AITPM Victorian Branch Technical Forum
Road Safety Challenges ...

Tuesday 8th April 2008, 5:30pm – 7:00pm
VicRoads Theatrette, 60 Denmark Street, Kew

Our speakers tonight are...

David Axup
Director, David R Axup & Associates
(former Chief Superintendent, Victoria Police)

Terry Spicer
Manager Railway Level Crossing Safety,
Department of Infrastructure

Peter Bellion
Major Collision Investigation Unit,
Victoria Police

Chris Blanksby
National Discipline Leader - Heavy Vehicles,
ARRB Group

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AITPM Victorian Branch 2008 Technical Forum program

Wed 7 May
Monash – City Link – Westgate Upgrade Project

Tues 10 June
Public Transport Priorities

Wed 9 July
Transport Legislation Review (DOI)

Tues 5 August
Activity Centres – Transit Orientated Development

Wed 17 September
Eastlink

Tues 7 October
Congestion Management

Wed 12 November
Sustainable Transport (DOI)

www.aitpm.com/main/n_activities_VIC.html

AITPM National Conference
Perth:
3 – 5th September
2008

www.aitpm.com
RAILWAY CROSSING SAFETY MANAGEMENT IN VICTORIA

Terry Spicer
Manager Railway Crossing Safety & Emergency Response
Public Transport Division

Some RLX Safety Examples

• Every Day Examples of Public Behaviour at Railway Crossings???

SA Video Clips

Our Appreciation to the South Australia Department of Transport, Environment & Infrastructure, (Level Crossing Unit), for the Use of the Video Clips, Which Featured in the SA Media in July 2005.

ARE WE WINNING?

• Not if You Pay Heed To Regular Media Reports!

The Good News!

“Over the Past 35 Years Fatal Accidents Between Motor Vehicles and Trains Have Been Reduced by Over 70% Nationally” & by 85% In Victoria”*
“This is More Than Twice the Reduction in the Road Toll Over the Same Period”

*MUARC/QUT: Proposal To Undertake Research Into Reducing The Risk of Crashes At Railway Level Crossings in Australia 2002

Achievements
Achievements

Table 1
Fatalities at railway crossings in Victoria by category of road user; 1990-76 and 1994 – 2001

<table>
<thead>
<tr>
<th>Period</th>
<th>Vehicle occupants</th>
<th>Pedestrians</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-76</td>
<td>174</td>
<td>25</td>
<td>199</td>
</tr>
<tr>
<td>1994-2001</td>
<td>26* (95% Reduction)</td>
<td>28</td>
<td>54</td>
</tr>
</tbody>
</table>
* plus three bicycle fatalities plus three wheelchair fatalities
2000-2007 | 26                | 28           | 54    |

The Bad News?

The Statistics Have Plateaued

For the eight year period January 2000 - December 2007 there were 26 motor vehicle occupant/train fatalities.

The Bad News?

It is already proving to be exponentially harder to repeat the 85% reduction in Victoria over the next 40 years!

LX Accident Statistics - Context

- Level Crossing Motor Vehicle Fatalities Contribute Less Than One Percent of the National Road Toll.
- Since 1990 (Prior To Kerang) 65 People (Av = 4 p.a.) Have Been Killed in Motor Vehicle LX Train Accidents in Vic*.
- It Would Take ‘10 Weeks’ “Not 17 Years” For The Same Number of People to Be Killed On Victorian Roads.
- Over 6000+ (estimated) people will have died on Victorian roads during the same 17 year period.

* The Age 6 June 2007.

The RLX Safety Risk?

- Level Crossing Accidents Still Present the Greatest “Potential” Danger on the Railways

Dr Allan Sefton, UK The Health and Safety Executive’s (HSE), Director of Rail Safety, 2005. Responsibility transferred to the Office of the Rail Regulator (ORR on 1 April 2006)

What is THE RLX Safety Risk?

‘CATASTROPHIC’ RISK EVENT!
What Does ALCAM Do?

- Complex Scoring Algorithm
- Characteristics = Properties of the Crossing Which May Contribute to a Mechanism Being Triggered
- Accident Mechanisms = Human Factors – Driver/Pedestrian – Outcomes Which May Lead to a Collision
- Controls = Mitigating Measures Which May Reduce the Likelihood of a Mechanism Being Triggered

The Sum of Which = ‘Total Risk Exposure Score’

What Does ALCAM Produce

- Safety improvement required - Risks have been identified that require priority attention and are key to ensuring that infrastructure works to be undertaken to return risk to an acceptable level.
- Safety improvement to be considered - Risks have been identified that require further assessment by relevant road and railway entities. Remedial action may be required to address any unacceptable risks.
- Safety at site to be monitored - Indicative that appropriate protection is in place and that remedial action is unlikely to be required. Ongoing monitoring by road and railway entities is required.

Key ALCAM Principle: ‘If a Risk Can Be Mitigated It Should Be Mitigated - Irrespective of the Risk Score’

What Is Different About ALCAM?

- Raises the Bar With Respect to the Application of AS1742.7 - 2007 Visibility (S1, S2, & S3) Standards
- Higher Priority on Mitigating ‘Queuing’ & ‘Short – Stacking’ Risks

 QUEUING RISK EXAMPLE!

 SHORT STACK RISK EXAMPLE!

ALCAM – National Adoption

- Endorsed By the Australian Transport Council (ATC) (Commonwealth, State, Territory - Transport Ministers) For National Adoption May 2003
- New Zealand Have Joined the National ALCAM Committee.
- Australian States & Territories at Various Stages of Implementation. NZ About To Start.
ALCAM Vic Implementation

- 2927 Field Surveys December 05 – December 07
- Currently Evaluating, Analysing and Quantifying Results.
- Will be Included in “Strategy To Improve RLX Safety in Victoria”.

Interim Results

21,435 ‘Issues’ = Av 7 per RLX

Interim Results

Characteristics Present by Percent of Level Crossings

Interim Results

Characteristics by Occurrences at Level Crossings
Interim Results

- The Majority of the 93% Non-Compliance Are Road and Rail Signs and Road Markings.
- All Stakeholders Have Been Advised Of Their Individual ‘Issues’.
- More Work to Be Completed on the ALCAM Analysis.

LEGISLATIVE CHANGES

- NTC (Model) Rail Safety Bill 2006 & Amendments.
- RLX Safety Interface Agreements. (SIA’s). (1 July 2010 Implementation).
- To Be Included In All State & Territory Rail Safety Legislation.

New ITS Technology

- Which One For The Australian Rail/Road Industry?
  www.its-australia.com.au

New ITS Technology

- Australian Transport Council/S.C.O.T. National Road and Rail Industry Taskforce To Determine Which One Of The Potential ITS RLX Safety Applications Should Be Adopted In Australasia?

ALCAM

Questions Please?

terry.spicer@doi.vic.gov.au
(03) 9655 6422
0418 666 212
Motorcycle Crash Study

Presented by - Sgt. Peter Bellion, Major Collision Investigation Group.

Introduction

- 12 month study, commenced May 2002
- Of Fatal/Life Threatening Injury M/cyclist crashes
- Aim to identify contributing factors, in order
- To better target strategies/countermeasures
- To reduce motorcyclist trauma
- Study commissioned Feb 2002 by A/C SHUEY
- Response to concerns by motorcycle lobby groups

Findings

- 47 Crashes attended/investigated 1/5/02 - 20/4/03
- Motor Cycle Crashes, MCIG trained investigators
- Investigators trained in collision reconstruction
- 83% of the crashes, fatal outcome
- 17% of the crashes, life threatening injury outcome
Licences/Registration/Roadworthy
- 60% of riders held full license
- 19% unlicensed
- 22% learner or probationary
- 92% of motorcycles were registered
- 92% of motorcycles were roadworthy

Behavioural factors

Infringement history/speeding/blood alcohol/cannabis and at fault
- 52% of riders had traffic infringement history
- 38% of riders were exceeding the speed limit
- 19% or riders had alcohol in their blood
- 11% of riders had cannabis in their blood
- 77% of the time riders assessed as being at fault

Environmental factors key findings:

Signage
- 43% of collisions occurred on roads where no advisory or regulatory signs were present
- 21% of collisions occurred on roads where relevant signage should have been present
- 36% of collisions occurred where relevant signage was present
Road Configuration
- 33% of collisions happened on a left curve, nearly all excessive speed related.
- 29% of collisions occurred on a straight road alignment.
- 21% of collisions occurred at an intersection.

Environmental factors key findings:

Time of day/week
- 77% of collisions occurred during daytime.
- 56% of collisions occurred b/w 12 p.m. & 6 p.m.
- 48% of collisions occurred on the weekend.
- 30% on a Saturday.
- 18% on a Sunday.

Break down of at fault:
- Younger riders more at fault than older riders.
- Average rider age 32 years, range 17 to 56 yrs.
- Fault significantly related to excessive speed.
- Average speed of at fault 83 km/h c.f. not at fault average speed of 69 km/h.
- Majority at fault on left curve, downhill, going too fast for road and weather conditions present.
- Collisions where riders not at fault were all in metropolitan area.

Age related factors:
- Younger riders more likely to have alcohol present.
- Younger riders either probationary or unlicensed.
- Older riders had more traffic infringement history.
### Speed & Speeding:

**Motorcyclists more likely to exceed speed limit in:**
- country areas;
- on a left hand curve;
- on roads with a downhill grade; and
- if they had a traffic infringement history.

**On straight level roads riders tended to stay within speed limits.**
- Pre-impact speed on average was higher in areas where advisory or regulatory signs were absent.
- Riders who exceeded the speed limit on average possessed a full licence for a longer period of time.

### Alcohol/Cannabis

- Alcohol more prevalent in riders in mid 20’s who also tended to exceed speed limits.
- These riders had only possessed a full licence for a short period of time.
- Riders who tested positive for alcohol/cannabis were more likely to ride b/w midnight & 6 a.m;
- or b/w 12 p.m. & 6 p.m.

### Collision Outcome

- Death more likely in areas where signage was absent.
- Severe injury more likely where signage present.
- Fatal outcome where rider undergoes speed change during impact of 40 km/h upwards.
- Faster the impact speed greater chance of being killed.
Overview

- Truck stability
  - Performance Based Standards
  - Network screening
  - Fleet safety risk assessment and crash reconstruction

- Rail level crossings
  - Acceleration performance of heavy vehicles
  - Rumble strip testing

- Infrastructure impact of trucks
  - Dynamic wheel loads

Truck stability - PBS

Road surveyed to determine geometry
Vehicles tested to determine
- speed profile
- lateral acceleration time history
- roll angle time history
Simulations used to reconstruct travel at given speed profile on road geometry
- Validated against roll and lateral acceleration test data
- Used to calculate Load Transfer Ratio – to measure proximity to rollover

Truck stability – network analysis

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Vehicles tested to determine
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Truck stability – network analysis

• Load transfer ratio (LTR)

Truck stability – network analysis

• Alternative approach:
  – Determine safe truck speed for given road geometry using simulation
  – Use these results to recommend safe speed limits for trucks on that network

Truck stability – fleet safety

• Crash reconstruction

Truck stability – fleet safety

• Driver training

Rail level crossings

• Acceleration time for heavy vehicles is critical to level crossing clearance time

Rail level crossings

• In-cabin noise testing of rumble strips was conducted
  • Enabled comparison of the noise levels from different installations
**Australian Truck and Bus Research and Information Centre (ATBRIC)**

- ARRB is proposing to develop a centre for coordinating research efforts and ensuring these are effectively disseminated to industry, focusing on:
  - Truck and bus safety and efficiency
- As well as playing a coordinating role, this centre would house advanced technology, enabling key unknowns to be addressed:
  - For example:
    - How do different drivers respond to current fatigue rules?
    - How do drivers make decisions about the right speed for a bend?

**Infrastructure impacts**

- Instrumentation developed to easily measure vertical wheel forces
- Testing conducted on a tri and quad axle semi-trailers
- On air and mechanical suspension
- At various speeds on different roads

**Summary**

- PBS assessments address inherent vehicle performance
- Truck safety must also consider the role of:
  - infrastructure
  - the driver
- A range of studies were carried out looking at specific cases
- Further development and emphasis on multi-faceted approach required