Australian Government

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to the Report of the House of Representatives Standing Committee on Transport and Regional Services

Train Illumination

An inquiry into some measures proposed to improve train visibility and reduce level crossing accidents

The Hon Warren Truss MP, Deputy Leader of the Nationals,
Minister for Transport and Regional Services

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Background

The issue of level crossing safety, in particular train conspicuity, was raised with the House of Representatives Standing Committee on Transport and Regional Services after a multiple fatality at Yarramony near Jennacubbine in Western Australia, in July 2000.

After private briefings from individuals, industry experts and state government transport departments, the Committee decided to formalise the inquiry and produce a report. The Committee's report acknowledges that it focused on only one aspect of the complex level crossings issue (train conspicuity).

The NSW STAYSAFE Parliamentary Committee released its *Report on the Safety of Railway Level Crossings – Where Roads and Railway Lines Meet at Substantially the Same Level* in October 2004. This report is quite broad-ranging and makes 69 recommendations, including some relating to train conspicuity.

In Australia, regulation for level crossing safety is primarily the responsibility of the state and territory governments.

There are national forums for information sharing and coordination of activities: the Standing Committee on Transport (SCOT) Rail Group, which includes representatives of all jurisdictions including the Australian Government Department of Transport and Regional Services; and the Australian Railway Crossing Strategy Implementation Group (ARCSIG, a subcommittee of SCOT Rail Group), formed to oversee the implementation of the National Railway Level Crossing Safety Strategy, in which the Australian Government is involved only as an observer.

The Department of Transport and Regional Services (DOTARS), through the Australian Transport Safety Bureau (ATSB), has a defined role in independent rail safety investigation and data management[1]. The ATSB also has a role in monitoring progress of National Road Safety Action Plans, which include level crossing safety education as an action area. Other roles played by DOTARS in relation to rail include an Executive representative on the SCOT Rail Group and assistance with Secretariat functions; review of funding of rail projects through AusLink; research on rail activity and economic data through the Bureau of Transport and Regional Economics (BTRE); oversight of the Australian Rail Track Corporation (ARTC) and National Transport Commission (NTC); and policy development.

In the context of the Australian, State and Territory governments' commitment (set out in the *Inter-Governmental Agreement for Regulatory and Operational Reform in Road, Rail and Intermodal Transport*) to establish "a national approach to regulatory and operational reform for the rail industry", the NTC has been tasked with developing:

- a framework to improve and strengthen the co-regulatory system for rail safety including the application of mutual recognition; and
- a national policy on key rail safety issues and procedures and standards to manage major risk factors.

[1] The ATSB investigates on the Defined Interstate Rail Network (DIRN) under the *Transport Safety Investigation Act 2003*. The ATSB publishes rail safety data supplied by state regulators and sourced from the ABS and hospitals.

To this end, the NTC has been working on a number of projects aimed at delivering:

- principles to guide the development of a strengthened co-regulatory framework; and
- model rail safety legislation.

At their June 2005 meeting, Australian Transport Council (ATC) Ministers considered and agreed in principle to a number of policy reform objectives for nationally agreed model rail safety legislation. The policy proposals will provide for the first time, the basis for a nationally consistent approach to rail safety regulation across Australia. Ministers will formally consider and vote on the draft Model Rail Safety Bill in November 2005, with detailed regulations to support the legislation also to be completed for Ministerial consideration.

The 2005-06 NTC Work Program recently agreed by the ATC includes the following specific items to be developed by the NTC:

- methods for improving rail safety data
- criteria for identification and management of rail safety risks
- guidelines for the assessment and audit of safety management systems
- nationally consistent competency standards for enforcement, audit, operations and investigations.

The Australasian Railways Association (ARA) is the major industry association for the rail sector in Australia and New Zealand. The ARA represents the interests of both private and government rail operators, track owners, manufacturers of locomotives, rolling stock, signalling and communications, equipment suppliers, maintenance and construction companies etc. The ARA is working closely with the Cooperative Research Centre for Railway Engineering and Technologies on research examining the behaviour of non-rail users at level crossings in the hope of developing effective educational tools to improve awareness of the safety issues surrounding level crossings.

The ARA is represented on the Australian Railway Crossing Safety Implementation Group (ARCSIG).

The ARA is responsible for the Code of Practice for Australian Rail Operations which provides:

- A uniform approach to the definition of operational standards.
- A safe operating environment where infrastructure, rolling stock and operating systems are in accord with the principles defined in the Code.
- A uniform basis with which to comply with the Australian Standard (AS 4292).
- A basis for assisting the process of mutual recognition of rail safety accreditation.
- A basis for developing investment decisions.

Consultation and input

Input to this Australian Government response was received from ARCSIG, which includes representatives of all jurisdictions (except the Australian and ACT Governments) as well as the NTC and the ARA.

General comments

The Australian Government recognises that collisions at railway crossings are the most serious safety issues faced by the rail system in Australia, although the number of deaths and injuries is small compared with many other causes of road casualties.

In addition, it notes that around one-third of collisions between a train and a road vehicle occurred at passive crossings. As passive crossings are invariably located on rural roads, accidents often have large impacts on smaller rural communities.

The Australian Government, together with the State and Territory Governments and the rail industry has been active in trying to identify the most appropriate options for reducing the risk of such accidents. State and Territory Governments and the rail industry have begun to implement further measures arising from these studies.

The National Railway Level Crossing Safety Strategy was approved by the ATC in May 2003 together with a detailed Action Plan. The responsibility for overseeing its implementation was given to ARCSIG which comprises all State jurisdictions, the Northern Territory, the ARA, the NTC and Austroads.

A 2002 Austroads report *Reducing collisions at passive railway level crossings in Australia*, made a range of recommendations relating to: data issues, road signs and markings, proactive risk management using a risk scoring system such as the Queensland Risk Scoring Matrix, considering use of reflective strips, research into lower cost active treatments, education, and wider use of active crossings (and/or closure of some passive crossings).

The ATSB has also funded research in this area. The report *Prospects for improving the conspicuity of trains at passive railway crossings* (CR 217) by Peter Cairney was released in December 2003. Dr Cairney came to the view that treating trains rather than treating passive crossings is attractive because:

- it is a lower cost option, since there are about three times as many passive crossings as there are locomotives, and the cost of the devices is likely to be considerably less;
- it is unlikely that all passive crossings will be treated in the foreseeable future; and
- it will take some time to install active treatments at all the sites at which they are justified.

However, the effects on crash reduction are likely to be much smaller than the effect of providing active treatments (available data suggest that active warnings would reduce crashes by more than 60 per cent).

Dr Cairney also points out that the Code of Practice for Australian Rail Operations embodies high standards for locomotive lighting so that achieving worthwhile improvements in conspicuity over and above this may not be possible.

Dr Cairney warns that there are critical aspects of collisions between road vehicles and trains at passive level crossings which any improvements to conspicuity must address. These are:

- the time of the crash (daytime crashes are approximately 70 per cent of the problem and night-time crashes account for approximately 30 per cent; and
- type of crash (the road vehicle is struck by the train in 65 per cent of cases, and the road vehicle runs into the side of the train in approximately 35 per cent of cases).

These observations highlights the fact that the causes of passive level crossing accidents are quite complex and involve a range of factors that are not solely related to train conspicuity.

Therefore, it is important for any specific nationally coordinated actions to be based on quality research subjected to practical trials to determine their cost and effectiveness.

This is not to say that individual jurisdictions should not, and do not, continually make improvements to the safety of the road and rail network in response to identified high-risk situations.

RESPONSES TO THE RECOMMENDATIONS

Recommendation 1

The Committee recommends that the Australian Government take steps, through the Transport Ministers Council, to require that all locomotives and rolling stock in the Australian rail industry are fitted with standard reflective strips or reflective paint and that all locomotives are fitted with rotating beacons lights.

Support in part

The Australian Government supports the objective of improving train visibility with relatively low-cost reflective strips on locomotives and rolling stock. The Australian Government would not support moves to make rotating beacons compulsory, without evidence that this would be worth the significant costs involved.

The Austroads (2002) report *Reducing collisions at passive railway level crossings in Australia* found that reflective sheeting may be an effective low-cost countermeasure for crashes involving running into the side of trains at night, provided the reflectors are cleaned and replaced at suitable intervals. It noted that, in the selection of appropriate materials, it was important that they have high retro-reflectivity over a wide range of angles, as railway tracks may cross at extreme angles.

The use of reflective strips is already current practice for some rail operators, and the Australasian Railways Association (ARA) considers that they are likely to become standard throughout the industry.

Many locomotives also have flashing ditch lights or crossing lights. The ARA is currently undertaking a review of Volume 5 (Rollingstock) of the Code of Practice for Australian Rail Operations, which will provide guidance on design and maintenance features of rolling stock and locomotives. The ARA has advised that the issue of lights and reflective strips has been given priority. A draft national locomotive lighting and visibility standard has been developed and released as part of a public consultation process. The draft standard includes proposals to address improved external lighting, reflective materials and livery and paint requirements.

The Committee did not put forward a strong case for the fitting of rotating beacons stating only that “This could increase conspicuity during daylight hours as well as being more likely to attract attention during the night.” The Committee also stated that, after considering evidence concerning the conditions in which many fatal crossing accidents have occurred, it is not convinced that generally placing additional lights on locomotives will have a substantial effect in reducing the number of fatalities. The Australian Railway Crossing Strategy Implementation Group (ARCSIG) has noted that there are about 2,400 locomotives in Australia, and the rail industry advises that the cost of installing rotating beacons on trains would be considerable.

ARCSIG agreed with the Committee that rotating beacons would not be expected to provide a benefit at crossings controlled by train-activated boom gates or flashing lights. It also felt that no benefits would be derived for operations during the day. ARCSIG’s view was that given that only about 30 per cent of level crossing crashes occur at night and only about 30 per cent occur at uncontrolled crossings, rotating

beacons on trains would have to have a very large effect on that combined subset of crashes in order to be cost-beneficial overall. There is no evidence to suggest that this would be the case.

The Australian Government notes that the NSW STAYSAFE Committee recommended at a State level that "the Ministry of Transport …. identify and review the efficacy of measures to improve the conspicuity of trains, with specific attention to issues associated with trains travelling across level crossings, including but not limited to:

- locomotive ditch lights,
- locomotive strobe lights,
- general locomotive lighting,
- the use of locomotive highlights
- the use of retro-reflective marking on locomotives, goods wagons and passenger carriage."

Recommendation 2

The Committee recommends that the Australian Government seek the national adoption of a level crossing risk scoring system based on the Queensland model and adapted for local conditions.

Support

The Australian Government supports this recommendation. At the 23 May 2003 Australian Transport Council (ATC) meeting, Ministers endorsed national adoption of the Queensland Assessment Matrix (Risk Scoring Matrix, RSM) for assessing risk at railway level crossings and prioritising treatments.

The Australian Railway Crossing Strategy Implementation Group (ARCSIG) reported that the Australian Level Crossing Assessment Model (ALCAM) has been developed and is being implemented nationally. There is a national liaison group which coordinates practice, and reviews and refines the assessment process and model. A complementary web-based information system (WEBLX), has been developed. The potential to include pedestrian issues in ALCAM is being investigated.

The Australian Government notes that the NSW STAYSAFE Committee recommended that the Rail Infrastructure Corporation, in consultation with other rail agencies interstate, continue to develop and maintain a risk assessment and prioritisation programme for railway level crossings; and that the Rail Infrastructure Corporation, in consultation with other rail agencies interstate, ensure that the development of a risk assessment and prioritisation programme for railway level crossings is organised to readily identify issues associated with high-speed passenger services, and high-speed rail operations generally.

Recommendation 3

The Committee recommends that the Australian Government initiate, through the Transport Ministers Council, a program to install, as a minimum, rumble strips at high accident risk level crossings.

Do not support

The Australian Government supports research and trials in this area, but considers that any widespread implementation programme should await the outcome of these trials.

As the Committee's report notes, Main Roads Western Australia has been trialling the use of rumble strips at high accident risk level crossings. Rumble strips are thin strips of (typically thermoplastic) material laid transversely across the road in such a way as to generate a noise when a vehicle runs over them. The noise is presumed to alert the vehicle driver of a potential hazard.

The trial results show that the rumble strips had a significant effect in reducing speed at crossings with a 'Stop' sign but the effect was negligible at crossings with a 'Give Way' sign. It was also thought that this result was strongly associated with the number of strips. Main Roads WA is currently considering the merits of a further trial using more strips to determine if a significant effect can be achieved at crossings with a 'Give Way' sign and, if so, the optimum number of strips required. The Australian Railway Crossing Strategy Implementation Group (ARCSIG) is monitoring this work and will report any progress to SCOT Rail Group in due course.

The Australian Government notes that the NSW STAYSAFE Committee recommended that the Rail Infrastructure Corporation, in consultation with the NSW Roads and Traffic Authority (RTA) and local councils, develop a programme for the installation of gateway treatments and other perceptual countermeasures to provide better cues to motorists on roads approaching railway level crossings, including but not limited to road markings, signage, roadside infrastructure, the road pavement design and construction (e.g. road width, road surface treatment, rumble strips, etc.), and traffic signals (e.g. approach flashing lights).

Recommendation 4

The Committee recommends that the Australian Government through the Transport Ministers Council, support continued research into the efficacy of train activated rumble strips with a view to the installation of these strips at the most dangerous level crossings.

Do not support

The Australian Government supports the continuation of research into different forms of warning systems, but would not support detailed research into train-activated rumble strips because the available evidence suggests that they are not likely to have a favourable benefit-cost ratio or to compare favourably with other active warning alternatives.

The Committee report describes train-activated rumble strips as a "developing technology". The Australasian Railways Association (ARA) noted that train-activated rumble strips have the potential to incur significant costs compared with other emerging Intelligent Transport Systems (ITS) technologies.

The Australian Railway Crossing Strategy Implementation Group (ARCSIG) considered that they would also be less effective than flashing lights, and that care should be taken in considering the introduction of an additional warning device which drivers would need to understand, without diminishing the effect of existing standard warnings.

ARCSIG is currently monitoring the progress of trials of low-cost active warning devices in Victoria and South Australia. These devices offer a cheaper means of detecting a train approaching a level crossing by using a series of loops sitting on the top of sleepers on both sides of the crossing, similar to those set into the roadways on approaches to traffic lights. The information is sent to the level crossing via a radio pulse, and a set of flashing lights can be set off on the approach of a train. These lights may be in advance of the crossing for approaching motorists, and flash yellow as a warning that a train might be approaching. Because this system employs non-railway signalling equipment, it is cheaper than the standard systems presently used for flashing red lights and booms.

In South Australia a Low Cost Activation System (LCAS), manufactured by Hi-LUX Technical Services P/L, has been installed on Australian Rail Track Corporation track at an active level crossing in Monarto and under blind trial mode operation (where lights activated by the system are not visible to the public) since July 2002. The performance of the LCAS has been assessed on an ad hoc basis since installation, using data logged by the system and comparing it to available data from a rail predictor unit associated with the level crossing. Data was collected between July 2002 and December 2004. The predictor system recorded 4372 rail movements while the LCAS identified 4352 comparable events – a discrepancy of 20 events in detection between the two systems. For 19 of these events the system had developed a fault and was operating in a fail-safe mode as designed. Only one event remains unexplained, representing a 0.02% failure rate in event detection. The LCAS has proven to be durable in the rail environment over an extended period and there has been no need to undertake maintenance of the unit since installation.

The monitored trial has been completed, although the equipment remains in place, and a final report was tabled at an ARCSIG meeting on 2 August 2005. The report concludes that the trial was successful in proving the technology. However, the issues regarding the visual aspects of the warning device and any legal implications remain unresolved and will be subject to further consideration. There are no plans for any further South Australian trials. The Victorian trial is progressing and is expected to be completed by the middle of next year.

The Australian Government notes that the NSW STAYSAFE Committee recommended that the NSW Roads and Traffic Authority (RTA) and the Rail Infrastructure Corporation assess the feasibility of installing train-activated rumble strips at passive railway level crossings.

Recommendation 5

The Committee recommends that the Department of Transport and Regional Services, with state transport departments, formally look at the Canadian based level crossing education program, 'Operation Lifesaver', for the possible adoption into Australian state road safety programs.

Support in principle

The Australian Government supports the investigation of education, information and awareness campaigns, while noting that responsibility for the management of these investigations rests with the Australian Railway Crossing Strategy Implementation Group (ARCSIG) and the Australasian Railways Association (ARA).

The Australian Transport Council (ATC) endorsed the National Railway Level Crossing Safety Strategy in May 2003, together with an Action Plan of projects. These documents included a strategic action to investigate education, information and awareness campaigns, including possible adoption of 'Operation Lifesaver'.

The National Road Safety Action Plan for 2005 and 2006 also includes an action to "develop and implement a coordinated approach to improving public awareness of level crossing safety issues, involving road safety agencies, Standing Committee on Transport (SCOT) Rail Group and the rail industry."

Most states and territories currently have, or are developing, railway level crossing safety education activities.

The Department of Transport and Regional Services (DOTARS), through the Australian Transport Safety Bureau (ATSB), has a defined role in independent rail safety investigation and data management and in monitoring the progress of National Road Safety Action Plans, but does not have responsibility for coordinating or implementing level crossing safety initiatives. While the ATSB will continue to monitor jurisdictions' progress as part of the Action Plan monitoring, the Australian Government has not funded the ATSB or DOTARS to engage in a national level crossing coordination or education role.

ARCSIG notes that there is an opportunity for the states and territories to work collaboratively on railway crossing safety activities. The ARCSIG Management Plan includes a project to "investigate education, information and awareness campaigns for all stakeholders (public, engineers, police, etc) integrated with other road safety campaigns, including possible adoption of 'Operation Lifesaver'."

The ARA believes there is considerable merit in adopting a community-based road safety programme which might utilise some concepts from the 'Operation Lifesaver' programme. It held a National Level Crossing Behavioural Workshop in April 2005 to develop a long term national plan to improve rail level crossing safety by changing road user behaviour. The safety improvement will be delivered through community- and state-based programmes utilising education, enforcement and engineering. The workshop was attended by over 60 representatives of road, rail and police authorities in each state.

The ARA is taking input from the delegates at the workshop to develop a national plan and associated implementation timeline. The ARA will seek endorsement for the plan from ARCSIG and relevant authorities and then present it to SCOT for endorsement in October 2005 as a basis for detailed consultations with jurisdictions. Once these consultations are completed, the national plan will be submitted to the ATC for consideration and agreement. The ARA's current view is that the plan will be acted upon and overseen by a body yet to be decided. The body would work in close cooperation with State Railway Level Crossing Committees to manage the plan. At this stage, a launch of the plan is proposed for July 2006.

The Australian Government notes that the NSW STAYSAFE Committee recommended that the Ministry of Transport, the NSW Roads and Traffic Authority and local councils review the Operation Lifesaver programme in Canada and the United States for possible use, when adapted to Australian conditions and culture in NSW.