NATIONAL TRANSPORTATION SAFETY BOARD
Public Meeting of July 23, 2013
(Information subject to editing)

Highway Accident Report: School Bus and Truck Collision at Intersection Near Chesterfield, New Jersey February 16, 2012

This is a synopsis from the Safety Board's report and does not include the Board's rationale for the conclusions, probable cause, and safety recommendations. Safety Board 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.

EXECUTIVE SUMMARY

On Thursday, February 16, 2012, about 8:15 a.m. eastern standard time, near Chesterfield, New Jersey, a Garden State Transport Corporation (GST) 2012 IC Bus, LLC, school bus was transporting 25 kindergarten–sixth-grade students to Chesterfield Elementary School. The bus was traveling north on Burlington County Road (BCR) 660 through the intersection with BCR 528, while a Herman's Trucking Inc. 2004 Mack roll-off[1] truck with a fully loaded dump container was traveling east on BCR 528, approaching the intersection. The school bus driver had stopped at the flashing red traffic beacon and STOP sign. As the bus pulled away from just forward of the white stop line on BCR 660 and entered the intersection, it failed to yield to the truck and was struck behind the left rear axle. The bus rotated nearly 180 degrees and subsequently struck a traffic beacon support pole. One bus passenger was killed. Five bus passengers sustained serious injuries, 10 bus passengers and the bus driver received minor injuries, and nine bus passengers and the truck driver were uninjured.

The crash investigation focused on the following safety issues:

- **School bus driver fatigue, sedating prescription medications, medical conditions, and commercial driver's license medical examinations:** These factors were examined to assess what might have caused the school bus driver to proceed into the

[1] A *roll-off container* is typically an open steel receptacle used to remove and contain construction and demolition waste. Roll-off (also known as a roll-off cable hoist) service refers to the installation of hydraulically operated rails and a cable hoist designed to load rectangular dumpsters atop the truck chassis behind the cab. Hydraulic pistons elevate and lower the forward end of the rails to work in concert with the cable hoist to raise or lower the dumpster onto the back of the truck.

intersection despite having adequate sight distance after stopping for the red traffic beacon and STOP sign.

- **Truck driver speed, oversight of overweight commercial vehicles, brake maintenance, and final stage manufacturing air brake system installation:** The final stage manufacturer improperly installed the lift axle air brakes on the truck, which—along with the condition of the brakes, overloading of the vehicle, and the truck's speed—led to the severity of the collision with the school bus.

- **Connected vehicle technology:** Effective countermeasures are needed to assist in preventing intersection crashes—for example, systems such as connected vehicle technology could have provided an active warning to the school bus driver of the approaching truck as he began to cross the intersection. Although the bus driver was adamant in his postcrash interview that he had pulled forward sufficiently to see clearly in both directions, he failed to see the oncoming truck and proceeded into its path.

- **School bus occupant injuries and school bus crashworthiness:** The truck striking the school bus, as well as the bus striking the traffic beacon support pole, created high lateral forces that led to penetration of the bus interior. These factors contributed to the one fatality and severe injuries. Although the school bus was equipped with lap belts, the NTSB sought to determine how many passengers were using their seat belts, and examined whether properly worn lap belts and interior school bus protection measures could have improved the crashworthiness of the bus and mitigated passenger injury.

As a result of this crash investigation, the NTSB makes recommendations to the Federal Motor Carrier Safety Administration (FMCSA); National Highway Traffic Safety Administration (NHTSA); the states of California, Florida, Louisiana, New Jersey, New York, and Texas; the National Truck Equipment Association; National Association of State Directors of Pupil Transportation Services; National Association for Pupil Transportation; National School Transportation Association; School Bus Manufacturers Technical Council; National Safety Council School Transportation Section; and Herman's Trucking Inc. The NTSB reiterates four recommendations to the FMCSA and three recommendations to NHTSA.

CONCLUSIONS

1. None of the following were factors in the crash: (1) alcohol impairment or illicit drug use by the school bus driver, or alcohol, over-the-counter, prescription medication, or illicit drug use by the truck driver; (2) in-vehicle or external distractions, including cell phone use; (3) truck driver fatigue; (4) operations by Garden State Transport Corporation, the school bus motor carrier; (5) school bus mechanical defects or deficiencies; or (6) weather.

2. The emergency response was timely and adequate.

3. The truck was within the school bus driver's available line of sight and within a hazardous proximity when the bus driver began to cross the intersection.

4. The driver of the truck was driving in excess of the posted speed limit before braking for the impending collision, and this higher speed contributed to the severity of the crash.

5. The school bus driver did not effectively scan Burlington County Road 528 for oncoming traffic and failed to observe the approaching truck prior to impact.

6. The school bus driver was fatigued due to acute sleep loss, chronic sleep debt, and poor sleep quality associated with his medical conditions and alcohol use; the sedative side effects from prescription medications; and the synergistic effect of these factors.

7. The school bus driver's fatigue contributed to his reduced vigilance and detection of the approaching truck.

8. The school bus driver failed to disclose pertinent information about his medical history as required on the commercial driver's license medical certification examination form, which prevented the accurate assessment of his qualifications to drive a school bus in commercial operations.

9. The commercial driver's license medical examiner did not thoroughly evaluate the school bus driver for medical conditions that could have disqualified him from receiving a commercial driver's license.

10. Based on the school bus driver's combination of medical conditions and use of multiple prescription medications, it is likely that he would not have been medically certified to drive a school bus if: (1) he had fully disclosed his medical history on the commercial driver's license medical certification examination form, or (2) the medical examiner had completed a more thorough evaluation.

11. Some medical professionals who are authorized to perform medical examinations and certify commercial drivers as fit to drive may lack the knowledge and information critical to certification decisions; consequently, drivers with serious medical conditions may not be sufficiently evaluated to determine whether their conditions pose a risk to highway safety.

12. The combination of the truck's defective brakes and overweight condition reduced its overall braking efficiency, thereby contributing to the severity of the crash.

13. Had the truck been equipped with an onboard weighing system, the truck driver would have had information about its overweight condition.

14. Had the truck been equipped with an onboard brake stroke monitoring system, the truck driver could have had information about the out-of-adjustment and impending out-of-adjustment brakes.

15. Due to improper installation of the lift axle brake system by Automated Waste Equipment, the brakes on the truck would not likely have met FMVSS 121 timing requirements at the time of manufacture.

16. Had the lift axle brake system been properly installed on the truck, air would have been applied to the brakes earlier, thereby reducing the severity of the crash.

17. The driver of the truck did not ensure that his vehicle was within allowable weight restrictions, despite the requirement to do so and the fact that there was a weigh station 2.5 miles from his originating point.

18. Herman's Trucking did not have effective oversight of its drivers to ensure that the company truck was routed, as required by law, to the closest weighing scales, thereby preventing the transportation of overweight loads on public roads.

19. Although the sight distance available for vehicles stopping at the stop line on northbound Burlington County Road 660 was inadequate, it did not contribute to the cause of the crash because the school bus driver stopped forward of the stop line, where there was sufficient sight distance.

20. The skew of the Burlington County Road 528–660 intersection required the school bus driver to turn farther to the left to observe oncoming traffic, which called for more continuous scanning to safely cross the highway.

21. Burlington County took direct steps following the crash to improve the safety of the Burlington County Road 528–660 intersection.

22. Connected vehicle technology could have provided active warnings to the school bus driver of the approaching truck and possibly prevented the crash.

23. The analysis of potential harmful interference from large numbers of unlicensed national information infrastructure devices is critical prior to opening up safety-sensitive frequencies to these devices, particularly to prevent delay in rulemaking on connected vehicle technologies in both passenger cars and commercial vehicles.

24. The fatally and severely injured passengers were seated in the back half of the school bus, in the area of the higher impact forces and accelerations.

25. Some students on the school bus wore their lap belts improperly or not at all.

26. Based on information from both the Chesterfield, New Jersey, and the Port St. Lucie, Florida, crashes, lap belts can provide a benefit to passengers who wear them properly.

27. Adding protection to school bus sidewalls, sidewall components, seat frames, and other currently exempt interior components can reduce injuries to unbelted or lap-belted school bus passengers.

28. In the Port St. Lucie, Florida, crash, the combination of high forces, lack of upper body restraint, and loss of seating system integrity resulted in fatal injuries to one passenger.

29. The design of a school bus restraint system must also focus on maintaining the integrity of the seating system during severe impact scenarios.

30. In severe side impact crashes, such as Chesterfield, New Jersey, and Port St. Lucie, Florida, properly worn lap and shoulder belts reduce injuries related to upper body flailing commonly seen with lap belts only and, therefore, provide the best protection for school bus passengers.

31. Better student, parent, and school district education and training may increase usage and the proper fit of passenger seat belts in school buses.

32. Although school buses are extremely safe, properly worn passenger seat belts make the school bus safer, especially in severe side impacts and rollovers.

PROBABLE CAUSE

The National Transportation Safety Board (NTSB) determines that the probable cause of the Chesterfield, New Jersey, crash was the school bus driver's failure to observe the Mack roll-off truck, which was approaching the intersection within a hazardous proximity. Contributing to the school bus driver's reduced vigilance were cognitive decrements due to fatigue as a result of acute sleep loss, chronic sleep debt, and poor sleep quality, in combination with, and exacerbated by, sedative side effects from his use of prescription medications. Contributing to the severity of the crash was the truck driver's operation of his vehicle in excess of the posted speed limit, in addition to his failure to ensure that the weight of the vehicle was within allowable operating restrictions. Further contributing to the severity of the crash were the defective brakes on the truck and its overweight condition due to poor vehicle oversight by Herman's Trucking, along with improper installation of the lift axle brake system by the final stage manufacturer—all of which degraded the truck's braking performance. Contributing to the severity of passenger injuries were the nonuse or misuse of school bus passenger lap belts; the lack of passenger protection from interior sidewalls, sidewall components, and seat frames; and the high lateral and rotational forces in the back portion of the bus.

RECOMMENDATIONS

New Recommendations

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

To the Federal Motor Carrier Safety Administration:

1. Require that all persons applying for inclusion on the National Registry of Certified Medical Examiners have both a thorough knowledge of pharmacology and current prescribing authority. (H-13-XX)

To the National Highway Traffic Safety Administration:

2. Develop minimum performance standards for onboard vehicle weighing systems for trucks that have a gross vehicle weight rating of 10,000 pounds or more and are typically field loaded and used in the transportation of aggregates or earthen construction materials, raw natural resources, and garbage or refuse, or in logging and timber operations, or agricultural operations. (H-13-XX)
3. Once minimum performance standards for onboard vehicle weighing systems are established, require these systems to be installed on newly manufactured trucks that have a gross vehicle weight rating of 10,000 pounds or more and are typically field loaded and used in the transportation of aggregates or earthen construction materials, raw natural resources, and garbage or refuse, or in logging and timber operations, or agricultural operations.[VC-CAH] (H-13-XX)
4. Develop minimum performance standards for connected vehicle technology for all highway vehicles. (H-13-XX)
5. Once minimum performance standards for connected vehicle technology are developed, require this technology to be installed on all newly manufactured highway vehicles. (H-13-XX)

To the states of California, Florida, Louisiana, New Jersey, New York, and Texas:

6. Develop (1) a handout for your school districts to distribute annually to students and parents about the importance of the proper use of all types of passenger seat belts on school buses, including the potential harm of not wearing a seat belt or wearing one but not adjusting it properly; and (2) training procedures for schools to follow during the twice yearly emergency drills to show students how to wear their seat belts properly. (H-13-XX)

7. Upon publication of the National School Transportation Specifications and Procedures document, revise the handout and training procedures developed in Safety Recommendation 6 to align with the national procedures as appropriate. (H-13-XX)

To the National Truck Equipment Association:

8. Notify your members of the Chesterfield crash and of the need to check their vehicles for potentially improper lift axle brake installation. (H-13-XX)

To the National Association of State Directors of Pupil Transportation Services (NASDPTS), National Association for Pupil Transportation (NAPT), National School Transportation Association (NSTA), School Bus Manufacturers Technical Council (SBMTC), and National Safety Council School Transportation Section:

9. Develop guidelines and include them in the next update of the National School Transportation Specifications and Procedures to assist schools in training bus drivers, students, and parents on the importance and proper use of school bus seat belts, including manual lap belts, adjustable lap and shoulder belts, and flexible seating systems. (H-13-XX)

To the National Association of State Directors of Pupil Transportation Services (NASDPTS), National Association for Pupil Transportation (NAPT), and National School Transportation Association (NSTA):

10. Provide your members with educational materials on lap and shoulder belts providing the highest level of protection for school bus passengers, and advise states or school districts to consider this added safety benefit when purchasing seat belt-equipped school buses. (H-13-XX)

To the School Bus Manufacturers Technical Council:

11. Develop a recommended practice for establishing and safeguarding the structural integrity of the entire school bus seating and restraint system, including the seat pan attachment to the seat frame, in severe crashes—in particular, those involving lateral impacts with vehicles of large mass. (H-13-XX)

To Herman's Trucking Inc.:

12. Develop and implement route procedures to prevent the transportation of overweight loads. (H-13-XX)

Previously Issued Recommendations Reiterated in This Report

As a result of this accident investigation, the National Transportation Safety Board reiterates the following previously issued safety recommendations:

To the Federal Motor Carrier Safety Administration:

1. Develop a comprehensive medical oversight program for interstate commercial drivers that contains the following program elements:

   Individuals performing medical examinations for drivers are qualified to do so and are educated about occupational issues for drivers. (H-01-17)

   Medical certification regulations are updated periodically to permit trained examiners to clearly determine whether drivers with common medical conditions should be issued a medical certificate. (H-01-19)

   Individuals performing examinations have specific guidance and a readily identifiable source of information for questions on such examinations. (H-01-20)

   The review process prevents, or identifies and corrects, the inappropriate issuance of medical certification. (H-01-21)

To the National Highway Traffic Safety Administration:

1. Develop minimum performance standards for onboard brake stroke monitoring systems for all air-braked commercial vehicles. (H-12-58)

2. Once the performance standards in Safety Recommendation H-12-58 have been developed, require that all newly manufactured air-braked commercial vehicles be equipped with onboard brake stroke monitoring systems. (H-12-59)

Previously Issued Recommendation Reiterated and Reclassified in This Report

As a result of this accident investigation, the National Transportation Safety Board reiterates and reclassifies from "Open – Acceptable Response to "Open – Unacceptable Response" the following previously issued safety recommendations:

1. Develop and incorporate into the FMVSS, performance standards for school buses that address passenger protection for sidewalls, sidewall components, and seat frames. (H-01-40)