Bureau de la sécurité des transports du Canada

Expanding the Use of On-Board Voice and Video Recorders

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Outline

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- 2. Trenton Junction Investigation (R99T0017)
- 3. Burlington Investigation (R12T0038)
- 4. Watchlist On-Board Voice and Video Recorders
- 5. LVVR Safety Study
 - Current Technology / Experience
 - Assessment Methodology
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Background

- No requirement for on-board voice and video recorders on locomotives.
- Limited installations have been on a voluntary basis by railways.

R99T0017 - Trenton Junction

- Train passed a signal that was indicating Stop.
- Train travelled over a switch in the reverse position, and then came to a full stop.
- No derailment, no injuries.

R99T0017 - Trenton Junction

- What happened that day?
- The signals worked as intended –
 So how were they missed.

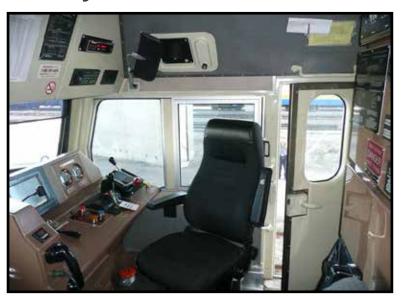
R99T0017 - Trenton Junction

"Had the locomotive event recorder (LER) in the controlling locomotive cab been equipped with voice recording capability, it may have been possible to determine more definitely the effectiveness of the crew's communications as they approached the occurrence location."



Recommendation R03-02

The Department of Transport, in conjunction with the railway industry, establish comprehensive national standards for locomotive data recorders that include a requirement for an on-board cab voice recording interfaced with on-board communications systems.



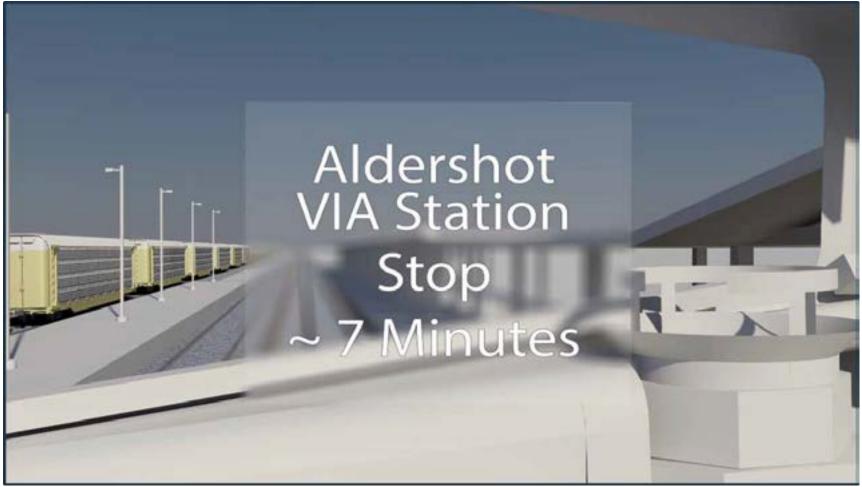
R12T0038 - Burlington



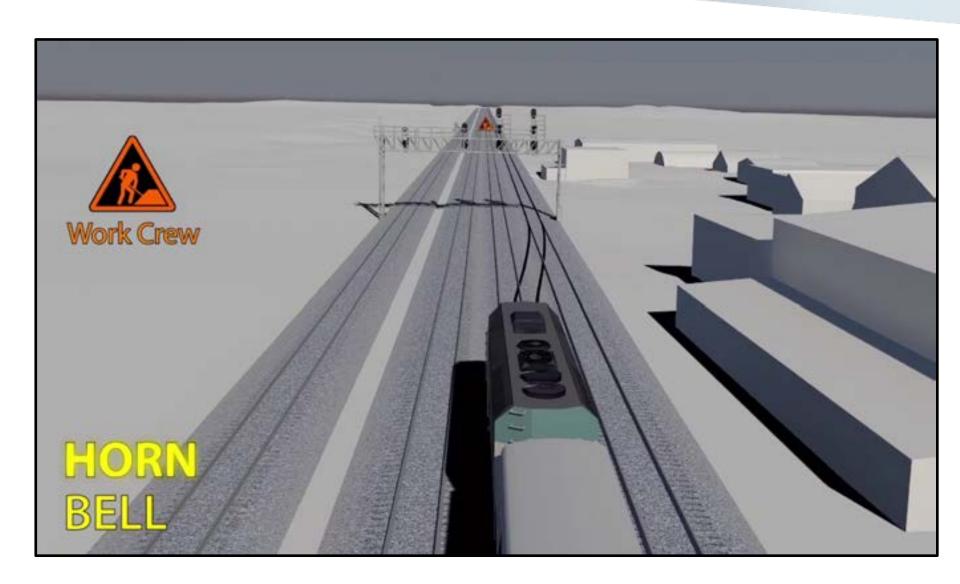
Railway Signals



The signals worked as intended – So how were they missed?







Findings as to Risk

 The lack of locomotive in-cab voice and video recorders and forward facing video recorders deprives accident investigators of valuable sources of information that can enhance safety.



Recommendation R13-02

The Department of Transport require that all controlling locomotives in main line operation be equipped with in-cab video cameras.



Watchlist 2014 On-board Voice and Video Recorders

- With no requirement for on-board voice and video recorders on locomotives, key information to advance railway safety may not always be available.
- Ensure that communications and interactions in locomotive cabs are recorded.
- The TSB is committed to working with the regulator and the railway industry to explore ways of making progress on this issue.

CTAISB Act

- CTAISB Act restricts the use of on-board recordings to TSB investigations.
 - Subsection 28(2) states that every on-board recording is privileged ...
 - Subsection 28(7) states that an on-board recording may not be used ... in disciplinary proceedings, proceedings relating to the capacity or competence of an officer or employee ..., or in legal or other proceedings.

Use of On-Board Recordings

TSB Investigations:

 LVVR is essential for fully understanding the sequence of events and for examining crew actions and interactions.

Expanded Use?:

 TSB, TC and other stakeholders see value in expanding the use of on-board recorders for legitimate safety purposes within the context of SMS programs.



TSB / TC Joint LVVR Safety Study

- Assess the technology and operational aspects of LVVR.
- Demonstrate the safety benefits of this technology.
- Identify best practices.
- Identify implementation issues.

LVVR Safety Study – Project Tasks

Project Tasks	Sub-Tasks
A. Technology Assessment	 Experience from the US. Experience from the other modes. Current Canadian experience. Common / Best Practices - Technology.
B. Legislative & Regulatory Assessment	 Applicable Acts and Regulations. Privacy Concerns. Other Legal Issues. Implications for other modes.
C. Operational / Human Factors Assessment	 Checklist for assessing On-Board Recordings. Triage and Detailed assessments. Common / Best Practices – Operational. Potential to evaluate Human Factors.
D. Safety Benefits Assessment	 Benefits for TSB Investigations. Benefits for proactive safety management.



Current Technology / Experience

Current Experience	Preliminary Observations
Experience from the U.S.	 Freight Railroads Passenger / Commuter Railroads Federal Railroad Administration NTSB
Experience from the other modes	Aviation - CVRsMarine - VDRs
Canadian Experience	 Locomotive Event Recorders Forward – facing video On-Board Voice & Video Recorders On-Board Voice Recorders On-Board Video Recorders









Assessment Methodology

Elements to Consider	 Operational – Normal Situation Human Performance Operational – Non-Normal Situation
Checklist for assessing On- Board Recordings	Voice & Video RecordingsVoice RecordingsVideo Recordings
Scenarios of Interest	 Time of day High vs. low periods of work Start vs. end of shift Additional Crew Members

Checklist for Assessing On-Board Recordings

A. Crew Information	•	Role of each crew member Crew interaction
B. Capturing element performance	ts of human • •	Level of alertness Workload Situation awareness
C. Locomotive contro	ols •	Coverage area Numerical readouts / position Inputs from crew members Responding to alarms
D. Non-normal situat	ions •	



Preliminary Observations

Operational

Voice & Video Recordings

Voice Recordings

Video Recordings

Concluding Comments

A. Complete the LVVR Safety Study:

- Data collection completed.
- Analysis to be completed in April 2016.
- Final report to be prepared in May 2016.

B. Next Steps:

- Circulate final report to stakeholders in all modes.
- TSB/TC discussions on "go-forward" plan.

Canada