NATIONAL TRANSPORTATION SAFETY BOARD
Public Meeting of July 25, 2017
(Information subject to editing)

Highway-Railroad Grade Crossing Collision
Valhalla, New York
February 3, 2015
NTSB/RAR-17-01

This is a synopsis from the NTSB's report and does not include the Board's rationale for the conclusions, probable cause, and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing to reflect changes adopted during the Board meeting.

Executive Summary

On February 3, 2015, at 6:26 p.m. eastern standard time, a 2011 Mercedes Benz ML350 sport-utility vehicle driven by a 49-year-old woman, traveled northwest on Commerce Street in Valhalla, New York, toward a public highway-railroad grade crossing on the Harlem Subdivision of the Metro-North Railroad. Traffic on Commerce Street was heavy and congested when the driver turned northeast and entered the boundary of the highway-railroad grade crossing and stopped.[1] The highway-railroad grade crossing consisted of two highway lanes (one for each direction) and two railroad tracks, and was equipped with reflectorized pavement markings, advance warning signs, flashing lights, and gates. The driver moved beyond the highway-railroad grade crossing boundary (stop line) and stopped adjacent to the railroad tracks. The grade crossing warning system activated and the gate came down, striking the rear of her vehicle. She then exited her vehicle and examined the gate. The driver then returned to her vehicle and moved forward on to the tracks. Meanwhile, Metro-North Railroad passenger train 659, consisting of eight passenger railcars, traveled north and approached the highway-railroad grade crossing at a speed of 59 miles per hour. The engineer from train 659 activated the train's emergency brakes about 260 feet before the highway-railroad grade crossing and collided with the sport-utility vehicle at a recorded speed of 51 miles per hour.

The train and the sport-utility vehicle continued northbound, resulting in the damage of the electrified third rail on the west side of the track. The third rail detached, pierced the sport-utility vehicle, and then entered the railcar. The train and the sport-utility vehicle came to rest about

[1] In this report, the term *boundary* is used for the reader to conceptualize the location of the sport-utility vehicle past the stop line of the highway-railroad grade crossing. This stop line indicates the point behind which highway vehicles are stopped or might be required to stop when the crossing warning system activates.

665 feet from the point of collision. An estimated 343 feet of third rail penetrated the first passenger railcar.

Metro-North Railroad estimated 645 passengers were on board train 659 at the time of the accident. Five passengers died and 9 passengers and the engineer were injured, all in the lead railcar. The driver of the sport-utility vehicle also died.

This report addresses the following safety issues:

- **Metro-North Railroad third rail design.** Metro-North Railroad's third rail system was not constructed to fail in a controlled manner or break away.[2] The National Transportation Safety Board found that Metro-North Railroad's third rail system was not constructed to break away when subjected to undesirable overloaded conditions such as those involved in this accident.
- **Grade crossings.** There were three grade crossings within 2 miles of the Commerce Street grade crossing. The state of New York Department of Transportation has a policy that allows for the consolidation of grade crossings wherever possible. The National Transportation Safety Board determined that the town of Mount Pleasant, New York, should take action to improve grade crossing safety.

- **Grade crossing risk assessment.** The investigation found that the proximity of highway-railroad grade crossings with third rail systems belonging to commuter railroads or rail transit properties could increase the severity of highway-railroad grade crossing accidents. The National Transportation Safety Board found that conducting a risk assessment of such conditions could help mitigate this increased risk of grade crossing accident severity.

Findings

1 None of the following were factors that contributed to this accident: (1) the mechanical condition of the train or sport-utility vehicle, (2) the engineer's performance, (3) environmental factors and weather, (4) the condition of the track, (5) the condition of the railroad signal system, (6) fatigue of the engineer, (7) cell phone use while operating the train or sport-utility vehicle, and (8) the use of alcohol or other drugs by the engineer.

2 The sport-utility vehicle driver was not under the influence of alcohol or other drugs at the time of the accident.

3 The sport-utility vehicle driver had no identified medical condition which may have contributed to the accident.

[2] *Third rail* refers to a conducting rail by which electric traction power is delivered to trains. On this system, as with most systems, the conductor rail is placed on the outside of the running rails.

4 The sport-utility vehicle driver was not experiencing performance decrements from chronic or acute fatigue at the time of the accident.

5 The sport-utility vehicle driver, for undetermined reasons, did not comply with the advance warning system at the Commerce Street highway-railroad grade crossing; stopped past the stop line within the boundary of the grade crossing; and moved on to the tracks.

6 After the grade crossing activated, the sport-utility vehicle driver's attention was most likely diverted to the crossing gate arm striking her vehicle, and the driver was unaware of the proximity of the approaching train.

7 The sound of a Metro-North Railroad train horn was audible from inside an exemplar 2011 Mercedes Benz ML350 sport-utility vehicle when a train was 350 feet from the Commerce Street highway-railroad grade crossing.

8 There was insufficient evidence to determine if the driver's familiarity with the operation of the sport-utility vehicle caused an inadvertent or unintentional forward movement at the Commerce Street grade crossing.

9 The introduction of sparks, flaming debris, and fuel into the lead railcar was the source of ignition and multiple areas of ignition contributed to the spread of a postaccident fire.

10 The emergency window exits that passengers used on the left side of the lead railcar functioned as designed, and there likely would have been more serious injuries due to the fire and smoke had these exits not functioned properly.

11 The power controller commands de-energized the electrical power to substations B26 and B29 in a timely manner following the collision.

12 The power controller completed the emergency power shutdown in a manner such that electrical power did not cause or contribute to injuries to the emergency responders or the train evacuees.

13 Metro-North Railroad's third rail system was not constructed to fail in a controlled manner or break away when subjected to undesirable overloaded conditions such as those involved in this accident.

14 The continued use of the Metro-North Railroad's current third rail system (which lacks controlled failure mechanisms) may increase the severity of railcar damage and serious injuries when accidents occur at or near grade crossings.

15 The presence of third rail systems at or near highway-railroad grade crossings on commuter railroads and rail transit properties could increase the severity of highway-railroad grade crossing accidents.

16 The highway-railroad grade crossing warning system on the Metro-North Railroad at Commerce Street functioned as designed when the accident occurred and met federal and state requirements.

17 The Metro-North Railroad highway-railroad grade crossing warning system preemption circuit was properly configured and it functioned as designed.

18 The state of New York Department of Transportation should assess the intersections near highway-railroad grade crossings in its regions with preempted traffic signals to determine whether timing adjustments are established based on engineering principles or current industry guidance.

19 The postaccident process taken by the town of Mount Pleasant to recommend closure of the Commerce Street highway-railroad grade crossing complied with the state of New York Department of Transportation and the Federal Highway Administration guidance regarding the closure of highway-railroad grade crossings.

20 The closure criteria attributes from the town of Mount Pleasant's study support closure of the Commerce Street highway-railroad grade crossing, as outlined in the Federal Highway Administration's August 2007 edition of the *Railroad-Highway Grade Crossing Handbook*.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the driver of the sport-utility vehicle, for undetermined reasons, moving the vehicle on to the tracks while the Commerce Street highway-railroad grade crossing warning system was activated, into the path of Metro-North Railroad train 659. Contributing to the accident was the driver of the sport-utility vehicle: (1) stopping beyond the stop line, within the boundary of the highway-railroad grade crossing, despite warning signs indicating the approach to the grade crossing; and (2) reducing the available time to clear the grade crossing by exiting the vehicle after the grade crossing warning system activated because the driver's attention was diverted by the grade crossing warning system crossing gate arm striking her vehicle. Contributing to the severity of the accident was the third rail penetrating the passenger compartment of the lead passenger railcar and the postaccident fire.

RECOMMENDATIONS

New Recommendations

As a result of its investigation, the National Transportation Safety Board makes the following new safety recommendations:

To the Federal Transit Administration:

1 Notify all rail transit properties that have third rail systems at or near highway-railroad grade crossings about this accident and advise them to conduct a risk assessment for those highway-railroad grade crossings.

2 After a full risk assessment is complete, require rail transit properties to implement corrections to their findings that will mitigate the risk of highway-railroad grade crossing accident severity.

To the Metro North Railroad:

3 Conduct a risk assessment for all highway-railroad grade crossings that have third rail systems present at or near those highway-railroad grade crossings and implement corrections based on your risk assessment findings that will mitigate the risk of highway-railroad grade crossing accident severity.

To the Long Island Rail Road, National Passenger Rail System, Port Authority Trans-Hudson Corporation, and Southeastern Pennsylvania Transportation Authority:

4 Conduct a risk assessment for all highway-railroad grade crossings that have third rail systems present at or near those highway-railroad grade crossings and implement corrections based on your risk assessment findings that will mitigate the risk of highway-railroad grade crossing accident severity.

To the state of New York Department of Transportation:

5 Once you complete an assessment at intersections in your regions near highway-railroad grade crossings with preemptive traffic signals, proceed with making any necessary adjustments based on engineering principles and current industry guidance.

To the town of Mount Pleasant, New York:

6 Take action based on the results of your traffic study and the Federal Highway Administration's August 2007 guidelines to improve grade crossing safety in the town of Mount Pleasant.