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Mr John Eren, MLA
Chair
Road Safety Committee
Parliament House
EAST MELBOURNE VIC 3002

Dear Mr Eren

ROAD SAFETY COMMITTEE INQUIRY INTO IMPROVING SAFETY AT LEVEL CROSSINGS

Public Transport Safety Victoria (PTSV) has been invited to make a submission to the Parliament of Victoria Road Safety Committee Inquiry into Improving Safety at Level Crossings. As the Director, Public Transport Safety I am grateful for the opportunity to make comment and this letter outlines my current position on level crossing safety.

The position of Director, Public Transport Safety is an independent statutory office established under the *Transport Act 1983.* The director is supported by DOI staff comprising Public Transport Safety Victoria.

PTSV's primary function is to accredit train, tram and bus operators who operate within Victoria and to monitor their ongoing safety performance. It does this through the *Rail Safety Act 2006,* the *Transport Act 1983* and certain delegated legislation *which sits under them.*

The *Rail Safety Act 2006* provides that risks to safety have to be eliminated so far as is reasonably practicable, or if they cannot be eliminated, then reduced so far as is reasonably practicable. In determining what is reasonably practicable, regard can be had to the availability of ways to eliminate or reduce the risk, and to the cost of doing so.

Safety of level crossings in Victoria

Under the *Rail Safety Act 2006* it is the accredited rail operators who must meet the test of 'so far as is reasonably practicable' and PTSV uses the test to determine compliance and enforcement activity and regulatory interventions.

Overall and at this point in time, PTSV believes that Victoria's level crossings, **when properly maintained and properly used**, meet this legal test. However, it is clear that collisions between heavy road vehicles and passenger trains still occur and represent one of Victoria's principal safety risks to train passengers. Put into context, travelling by train is still considerably safer than travelling by motor vehicle. This is demonstrated by comparing heavy rail and road fatalities statistics. For the financial year 2006/07 (excluding suicides, deaths by natural causes and trespasser fatalities), there were 15 rail fatalities compared to 293 road fatalities (excluding pedestrian fatalities).

Any type of collision at a level crossing is a risk to safety but a collision between a heavy road vehicle and a train has a much greater potential for catastrophe. This was tragically demonstrated by the 11 fatalities resulting from the recent Kerang collision, the events at Trawalla in 2006, in which two people were killed, and the 2002 accident at Benalla that killed three people on-board a heritage steam passenger train.[1] Consequently, these types of accidents highlight the increased risk to train passengers of heavy vehicles and train collisions, in particular, the increased likelihood of a serious train derailment.

PTSV's rail safety occurrence database indicates that, between February 2003 and May 2006, there were 12 collisions between heavy vehicles and trains at active crossings, two at passive crossings, and approximately 43 near misses. The risk exposure is augmented by the increasing levels of heavy vehicle traffic[2] and the integration of more frequent and faster trains on regional train services.

It is therefore fair to conclude that safety risk at level crossings will, if nothing is done in mitigation, increase over time. The State Government has programs in place to offset this increase by implementing a risk-based program to upgrade level crossings across Victoria (circa $250 million over the next ten years). Following the accident at Kerang, an additional program involving the installation of cameras, rumble strips and advanced warning signs has also begun.

As technology moves on, further opportunities to improve level crossing safety must be embraced. A recent example of how this is occurring involves level crossing warning signs that utilise mobile phone technology and solar power to reduce the cost of traditional advance warning signs. These are called Low Cost Advance Warning Signs (LCAWS) and they can be remotely monitored. Remote monitoring provides another line of defence given that LCAWS are not fail-safe (see later).However as an additional safeguard to only passive protection at level crossings, the inclusion of LCWAS should assist motor vehicle drivers to be more vigilant at passive crossings. The aggregate risk reduction for a given capital outlay should be much higher for deploying this type of technology and, indeed, this is what should drive its adoption.

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[1] Australian Transport Safety Bureau. (2002). Level crossing collision between steam passenger train 8382 and loaded B double truck. Australian Transport Safety Bureau: ACT.

[2] National Transport Commission (2004). National heavy vehicle safety strategy (fact sheet). National Transport Commission. Retrieved 17th Sept, 07 from www.ntc.gov.au.

Given actively protected level crossings are already designed to be fail-safe[3], it is reasonable to focus our attention on motor vehicle driver behaviour around level crossings. PTSV's submission centres on how new technologies can assist motor vehicle drivers to comply with the road rules when approaching and using a level crossing. PTSV believes that addressing this issue will reduce the safety risk for private motor vehicle occupants and train passengers from heavy vehicles and trucks.

New technologies

PTSV believes GPS technologies should be explored but in addition existing technologies and assumptions surrounding these technologies should also be further evaluated to ensure costs are commensurate with the benefits. It is possible that a combination of certain technologies could mean that previous mitigations should no longer be pursued. For example, recent research has suggested that the introduction of boom barriers and photo/video enforcement, could potentially reduce level crossing collisions by up to 75%. Give-way signs were considered to be the weakest intervention, reducing expected collisions by 19%.[4] A similar analysis, supported by pre and post installation measurements, should be performed to determine the effectiveness of new level crossing technologies. In particular, human factors issues should be addressed using formal assessment methods.

PTSV believes that new technologies can make a significant contribution to changing motor vehicle driver behaviour. PTSV believes that Global Positioning Systems (GPS) may be used to provide warnings of the proximity of level crossings or even approaching trains in a truck or car which could assist with the provision of better information to the driver. According to the United Nations Transport and Tourism Division, the GPS' are an economical alternative to other devices used to improve level crossing safety. GPS' are already incorporated in many automobiles, including trucks, as a method of localising coordinates, speed and arrival times.[5] This technology is currently being used to provide details on trains such as their speed, location, and braking curves.

The simplest use of GPS systems is the inclusion of GPS coordinates into the GPS map databases. As a vehicle approaches a level crossing, the GPS module can provide a voice warning of the crossing and, possibly, an advisory speed limit. A similar GPS system is already in development in motor vehicles which, using wireless technology can estimate the trajectories and locations of other vehicles in vicinity.[6] Consequently, the GPS system provides drivers with warnings of impending collisions. Exploration of whether this technology

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[3] This means that the lights and boom gates (if fitted) will automatically activate if a piece of equipment on the track or in the signalling control is not functioning correctly.

[4] Saccomanno, F. F., Park, P.Y., & Fu, L. (2007). Estimating countermeasure effects for reducing collisions at highway-railway grade crossings. Accident Analysis and Prevention, 39, 406-416.

[5] Transport and Tourism Division. (2000). Evaluation of cost-effective systems for railway level-crossing protection. United Nations Publications.

[6] Misener, J. A., Sengupta, R. & Krishman, H. (2005). Cooperative collision warning: Enabling crash avoidance with wireless technology. Retrieved 27th Sept, 07 from http://www.its.berkeley.edu/newsbits/winter2005/Cicaspaper2.pdf

would transfer to train detection would be encouraged. PTSV supports the use of GPS technology in this context to improve level crossing safety.

There has been some disagreement about whether technologies that are not labelled fail-safe can effectively reduce risks at level crossings. This debate has led to the rejection of some technologies considered to not be fail-safe. PTSV therefore recommends exploring new technologies that may not be considered fail-safe, as this should not be the only criterion for determining effectiveness in mitigating safety risks.

Human behaviour

It is vital that human behaviour is assessed when managing the safety risks at level crossings. Human factors work aims to increase the reliability of interaction between engineered systems, such as level crossings, and people (e.g. vehicle drivers, pedestrians etc.) to improve safety performance. Human Factors studies can make an important contribution through providing information on human behaviour to the design of level crossings and surrounding environments (e.g. roads) in order to maximise human capabilities and minimise their limitations.

Such human factors work would include examining the dynamics of human perception, decision making ability, experience and understanding, and behavioural limitations and how they are affected by level crossing design. For example, the Rail Safety Standards Board (RSSB) released a report on human factors at level crossings in the United Kingdom, which detailed the precise perceptual limits of an individual's vision, their ability to interpret colours and patterns, and so on.[7] This information is vital to understanding why and how people can have difficulty with interpreting warning signals and detecting the presence of trains. Further Human factors studies would provide guidance to level crossing designers and implementation teams on encouraging safe behaviour at level crossings. These studies are investigating the impact of changes to infrastructure design, signage, reductions and so on.

Human Factors studies can help explain why individuals often ignore level crossing warnings. A recent survey of pedestrians at a number of Victorian crossings, revealed 35 percent of 212 pedestrians did not know whether it was illegal to cross in the presence of a train. Eight percent believed it was not illegal to cross.

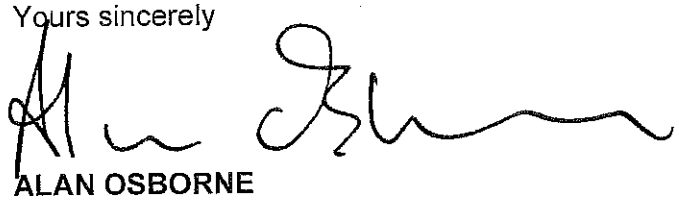
[7] Rail Safety and Standards Board (2004). Human factors assessment of the risks associated with MWL crossings. Human Engineering: Bristol.

Recommendations

PTSV concludes that the key opportunity to improve level crossing safety is with motor vehicle drivers. Our recommendations below relate to improving driver performance when using level crossings. In conclusion PTSV recommends the following:

- LCAWS technology should be considered for passive crossings with particular risk features relating to them
- GPS technology should be investigated as this could be used to provide motor vehicle drivers with warnings of impending collisions
- New technologies that are not considered fail-safe should not be automatically discounted
- New technologies should be validated through evaluation trials and research, with particular emphasis on understanding the human factors issues.

Yours sincerely



ALAN OSBORNE
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05/10/2007