Safety at RLX: Driver acceptance of potential ITS interventions

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Outline

- RLX collisions
- Driver acceptance of ITS
- Study method
- Results
- Implications of findings
RLX collisions

• More than 40% of rail-related fatalities
• 2% of road fatalities
• Substantial damage costs
• 46% unintended driver errors
• Flashing lights and bells halves incidents but expensive
Driver acceptance of ITS

• Acceptance needed to ensure use and compliance
• If technologies are not accepted, they are unlikely to be purchased or switched on, change driver behaviour and improve safety
• Acceptance concepts
  – ease of use and usefulness (Technology Acceptance Model)
  – effectiveness, usability, usefulness, equity (Regan et al., 2002)
Aim of the research

• Preliminary assessment of the acceptance by drivers of several potential technologies to increase driver awareness at RLX
Study method

- 4 focus groups
  - 2 Brisbane, 2 Rockhampton
  - 38 drivers
  - 68% female, aged 21-58 years
  - Experienced with passive and active crossings
  - Not rail workers
Typical passive and active RLX

Figure 1: Passive railway level crossing

Figure 8: Active railway level crossing
Simple in-vehicle warning

In-vehicle warning device: message similar to road signs
# In-vehicle train direction warning

<table>
<thead>
<tr>
<th></th>
<th>No train</th>
<th>Train arriving from right</th>
<th>Trains arriving from both sides</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
</tbody>
</table>

- **No train**: No train signal is displayed.
- **Train arriving from right**: An indicator shows the train is coming from the right.
- **Trains arriving from both sides**: A double indicator signifies trains approaching from both directions.
In-vehicle obstruction warning

Picture 4: In-vehicle warning device: information about the obstruction of the crossing
In-vehicle collision warning

Picture 5: In-vehicle warning device: likely collision
VMS warning system

Step 1: no train

Step 2: train approaching – 1st message

Step 3: train approaching – 2nd message
**Valet system**

Step 1: no train

Step 2: train approaching

Step 3: train very close

**Picture 7:** On-road warning: flashing lights on the road
Results – message content

• Train approaching, not crash imminent
• Presence of passive crossing
• Not train direction
Results - effectiveness

- Lack of trust in the technology
- Reliability
- Complacency
Results – ease of use

- Attention
- Visual recognition
- Audio recognition
- Message displayed
- Distraction and annoyance
- Driver control
Results - usefulness

- Unfamiliar areas
- High-risk individuals
- Concern regarding behavioural adaptation
Results – cost

- Incorporation into GPS
- Cost to individuals of repairs – or not
- Costs to govt of installation and maintenance
- Lower cost alternatives – road markings
- ITS versus active crossings
Implications of findings

• Usefulness major predictor of acceptability
• Effectiveness is more than just part of usefulness – a central construct
• Concerns about reliability
• Cost and equity
Acknowledgments

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Questions?

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