Presentation Overview

• R2.119 Baseline Rail Level Crossing Video project
  – Why the project was undertaken
  – Research methodology
  – Project team
  – Data collection
  – Concept of operations

• Student Projects aligned with R2.119
  – Understanding motivations of train drivers to report near-misses
Why Project was Undertaken?

• Number of level crossing collisions (lagging indicators) insignificant for data analysis

• Near-miss occurrences (leading indicators)
  – Occur with a frequency orders of magnitude greater than collisions
  – Reportable occurrences

• However, there are issues with current paper-based reporting
  – Under-reporting & inconsistencies in reporting
  – Subjectivity
  – Inaccuracies in retrospective description of events
Why Project was Undertaken?

- Pitfalls of causal analysis on sparse data\(^1\)
  - Over-interpretation
  - Tendency for analysts to identify causal factors representative of a category of failure rather than identifying characteristics that may distinguish it
  - Current near-miss reporting does not describe the “less visible influences” that may condition an incident

---

Baseline Rail Level Crossing Video

• What is Baseline Rail Level Crossing Video?
• A platform and process that
  – Supports the capture of objective data on near-miss occurrences
  – Supports retrospective incident analysis
  – Captures the most complete picture of the context and inter-relationships around occurrences that have been provided in near-miss reporting to date!
Reflection / Refinement Methodology

1. Collect data
2. Identify level crossing occurrences
3. Use model to describe causation in occurrences
4. Analyze how well model describes occurrences
5. Refine level crossing accident causation model
6. Identify level crossing occurrences
7. Refine level crossing accident causation model
824 Level crossings
451 Public
248 Occupational
28 Pedestrian
97 Queensland Rail
Train Black Box Data

![Graphs and images showing data analysis]

- Speed (km/h)
- Brake
- Power
- Kango

Comparisons a and b.
Alarms and Thresholds

± 5 seconds

Low alert threshold

High alert threshold

Klaxon not sounded = **Hard high** alert threshold

E.g. 310m for line speed 70 km/h

High alert threshold

**Hard high** alert threshold

Stop line (6.5m from rail)

Danger zone (3m from rail)
Benefits to the Rail Industry

• The integrated approach to safety data recording and analysis insures **systemic factors that condition, influence or potentially contribute to an occurrence** are captured both for safety occurrences and precursor events.

• Provides a rich tapestry of antecedent causal factors that can significantly improve learning around accident causation.

• The development of targeted and more effective countermeasures.

• Better risk models to estimate risk and prioritize safety funds.

• Inform improvements to existing paper-based reporting:
  – Better criteria and sub-categorization consistent with statutory reporting requirements
  – Simulator-based training for drivers to improve objectivity of reporting.
Student Projects aligned with R2.119

PhD student project: Video Analytics for the Detecting Events of Interest on Approach to Railway Level Crossings

Masters student project: Understanding Motivations of Train Drivers to Report Near-Misses

R2.119 Baseline RLX Video Project
Understanding Motivations of Train Drivers to Report Near-Misses

- Researchers agree near collision information is under-reported, but it is not known why
- It is not known what makes a driver decide to report one incident but not report another
- Information reported is subjective but it is not known how to improve this
Research Aims

• Identify potential factors which may contribute to the non-reporting of a near collision
• Establish why train drivers do not to report in particular situations
• Discover why train drivers do report in particular situations
• Understand the decision making process that occurs at the moment when a train driver determines that a particular situation is, or is not, a near miss
Methodology Overview

Phase 1
A questionnaire will be used to explore the underlying factors that influence train drivers’ near miss reporting activities.

(ethics approval pending)

Phase 2
The themes from the questionnaires will be postulated as open ended questions and presented to the two focus groups

(ethics approval pending)

Results
Improved understanding of near miss under-reporting
Informing metrics that should improve the quality and quantity of near collision reporting
Project Participants

Recruitment

• Call for volunteers through the project partner organisations

Bias

• Possible bias is acknowledged (some participants may have extensive personal experience with near misses, some may have none, however this is addressed by open invitation to all drivers)
How the results improve the project

- Demographic information regarding non-reporting
- Better understanding of near miss subjectivity
- Improved knowledge surrounding actual reasons for not reporting
Questions?

interchange

8-9 APRIL 2014

Questions?