

# **MOTORIST BEHAVIOUR AT RAILWAY LEVEL CROSSINGS: AN EXPLORATORY STUDY OF TRAIN DRIVER EXPERIENCE**

J. Davey, N. Ibrahim & A. Wallace  
Centre for Accident Research and Road Safety – Queensland  
Queensland University of Technology (QUT), Brisbane, Australia  
(Phone: +61 7 3864 4926, Fax: +61 7 3864 4640, Email: [n2.ibrahim@qut.edu.au](mailto:n2.ibrahim@qut.edu.au))

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## **ABSTRACT**

Railway level crossings are the interface between roads and train lines, and as such are the potential site for vehicle-train collisions and incidents. Of all road crash types, those between motor vehicles and trains are amongst the most severe. However, research into motorist safety at level crossings is currently very limited in Australia, despite 74 fatalities due to collisions between trains and motor vehicles at level crossings from 1997 to 2002. In Queensland, there were 230 reported crashes from 1997 to 2001. Train Drivers are first-hand witnesses to numerous incidents that occur between road users and trains at railway level crossings. This exploratory study utilised focus group discussions to investigate Train Driver experience of motorist behaviour at railway level crossings. Observed motorist behaviour, “near misses”, “incidents” and reporting issues were investigated. Analysis of focus group data was used to assist in the identification of high risk road user groups specific to the issue of railway level crossing safety, and associated high risk driving behaviours.

## **INTRODUCTION**

Collisions between vehicles and trains at railway crossings account for only a small percent of all road casualties, however these accidents are three times more likely to involve fatalities as compared to all other types of road crashes (Afxentis, 1994). It is approximated that there are around 100 crashes between a road vehicle and a train in Australia each year (Australian Transport Council, 2005). From 1997-2002, there were 74 deaths due to collisions between trains and motor vehicles at level crossings in Australia (Australian Transport Safety Bureau, 2003) and in Queensland alone, there were 230 crashes reported overall during the period 1997-2001 (Queensland Transport, 2002). Due to challenges in the reporting and national data management of “near miss” incidents, the characteristics and frequency of “near miss” incidents are unknown; anecdotally however, rail industry experts note that these incidents at railway level crossings are more numerous than reported.

Safety related to railway level crossings has continued to be of concern to road and rail authorities for many years and has been included as a major action area in the 2003-2004 Australian National Road Safety Action Plan (Australian Transport Council, 2000) and a supporting measure in the 2005-2006 plan (Australian Transport Council, 2005). A Commonwealth investigation of fatal crashes at railway level crossings has supported the notion that human fault is a high source of accidents (Australian Transport Safety Bureau, 2002). Based on an analysis of accidents spanning from 1988 to 1998, it was revealed that unlike other fatal road crashes, accidents at railway crossings were less likely to involve fatigue, speeding, drugs or alcohol. Instead these accidents were more likely to be attributed to errors in driver behaviour.

There are approximately 9400 public railway level crossings in Australia, of which 30% have active protection, 64% have passive protection and the remainder have other control or

protection (Ford, 2002). ‘Active’ crossings display a range of dynamic devices to alert motorists of upcoming danger and impose a requirement to stop in unsafe conditions such as flashing lights only or flashing lights, bells and boom barriers, which are activated through track circuitry operated by an approaching train. ‘Passive’ crossings have no dynamic devices to warn drivers of an approaching train and feature a static array of signs that remain constant. Accidents at active crossings are more common than accidents at passive crossings in Australia (Ford, 2002).

In a 2001 submission to the Staysafe Committee’s Joint Standing Committee on Road Safety’s Review of Railway Level Crossing Safety in New South Wales (NSW), the NSW Labor Council with the Rail, Tram and Bus Union NSW reported on ‘near-misses’ occurring on NSW level crossings utilising Train Drivers as key informants (Labor Council of New South Wales, 2001). The report stated that one of the most disturbing aspects of the report was “the ability of Train Drivers to detail the regularity at which ‘near misses’ occur each week” (Labor Council of New South Wales, 2001). Common incidents included breaches of stop signs, vehicles crossing tracks while flashing lights are active and vehicles attempting to “beat the train”. Issues with long/heavy trucks overhanging on rail crossings and breaching barriers were also common. The report also noted that motorists were uneducated about safe behaviour at railway level crossings and there seemed to be a willingness to take risks on approach and whilst presented with active warning systems (Labor Council of New South Wales, 2001).

It was beyond the scope of this study to fully investigate the effects of level crossing incidents on Train Drivers; however, it is important to recognise the experiential context of the Train Drivers when exploring the issues of incidents at level crossings. As part of the overall exploration of the issues, Train Drivers were asked to comment on the impact of accidents and incidents upon them; however this was not the main focus of the study. The objectives of the study were to explore Train Drivers’ experiences of:

- ‘Incidents’ and ‘near misses’ at level crossings: frequency, reporting, characteristics
- Motorist behaviour at level crossings
- Vehicle types involved in level crossing incidents
- Perceptions on motorist behaviour at level crossings
- The impact of level crossing incidents on Traincrew

## **METHOD**

### **Participants**

Seventeen Train Drivers/ Traincrew from an Australasian rail company participated in focus groups: eight from a metropolitan area and nine from two regional areas. All participants were male reflecting gender profile of this workforce. The mean years of industry experience for the metropolitan group was 24 years (range 1-34 years) and for the regional group, 23 years (range 5 months- 42 years). The majority of participants were Train Drivers (n=15), two participants were Train Guards<sup>1</sup>. In consideration of the sensitive nature of involvement in accidents and fatalities, participants were not asked directly if they had been involved in an accident but were encouraged to discuss their experiences. The majority of the drivers revealed they had experienced an ‘incident’ or fatality (including suicides) during their career with three drivers reporting they had experienced from over five fatalities to up to nine fatalities. All participants had experienced ‘near misses’ with road users at level crossings.

<sup>1</sup>Train guards are responsible for ensuring safe closing of the doors and signalling to the driver that the train is ready for departure. They act under the direction of the Train Driver during normal operations, and in the case of a major incident the guard will carry out directions given by the Train Driver.

## **Procedure**

A purposive sampling technique was utilised to recruit participants as this sampling strategy involves the choice of ‘information-rich cases that manifest the phenomena of interest intensely’ but not at the level of ‘extreme case’ sampling (Polit & Hungler, 1999). The goal of this strategy is to choose informants that have the ability to provide rich and strong examples of the phenomena. For these reasons the selection criteria of, “direct involvement in a level crossing accident” was not used and all company Train Drivers from the metropolitan area and the selected regional area were chosen as the participant pool. Participants were then recruited through self-selection. Following approval from the rail company and Traincrew union representatives, participants were invited by their Traincrew Managers to take part in a focus group to discuss their experiences and opinions about motorist behaviour at level crossings. Participants were informed that participation was purely voluntary and that their responses would remain anonymous through de-identification of any collected data.

As this was an exploratory study, focus groups were employed for data collection, to explore the experiences of Train Drivers. After consulting with industry stakeholders and piloting of the focus group’s questions and moderators’ guide, two focus groups were conducted with Train Drivers from an Australasian rail company. The first session was conducted in a provincial city with Train Drivers from regional and freight services areas and the second with Train Drivers from the metropolitan area. Both focus groups were conducted on the rail company premises in a private meeting room and were moderated by two facilitators. During the sessions an inductive approach was used, which allowed the facilitators to be flexible in exploring issues and themes as they arose. Each session took approximately one and a half hours to complete. The sessions were taped with permission of the participants and transcribed afterwards at the research office. Notes taken by the facilitators during the sessions were included in the transcribed data. All data was de-identified on transcription to protect the identity of the participants. The data was then analysed through a qualitative thematic analysis process. Information sheets were provided to the participants by the Traincrew Managers prior to the focus group and posters advertising the sessions were placed on noticeboards in the Traincrew staff areas. Consent forms were signed by participants at the beginning of the focus group. The 24 hour contact details of the rail company’s employee counselling service were listed on the information sheets.

## **RESULTS**

The results are presented in five sections, divided on the basis of the topic areas and themes identified from the data. General background data for the sample regarding their position and involvement in accidents at level crossings and fatalities (as reported by the participants) are also presented. The data has been de-identified and all reported names are pseudonyms.

### **Background data**

While the majority of participants were Train Drivers (n=15), two participants were Train Guards who had experience in other areas of the rail industry including shunting and station positions. Many of the Train Drivers had entered into this position after moving through the ranks of “cleaner” to “fireman” to driver”. All participants had experienced ‘near misses’ with road users at level crossings and the majority of the drivers revealed they had experienced an ‘incident’ or fatality (including suicides) during their career with most drivers commenting they had been involved in “a few” fatal incidents. Three drivers reported experiencing an alarming number of fatalities from over five to up to nine. Comments were made by two of these drivers that on “*the next one*” they will leave their position as a Train Driver due to the impact of these incidents.

## Definitions

The opening topic of the sessions focused on defining the terms 'near miss' and 'incident' by the Train Drivers themselves. While comments were given explaining these terms, one of the clearest themes to emerge was the lack of clear definition of the term 'near miss'. On the surface it seemed quite clear that, "*an incident is when you actually hit... the car or hit a truck, whatever*" and that a 'near miss' is "*when the train nearly hit a vehicle*". Further comments however revealed that: there are many defining characteristics of a 'near miss'; its definition relies on a number of subjective factors and that due to lack of definition, there are blurred boundaries between 'incidents' and 'near misses' or "*close calls*".

The most defining characteristic of a 'near miss' included whether there was physical impact with the train or not. Participants classification of a situation as a 'near miss' was actually based on the individual Train Drivers perception and subjective assessment and it is important to note that this differs between drivers. Comments were made that, "*what might be a near miss for me, may not be a near miss for Joe*", and "*everybody's made differently...what could upset Harold, might not upset me*". The latter comment reflected the general emphasis on the subjective nature of defining and even reporting of 'near misses'. The terms "*upset*", "*worried*" and "*care*" were often used with acknowledgement of the effects on Train Drivers including comments such as, "*that wrecked him; that really wrecked him*".

Subjective factors influencing their definition included the perception of the Train Driver of whether impact was "*likely*". This could be based on judgements of the speed of the train and the road user, and the distance of the road user from the train as in the following narrative:

*I had a near miss about 3 days ago... I was only going about 20 k/hr... The car pulled up, there was plenty vision on the left hand side there was blocked vision on the right hand side with trees and houses...we got about probably fifty feet from the crossing and a motorbike went straight through it. I mean we were only doing 25 but ... didn't seem to bother the bloke on the motorbike he just give us a wave and kept on going. (Regional area)*

Definitions could also be made on predictive perceptions of the road user's behaviour, "*a near miss is when they look like they're not going to stop and they're arsing about and they do stop*".

Differences of definition between the Train Driver groups of coal and freight were also noted, with one participant (Freight Train Driver) saying, "*I think there's a bit of a variance... between the coal boys and the freight guys because what they call a near miss and what freight guys call a near miss might be two different things...we deal with faster trains.*" There were no obvious differences noted between the regional and metropolitan groups. Comments about the difficulties of differentiating between a 'near miss' and an 'incident' were related to near misses that were "*too close*"; where even after emergency braking a collision is avoided by "*a couple of inches*". It was felt these "*could be classed as an incident*".

## Frequency and reporting

The regional group reported a high frequency of 'near misses', with comments that these could be reported on every shift. It was also noted that there was no pattern, "*you just never know when its gonna happen*", and there were sometimes high and low numbers of incidences. It also depended on location, with some regional areas experiencing higher numbers due to the location of train lines. The metropolitan group generally agreed that frequencies are unpredictable "*you may not come across a crossing incident for 2 months then*

*there's four, five in a row*", but that on what is a very large network with hundreds of Train Drivers it generally happens daily.

Most participants revealed that 'near misses' are not always reported. Some of the themes that were revealed from the discussion on reporting 'near misses' included difficulties from the lack of clear definition, issues of non-reporting which included personal feelings, work culture surrounding reporting and lack of perceived outcomes. The participants stated that 'near misses' are reported over the radio to network control and from there a daily incident report is produced. Not all drivers were aware of this report or had access to it.

Issues with the lack of clear definition meant that 'near misses' are reported dependant on the individual Train Drivers' perception of the situation, *"it depends on the driver (train)"*. High perceived risk of injury to the Train Driver was also mentioned as a reason for reporting, with comments some may be more likely to report truck 'near misses' because trucks are more likely to *"kill"* a Train Driver. Issues of non-reporting were influenced by personal feelings about the situation and included comments of, *"You don't want to dwell on it either, like you want to keep going"* and *"I've reported probably about 1/3 and the rest you just give up you don't even care about it"*. Workplace "norms" surrounding reporting and the process of reporting generally inhibited a culture of reporting, with one participant revealing,

*I've only been driving for a short period of time... In that period I've reported incidents and road crossings less and less, as the years progress. Because it's a peer pressure thing you know, on the radio everyone hears it again and things like that can come into play. But in the end you get so used to it, you say, "oh here's another one, oh well who cares about it. (Metropolitan Area)*

A similar reaction of reduced reporting was revealed in those who perceived there was no useful outcome to reporting. Some participants were not aware what 'near miss' data is used for or what the processes are for dissemination. Some felt not enough could actually be achieved with this data. Comments included, *"if we say that we've had near misses at this crossing...there's no way for them to improve it"*; *"there's no way to catch the offenders, even with the rego number"* and *"there's no feedback"* with reporting.

### **Motorist behaviours and vehicle types**

There were differences between the metropolitan and regional Train Driver groups in this topic area that can be attributed to the different types of crossings found in these areas. The metropolitan Train Drivers generally experienced motorist behaviour at active crossings with flashing lights and boom gates while the regional Train Drivers experienced behaviours at active crossings with boom gates, crossings with lights only and passive crossings with stationary signs.

In regards to motorist behaviour, the regional group participants noted that motorists not stopping or giving way at passively controlled crossings is continuing to be a major concern and that behaviours differ with location. Interaction with engineering devices was discussed and although it was agreed that generally people stop for the barriers, high risk motorist behaviours at active crossings included *"running"* the flashing lights and disobeying the boom barriers by driving around or straight through them. Other high risk behaviours included motorists attempting to beat the train across the crossing, *"speeding up"* at flashing lights, and general risk taking by younger drivers in particular. Participants spoke of motorist behaviour that they perceived were due to inattention such as, getting stuck under lowering boom gates and *"not seeing"* the train and subsequently driving into its path. Motorists not allowing enough time to cross in front of the train and hesitating or stop-starting at the crossing were

also noted to be at high risk. There was a general perception from these behaviours that motorists are unable to judge the speed and distance of an approaching train.

Mention was made of risk taking in motorcyclists and younger drivers, however the main cause of concern was trucks and heavy vehicles, as breaches by trucks at level crossings are common, and the potential crashes are likely to injure / kill the Train Driver and possibly derail the train. Heavy vehicles were noted to be slower to get across the crossing due to vehicle length. High risk behaviour in this road user group included not stopping at passive crossings, trying to beat the train across the crossing and going around or through boom gates.

In the metropolitan Train Driver group experiences of motorist behaviour at level crossings included: motorists driving around boom gates, getting stuck under boom gates, queuing over congested crossings and driving through the crossing after the red lights are flashing. The behaviour of motorists driving around boom gates was noted to happen quite regularly with one participant commenting it happens “*everyday...they reverse back and then drive around them*”. It was very common that motorists were seen driving through the crossing when the lights are flashing both before and after the booms were activated and some crossings were named as “*black spots*” where motorists repeatedly offend. Vehicles protruding into the path of the train and motorists entering congested crossings and then panicking and driving backwards into the boom gates were also mentioned.

For the metropolitan group, trucks were also mentioned, with the issue of getting stuck under the boom gates due to the overhang of the vehicle on the crossing. Comments were made that in some cases the boom gates have closed on the rear trailers of trucks without the truck driver even realising. Motorcyclists trying to beat the train were mentioned as high risk road user behaviour.

### **Perceptions on motorist behaviours**

There was agreement by the regional group that about 60% of ‘near misses’ are due to poor visibility with only 30-40% actually due to the motorist. Perceptions on why motorists enacted risky behaviours at crossings were a common theme throughout the discussion. These perceptions were generally based on the Train Drivers’ interpretation of the vehicle approach and reactions of the motorist. In the cabin of a train, Train Drivers are often able to see the vehicle on approach to the crossing and make predictive judgements about their behaviour. Common thoughts included, “*You see a car or truck... coming up the road...and you think is this bloke gonna stop or what?*”. On seeing the motorists in the vehicle, interpretations of frustration and impatience were made, such as:

*You can actually see the look on the motorist’s face...when you’re on a train, the boom gates come down and they are... ‘Aw the train’ they’re not real happy, especially when they are going to work.*

A thorough range of perceptions on why motorists enacted risky behaviours at crossings were given by the participants including those contributing factors that are attributable to the environmental rather than human factors. There was general agreement in the regional group that motorists’ behaviour was influenced by the motorists’ complacency, lack of knowledge and low perception of risk. Impatience by the motorist was a commonly recognised theme with comments that, “*being in hurry*”, time pressures, and anger and frustration with waiting for the train to pass, being noted by both groups of participants. For the regional Train Drivers, possible reasons for “*local motorist*” behaviours included: low expectations of coming across a train due to the infrequency of trains at crossings (and subsequent complacency) and knowledge of the waiting times when stopping for a train leading to “*beat*

*the train*” behaviours. This perception of motorists trying to “beat” the train, lights or boom gates “to save time” was a recurring theme with both groups.

The lack of enforcement of the road rules at crossings emerged as a strong theme, with participants noting that motorists “*know they won’t get caught*”. This was also suggested for the small amount of motorists that engage in high risk taking or “*thrill seeking*” behaviours. In the regional group, motorist inattention and distraction were common issues identified, with the concepts of motorists’ “*not seeing the train*” or “*not registering*” that they are at a crossing mentioned. Motorist knowledge was also thought to be a contributing factor to behaviour with comments that there is low knowledge of a train’s stopping distance, public misconceptions on the ability of the train to stop and the poor understanding of the meaning of warning lights. One Train Driver commented, “...*people say that to me, why don’t we stop for them?*”. Due to the high number of motorists that do not leave enough time to cross safely, it was also thought that motorists did not have the ability to judge the distance and speed of an approaching train. Tourists and those unfamiliar with regional areas were noted to drive “*straight through*” passive crossings without stopping.

Perceptions on the behaviours of truck drivers included influences of: fatigue; time pressures; delays in waiting for long trains and frustration; drivers not knowing the length of their vehicle; and misjudging the time taken to cross safely.

### **Impact on Train Drivers**

For both participant groups, the psychological effects of level crossing incidents on the Traincrew was a major cause of concern, with some Train Drivers never being able to return to work following an ‘incident’ due to severe stress. Many comments were made on the feelings of stress and anxiety experienced during ‘near misses’ and ‘incidents’, with descriptions such as, “*your heart goes out the window*”, “*your stress levels go up*” and comments about “*rather dying in your seat*” than on the floor of the train cabin. One participant described his reaction to the acute anxiety experienced during an accident with the following comment:

*I froze in the seat, I just froze. I always said if it looks like I’m having an accident, I’m on the floor, but I couldn’t, I could not move out of the seat. The front of the loco was squashing down from the cattle truck lying on top of it. And I’m just sitting there watching it.*

The long term impact of incidents on the Traincrew was a clear theme, with comments of “*Time people are having off work because of this, man hours lost...its wrecking a few people’s lives, its wrecking families actually, destroying families...*”. Coping and resiliency or “*hardening to it*” were also acknowledged in this topic area. Comments were made, particularly in the metropolitan group, that the processes of “*stress breaks*” for Traincrew after an ‘incident’ or ‘near miss’ are not always appropriate and need to be revised, acknowledging the impact on the individual.

## **DISCUSSION**

A number of factors need to be considered when interpreting the results of this study. To begin with, as an exploratory study investigating the subjective experiences of a distinct group, this study does not attempt to provide empirical generalisations about Train Drivers, ‘near misses’ and motorist behaviour at level crossings. The sample was self-selecting and so cannot be considered to be a representative sample of Train Drivers however, this self-

selection was specific to the objectives of the sampling plan and research: to choose informants that have the ability to provide rich and strong examples of the phenomena; and to explore level crossing safety issues from the perspectives of Train Drivers. In spite of these limitations the participants provided an insight into a number of issues related to level crossing safety and data management that requires further attention.

Focus groups were selected as the most appropriate data collection method for this study as they offered the opportunity to explore and gather rich data on the issue and gain insights into participant's experiences. Some advantages of conducting focus groups are that they allow data to be collected from a number of people in a relatively short period of time (Beyea, 2000) and provide 'high density' qualitative information (Nicolson & Anderson, 2003). The group experience is also advantageous as it facilitates discussion in a supportive environment (Nicolson & Anderson, 2003).

Strategies to enhance the rigour of this study included the use of a purposive self-selection sampling technique without the selection criteria of "involvement in a collision" to avoid extreme cases biasing the sample. Member checking techniques were utilised at the end of the sessions to clarify the main points of the discussion and invite corrections in interpretation from the participants. Notes made during the sessions were used during analysis as they contained immediate analytical perceptions about the sessions. Within the paper itself, explanations of the context, setting and researcher roles have been provided to assist in the transferability of the study and raw data in the form of quotes have been included to provide supporting evidence for interpretation and analysis.

This exploratory study provides an insight into a number of level crossings safety issues from the perspective of Train Drivers as key informants. Firstly, findings on the difficulties in defining and reporting 'near misses' has important implications for data management on level crossing safety, from state based industries to the national level. Data on all components of level crossing safety are limited currently in Australia with no national database existing to monitor the trends of fatalities, injuries, collisions, and 'near misses'. Recent comments by Wigglesworth, Graham and Routley, (2005) indicate that there are many limitations in using the national rail toll and coronial databases as a basis for investigations and that the development of an accurate, annual data source is required. Prior to the successful management of this data, issues such as those identified by the Train Drivers, of the definitions of 'near misses', low reporting levels and mechanisms for use, will need to be explored and resolved.

Secondly, insights were provided into the common at-risk motorist behaviours observed at level crossings. Differences noted between the regional and metropolitan areas is an important finding for those involved in intervention development at engineering, education and enforcement levels. It is important to note however, that perceptions on the reasons behind motorist behaviour are those of the participants and as such are subjective in nature. Noted behaviours could be classed between perceived intended and unintended behaviours in both groups. In the regional group, the main intended behaviours by motorists were found to be breaching the road rules by not stopping at signs or flashing lights and high risk activities such as trying to beat the train or going around boom gates. A study from the United States (Witte & Donohue, 2000) adds support to this notion as their findings revealed a sub group of 10-20 percent of respondents labelled 'risk seekers' engaged in the same high risk behaviours at level crossings. Unintended motorist behaviours included those as a result of inattention, distraction or judgment errors; findings that are supported by Wigglesworth (2001) in his study of 85 consecutive fatal crashes in Victoria. In the metropolitan group, intended behaviours included the same breaches of road rules and boom gates at active crossings while the unintended motorist behaviour of queuing on a congested crossing was noted. Both

groups identified trucks as high risk vehicles and motorcyclists for risk taking behaviour. Local drivers, as an at-risk road user group, were established from the analysis which is also supported by Wigglesworth (2001) who notes that 85 percent of those killed in that study lived locally and were familiar with the crossing.

Disturbingly these behaviours and breaches were all noted to be frequent occurrences with little if any enforcement noted. The descriptions of motorist behaviours and ‘near miss’ narratives followed closely to human factors findings on accident contributors for level crossings accidents including; driver behaviour, driver distraction, risk taking and active warnings (Caird, Creaser, Edwards, & Dewar, 2002). Interestingly, the regional group believed about 60 percent of ‘near misses’ were due to poor visibility at the crossings with only 30-40 percent actually due to the motorist. The ATSB (Australian Transport Safety Bureau, 2003) notes similarly, that 46 per cent of level crossing crashes appeared to be due to unintended road user error, whereas higher percentages are often attributed to driver error by other sources, including the National Transport Safety Board (United States) who state 69% of these crashes are due to driver behaviour (Caird et al., 2002).

Finally, the insights provided by the participants on the impact of level crossing accidents and ‘near misses’ on Train Drivers and others emergency services involved, brings the problem into focus as a road safety and community issue, as well as an risk management area for rail authorities. Recommendations from the participants followed general safety areas of engineering, education and enforcement with suggestions for improvements in engineering to assist the Train Driver and the motorist, industry related improvements for the Train Drivers, education for motorists with specific content requirements and a strong need for some form of enforcement; in particular red light type cameras at crossings.

The experiences and observations of motorist behaviour at level crossings by Train Drivers as first-hand witnesses, provides some insight into necessary directions for future level crossing safety action. The issues surrounding ‘near miss’ definition and reporting need to be addressed, which in turn will improve the content of an essential national database on level crossing incidents, as it is developed. Organisational procedures for reporting and outcome disseminations possibly require review for reporting levels to be maintained and improved for this end. A number of recommendations for educational countermeasures were suggested with strong insights into actual observed behaviour. Perceptions on the motivating factors beneath these behaviours will continue to require further research with exploratory studies with high-risk road users being timely and necessary before engaging in educational programs. This study poses further questions into the experiences of Train Drivers over the varied networks of Australia and possibilities of confirmatory research with other informants. The potential benefits from this future research would be: improved knowledge of level crossing safety issues; leading to improved level crossing educational strategies for motorists; and potentially improved level crossing safety. This would benefit motorists, the general community, and both the rail and road authorities.

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