



Office of the Chief Investigator
Transport and Marine Safety Investigations

**Rail Safety Investigation
Report No 2007 / 05**

Level Crossing Collision between
Yarra Valley Tourist Railway Trolley No PM16
and a Motor Vehicle at a Level Crossing
at TarraWarra Estate
12 April 2007



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THE CHIEF INVESTIGATOR

The Chief Investigator, Transport and Marine Safety Investigations is a statutory position established on 1 August 2006 under Part V of the *Transport Act 1983*.

The objective of the position is to improve public transport and marine safety by independently investigating public transport and marine safety matters.

The primary focus of an investigation is to determine what factors caused the incident, rather than apportion blame for the incident, and to identify issues that may require review, monitoring or further consideration. In conducting investigations, the Chief Investigator will apply the principles of 'just culture' and use a methodology based on systemic investigation models.

The Chief Investigator is required to report the results of investigations to the Minister for Public Transport and / or the Minister for Roads and Ports. However, before submitting the results of an investigation to the Minister, the Chief Investigator must consult in accordance with section 85A of the *Transport Act 1983*.

The Chief Investigator is not subject to the direction or control of the Minister(s) in performing or exercising his or her functions or powers, but the Minister may direct the Chief Investigator to investigate a public transport safety matter or a marine safety matter.

1. EXECUTIVE SUMMARY

At about 1115 on Thursday 12 April 2007, a Yarra Valley Tourist Railway motorised trolley operating the 1100 service from Healesville collided with a motor vehicle at the "Mirrors" level crossing on the TarraWarra Winery Estate near Healesville. The "Mirrors" crossing is an occupation crossing situated on a private access road and is not protected by any road signage.

The trolley service was crewed by a driver and carried seven passengers, including three children and one Yarra Valley Tourist Railway volunteer.

As a result of the impact the trolley was derailed but remained upright. A small fire which broke out in the trolley was quickly extinguished by the trolley driver.

There were no reported injuries to the occupants of either the trolley or motor vehicle.

The investigation has identified that visibility restrictions for both road and rail vehicles at this level crossing was a major factor in this incident occurring together with the lack of signage to identify the presence of the crossing to road users.

As a result of this incident the Yarra Valley Tourist Railway implemented operating restrictions for this crossing to mitigate further risk to the public and volunteers.

The investigation recommends that the Yarra Valley Tourist Railway review level crossing protection on the line between Healesville and Yarra Glen for adequacy and compliance to standards.

2. CIRCUMSTANCES

2.1 Background

Yarra Valley Tourist Railway (YVTR) operates on the former Victorian Railways line between Yarra Glen and Healesville under an Order-in-Council initially issued in 1991 then re-issued in 2003.

YVTR is an accredited Manager of Infrastructure and an operator of rolling-stock.

The railway operates on Sundays, public holidays and during school holidays from Wednesday to Sunday. Round trips depart Healesville Railway Station every hour from 1000 to 1600, weather permitting.

Operations of passenger trolleys were permitted between Healesville Railway Station and Tunnel Hill Block Point. The block point location is on the Yarra Glen side of the "Mirrors" crossing and about four rail kilometres from Healesville Station. Railway maintenance movements are permitted beyond this block point to Yarra Glen Railway Station.

YVTR managed train movements by using the Train Staff and Ticket safeworking system as detailed in the Tourist Railway Rules and General Instructions 1994. All movements were recorded in a Train Register book at Healesville Station.

A guard's 'statement of running'¹ was required and was completed by the trolley driver for both the previous trip and for the outbound 1100 trip.

Communications for trolley movements was via a dedicated mobile phone and drivers were responsible for ensuring this communication equipment was in their possession for each tour of duty.

2.2 The event

At about 1115 on Thursday 12 April 2007, YVTR motor trolley No PM16 carrying seven passengers and travelling towards Yarra Glen collided with a motor car at the "Mirrors" level crossing.

As a result of the collision the trolley was derailed but remained upright. When the motor vehicle collided with the motor trolley the impact caused an electrical fire on the trolley which was quickly extinguished by the trolley driver.

There were no reported injuries as a result of the collision.

¹ A guard's 'statement of running' records departure and arrival times for each trolley operation.

3. FACTUAL INFORMATION

3.1 Personnel

3.1.1 Trolley driver

The trolley was crewed by a driver only.

The driver had a valid Health Assessment with no restrictions. He was qualified and current in the YVTR safeworking system and in the operation of the vehicle. His last proficiency test was conducted on 26 June 2006.

A post incident breath test, conducted by police after the incident, was negative.

3.1.2 Road vehicle driver

The motor vehicle driver was a contractor at the TarraWarra homestead. He had been contracting at the homestead for about 20 years.

3.2 Vehicles involved

3.2.1 Rail

Motor trolley No PM16 was a two-axle passenger trolley with a carrying capacity of 15 adults. The vehicle was purpose-built for the railway and was based on a design utilised by the Victorian Railways for ganger's trolleys. Construction utilises square tubular frame and superstructure with steel sides and end panels, timber flooring and seats. The vehicle was not enclosed.

The vehicle was propelled by a Subaru four cylinder petrol motor mounted under floor with an automatic transmission driving both axles via chains. Braking was foot operated hydraulic discs on both axles. Trolley No PM16 was four metres long 1.8 metres wide with a tare weight of 950 kg and a gross maximum weight of 2200 kg.

Passenger accommodation is platform side access with forward and rear facing seating with no side doors, however safety chains are provided. A driver's compartment was provided at one end only. Lights and audible warning devices were fitted to both ends of the vehicle

YVTR procedures require annual independent external inspections and six monthly major servicing of the trolley. The last annual inspection was conducted in September 2006 with the last major service conducted and certified on 24 February 2007.

Trolley No PM16 was accredited for driver-only operation.

The rail trolley received minor damage.

3.2.2 Road

The road vehicle involved was a Mitsubishi Magna station wagon. The trolley impacted the right rear section of the car and damage was sustained to the rear right hand quarter panel, side glass, rear bumper and tail light assembly. The car was driveable after the collision.

3.3 Infrastructure

The level crossing was an occupation crossing² on a sealed road which provided access to the TarraWarra Estate homestead through a locked gate situated 30 metres prior to the crossing. The crossing was located about four rail kilometres east of the Healesville Railway Station. It was provided with two mirrors (hence its name) to allow visibility of the rail track for road users. At the time of the incident both mirrors were damaged to an extent that made them ineffective.

Road vehicles coming from the south (homestead) side of the crossing approached around a right-hand curve with visibility of the crossing and rail track restricted by embankments and vegetation. There were no line markings or signage to identify the crossing to motorists or warn of its existence.

For rail vehicles approaching the crossing from Healesville, a whistle board was located 221 metres prior to the crossing and a five mile per hour (eight km/h) speed restriction sign was located 85 metres before the crossing.

Rail traffic from Healesville approaches the crossing through a cutting on a descending gradient of 1:40 with visibility restricted by embankments and vegetation.

3.3.1 Standards for occupation crossings

Australian Standard 1742.7-2007, published in February 2007, sets down pavement markings and road signage requirements for level crossings. However, it states that the requirements of the standard are not applicable to occupation crossings therefore, there were no requirements for pavement markings or signage for road vehicles.

3.4 Interviews

3.4.1 Trolley driver

During his interview the trolley driver indicated that the standard pre-trip inspection and start-up checks were conducted and recorded for the day's operation. He said that he departed Healesville at 1100 and that the trip was uneventful until the incident. As he approached the "Mirrors" crossing he sounded the horn at the whistle board and twice after that prior to entering the crossing. He reported that the trolley was travelling at or under the five mile per hour speed restriction when it entered the crossing and he said that he looked both to his left and right for motor vehicles.

The trolley driver indicated that he did not sight the motor vehicle until immediately prior to the impact; he applied the emergency brake but was unable to avoid the

² An occupation crossing is an at-grade crossing providing access to private land for an occupier or other persons with the knowledge of the occupier of the land.

collision. He said that he felt the trolley being lifted in the air and carried sideways by the car until the trolley came to rest in a derailed state at an angle to the track. As a result of the collision a small fire broke out under the front of the trolley which he extinguished.

The driver reported that the trolley passengers were shaken but uninjured and that he assisted them to disembark the trolley. He said that after he contacted the officer in charge at the Healesville Station, the railway emergency response procedures were implemented and the passengers were transported back to Healesville by relief trolleys. Police attended the scene and conducted a preliminary breath test, the result of which was negative.

3.4.2 Trolley passengers

Passengers contacted confirmed that the trolley driver sounded the horn a few times approaching the crossing and that the speed of the trolley was extremely slow. They were aware of nearing the photo stop which was at the end of their trip. It was also confirmed that there were no injuries and that the Yarra Valley personnel assisted with egress from the trolley, extinguished a small electrical fire and that transportation back to Healesville was promptly provided.

3.4.3 Motorist

The motorist involved is a regular contractor at the estate and has been engaged by the estate in contract work over a period of about 20 years.

He said that he was proceeding from the homestead and did not hear or see the trolley approaching. He also indicated that he was not aware of the schedule or operations of the railway. This was the first time he had encountered a rail vehicle at the crossing.

3.4.4 Estate manager

When interviewed the estate manager indicated that all contractors are made aware of the presence of the railway on the access road and that rail traffic could be encountered at any time. Mirrors were installed in an endeavour to provide additional viewing at the crossing because of the limited sighting lines, however these had been vandalised by trespassers.



Figure 1 - View of post collision location of PM16



Figure 2 - Rail approach view of level crossing

3.5 Weather information

At the time of the incident it was clear and sunny.

3.6 YVTR Safety Management System

One of the risks identified by YVTR in their risk register, dated 4 March 2007, related to collisions with road vehicles at level crossings. YVTR reduced this risk to a level acceptable to them by applying a track speed restriction at the “Mirrors” level crossing.

Annual independent track inspections are required under the YVTR safety management system. The last inspection was conducted by an independent company on 7 October 2006 and the report stated that all level crossings had the required signage in place.

YVTR also requires track patrols to be undertaken and completed at least 30 minutes prior to the first scheduled service on each day of operation. A track patrol was conducted on 12 April 2007 and no issues were reported with the track.

4. ANALYSIS

4.1 Level crossing infrastructure

To mitigate the risk of a collision between road and rail vehicles at the “Mirrors” level crossing two steps were taken. The rail operator restricted the line speed over the crossing to eight km/h and the road owner erected two convex mirrors to assist a motorist to observe an approaching trolley. There was also a requirement for rail vehicles to sound their whistle approaching the crossing. However, it was difficult for motor vehicle drivers to hear the whistle, partly because of the topography through which the train travelled.

On this occasion, the mirrors had been vandalised and as a result they did not allow road vehicle drivers to clearly observe approaching trains. Also, despite the fact that the trolley driver complied with YVTR procedures and reduced speed approaching the crossing to eight km/h he was unable to stop his trolley prior to colliding with the rear quarter panel of the road vehicle.

While YVTR probably believed that they had adequately mitigated the chance of a collision at the crossing by introducing a speed restriction this incident showed that the restriction did not mitigate the chance of a collision but had an effect on the outcomes. The other mitigator at the crossing, (the two mirrors), had been rendered ineffective and had not been restored to a serviceable condition by the railway or property owner. Passenger operations were permitted to continue to operate over the crossing in this condition. As a result, the YVTR risk register was not effective in dealing with collisions at the “Mirrors” crossing.

This incident highlights the need for both rail operators and road owners to ensure that any mitigators put in place to prevent collisions are effective at the time of their installation and remain so while operations are being conducted.

AS 1742. 7 - 2007

Section 1.2 of this Standard states “The requirements of this Standard are not applicable to railway crossings provided for the exclusive use of the occupier of private land or by other people with the knowledge and agreement of the occupier (sometimes known as ‘occupation’ crossings).”

Exemption from the standard assumes that the use of an occupation crossing is controlled by the landowner and that those who use the crossing will seek the landowner’s approval before accessing the land. In effect the lack of a standard that requires level crossing protection potentially reduces the level of safety for both motorists and fare-paying passengers.

This raises the question as to why traffic control at occupation (private) crossings should be treated differently to public crossings especially on lines where passenger operations are conducted.

4.2 Motor trolley No PM16

The construction specifications for trolley PM16 were based on the Victorian Railways ganger's trolleys. This specification does not provide for occupant protection in the event of a vehicle roll-over.

5. CONCLUSIONS

5.1 Findings

1. The competency and medical status of the YVTR driver operating PM16 were both current.
2. Trolley PM16 had been certified and inspected in accordance with YVTR's safety management system.
3. Trolley drivers could not observe road vehicles approaching the "Mirrors" level crossing.
4. There were no pavement markings or signage to warn road users of their approach to the level crossing.
5. YVTR emergency response procedures were applied and adequate for the situation.

5.2 Contributing factors

1. The collision risk mitigation taken by the rail operator was inadequate.
2. The mirrors provided to allow visibility along the track for road users were ineffective due to them having been vandalised.
3. No action had been taken to ensure that the collision risk mitigation for road users (mirrors) had remained effective.

6. SAFETY ACTIONS

6.1 Safety actions taken since the event

1. YVTR prohibited passenger carrying trolley movements over the “Mirrors” crossing.
2. YVTR implemented amended operating procedures for maintenance trolley movements over the “Mirrors” crossing.
3. YVTR in conjunction with the TarraWarra Estate management has installed passive level crossing protection in accordance with AS1742-7 2007 at “Mirrors” crossing.

6.2 Recommended safety actions

RSA 2008005

That YVTR review all crossing protection on the Healesville to Yarra Glen section with respect to adequacy and compliance to standards.

RSA 2008006

That YVTR review their risk register in respect to the risk of trolley roll over in the event of a collision or derailment.

RSA 2008007

That the Victorian Railway Crossing Safety Steering Committee review level crossing protection applied at private / occupation crossings particularly in respect to lines where passenger services are operated.