Australian Government
Australian Transport Safety Bureau

Collision between a truck and passenger train 8205

Pettavel Road Level Crossing, Mount Moriac, Vic | 7 September 2013

Investigation

ATSB Transport Safety Report
Rail Occurrence Investigation
RO-2013-024
Final – 11 February 2014

This investigation was conducted under the *Transport Safety Investigation Act 2003* by the Chief Investigator, Transport Safety (Victoria) on behalf of the Australian Transport Safety Bureau in accordance with the Collaboration Agreement entered into on 18 January 2013.

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

Publishing information

Published by: Australian Transport Safety Bureau
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Addendum

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Safety summary

What happened

On 07 September 2013 at about 0925, V/Line passenger train 8205 travelling to Warrnambool, Victoria collided with a northbound road vehicle (rigid truck and dog trailer combination) at the Pettavel Road level crossing in Mount Moriac, located about 20 km west of Geelong. Vehicular traffic across the Pettavel Road level crossing was controlled by warning and Stop signs (passive controls).

Five passengers, the locomotive driver and a conductor sustained minor injuries in the collision. The truck driver was not physically injured.

The collision destroyed the road vehicle trailer and caused significant damage to the locomotive and approximately 75 m of track infrastructure.

What the ATSB found

The ATSB found that the driver of the truck did not come to a stop at the railway crossing Stop sign and proceeded into the level crossing and the path of the train. It is possible that the truck driver's attention to the driving task was compromised and he did not look for trains. It is also possible that the driver noticed the train and misjudged its speed, believing that he could get through the crossing before the arrival of the train.

When at the Stop sign south of the crossing—the direction the truck driver approached the crossing—there was adequate sighting to the east, the direction from which the train approached.

The investigation also found that location of the warning signage and the Railway Crossing Ahead sign on the approach to the level crossing was not in accordance with *Australian Standard AS 1742.7-2007, Manual of uniform traffic control devices, Part 7: Railway crossings*. These non-compliances with the standard were not contributory to this incident.

What's been done as a result

V/Line has made a submission to the Railway Crossing Project Delivery (RCPD) Committee[1] to consider the upgrade of the Pettavel Road level crossing from passive to active warning protection devices.

Surf Coast Shire Council has relocated the signage to comply with the requirements of the *Australian Standard AS 1742.7-2007, Manual of uniform traffic control devices, Part 7: Railway crossings*.

Safety message

Road vehicle drivers, especially of heavy vehicles, using railway level crossings equipped with passive controls need to be vigilant, observe road-warning signs, obey road rules and look out for trains.

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[1] Railway Crossing Project Delivery (RCPD) Committee is a sub-committee of the Victorian Railway Crossing Safety Steering Committee (VRCSSC) which consists of stakeholders responsible for Victoria's railway crossing upgrade program.

Contents

The occurrence

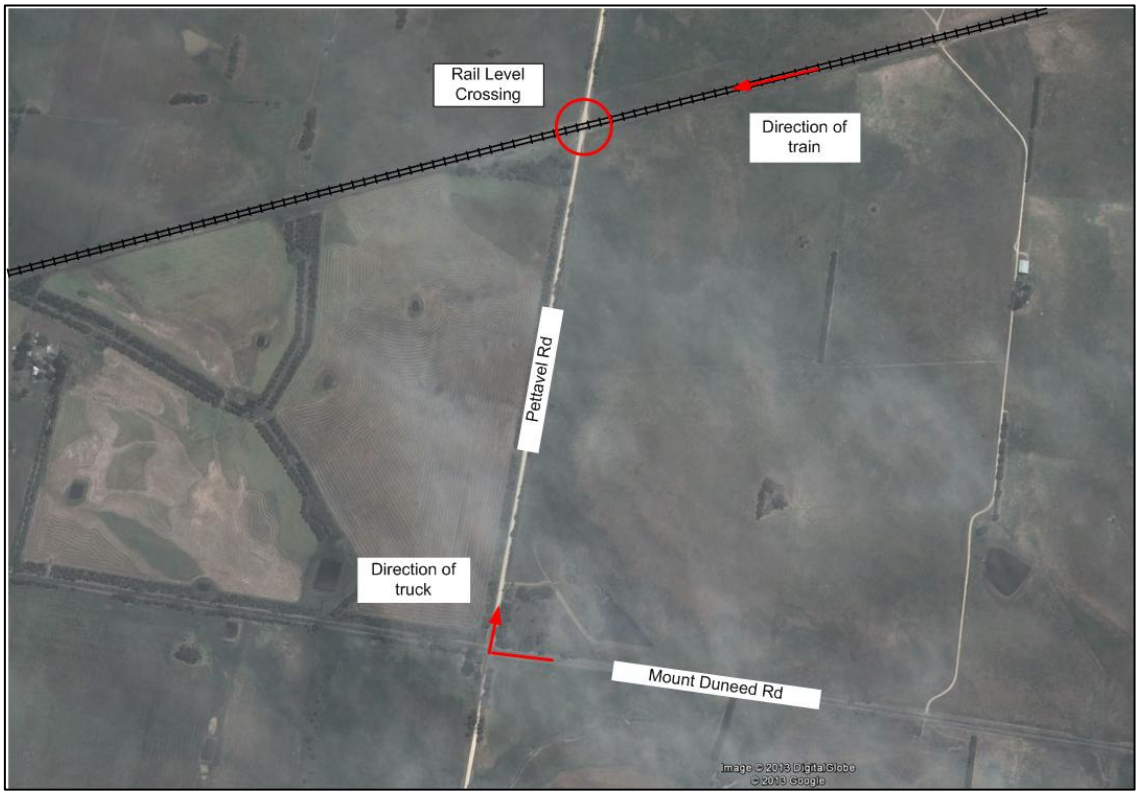
On 7 September 2013, a V/Line passenger train was operating the scheduled 0800 service 8205 from Melbourne to Warrnambool, Victoria. One driver operated the train from Melbourne to Geelong and another driver took over for the service from Geelong to Warrnambool. The driver who took control in Geelong at about 0900 reported that all safety checks and the testing of the brakes and whistle was conducted prior to departing Geelong at about 0918.

As train 8205 approached the Pettavel Road level crossing from the northeast, a rigid truck and dog trailer combination that was employed in transporting soil from a development site turned onto Pettavel Road from Mount Duneed Road (Figure 1). The truck had completed one trip through this level crossing that morning, and was on the second trip. The truck was loaded with about 10 m^3 of soil and the trailer was carrying about 12 m^3 of soil.

The incident truck was following another truck that was also employed in transporting soil from the development site. As the train approached the Pettavel Road level crossing, both trucks were observed approaching the level crossing at moderate speed.

When the train was about 615 m from the crossing the trucks were observed by the train driver who sounded the whistle for about 3 seconds. The train whistle was again sounded, this time for about 7 seconds, commencing 407 m (whistle board location) from the level crossing. The train driver considered that the trucks had not been alerted to the train so, when the train was about 230 m from the crossing, he made an emergency brake application. About 182 m from the crossing, he sounded the horn for a further 5 seconds and when the train was about 100 m from the crossing, he concluded that the trucks were not going to stop and braced for the collision. The leading truck was observed to go through the level crossing and the second truck followed. As the second truck proceeded through the crossing, the locomotive, which had decelerated to a speed of about 101 km/h, collided with the truck's dog trailer. The locomotive came to a stand about 315 m past the level crossing.

Figure 1 - Overview of truck and train 8205 approach to the Pettavel Road level crossing



Source: Image courtesy of Google maps

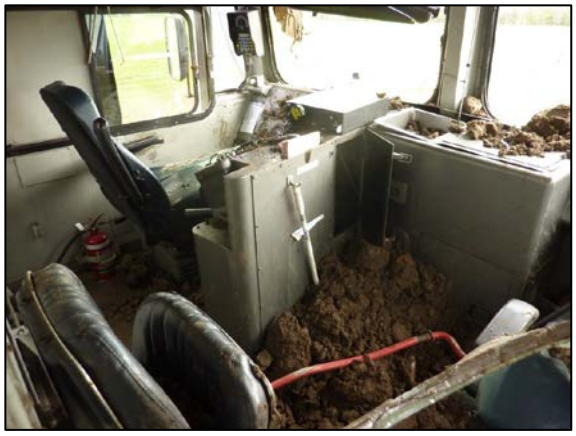
The train achieved a maximum speed of 112 km/h, which was within the permissible line speed of 115 km/h. The recorder indicated a rapid brake pipe pressure drop (emergency brake application) about 8 seconds before the collision. A minimum brake pipe pressure and maximum brake cylinder pressure was reached at about the same time as the collision.

Five passengers, the locomotive driver and a conductor sustained minor injuries in the collision. The truck driver was not physically injured.

The collision destroyed the road vehicle trailer, and caused significant damage to the locomotive (Figures 2 and 3) and approximately 75 m of track infrastructure.

Figure 2 - Damage to locomotive N458

Figure 3 - Damage to locomotive cab



Source: Chief Investigator, Transport Safety (Victoria)

Context

Location

Mount Moriac is located about 20 km west of Geelong, Western Victoria (Figure 4). The Pettavel Road level crossing is on the section of the V/Line broad-gauge regional network connecting Geelong and Warrnambool.

Figure 4: Location of Mount Moriac, Victoria

Source: Copyright Melway Publishing 2013. Reproduced from Melway Edition 41 with permission

Level crossing control

The Pettavel Road level crossing was equipped with passive controls.[2] The movement of vehicular traffic across the crossing was controlled by approach warning signage and Stop signs for each road approach. Road users were required to stop at the Stop sign and detect the approach of a train by direct observation.

Signage at level crossing

Australian Standard, Manual of uniform traffic control devices, Part 7: Railway crossings (*AS 1742.7 – 2007),* specifies the signage and sighting requirements for level crossings with passive controls.

Pettavel Road is an unsealed road with a speed limit of 100 km/h. Traffic controls installed on the approach from the south of the Pettavel Road level crossing (Figures 5 and 6) included a *Railway Crossing Ahead (W7-8)* sign located 174 m before the crossing and a *Stop Sign Ahead (W3-1)* sign as the second warning sign, located about 102 m in advance of the crossing. The location of the *Stop Sign Ahead (W3-1)* was not in compliance with the *AS 1742.7-2007* standard, which required its location to be between 180 and 250 m from the Stop sign. A *Railway Crossing Stop*

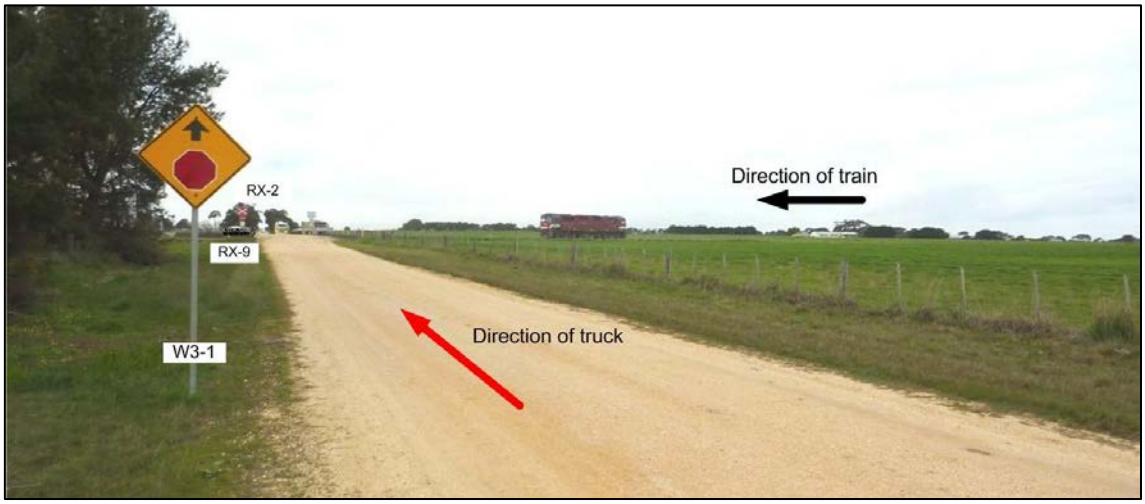
[2] Passive controls are where the control of the movement of vehicular traffic across a railway crossing is by signs and devices, none of which are activated during the passage of a train and rely on the road user detecting the approach of a train by direct observation.

Assembly (RX-2) and *Railway Crossing Width Marker Assembly (RX-9)* were also located in advance of the crossing.

Figure 5: Signage on approach to Pettavel Road level crossing from the south

Source: PASS Assets – Public Transport Victoria

Figure 6: Pettavel Road level crossing (approach from the south)



Source - Chief Investigator, Transport Safety (Victoria)

A further inconsistency with the S*tandard* was noted in that the *Railway Crossing Ahead* W7-8 (Figure 7) sign stipulated for passive crossings with GIVE WAY signs was installed, whereas the sign required for passive crossings with STOP signs is *Railway Crossing Ahead* sign W7-7 (Figure 8).

These non-conformities with the standard are not considered to have contributed to the collision.

Figure 7 – W7-8

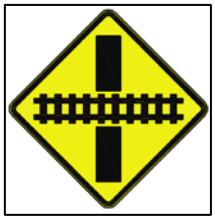


Figure 8 – W7-7

Sighting at level crossing

When approaching the level crossing from the south, there is clear sighting of trains to the east on the approach to the crossing and at the Stop sign (Figure 6 and 9).

Figure 9: Sighting from Pettavel Road level crossing Stop line to the east

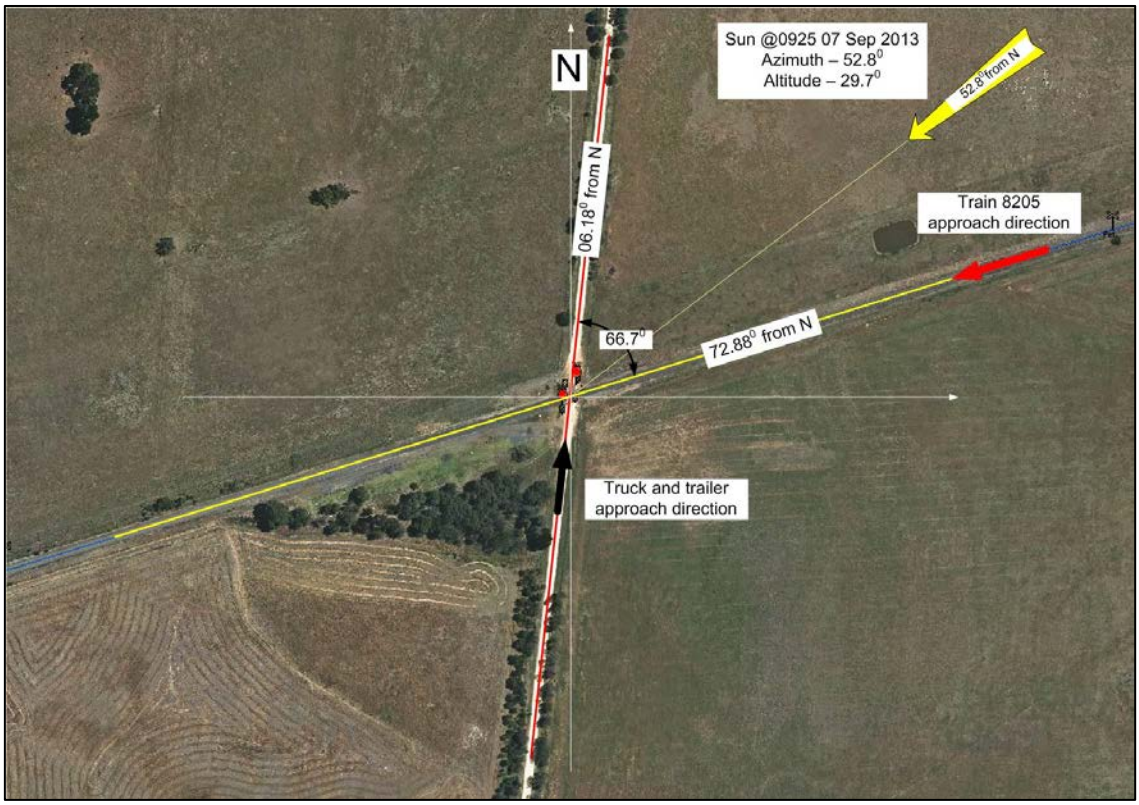
Source: Chief Investigator, Transport Safety (Victoria)

The directional alignment of Pettavel Road is approximately 6° east of north and forms an angle of 66.7° with the rail tracks (Figure 10). *AS 1742.7-2007* specifies maximum sighting angles to the left and right measured at the Stop sign to ensure that an approaching train can be sighted without excessive head movement by a vehicle driver or sight obstructed by parts of the vehicle itself. An assessment of the Pettavel Road level crossing's geometry revealed that the viewing angle to the east from the Stop sign south of the crossing (truck approach direction) was within the angle specified by the standard.

Environmental conditions

The incident occurred at about 0925, and at that time the sun's azimuth[3] was 52.8° at an altitude[4] of 29.7° (Figure 10). The weather was fine with clear visibility at the time of the incident. On-site observation established that sighting of the train was unlikely to have been affected by sun glare.

Figure 10: Overview of truck and train approach path to the Pettavel Road level crossing



Source: PASS Assets – Public Transport Victoria

Level crossing sighting/clearing distance

With respect to sighting distances, *AS 1742.7-2007* requires that the distance be sufficient for a road vehicle driver stopped at the Stop sign to be able to start off and clear the crossing before the arrival of a previously unseen train. The Standard has a formula for calculating the minimum sighting distance for a vehicle of maximum length allowed for this road (design vehicle)[5]. Using the formula and measurements obtained on site, the design vehicle when stopped at the Stop sign on the southern side of the Pettavel Road level crossing requires 552 m sighting distance to safely clear the track with a train approaching at 115 km/h (normal track speed). When the formula was applied to a vehicle with similar specifications to the accident vehicle, the sighting distance requirement was about 504 m.

From the Stop sign south of the Pettavel Road level crossing, and looking east, clear sighting is available well beyond 552 m (Figure 9) and therefore exceeded the minimum sighting requirements specified in the *AS 1742.7-2007*.

[3] Azimuth is the clockwise horizontal angle from true north to the sun.
[4] Altitude is the vertical angle from an ideal horizon to the sun.
[5] The minimum sighting distance calculation was based on a loaded semi-trailer, 19 m in length (maximum allowable for this road) and having an acceleration of 0.36 m/s².

Rail crossing interface coordination

The *Rail Safety Act 2006 (Vic)* requires that rail infrastructure managers and other relevant stakeholders, such as road managers, seek to enter into safety interface agreements (SIA) to enable cooperative management of risk at railway level crossings. For this location, the SIA was between the rail infrastructure manager, V/Line and the Surf Coast Shire Council as the road manager. SIAs require that the parties identify and assess risks and determine measures to manage those risks, so far as is reasonably practicable.

Train & crew

Train 8205 consisted of a locomotive hauling four passenger carriages and a power (generator) van.

The train driver was appropriately trained, qualified and certified as competent. Medical certification for the driver was valid and current. Drug and alcohol testing post incident returned negative results.

Neither the train handling nor the train's mechanical systems were considered factors in the collision.

Road vehicle and driver

The rigid truck and dog trailer combination was approximately 15 m in length. The 6.0 m trailer was connected to the truck by the 2.5 m drawbar.

The truck driver held a valid and current heavy vehicle licence. No alcohol was detected during post-incident preliminary breath tests conducted on the truck driver. There was no evidence of any mechanical defects that may have contributed to the accident.

The truck driver stated that when the first truck went through the level crossing, he stopped at the crossing and looked for trains. He reported that as he did not observe any trains, he proceeded through the crossing. When his truck was on the tracks he heard the train horn. He then looked to his right and noticed the train. He attempted to accelerate forward to clear the crossing, and then felt the impact of the train colliding with the trailer.

Witness accounts

Two train passengers who were seated in the left window seats of the passenger cars observed the approach of the trucks towards the level crossing. One passenger reported that he observed two trucks approach the level crossing and they did not slow down or come to a stop at the railway crossing. He observed the first truck go through the level crossing and then felt the impact when the train collided with the trailer of the second truck. The second passenger stated that she saw a truck approach the crossing from the left. She stated that she lost sight of it and fell off her seat when the train collided with the truck.

Other occurrences

On average, of the 100 level crossing incidents that occur annually in Australia; 37 result in fatalities. In 2002, the ATSB reviewed information on 87 fatal level crossing accidents and found that in 66 percent of these accidents, the road vehicle was impacted by the front of the train, and over 80 percent occurred in daylight during fine weather conditions. The review also found that unintended road user error accounted for 46 percent of these fatal events.[6]

[6] Australian Transport Council, *National Railway Level Crossing Safety Strategy 2010-2020*.

Safety analysis

Driver behaviour and situational factors

Interview and witness statements indicate that it is probable that on approach to the level crossing on Pettavel Road, neither truck came to a stop at the Stop sign, but rather, both trucks continued towards and through the level crossing without any observable reduction in speed. The first truck cleared the level crossing before the train arrived; however, the second truck was unable to traverse the crossing before the arrival of the train, resulting in a collision.

Driver compliance with passive level crossings

Driving simulator studies have found that of three levels of traffic control devices installed at level crossings in Australia, a passively protected level crossing (Stop signs only), elicited the least driver compliance, with between 26 and 40 percent of participants making violations at the Stop sign controlled level crossing.[7] [8] [9] Similar issues have been identified in field observational research, where compliance with Stop sign protected level crossings has been measured at 41 percent, compared to 70-77 percent compliance with crossings with active controls (flashing lights and boom barriers respectively).[10]

When these non-compliance issues are considered in combination with research indicating that humans lack the ability to accurately judge the speed and distance of an oncoming train,[11] it is clear that the interface of rail and road at passively controlled level crossings poses a significant safety risk.

Human information processing is limited in that each person has finite cognitive resources available to attend to information or perform tasks during any particular time period. In general, if a person is focussing on one particular task, then their performance on other tasks will be degraded.[12] In the context of a truck driver approaching a passively protected level crossing, the extent of performance degradation may depend on factors such as:

- the extent to which the train is conspicuous or easy to observe/hear
- the expectation of the presence of a train
- the truck driver's focus of attention at that point in time and the existence of any distractions
- task competence including factors such as driving experience and history of any driving violations / errors
- the influence of other factors such as fatigue, drugs, alcohol or a medical condition.

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7 Tey, L-S., Ferreira, L. & Wallace, A. (2011). Measuring driver responses at level crossings. *Accident Analysis and Prevention, 43,* 2134-2141.

8 Rudin-Brown, C.M., Lenne, M.G., Edquist, J., & Navarro, J. (2012). Effectiveness of traffic light vs boom barrier controls at road-rail level crossings. *Accident Analysis and Prevention, 45,* 187-194.

9 Lenne, M.G., Rudin-Brown, C.M., Navarro, J., Edquist, J., Trotter, M. & Tomasevic, N. (2011). Driver behaviour at rail level crossings: Responses to flashing lights, traffic signals and Stop signs in simulated rural driving. *Applied Ergonomics, 42,* 548-554.

10 Tey, Ferreira, & Wallace (2011).

11 Cooper, D.L. & Ragland, D.R. (2008). Addressing inappropriate driver behaviour at rail-highway crossings. *Safe Transportation Research and Education Centre, Institute of Transportation Studies:* UC Berkley. http://escholarship.org/uc/item/8kg5r9w3

12 Kahneman, D. (2011). *Thinking Fast and Slow*. Farrar, Straus & Giroux: New York.

Conspicuity

There are two key visual conspicuity factors which can affect this judgement, glare and contrast.[13]

The collision occurred at 0925, approximately 3 hours after sunrise. It was established that the truck driver's view of the approaching train was unlikely to have been adversely affected by glare caused by low sun.

The locomotive was red and yellow in colour, suggesting a good contrast against the sky and surrounding vegetation, and it had both the ditch and headlights operating to enhance conspicuity. Vision of the rail line to the east from the southern approach on Pettavel Road was unobstructed by vegetation, terrain or infrastructure, and the rail line continued in a straight line for over a kilometre providing good sighting opportunity for traffic approaching the level crossing from the south, as was the case in this incident.

It was concluded that the truck driver's vision of the train was unlikely to have been impeded by glare or contrast issues, and was unobstructed by vegetation or the profile of the rail line. Further, while his vision ahead was compromised by the dust being generated by the truck ahead, the driver's vision of the rail line appears to have been clear.

Train horn audibility

The train horn was sounded multiple times before the train approached the level crossing. Detectability of a train horn by a truck driver is subject to a number of influencing factors, including the acoustic properties of the horn, other noise or noise buffering properties in the listening environment, such as terrain, vegetation, road surface noise, engine and/or fan and other ancillary device noise, as well as the sound insulation properties of the vehicle.[14] [15]

On this occasion, the truck's windows were approximately half open. There was no music or radio on in the truck cab on approach to the level crossing. Despite the train driver sounding the horn multiple times on approach to the level crossing, the truck driver recalled hearing the horn sound for the first time as his truck was proceeding across the rail line.

A National Transportation Safety Board (NTSB) study[16] reported that the sound of a train horn is effective as a warning only if the road vehicle driver recognises it as a train horn, and that this recognition is affected by the vehicle interior noise levels, exterior traffic noise, the sound characteristics of the train horn, vehicle driver expectations, and 'insertion loss'.[17]

The NTSB report concludes that *'…*it is difficult for a [road vehicle] driver to detect the presence of a train by its audible warning only and still have sufficient time to react to its presence'.

Expectancy

Being unfamiliar with the area, and having traversed the Pettavel Road level crossing only one time before the collision, it is unlikely that the driver had developed an expectation that he would not encounter a train. The influence of an expectancy bias is therefore not considered to have contributed to the collision.

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13 Gray, R. & Regan, D. (2007). Glare susceptibility test results correlate with temporal safety margin when executing turns across approaching vehicles in simulated low-sun conditions. *Ophthalmic & Physiological Optics, 27*, 440-450.

14 Dolan, T. G. & Rainey, J.E. (2005). Audibility of Train Horns in Passenger Vehicles. *Human Factors, 47 (3),* 613-629.

15 National Transportation Safety Board (1998). *Safety at Passive Grade Crossings, Volume 1 Analysis*: *Safety Study NTSB/SS-98-02:* Washington DC.

16 National Transportation Safety Board (1998), *Safety at passive grade crossing; Volume1: Analysis*. Safety Study NTSB/SS-98/02.

17 *Insertion loss* is the difference between the measured values of a sound from an exterior sound source taken outside the highway vehicle and from inside the vehicle.

Driver attention and distraction

Cognitive workload

Interview evidence established that while the driver was unfamiliar with the local area, he was familiar with the operation of the vehicle was accustomed to negotiating passive level crossings from previous roles, and was familiar with his employer and the tasks required of him. There was no compelling evidence to suggest that the driver's cognitive workload impeded the performance of his driving tasks.

Driver distraction

Distraction can be understood as a type of inattention, where a person's attention is diverted by a particular event or object. Potential sources of distraction for the truck driver included his hands free mobile phone, two-way radio, and the GPS system in the cab. There was no evidence to indicate that the driver was operating or otherwise attending to any of this equipment on the approach to the level crossing.

Attentional disengagement (mind wandering)

While driver distraction is widely acknowledged as impeding performance of driving tasks, it is important to recognise that people can also become unintentionally inattentive to driving tasks without the presence of a competing activity.[18] Attentional disengagement, or mind wandering, can be described as occurring when attention normally directed toward the primary task momentarily shifts away from the external environment, even though the individual continues to show well practiced automatic responding.[19] [20] Mind wandering or 'zoning out' can occur in situations where tasks are protracted, unvarying, familiar, repetitive or undemanding.[21] It is therefore possible that the driver's mind wandered and that his focus was not on the driving tasks and he did not observe the train until it was too late.

Go/no-go decisions

In making go/no-go decisions in driving, such as crossing a train line in front of an approaching train, the driver must make an estimate of the time to collision (time that is left until a collision occurs if both vehicles continue on the same course and at the same speed)[22] and the time required to execute the manoeuvre. If the time to execute the manoeuvre is judged to be sufficiently less than the time to collision, then the driver will perform the manoeuvre. Accurately judging the speed of an approaching train from a moving vehicle is a complex task that can result in drivers overestimating the time to collision and hence they perform manoeuvres with a reduced safety margin. It is possible that the truck driver noticed the approaching train, but misjudged the speed and believed that he could go through the crossing before the arrival of the train.

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18 Regan, M.A., Hallett, C., and Gordon, C.P. (2011). Driver distraction and driver inattention: Definition, relationship and taxonomy. *Accident Analysis and Prevention, 43,* 1771-1781.

19 Smallwood, J. & Schooler, J.W. (2006). The Restless Mind. *Psychological Bulletin, 132 (6),* 946-958.

20 Cheyne, J.A., Soman, G.J.F., Carriere, J.S.A., and Smilek, D. (2008). Anatomy of an error: A bidirectional state model of task engagement/disengagement and attention-related errors. *Cognition, 111,* 98-113.

21 Cheyne, Soman, Carriere and Smilek, (2008).

22 Vogel, K. (2003). A comparison of headway and time to collision as safety indicators. *Accident Analysis and Prevention,35,* 427-433.

Fatigue

In the context of human performance, fatigue is a physical and psychological condition which can arise from a number of different sources, including time on task, time awake, acute and chronic sleep debt, and circadian disruption (disruption to normal 24-hour cycle of body functioning). A review of fatigue research notes that fatigue can have a range of influences on performance, such as decreased short-term memory, slowed reaction time, decreased work efficiency, reduced motivational drive, increased variability in work performance, and increased errors of omission.[23]

Interview evidence indicated that the truck driver had obtained adequate sleep on the night prior to the morning of the collision, and was feeling refreshed and alert. There was no indication that the effects of fatigue were present either leading up to or at the time of the collision.

Signage on approach to level crossing

On the southern approach to the level crossing, the *Stop Sign Ahead (W3-1)* was located about 97 m from the Stop sign. *AS 1742.7-2007* standard requires it to be located between 180-250 m from the Stop sign for 100 km/h speed-limited roads. Although the shorter distance to the crossing reduces the warning time available to road vehicle drivers, having traversed this level crossing one time before the collision, the truck driver acknowledged observing the signage and was aware of the requirement to stop and look for trains. These non-compliances with the standard were not contributory to this incident.

[23] Battelle Memorial Institute (1998). *An Overview of the scientific literature concerning fatigue, sleep, and the circadian cycle.* Report prepared for the Office of the Chief Scientific and Technical Advisor for Human Factors, US Federal Aviation Administration.

Findings

From the evidence available, the following findings are made with respect to the collision between a truck and V/Line passenger train 8205 at the Pettavel Road level crossing, Mount Moriac on 07 September 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

- The driver of the truck did not stop at the Stop sign of the level crossing and entered the crossing into the path of the approaching passenger train.

Other factors that increase risk

- **On the southern approach to the level crossing, the *Stop Sign Ahead (W3-1)* warning sign was not located in accordance with the requirements of *AS 1742.7-2007.* [Safety Issue].**

Other findings

- *Railway Crossing Ahead* W7-8 sign was installed in place of *Railway Crossing Ahead* W7-7.
- When approaching the crossing from the south there is adequate sighting to the east from the Stop sign.
- There were no reported deficiencies with the mechanical condition of the truck that may have contributed to the collision.
- There were no deficiencies identified with the mechanical condition of the passenger train that may have contributed to the collision.
- There was little effective action that the train crew could have taken to prevent the collision.

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(s). In addressing those issues, the ATSB prefers to encourage relevant organisation(s) 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.

Location of level crossing warning signage

Number:	RO-2013-024-S1-01
Issue owner:	Surf Coast Shire Council
Operation affected:	Rail - Other
Who it affects:	Users of Pettavel Road level crossing

Safety issue description:

On the southern approach to the level crossing, the *Stop Sign Ahead (W3-1)* warning sign was not located in accordance with the requirements of *AS 1742.7-2007* standard.

Response to safety issue: Surf Coast Shire Council.

The Surf Coast Shire Council has relocated the warning signage to comply with the requirements of the AS 1742.7-2007 standard.

Action number: RO-2013-024-NSA-028

ATSB comment:

The ATSB is satisfied that the action has been taken by Surf Coast Shire Council appropriately addresses this safety issue.

Current status of the safety issue:

Issue status: Adequately addressed.

Justification: Positioning of the warning sign in accordance with AS 1742.7-2007 should provide adequate warning to motorists of the upcoming level crossing.

Additional safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence

V/Line advised the ATSB that it has made a submission to the Railway Crossing Project Delivery (RCPD) Committee[24] to consider the upgrade of the Pettavel Road level crossing from passive to active warning protection devices.

[24] Railway Crossing Project Delivery (RCPD) Committee is a sub-committee of the Victorian Railway Crossing Safety Steering Committee (VRCSSC) which consists of stakeholders responsible for Victoria's railway crossing upgrade program.

General details

Occurrence details

Date and time:	07 September 2013 – 0925 EST	
Occurrence category:	Accident	
Primary occurrence type:	Level crossing collision	
Location:	Pettavel Road, Mount Moriac, Victoria	
	Latitude: 38° 13.79' S	Longitude: 144° 14.54' E

Train details

Train operator:	V/Line	
Service:	8205	
Type of operation:	Passenger train	
Persons on board:	Crew – 03	Passengers – 112
Injuries:	Crew – 02	Passengers – 05
Damage:	Minor	

Road vehicle details

Vehicle type:	Truck and dog trailer combination	
Registration:	Private	
Persons on board:	Driver - 1	
Injuries:	Driver – 0	Passengers – 0
Damage:	Significant	

Sources and submissions

Sources of information

The sources of information during the investigation included:

- V/Line Corporation
- VicTrack
- Victoria Police
- Surf Coast Shire Council.

References

Australian Government, Geoscience Australia.

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Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003*, the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the *Act* allows a person receiving a draft report to make submissions to the ATSB about the draft report.

Any submissions from those parties will be reviewed and where considered appropriate, the text of the draft report will be amended accordingly.

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 safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

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

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Investigation

ATSB Transport Safety Report

Rail Occurrence Investigation

Collision between a truck and passenger train 8205,
Pettavel Road Level Crossing, Mount Moriac, Vic, 7 September 2013

RO-2013-024
Final – 11 February 2014