

NATIONAL TRANSPORTATION SAFETY BOARD
Virtual Meeting of February 8, 2022
(Information subject to editing)

Multivehicle Crash Near Mt. Pleasant Township, Pennsylvania
January 5, 2020
HWY20MH002

This is a synopsis from the NTSB's report and does not include the Board's rationale for the findings, probable cause, and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached findings 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

What Happened

About 3:30 a.m. on January 5, 2020, on the westbound Pennsylvania Turnpike near Mt. Pleasant Township, Pennsylvania, a motorcoach carrying 59 passengers ran off the right side of the road, hit the adjacent embankment, and overturned, blocking all westbound lanes. The motorcoach was rounding a curve at night and in light snow. Within seconds, two trucks towing semitrailers that were following the motorcoach hit it. A westbound car and a third truck drove off the road to avoid the wreckage. The motorcoach driver, two passengers, and both occupants of the second truck died in the crash; 49 of the motorcoach passengers and the codriver of the first truck were injured. The driver of the first truck, the occupants of the third truck, and the occupants of the car were uninjured.

What We Found

The regulatory speed limit on the turnpike is 70 mph, with an advisory speed of 55 mph on the curve where the crash occurred. The motorcoach driver entered the curve at 77 mph and struck the embankment at a speed of about 60 mph before overturning. We found that the motorcoach's engine brake was likely engaged, which can decrease traction on wet roadways. The first truck hit the motorcoach at a speed of about 21 mph, causing minor damage. The second truck crashed into the first truck and the motorcoach, causing catastrophic damage; its last recorded speed was 56 mph.

Most states use tools by the Federal Highway Administration (FHWA) for setting speed limits, yet using the 85th percentile in these tools is outdated and should be discontinued. One method to help drivers reduce their vehicle's speed is

variable speed limit signs that change the regulatory speed limit and are enforceable, such as by speed safety cameras, which are an effective countermeasure to reduce speeding-related crashes. In this crash, we found that such signs could have led the drivers to travel at lower speeds and potentially prevented or mitigated the crash. Another method for reducing vehicle speeds is advanced speed-limiting technology in vehicles, which could also help drivers avoid exceeding speed limits.

We determined that the circumstances of the impacts for each of the three trucks were likely outside the capabilities of the collision avoidance system available on the vehicles or outside the testing performance protocols being developed by the National Highway Traffic Safety Administration (NHTSA). However, it is critical that the full functionality of installed collision avoidance systems be maintained in the event they are necessary. In this crash, we found that one of the truck's collision avoidance systems was not operational and that commercial drivers could improve vehicle safety by reporting defects or faults in collision avoidance systems on driver vehicle inspection report forms.

We also found that connected vehicle technology, if installed on the vehicles involved in the crash, could have provided information about the overturned motorcoach in the roadway to alert drivers to the hazard they were approaching. However, recent regulatory action by the Federal Communications Commission (FCC) has reduced the size of the intelligent transportation system communication spectrum and allows harmful interference from unlicensed devices, such as those that use wi-fi; we believe this action threatens the future deployment of connected vehicle technology.

Lastly, we found that video event recorder systems on commercial vehicles, such as that installed on one of the trucks, can provide vital information in for evaluating the circumstances leading to a crash, as well as critical vehicle dynamics and occupant kinematics data for assessing crash severity. Further, motor carriers can proactively use the systems to aid in driver training and address driver behaviors that increase crash risk.

Probable Cause

We determined that the probable cause of the crash near Mt. Pleasant Township, Pennsylvania, was the motorcoach driver's loss of control due to the motorcoach's unsafe speed on the wet curve and the driver's likely excessive steering inputs, which caused the motorcoach to run off the road, strike an embankment, and subsequently roll over across the roadway, which led to two commercial trucks colliding with the motorcoach. Contributing to the severity of the crash was the high initial and impact speed of the second truck.

What We Recommended

Because of the outdated nature of relying on the 85th percentile speed for determining speed limits, we recommended that the FHWA evaluate the applicability and use of the 85th percentile speed input variable in its tools for setting appropriate speed limits. To address speed on the Pennsylvania Turnpike, we recommended that the Commonwealth of Pennsylvania seek authority to allow speed safety cameras to be used on the turnpike outside of active work zones. We also recommended that the Pennsylvania Turnpike Commission implement the use of variable speed limit signs or other similar technology to adjust statutory speeds based on real-time information regarding weather and road conditions. Further, we reiterated a recommendation to the Commonwealth of Pennsylvania to authorize state and local agencies to use automated speed enforcement.

To address the importance of connected vehicle technology, we made recommendations regarding spectrum allocation and performance standards. We recommended that the US Department of Transportation implement a plan for nationwide connected vehicle technology deployment to address the limitations associated with the reduced spectrum for intelligent transportation systems and interference from unauthorized devices, such as those that use wi-fi. We also recommended that the FCC implement appropriate safeguards to protect vehicle-to-everything communications from harmful interference from unlicensed devices, such as those that use wi-fi. We reiterated recommendations to NHTSA to develop minimum performance standards for connected vehicle technology for all highway vehicles and, once standards are developed, to require this technology to be installed on all newly manufactured highway vehicles.

We also reiterated recommendations to NHTSA to develop performance standards for advanced speed-limiting technology for heavy vehicles and, once standards are developed, to require that all newly manufactured heavy vehicles be equipped with such devices. Similarly, we also reiterated a recommendation to NHTSA to complete the development and application of performance standards for forward collision avoidance systems in commercial vehicles.

Regarding onboard video event recorders, we recommended that NHTSA require that all buses and trucks over 10,000 pounds gross vehicle weight rating be so equipped and that the Federal Motor Carrier Safety Administration (FMCSA) provide guidance to motor carriers to proactively use the onboard video event recorder information to aid in driver training and ensure driver compliance with regulatory rules essential for safe operation. We also reiterated a recommendation to the American Bus Association and the United Motorcoach Association to encourage their members to ensure that any onboard video system in their vehicles provides visibility of the driver and of each occupant seating location, visibility forward of the vehicle, optimized frame rate, and low-light recording capability.

Because of the importance of collision avoidance systems to be operational, we recommended that the FMCSA add collision avoidance systems to the parts and accessories that the driver vehicle inspection report form will cover. We also recommended that the American Trucking Associations, the Owner-Operator Independent Drivers Association, the Commercial Vehicle Safety Alliance, the American Bus Association, and United Motorcoach Association, the Transport Workers Union, the Amalgamated Transit Union, and the International Brotherhood of Teamsters inform their members about the importance of drivers reporting faults concerning advanced safety features on the driver vehicle inspection report form (if they are not already identified on the form). We further recommended that FedEx Ground Package System (FedEx) and United Parcel Service of America (UPS) require their drivers to report faults concerning advanced safety features, such as automatic emergency braking, in the optional section of the driver vehicle inspection report form (if they are not already identified on the form).

Findings

1. None of the following were factors in the crash: (1) qualifications of the motorcoach driver, (2) use of alcohol or other drugs by the motorcoach driver, (3) cell phone use by the motorcoach driver, (4) mechanical condition of the motorcoach, (5) pavement condition, and (6) roadway salt treatment used to address the freezing conditions.
2. The emergency response to the crash, including transportation of the injured, was timely and effective.
3. Although the motorcoach driver had adequate opportunities for sleep in the days before the crash, when and how long he slept and the quality of any sleep he had could not be determined.
4. The evidence is insufficient to establish that fatigue was a factor in the crash.
5. The motorcoach's engine brake was likely engaged at the time of the crash when the driver released the service brake and the throttle.
6. For unknown reasons, the motorcoach driver likely made excessive steering inputs beyond those needed to negotiate the curve.
7. The motorcoach driver was traveling too fast for the wet roadway conditions, on a curve with the engine brake likely engaged, resulting in a loss of vehicle control that led to the roadway departure and impact with the right-side embankment.
8. The motorcoach driver's likely use of the engine brake on the curve where the crash occurred reduced the available traction on the roadway.

9. Because the FedEx truck was traveling at a reduced speed when the driver became aware of the overturned motorcoach, the driver had time to react by braking, thus mitigating the severity of the truck's impact with the motorcoach.
10. Although the driver of UPS-1 attempted to avoid the impact with the rear of the FedEx truck, UPS-1's initial speed was too fast for the wet roadway conditions and made the driver's braking attempts ineffective in substantially reducing his vehicle's speed before the impact, contributing to the severity of the injuries sustained by the motorcoach passengers and the UPS-1 drivers.
11. The UPS-2 driver most likely had cues to the slowing and crashed vehicles ahead, enabling him to reduce the truck's speed, steer to the right, and therefore inflict only minor damage to the car stopped alongside UPS-1.
12. Had variable speed limit signs that change the regulatory speed limit and are enforceable, such as by speed safety cameras, been used to inform the drivers involved in the crash to slow to a speed more appropriate for a wet road surface, they would have been more likely to travel at lower speeds, which could have prevented or mitigated the crash.
13. The 85th percentile speed used in the Federal Highway Administration's tools, USLIMITS2 and the National Cooperative Highway Research Program 966, to set appropriate speed limits on all roadways is outdated and should be de-emphasized.
14. Speed safety cameras are an effective countermeasure to reduce speeding-related crashes, fatalities, and injuries.
15. Because advanced speed-limiting technology in vehicles can detect and respond to posted speed information and provide alerts, the technology can be used to help drivers avoid exceeding regulatory, advisory, and variable speed limits.
16. Maintaining the full functionality of installed collision avoidance systems is critical to vehicle safety, should a situation occur where collision avoidance is necessary.
17. The circumstances of the impacts for each of the three trucks were likely outside the capabilities of the collision avoidance system available on the vehicles and the parameters of the National Highway Traffic Safety Administration's research test procedures.
18. Connected vehicle technology, if installed on the vehicles involved in the crash, could have provided information about the overturned motorcoach in the roadway to the FedEx truck, UPS-1, UPS-2, and the car, so that the drivers could be alerted to the hazard they were approaching, and the automated vehicle systems or the drivers might have prevented or mitigated the crashes involving those vehicles.

19. Recent regulatory action by the Federal Communications Commission that decreases the size of the intelligent transportation system communication spectrum and allows harmful interference from unlicensed devices, such as those that use wi-fi, threatens the future deployment of connected vehicle technology.
20. Leadership by the US Department of Transportation is needed to establish regulatory certainty and resolve critical issues related to vehicle-to-everything communication protocols; interference from unlicensed devices, such as those that use wi-fi; and sufficiency of communication spectrum needed for advanced connected vehicle applications.
21. If drivers report defects or faults in collision avoidance systems on driver vehicle inspection report forms, repairs can be made more readily, thus improving the operational safety of the vehicle.
22. The forward- and inward-facing video event recorder system on the FedEx truck provided valuable information on the speed and operation of the motorcoach as it passed the FedEx truck, the hazard presented by the overturned motorcoach blocking all travel lanes, the FedEx driver's response to the overturned motorcoach, and the severity of the initial collision and the subsequent collision by the UPS-1 truck.
23. Onboard video event recorder systems, providing at a minimum visibility forward of the vehicle and inward toward the driver's face and instrument panel and parametric data associated with the event, such as real clock time, GPS location, and acceleration data, can provide valuable information for evaluating the circumstances leading to a crash, as well as critical vehicle dynamics and occupant kinematics data for assessing crash severity.
24. Information from onboard video event recorder systems can proactively be used by motor carriers to aid in driver training and address driver behaviors that have crash risks associated with them.

New Recommendations

To the US Department of Transportation:

1. Implement a plan for nationwide connected vehicle technology deployment that (1) resolves issues related to interference from unlicensed devices, such as those that use wi-fi; (2) ensures sufficient spectrum necessary for advanced connected vehicle applications; and (3) defines communication protocols to be used in future connected vehicle deployment.

To the Federal Highway Administration:

2. Evaluate the applicability and use of the 85th percentile speed input variable in both of your tools, USLIMITS2 and the National Cooperative Highway Research Program 966, for setting appropriate speed limits to reduce serious and fatal injuries.

To the National Highway Traffic Safety Administration:

3. Require that all buses and trucks over 10,000 pounds gross vehicle weight rating be equipped with onboard video event recorders that record, at a minimum, parametric data associated with the event, such as real clock time, GPS location, and acceleration data, and visibility of the driver's face and of each occupant seating location, visibility of the instrument panel, visibility forward of the vehicle, optimized frame rate, and low-light recording capability.

To the Federal Motor Carrier Safety Administration:

4. Provide guidance to motor carriers to proactively use the onboard video event recorder information to aid in driver training and ensure driver compliance with regulatory rules essential for safe operation.
5. Add collision avoidance systems, including automatic emergency braking, to the parts and accessories listed at 49 *Code of Federal Regulations*, section 396.11 (a)(1) that the driver vehicle inspection report form will cover.

To the Federal Communications Commission:

6. Implement appropriate safeguards to protect vehicle-to-everything communications from harmful interference from unlicensed devices, such as those that use wi-fi.

To the Commonwealth of Pennsylvania:

7. Seek authority to allow speed safety cameras to be used on the Pennsylvania Turnpike outside of active work zones.

To the Pennsylvania Turnpike Commission:

8. Implement the use of variable speed limit signs or other similar technology to adjust statutory speeds based on real-time information regarding weather and road conditions.

To the American Trucking Associations, the Owner-Operator Independent Drivers Association, the Commercial Vehicle Safety Alliance, the American Bus Association, the United Motorcoach Association, the Transport Workers Union, the Amalgamated Transit Union, and the International Brotherhood of Teamsters:

9. Inform your members about the importance of drivers reporting faults concerning advanced safety features, such as automatic emergency braking, in the optional section of the driver vehicle inspection report form (if they are not already identified on the form).

To the American Bus Association and the United Motorcoach Association:

10. Inform your members about the circumstances of the Mt. Pleasant Township crash, the importance of drivers following the Federal Motor Carrier Safety Administration's guidance on engine retarders, "Motorcoach Brake Systems and Safety Technologies," and the need to incorporate the guidance into their members' training and manuals.

To FedEx Ground Package System and United Parcel Service of America:

11. Require your drivers to report faults concerning advanced safety features, such as automatic emergency braking, in the optional section of the driver vehicle inspection report form (if they are not already identified on the form).

Reiterated Recommendations

To the National Highway Traffic Safety Administration:

Develop performance standards for advanced speed-limiting technology, such as variable speed limiters and intelligent speed adaptation devices, for heavy vehicles, including trucks, buses, and motorcoaches. (H-12-20)

After establishing performance standards for advanced speed-limiting technology for heavy commercial vehicles, require that all newly manufactured heavy vehicles be equipped with such devices. (H-12-21)

Develop minimum performance standards for connected vehicle technology for all highway vehicles. (H-13-30)

Once minimum performance standards for connected vehicle technology are developed, require this technology to be installed on all newly manufactured highway vehicles. (H-13-31)

Complete, as soon as possible, the development and application of performance standards and protocols for the assessment of forward collision avoidance systems in commercial vehicles. (H-15-5)

To the Commonwealth of Pennsylvania:

Authorize state and local agencies to use automated speed enforcement.
(H-17-32)

To the American Bus Association and the United Motorcoach Association:

Encourage your members to ensure that any onboard video system in their vehicles provides visibility of the driver and of each occupant seating location, visibility forward of the vehicle, optimized frame rate, and low-light recording capability. (H-15-2)