Safety Institute of Australia Inc

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Monday 14th April 2008

Presentation to the

PARLIAMENT OF VICTORIA

ROAD SAFETY COMMITTEE

Inquiry into improving safety at railway level crossings

SIA Delegation

- SIA greatly appreciates the invitation to contribute to this very important inquiry on improving level crossing safety.
- For 60 years the SIA has promoted nationally the highest possible standards of health and safety at work, on the roads, at play and at home.
- Dr Geoff Dell CFSIA, National President SIA, Principal Protocol Safety Management.
- Dr George Rechnitzer FSIA, Chair SIA Transport Safety Committee, Principal Forensic Engineer & Director DVExperts International.
- Mr Gary Lawson-Smith, CEO SIA, former CEO Aviation Safety Foundation Australasia.

SIA Strategic Overview

- The SIA's submission strongly advocates the adoption of a strategic top-down approach, e.g. UK Rail Safety Plan.
- Other transport modes, e.g. aviation, have gained significant safety, operational and environmental benefits by adopting a strategic approach over a "fly-crash-fix" reactive approach.
- More "crossing points" in the air route structure over Australia than the total number of railway level crossings. Would the public accept aviation crossing point accidents at the same rate as railway level crossing accidents in Victoria alone?
- Do the various transport modes offer their customers [i.e. the general public] different levels of safety. If so, why?

Risk vs Hazard Management - Stop the Safety Silos

- There are problems with the Risk Management Model – a "Hazard Management" approach is required.
- Learning from a cross-modal transport approach to safety as opposed to the current silos.
- Problem with intervention in the past:
  - Blame the driver is a distraction – proven not to work elsewhere;
  - Inadequate budget allocation not $30M need $300M;
  - 10/15 year plan required.

Safety Science Rules

- Application of Hierarchy of Hazard Control
  - Elimination - Grade Separation
  - Engineering – redesign crossing geometry, Rumble Strips, Lights, Gates, Intelligent Vehicles – GPS; RF; I/R
  - Administration - road rules, private behavior, training, surveillance
- Collision Frequency is consistent with road/rail usage, If no intervention, there will be a linear increase in crash rate.

Lessons from level crossing accidents

- Inadequate risk assessments are being carried out at level crossings:
  - they do not properly account for higher train speeds, severe restrictions to truck driver visibility due to truck cabin designs and the poor geometry of crossings.
- Untested assumptions on what works at level crossing:
  - e.g. stop signs; drivers can see approaching trains in time; train horns are effective; drivers will take appropriate action - poor / no training; Government allocated funding of upgrades to crossings is not commensurate with the magnitude of the problem.

Overseas level crossing review

- Australia is behind other leading nations in relation to level crossing safety:
  - Although Australia has safety standards relating to level crossings, most requirements are optional and not required.
  - The implementation of safety measures is not uniform throughout the country and varies significantly from state to state.
  - No clear guide exists about which types of control devices are required or recommended for certain defined characteristics.

Crossing safety reduced to the lowest level

- Due to low budget commitments, the fundamental safety of many passive crossings **has been reduced to the lowest level, i.e. the capabilities and perception of individual vehicle drivers.**
- **It is a complete abrogation of responsibility by the Government, Regulators and relevant agencies and operators, to acknowledge that passive crossings are in dire need of safety upgrade, yet resort to 'blaming the driver' when collisions occurs at such crossings.**

Trawalla and Lismore collisions – both preventable

Trawalla Train Crash

Lismore Train Crash

Kerang Tragedy, 2007

Fast train approaching Trawalla crossing

Another preventable accident

In Safety Management size does matter!

Visibility from a truck cab at a railway level crossing

Situational Awareness
"See and be Seen"

The truck driver's view

Situational Awareness – can technology enablers help? Aviation and Maritime safety says yes.

Situational Awareness
What is the fail safe mechanism?

Inadequate Designs, Situational Awareness & Human Factors

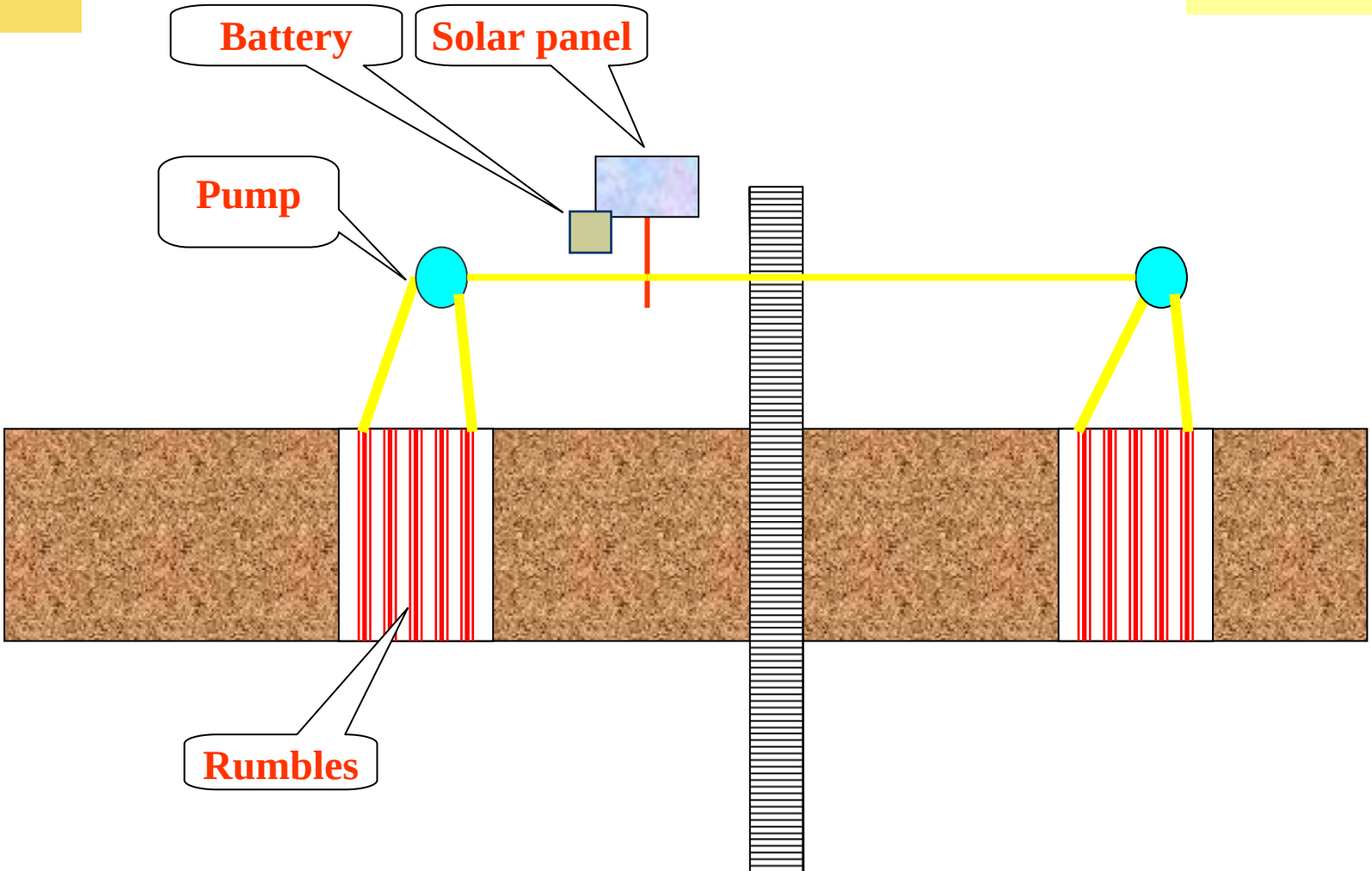
Human Factors:

- Situational Awareness – relies largely on perception
  - Lateral vision / Closing Distances / Angles;
  - Human Performance – Fatigue – Driving Skills
- Negative Training – warning of train crossing vs warnings of rail crossing.
- Rail crossings lacking proven technology e.g collision avoidance systems, and aural warnings etc.

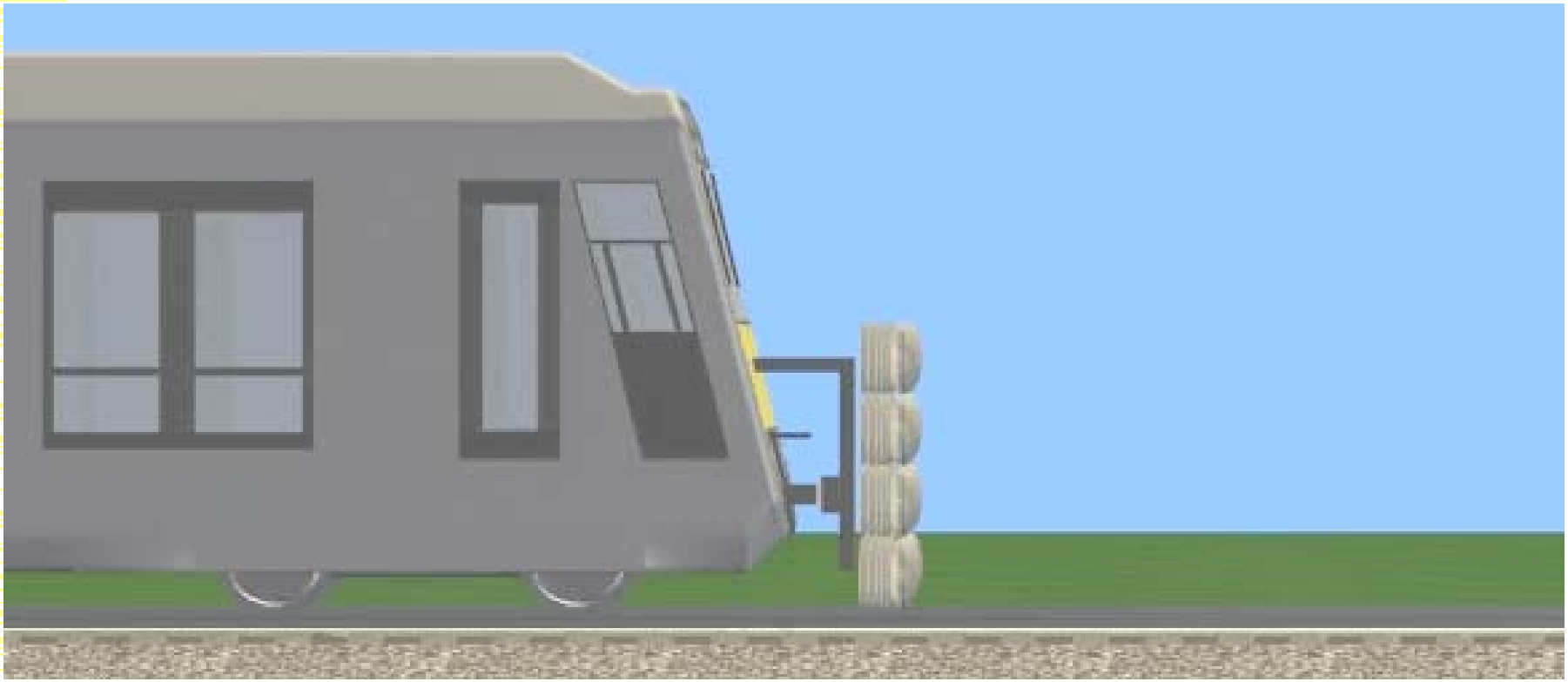
Install a low cost *active* rumble strip system

- Only active when a train is approaching the crossing.
- Use in conjunction with existing visual warning devices.
- Only provides a physical stimulus to the car driver when a train is approaching.

2. Active rumble strip system diagram (plan view)



Airbag on train front



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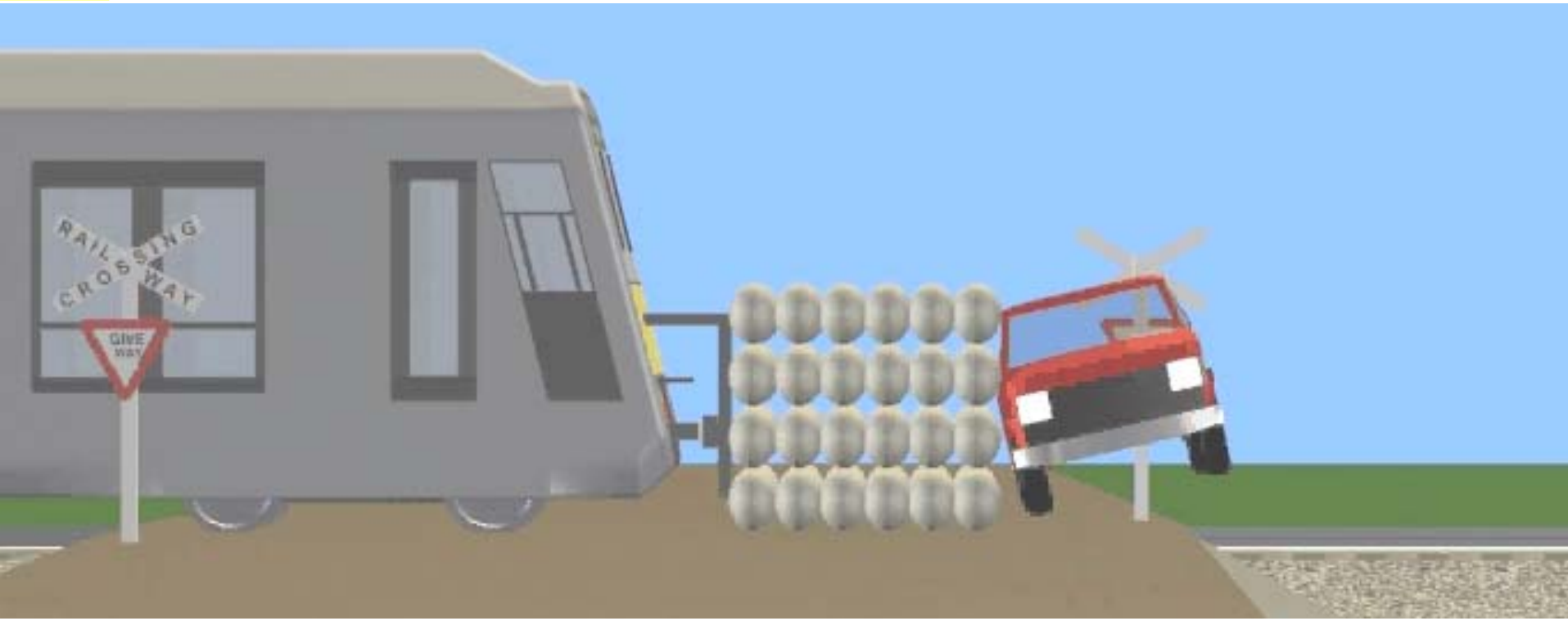

Where to from here

1. Review current administrative controls

1. The benefit, appropriateness and effectiveness of any educational programs should be quantified.
2. Review the effect of stop and give way signs at uncontrolled level crossings.
3. Implement enhanced train engine and rolling stock conspicuity measures
4. Review current methods of level crossing risk assessments which have not provided for high speed trains or actual levels of visibility available to truck drivers from truck cabins, or considered needs for each vehicle type[cars, buses, etc].

Where to from here [cont.]

2. Investigate Engineering Interventions

1. **Grade separation**
2. **Evaluate modern technology based methods to assist drivers to determine if it is safe to cross at uncontrolled level crossings.**
3. **Add Active and Passive Rumble Strips to all crossings with advance electronic active warning signs.**
4. **Evaluate Energy Attenuating Systems to the front of train engines to reduce the injury consequence of a train - road vehicle collision.**

Conclusions

1. No Silver Bullet.
2. Mix of design of crossings – signage / passive – prior to crossing.
3. Considering sight lines etc – active warnings – rumble strips.
4. Crashworthiness of trains.
5. Grade separation, where possible.
6. Provide alternate interim risk reduction practices in the time taken to implement identified level crossing upgrades.
7. Funding commensurate with need - not $30m/annum but $300m/annum Government and industry funding needs to be significantly increased to reduce the time lag of implementing necessary safety upgrades at many level crossings. Delays in implementation of such upgrades will result in further severe collisions at such crossings with attendant high cost and loss of life.

SIA Research Proposal

1. **Crash Test Research** required [airbags].
2. Evaluate proven technologies [e.g GPS]. SIA seeking a grant to co-ordinate a **Co-operative Research Project** involving e.g. MUARC and a Government and Industry partner.
3. SIA seeking Government support to conduct, during 2008-2009, an **independent Hazard Management Study of 20 level crossing sites**; and to coordinate a Cooperative Research Project.
4. **Adequacy of audible warnings –** consider hearing impaired – can't hear – use of ear related equipment – i.e. mobile phones, iPods etc.

Effective Safety rests with engineering controls

- SIA's strong view is that the global recognition of the hazardous nature of level crossings is best mitigated with the implementation of engineering controls.
- This effectively leads to the conclusion that it is the ultimate responsibility of the governing bodies and not of the general driving public to minimize level crossing risk.

Thank you

- **SIA appreciates and thanks the Road Safety Committee for the opportunity to contribute to this critical safety inquiry.**

References

- **SIA** written submission to the Parliament of Victoria, Road Safety Committee, Inquiry into Improving Safety at Railway Level Crossings, dated 15th October 2007.
- **DVExperts International** written Submission to the Parliament of Victoria, Road Safety Committee, Inquiry into Improving Safety at Railway Level Crossings, dated 17th December 2007.