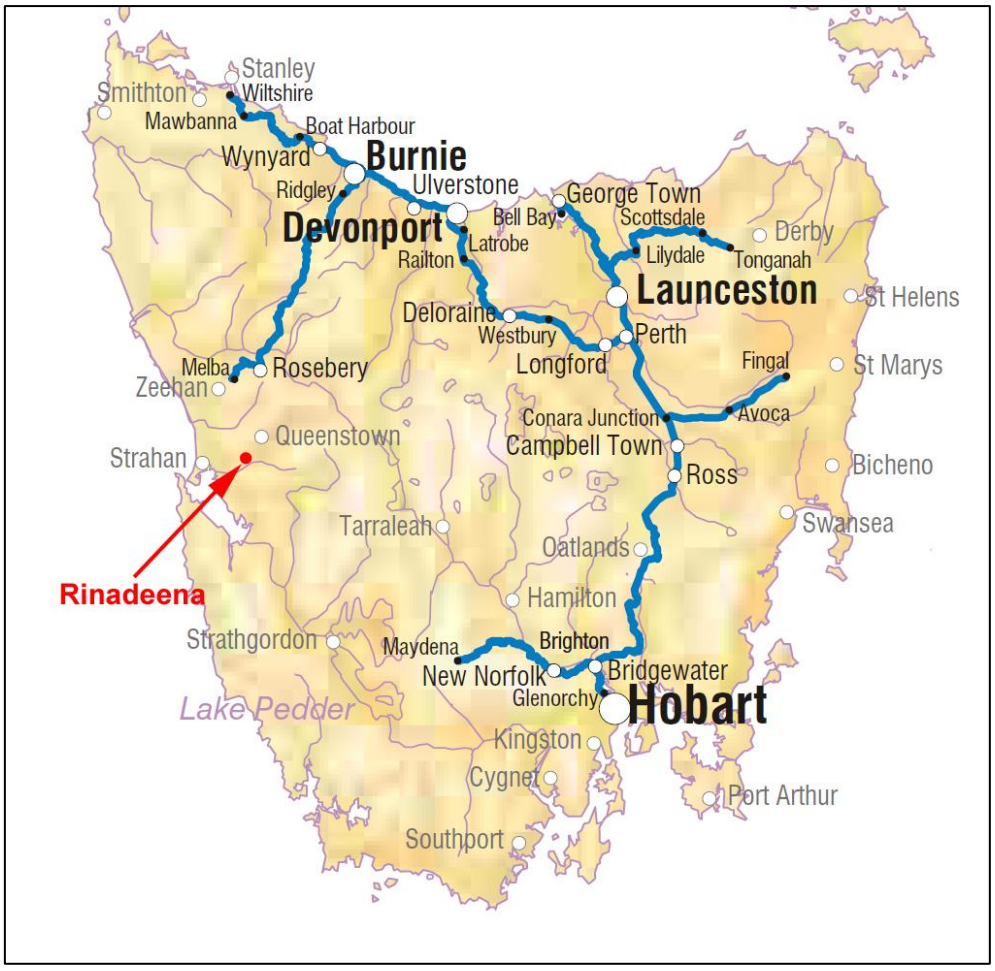
Contents

The occurrence

The information contained in this Preliminary report is derived from the initial investigation of the occurrence. Readers are cautioned that new evidence will become available as the investigation progresses that will enhance the ATSB's understanding of the accident as outlined in this Preliminary report.

On the morning of 4 June, the West Coast Wilderness Railway (WCWR) track maintenance gang held a toolbox meeting at their workshop (Carswell Park) in Queenstown, Tasmania, before heading off to their worksite just south of Rinadeena Station (Figure 1).

Figure 1: Location of Rinadeena

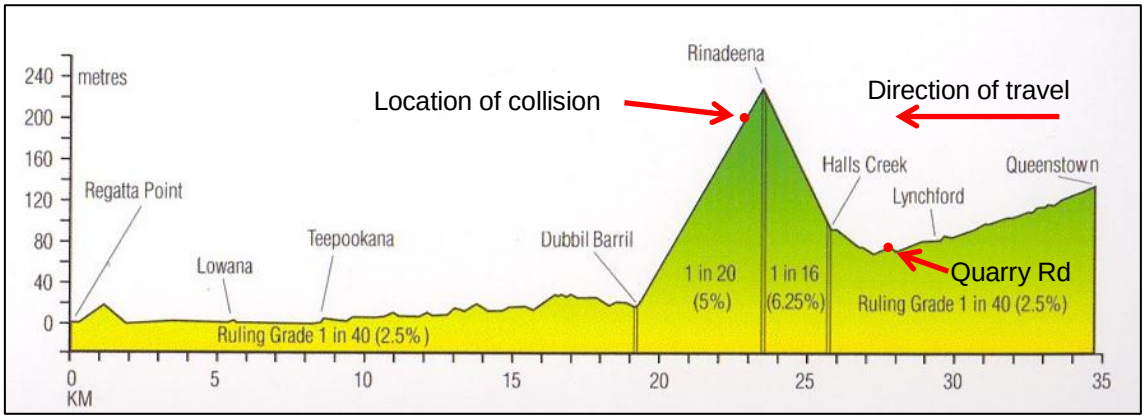


Source: Natmap

At about 1045, Hirail 1 (a Mazda dual-cab truck fitted with rail guidance equipment) with four track workers on board, and Hirail 3 (a Mitsubishi Canter dual-cab truck fitted with rail guidance equipment) with another four track workers on board, departed for the agreed on-track point at Quarry Road near Lynchford (Figure 2).

When Hirail 1 arrived at Quarry Road, it was put on track in a forward facing direction in preparation for the trip to Rinadeena. Before moving off, the driver called the crew in Hirail 3 using the in-cab very high frequency (VHF) radio to confirm their location. At the time, Hirail 3's crew were in the nearby yard picking up materials. Shortly afterwards, Hirail 3 was put on track in a forward facing direction to follow Hirail 1 to Rinadeena.

Figure 2: Railway grade chart showing the approximate location of the collision and Quarry Rd



Source: West Coast Wilderness Railway

When Hirail 1 arrived at the Rinadeena Station take-off point (Figure 3), it was off tracked, turned around and then on tracked again in readiness for reversing down the 1:20 grade to the worksite. The driver again called the crew in Hirail 3 via radio to confirm their location before moving off travelling in reverse at about 5 km/h. Hirail 3 was not far behind and as it arrived at Rinadeena Station the driver could see Hirail 1 disappear around the bend on the falling grade.

Figure 3: Rinadeena station access road and vehicle take-off point

Source: ATSB

Hirail 3 was then off tracked, turned around and then on tracked in reverse. The vehicle's handbrake was on, its rail guidance equipment was engaged on the track and it was ready to reverse down the steep grade following Hirail 1. At this time, one of the track workers commented to the works leader that the driver's side rear rail guidance wheel had been reported as noisy. It was his understanding that it had been fixed, but he suggested they check it anyway.

The two men got out of the vehicle to inspect the wheel. One of them then asked the driver to raise the rear rail guidance wheels so they could take a closer look. As the driver started to raise the wheels, the vehicle's rear road-going tyres were unloaded off the track. Hirail 3 then started to roll backwards down the grade with its rear road-going tyres skidding across the gravel surface of the take-off point as the vehicle picked up speed.

As Hirail 3 rolled away, its engine stalled. The driver frantically tried to re-start the engine while pushing on the brake pedal and pulling on the handbrake. However, when the driver applied the foot brake there was insufficient braking force being applied to the rail guidance wheels to control the vehicle's speed. The driver also tried without success to raise the front rail guidance wheels in an attempt to lower the front road wheels back onto the track to slow the vehicle.

Hirail 3 was out of control and gathering speed, so the driver told the remaining passenger to get out of the vehicle. The passenger then jumped clear from the driver's side. Seconds later, the driver realised that he could not control the vehicle and climbed across to the passenger side and jumped out. Hirail 3 was now unmanned, out-of-control and heading towards Hirail 1.

The track workers from Hirail 3 now had no way to warn the workers in Hirail 1 so one went to the nearby station building to attempt to use the radio located there. He first had to start the generator as the station was unmanned and had no permanent power. However, he was unable to get the radio to work.

At the same time, one of the other workers from Hirail 3 ran up the vehicle access road to gain higher ground and mobile phone reception. He then called the office, explained what had happened and requested help. One of the remaining two workers started to make his way down the grade following the vehicles.

Meanwhile, Hirail 1 was still railing backwards towards the worksite at about 5 km/h. Its occupants were unaware that the out-of-control and unmanned Hirail 3 was approaching them at speed.

Hirail 3 continued to gather speed as it rolled down the grade towards Hirail 1. Once it came into view of the track worker sitting in Hirail 1's front passenger seat, it was clear that the vehicle was out of control. Its speed was much higher than normal and its front passenger door was open.

Figure 4: Hirail 1 (foreground) and Hirail 3 (background) after the collision

Source: ATSB

The worker alerted the others to Hirail 3's rapid approach then jumped clear of Hirail 1, seeking refuge in the trackside drain. The worker sitting in the rear driver's side seat also jumped clear while the worker in the rear passenger side seat and driver remained in the vehicle. The driver then increased speed in reverse to try and out-run the approaching Hirail 3.

Hirail 3 continued on, passing the two workers who had jumped clear, before colliding with Hirail 1 and pushing it about 40 m along the track (Figure 4).

The worker in the rear of Hirail 1 was able to free himself and he attempted to use the vehicle's VHF radio to alert the WCWR office in Queenstown to the incident. After determining the radio was not operational, he made his way into Hirail 3 and, at about 1130, used its radio to contact the Queenstown office to raise the alarm.

The two occupants who had jumped clear of Hirail 1 made their way to the vehicle and began assessing the situation and rendering assistance to the driver who had been trapped and seriously injured as a result of the collision. Soon afterwards, the first of the occupants from Hirail 3 arrived at the crash scene. He advised the workers from Hirail 1 that the others were attempting to get assistance.

After the initial contact by radio and mobile phone to the Queenstown WCWR office, two personnel were dispatched to the Rinadeena Station Access Road to help coordinate communications between the field and the office and to assist emergency services in accessing the accident site.

Paramedics from Ambulance Tasmania were the first to arrive but they could not negotiate the access road in their vehicle. The Tasmanian Fire Service and the State Emergency Service arrived shortly after with an appropriate vehicle. All three emergency services proceeded down the access road to the Rinadeena station and then onto the accident site accompanied by a WCWR employee. Another WCWR employee remained at the access road entry point waiting for the police and further first aid supplies to arrive.

Once emergency personnel arrived at the scene, they treated the trapped driver and the other injured workers. Once the driver was stabilised, emergency crews began working to free him from the wreckage.

The police and first aid supplies arrived shortly after and they were taken down the access road to the station and then onto the accident site. The police then took control of the site and began their initial enquires.

Shortly after 1330, the trapped driver was removed from the wreckage and treated at the scene. At 1421 he was taken to Strahan by ambulance to be air lifted to Hobart Hospital for further treatment.

Context

West Coast Wilderness Railway

The West Coast Wilderness Railway (WCWR) is a heritage passenger railway. It is a reconstruction of the disused Mount Lyell Mining and Railway Company Abt[1] Railway that was built in the 1890's to transport copper from the company's Queenstown mine to the port of Strahan on the west coast of Tasmania. The narrow gauge[2] track, which still employs the Abt rack and pinion system, is about 35 km in length and traverses steep gradients of up to 1:16.

The steam powered locomotives used on the railway have an independent pinion drive which engages in a rack that is installed centrally between the tracks on the steep grades (Figure 5). This system provides the locomotives with improved traction when negotiating the steep grades.

Figure 5: The Abt rack

Source: ATSB

Current operations

Passenger services on the WCWR ceased at the end of April 2013 after the previous rail operator surrendered its lease to the Tasmanian Government.

At the time of this incident, none of the stations were manned and the track was undergoing restoration works in anticipation of a new lease being awarded and operations resuming sometime around November 2013.

WCWR Road rail vehicles

The road rail vehicles used on the WCWR are designed to drive on rail using front and rear sets of rail guidance wheels which can be lowered when the vehicle is positioned on the track. With the rail guidance wheels lowered onto the rails, the rear road wheels remain in contact with the track to provide the vehicle with motive power. The front road going wheels are raised clear of the track entirely. The rail guidance wheels are fitted with brakes and the rear road going wheels perform as

---

1 The Abt rack and pinion drive system was developed by Swiss locomotive engineer Roman Abt in 1882.

2 Track gauge of 1067mm.

they would normally, providing some braking effort and engine braking. There is no connection between the road rail vehicle and the rack.

The road rail vehicles that were involved in the incident were a 1995 Mazda T4600 known as ‘Hirail 1’ and a 2009 Mitsubishi Fuso Canter tip truck known as ‘Hirail 3’ (Figure 6). The front ofHirail 1’s rail guidance wheels were hydraulically braked through the operation of the vehicle’s brake pedal. All four of Hirail 3’s rail guidance wheels were electrically braked via a controller that received an input signal from the tail light switch on the brake pedal.

Figure 6: Hirail 3 with rail guidance wheels lowered

Source: Harrybilt Engineering & Welding Services, Ballarat, Victoria.

Safety analysis

Risk assessment

Preliminary analysis of the occurrence shows that the road rail vehicles (Hirail 1 and Hirail 3) were on and off railed as usual at Rinadeena, at the start of the 1:20 grade down to Dubbil Barril (Figure 4). Hence, the vehicles were exposed to the risk of roll-away when they lost either braking force or traction.

The risks associated with railing road rail vehicles on an incline, and the associated possibility of a roll-away, had not been identified by West Coast Wilderness Railway (WCWR). As a result, there were no procedures that outlined how, or where, the vehicles should be safely on or off railed.

Furthermore, while the drivers of the vehicles had road rail vehicle accreditation, they had not received any operator specific training that reinforced the procedures and highlighted the risks associated with operating the road rail vehicles on the steep inclines of the railway.

On 6 June 2013, the Office of the National Rail Safety Regulator (ONRSR) issued a prohibition notice to West Coast Wilderness Railway advising them not to use any road rail vehicles on rail until the following actions had been taken:

- Conduct a comprehensive risk assessment of the operation of road rail vehicles on the West Coast Wilderness Railway. The assessment must consider (but not be limited to) the content of the Rail Industry Safety Notice No. 7/2012 issued by the Rail Safety Unit of the Department of Infrastructure Energy and Resources on 29 October 2012, and the safety alerts it references.
- Establish detailed and comprehensive documented procedures for the operation of each road rail vehicle on the West Coast Wilderness Railway.
- Review the content of the training provided to the operators of road rail vehicles and the criteria used in assessing their competence.
- Retrain and reassess all operators of road rail vehicles in any new or revised procedure for the operation of these vehicles.

Since the incident, the ATSB has been in regular contact with WCWR and, on 8 July 2013, they were advised that the ATSB's preliminary analysis had identified a safety issue associated with their assessment and treatment of the risks associated with the operation of the road rail vehicles. That safety issue, and the actions taken thus far by WCWR, are listed in the Safety issues and actions section of this report.

Findings

From the preliminary evidence available, the following findings are made with respect to the collision between two road rail vehicles near Rinadeena, Tasmania, on 4 June 2013. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

Safety issues, or system problems, are highlighted in bold to emphasise their importance. A safety issue is an event or condition that increases safety risk and (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operating environment at a specific point in time.

Contributing factors identified thus far

- **West Coast Wilderness Railway had not considered all of the risks associated with the operation of road rail vehicles on the steep railway. [Safety issue]**

Safety issues and actions

The safety issues identified during this investigation are listed in the Findings and Safety issues and actions sections of this report. The Australian Transport Safety Bureau (ATSB) expects that all safety issues identified by the investigation should be addressed by the relevant organisation. In addressing those issues, the ATSB prefers to encourage relevant organisation to proactively initiate safety action, rather than to issue formal safety recommendations or safety advisory notices.

Depending on the level of risk of the safety issue, the extent of corrective action taken by the relevant organisation, or the desirability of directing a broad safety message to the rail industry, the ATSB may issue safety recommendations or safety advisory notices as part of the final report.

Risk assessment

Number:	RO-2013-041-SI-01
Issue owner:	West Coast Wilderness Railway
Type of operation:	Rail – Road rail vehicles
Who it affects:	All owners and operators of road rail vehicles

Safety issue description:

West Coast Wilderness Railway had not considered all of the risks associated with the operation of road rail vehicles on the steep railway.

Proactive safety action taken by: West Coast Wilderness Railway

The West Coast Regional Railway has advised the ATSB that they have:

- Reviewed their risk register in relation to the operation of road rail vehicles.
- Reviewed ISMS manuals – systems, rolling stock and infrastructure for operation and training for road rail vehicles operations.
- Developed procedures (operations manual) governing the operation of road rail vehicles including on/off tracking and vehicle operation.
- Initiated a new training and assessment program for personnel customised around West Coast Wilderness Railway operations and procedures.
- Implemented a requirement for all West Coast Wilderness Railway operators to receive the new training and be reassessed in road rail vehicle operations on the network.
- Begun implementing a road rail vehicle procurement and selection program, procedure and vehicle compliance checklist.
- Reviewed rail conditions.
- Reviewed all road rail vehicle on/off tracking locations.
- Upgraded the VHF radio system
- Considered providing ‘Spot Track’ GPS based emergency contact system.

Action number: RO-2013-014-NSA-02

ATSB comment/action in response:

The ATSB will continue to monitor these and any further safety actions initiated to address this safety issue.

ATSB safety recommendation to: West Coast Wilderness Railway

Action number: RO-2013-014-SR-01

Action status: Monitor

The Australian Transport Safety Bureau recommends that West Coast Wildness Railway undertake further work to address the risks associated with railing road rail vehicles on an incline.

ATSB safety advisory notice to: All road rail vehicle operators

Action number: RO-2013-014-SAN-01

The Australian Transport Safety Bureau advises that all road rail vehicle operators should consider the risks associated with railing road rail vehicles on an incline and take action where considered appropriate.

Current status of the safety issue:

Issue status: Monitor

Justification: Ongoing

Ongoing investigation activities

The ATSB investigation is continuing and will focus on:

- The circumstances leading to the failure of the braking system on Hirail 3.
- The appropriateness of the design, construction, maintenance and acceptance/approval of the road rail vehicles.
- The risks associated with the operation of the road rail vehicles on the steep inclines of the West Coast Wilderness Railway and the effectiveness of the implemented risk mitigation strategies.
- The availability and use of communication equipment for workers at remote sites.
- The adequacy of training and competency for the operation of road rail vehicles.

General details

Occurrence details

Date and time:	4 June 2013 – 1130 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Collision	
Location:	Near Rinadeena, Tasmania	
	Latitude: 42° 9.565' S	Longitude: 145° 29.681' E

Hirail 1 details

Vehicle Make and model	1995 Mazda T4600 truck	
Rail Guidance System	Front wheels elevated type, rear wheels non elevated type. Front wheels braked by hydraulic control	
Type of operation:	Track maintenance	
Persons on board:	Driver – 1	Passengers – 3
Injuries:	Driver – 1	Passengers – 3
Damage:	Destroyed	

Hirail 3 details

Vehicle Make and model	Mitsubishi Fuso Canter 4.0 FE85	
Rail Guidance System	Front wheels elevated type, rear wheels non elevated type. All four wheels braked by electrical control	
Type of operation:	Track maintenance	
Persons on board:	Driver –1	Passengers – 3
Injuries:	Driver –1	Passengers – 1
Damage:	Substantial	

Sources and submissions

Sources of information

The sources of information during the investigation included:

- West Coast Wilderness Railway
- Office of the National Rail Safety Regulator
- Harrybilt Engineering & Welding Services, Ballarat, Victoria
- Department of Infrastructure, Energy & Resopurces, Tasmania
- Tasmania Police
- Ambulance Tasmania

References

- RISSB Glossary of Railway Terminology Version 1

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

Australian Transport Safety Bureau

24 Hours 1800 020 616
Web www.atsb.gov.au
Twitter @ATSBinfo
Email atsbinfo@atsb.gov.au

Investigation

ATSB Transport Safety Report
Rail Occurrence Investigation
Collision between two road rail vehicles
Rinadeena, Tasmania, 4 June 2013
RO-2013-014
Preliminary – 15 August 2013