Fatal Distraction
Crossing Collision between VIA Rail Passenger Train & an OC Transpo Double-Decker Bus

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Transportation Safety Board of Canada

- Independent Federal agency reporting annually to Parliament via the Government House Leader
- Multi-modal – Air - Marine - Rail/Pipeline
- Chairperson and four Board members
- 215 employees nationwide
- 27 Rail/Pipeline Investigation Branch
- 1 Director – 3 Managers – 2 Admin Support, 2 Pipeline & 19 Rail Investigators
What We Do

• Advance Transportation Safety by:
  • Conducting independent investigations
  • Making findings as to cause and contributing factors
  • Making Recommendations to reduce or eliminate safety deficiencies
  • The best Recommendation is “NO” recommendation
Report Publically

• TSB Yearly Report to Parliament

• Various TSB Safety Products (safety information & advisory letters, Board recommendations and safety concerns)

• TSB Public Release of Reports (Press Releases; Briefings; Website; Social Media)

• Post-Release Activities:
  Recommendation Assessments;
  Monthly & Annual Statistics

• TSB Watchlist
Canada has about 14000 public crossings:
- 2450 - Grade Separated
- 3300 - protected with flashing lights and bells (FLB)
- 2300 - protected with flashing lights, bells and gates (FLBG)
- 5950 Passive Crossings
Rail occurrences – 5 yr. avg. – 1470/year
Crossing accidents - 5 yr. avg. - 180/year (12%)
2015 – 165 (15 fatalities, 18 serious injuries)
2016 – 133 (19 fatalities, 24 serious injuries)
Crossing accidents represent about 12% of occurrences, they account for about 30% of the fatalities and injuries.
Review of the Accident
Findings & Recommendations
More detail on aspects of the investigation related to some core elements of the Conference:
- Distraction
- Enforcement
On the morning of September 18, 2013, an OC Transpo (city transit) double decker bus collided with a VIA Rail passenger train just 39 seconds after the bus departed a bus stop. Six people died, including the bus driver, and about 34 more were injured.

- The accident goes far beyond the actions of any one individual. Given the same circumstances, this accident could have happened to just about any driver. A few things we learned:

  - There was no evidence of any drugs, alcohol or fatigue, nor did any medical issue affect the driver’s performance.
  
  - The automated flashing lights, bells and gates at the crossings operated as designed. In fact, they were active for about 49 seconds before the bus struck the train.
The Accident

- The operation of the train met company and regulatory requirements and it was slowing down as it approached the VIA Fallowfield Station.

- The bus was well maintained, and the brakes were fully operational.

- To provide greater context, we put together a short video that illustrates the sequence of events that led to the accident that day, in real time.
R13T0192
Crossing Collision
OC Transpo / VIA
18 September 2013
Site Examination

The bottom portion of the skirt behind the pilot of VIA 915 was 20 inches (51 cm) above the ground at the point of collision. The side panel was 44 inches (112 cm) above the ground. The chassis of the ADL E500 bus, was about 17 inches (43 cm) above ground level, had passed beneath the bottom portion of the skirt behind the pilot and side panel of VIA 915.
Site Examination

The rear truck of VIA 915 had derailed to the north side of the rails, on the crossing.
Site Examination

- VIA 915 and the first passenger car (VIA 3455) had jackknifed and came to rest straddling the main and siding tracks. The front truck of VIA 915, the rear truck of VIA 3455 and the 3 other passenger cars came to rest on the main track. The rear truck of VIA 915 and front truck of VIA 3455 came to rest on the siding track.
Stopping Sight Distance (SSD)

- The crossing lights on Woodroffe Avenue and on the Transitway were fully visible when the bus was 402 feet (122.5 m) from the Transitway crossing (SSD 426’ required).
- No Active Advance Warning Sign (AAWS) with warning light installed.
Multiple factors that played a role in this accident. The elimination of any one of these may have reduced the severity of the outcome, or even prevented it from happening.

Broadly speaking, these factors included:
- Collision and derailment,
- Bus speed and braking,
- OC Transpo company practices,
- Driving distractions,
- Configuration of the Transitway, and
- Bus crashworthiness.
Findings as to causes and contributing factors

- Bus crashworthiness
- Crossing configuration
- OC Transpo Bus 8017 collision with VIA 51
- Driving distractions
- OC Transpo practices
- Bus speed and braking

- Bus did not stop at activated crossing, striking VIA 51
- Bus shell insufficient for collision
- Obstructed view of activated crossing signals
- No advance warning of activated crossing signals
- Negotiating curve reduced ability to detect crossing signals
- Cognitive distraction related to passenger seating
- Video monitor use during critical driving sequence
- Risks from use of video monitor not managed
- Training focused on smooth braking
- Insufficient speed monitoring and enforcement on Transitway
- Braking technique increased stopping distance
- Bus speed 67.6 km/h increased stopping distance
- Acceleration due to common practice and “no trains” expectation
- Tracks spread, derailing the VIA coaches
- Locomotive derailed
- OC Transpo practices
Findings as to risk

- The report also contains 17 findings as to risk. Although these did not lead directly to the accident, they are related to unsafe acts or conditions with the potential to degrade rail safety, including:
  - the lack of mitigating strategies to reduce bus driver distraction
  - the lack of adequate crashworthiness standards for transit buses
  - the lack of crashworthy event data recorders on passenger buses
  - the lack of guidance as to when grade separation for crossings should be considered
  - the lack of guidance as to whether buses should stop at all railway crossings
TSB Recommendations

• Transport Canada
  1. Guidelines for the installation and use of in-vehicle video displays (driver distraction)
  2. CMVSS crashworthiness standards for transit buses
  3. Commercial passenger bus event data recorders
  4. Grade separation guidelines for Canada

• The City of Ottawa
  5. Grade separation in Ottawa
Driving Distractions

• Distractions can come from many sources.
• In this occurrence, there were a number of visual distractions and cognitive distractions which influenced the driver’s behaviour and actions.
Visual Distractions

• To observe the video monitor, a driver must alternate glances between the roadway ahead and the video monitor.
• The upward viewing angle of the video monitor and small images displayed made the driver’s task of understanding the image difficult.
• The driver’s eyes would be directed completely away from the forward roadway view while looking at the screen.
• Driver eye glances away from the forward visual scene lasting 2 seconds or longer are significantly associated with accidents and near accidents.
• The driver was likely visually distracted by looking at the video monitor during the critical driving sequence of negotiating the left-hand curve and approaching the crossing.
Cognitive Distractions

- Just prior to departing from the OC Transpo Fallowfield Station, the driver engaged at least one passenger in conversation regarding seating availability on the upper deck.
- Once the bus was moving, the driver would have been able to hear nearby passengers on the lower deck involved in similar conversations.
- The upper deck view on the video monitor displayed a standing passenger near the top of the stairs and the driver was glancing at the video monitor.
- The driver may have been contemplating the need to make a “no standing on upper deck” announcement as per OC Transpo company policy.
- These elements combined to create a situation where the driver was also likely cognitively distracted in the seconds before the accident.
Speed and Stopping Distance

- In Canada, most Driver Training Handbooks instruct drivers approaching any railway crossing at-grade to slow down, be prepared to stop, and yield the right-of-way to a train.
- It was not uncommon for OC Transpo bus drivers to exceed the posted speed limit in the area of the crossing as they accelerated toward a section of the Transitway with a 90 km/h speed limit, north of the crossing, to make up time.
- While travelling at 67.6 km/h, the bus required a stopping distance of 117.8 feet (35.9 m) yet was only 116.8 feet (35.6 m) south of the point of collision when brakes were applied.
- The stopping distance for a bus travelling at the posted speed limit of 60 km/h (37.3 mph), with all other factors remaining the same, would have been 96.8 feet (29.5 m), or 20 feet (6.1 m) before the point of collision.
- Exceeding the posted speed limit of 60 km/h by 7.6 km/h just prior to the initial brake application, increased the stopping distance required.
Elements Essential for Crossing Safety

• As outlined by Operation Lifesaver, there are 3 elements that are essential to improve crossing safety:
  • Engineering to improve crossing protection;
  • Education for vehicle drivers on risks associated with railway crossings;
  • Enforcement of crossing violations to reinforce safe driving habits.
• A weakness in one or more of these elements can increase the risk of a crossing accident.
• How do these 3 elements relate to this accident?
• Engineering
  • the Transitway crossing was equipped with one of the highest levels of AWD protection currently in use in Canada.
• Education
  • The OC Transpo bus driver training curriculum contained limited information on crossing safety.
Elements Essential for Crossing Safety

- **Enforcement**
  - OC Transpo special constables periodically conducted speed testing, but there was little follow-up and no adverse consequence for a speeding violation on the Transitway. Following the accident, about 25% of OC Transpo buses continued to speed approaching and traversing the crossing.
  - OC Transpo buses were driven through activated crossing lights and around or under activated crossing gates. While each of these is an offence under the OHTA, the violations were not enforceable on the Transitway since it was a private roadway.
  - The Ottawa City by-law had no specific requirements to deal with distracted driving, vehicles that did not stop at activated railway crossing lights, and vehicles being driven around or under activated crossing gates.
  - With regards to crossing safety, OC Transpo oversight of driver education and enforcement of driving violations was ineffective.
In Conclusion

- Distractions can come from many sources.
- Features which are engineered into vehicle design that are intended to aid drivers can sometimes become a source of distraction if not managed carefully.
- If bus drivers do not receive targeted railway crossing safety education, and if driver compliance with the rules of the road is not actively enforced, railway crossing safety will not be optimized.
- In today’s world, we all need to be more vigilant in order to minimize the risk of distraction while driving particularly when approaching a level crossing.
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