



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** February 8, 2012

**In reply refer to:** H-11-46

Chris L. Nicastro, Ph.D.  
Commissioner  
Department of Elementary and  
Secondary Education  
Post Office Box 480  
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The National Transportation Safety Board (NTSB) is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge you to take action on the safety recommendation in this letter. The NTSB is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

The recommendation addresses the need to revise school bus driver training to include the risk of driver inattention, the importance of proper scanning, and the necessity of keeping a safe following distance. This recommendation is derived from the NTSB's investigation of a multivehicle collision that occurred near Gray Summit, Missouri, on August 5, 2010, as traffic slowed in the approach to an active work zone on eastbound Interstate 44 (I-44), and motor vehicles merged from the closed left lane to the right lane. A 2007 Volvo truck-tractor with no trailer was traveling eastbound in the right lane and had slowed or stopped behind traffic. About 10:11 a.m. central daylight time, a 2007 GMC Sierra extended cab pickup truck merged from the left to the right lane and struck the rear of the Volvo tractor. This collision was the first in a series of three.

A convoy of two school buses from St. James High School, St. James, Missouri, was traveling eastbound in the right lane of I-44, approaching the slowed traffic and the collision ahead. Their destination was the Six Flags St. Louis amusement park in Eureka, Missouri. The lead bus was a 71-passenger school bus, occupied by 23 passengers. Following closely behind the lead bus was a 72-passenger school bus, occupied by 31 passengers. Seconds after the lead bus passed a motorcoach that had pulled over and stopped on the shoulder, it struck the rear of the GMC pickup. This collision—the second in the series—pushed the pickup forward, overturning it onto the back of the Volvo tractor. The front of the lead bus was ramped upward, as it came to rest on top of the GMC pickup and the Volvo tractor. Moments later, the following school bus struck the right rear of the lead bus.

The driver of the GMC pickup and one passenger seated in the rear of the lead school bus were killed. A total of 35 passengers from both buses, the 2 bus drivers, and the driver of the Volvo tractor received injuries ranging from minor to serious. Eighteen people were uninjured.<sup>1</sup> As a result of this investigation, the NTSB has issued 13 safety recommendations, 1 of which is addressed to the Department of Elementary and Secondary Education. This recommendation is consistent with the evidence we found and the analysis we performed. Information supporting this recommendation is discussed below. The NTSB would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

The NTSB determined that the probable cause of the initial Gray Summit collision was distraction, likely due to a text messaging conversation being conducted by the GMC pickup driver, which resulted in his failure to notice and react to a Volvo tractor that had slowed or stopped in response to a queue that had developed in a work zone. The second collision, between the lead school bus and the GMC pickup, was the result of the bus driver's inattention to the forward roadway due to excessive focus on a motorcoach parked on the shoulder of the road. The final collision was due to the driver of the following school bus not maintaining the recommended minimum distance from the lead school bus in the seconds preceding the accident. Contributing to the severity of the accident was the lack of forward collision warning systems on the two school buses.

Like the GMC pickup driver, the driver of the lead school bus did not attempt to brake or avoid the stopped vehicles ahead. According to the motorcoach driver who had been traveling behind the GMC pickup, he saw the initial collision occur 600 feet ahead of him and stopped his vehicle on the shoulder about 180 feet from the accident site. When interviewed by the Missouri State Highway Patrol, the motorcoach driver stated that, after pulling over, he exited his bus to attempt to warn other drivers to slow down.

The lead school bus driver stated that when she saw the motorcoach on the side of the road, and a man walking around in front of it, she became concerned about clearance between her vehicle and the motorcoach, so she steered a little to the left. She went on to say that she continued to watch the motorcoach from her side mirror; and, when she felt that her bus had cleared the motorcoach, she moved back to the right and almost immediately struck the GMC pickup. The driver's statements suggest that her actions were the result of driving-related safety concerns, not nondriving-related distractions. However, the length of time the bus driver spent selectively attending to the motorcoach—instead of monitoring the traffic ahead—was excessive and directly resulted in her involvement in the accident. The NTSB concluded that the collision between the lead school bus and the GMC pickup was the result of the bus driver's attention being drawn away from the forward roadway by the motorcoach parked on the shoulder.

Apart from the motorcoach, it appears that no other vehicle occupied the right lane between the lead school bus and the initial collision ahead; once the motorcoach had moved to the shoulder, the bus driver's forward view was unobstructed. Had the bus driver been attentive

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<sup>1</sup> For additional information, see *Multivehicle Collision, Interstate 44 Eastbound, Gray Summit, Missouri, August 5, 2010*, Highway Accident Report NTSB/HAR-11/03 (Washington, DC: National Transportation Safety Board, 2011), which is available on the NTSB website at <<http://www.nts.gov/>>.

to the forward roadway, she would have had ample time and sight distance to perceive and possibly avoid the initial collision. According to the sensing and diagnostic module data recovered from the GMC pickup, 6 seconds passed between the first collision involving the pickup and the second collision involving the lead bus. Depending on when the motorcoach moved to the shoulder, the lead bus driver might have had as much as 6 seconds to notice and react to the initial accident ahead. The Missouri *Commercial Driver License Manual* warns drivers of several situations that could present a hazard, among which are parked buses along the roadway from which passengers could emerge.<sup>2</sup> However, the manual also states that drivers should look 12–15 seconds ahead of them (in the context of stopping and lane-changing maneuvers). Further, the manual states: “When you use your mirrors while driving on the road, check quickly. Look back and forth between the mirrors and the road ahead. Don’t focus on the mirrors for too long. Otherwise, you will travel quite a distance without knowing what’s happening ahead.”<sup>3</sup>

The sequence of events leading to the involvement of the lead school bus in the accident is consistent with the literature on external distractions. Research has found that a significant number of distractions originate from objects external to the vehicle. External distractions may include vehicles on the shoulder of the road, billboards, and animals. The 100-car naturalistic<sup>4</sup> study conducted by the Virginia Tech Transportation Institute found that attending to external objects away from the forward roadway for more than 2 seconds increased the risk of accidents threefold.<sup>5</sup> The AAA Foundation for Traffic Safety examined the National Highway Traffic Safety Administration (NHTSA) National Automotive Sampling System/Crashworthiness Data System and found that 29 percent of distraction-related crashes were due to distractions outside of the vehicle.<sup>6</sup> A NHTSA-funded study on driver distraction in commercial vehicle operations, based on naturalistic data, found that—though glances outside the vehicle had an overall protective effect—long glances away from the forward roadway when an external distraction was present increased the risk of a safety-critical event. Overall, the study found that glances away from the forward roadway for any reason for more than 1.5 seconds significantly increased the risk of a safety-critical event.<sup>7</sup>

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<sup>2</sup> *Commercial Driver License Manual: New Test Standards Effective October 1, 2008* (Jefferson City, Missouri: Missouri Department of Revenue/American Association of Motor Vehicle Administrators, August 2009), p. 2-19.

<sup>3</sup> *Commercial Driver License Manual*, p. 2-11.

<sup>4</sup> Naturalistic studies attempt to observe the behavior or phenomenon of interest in its natural setting with a minimum amount of interference.

<sup>5</sup> S. Klauer and others, *The Impact of Driver Inattention on Near-Crash/Crash Risk, An Analysis Using the 100-Car Naturalistic Driving Study Data*, Report No. DOT-HS-810-594 (Washington, DC: National Highway Traffic Safety Administration, 2006).

<sup>6</sup> The AAA Foundation for Traffic Safety defines distraction as, “when a driver is delayed in the recognition of information needed to safely accomplish the driving task because some event, activity, object, or person within or outside the vehicle compelled or tended to induce the driver’s shifting attention away from the driving task.” See J. Stutts and others, *The Role of Driver Distraction in Traffic Crashes* (Washington, DC: AAA Foundation for Traffic Safety, 2001).

<sup>7</sup> For glances between 1.5–2 seconds, overall risk equals 1.29. For glances greater than 2 seconds, overall risk equals 2.93. See R. Olson and others, *Driver Distraction in Commercial Vehicle Operations*, Report No. FMCSA-RRR-09-042 (Washington, DC: Federal Motor Carrier Safety Administration, 2009).

These findings highlight the importance of proper glance behavior in promoting safety and avoiding accidents. Scanning the external environment is an essential part of the driving task. However, the risk of safety-critical events and accidents increases when drivers fixate on objects that are not in the forward view.

The state of Missouri requires school bus drivers to take 8 hours of school-bus related training annually but does not stipulate the specific content. The errors made by the school bus drivers in this accident suggest that periodic defensive driver training on such topics as driver inattention, proper scanning behavior, and safe following distance could help drivers avoid rear-end accidents when approaching traffic queues.

Therefore, as a result of its investigation of the Gray Summit accident, the National Transportation Safety Board makes the following safety recommendation to the Missouri Department of Elementary and Secondary Education:

Incorporate into school bus driver training the risk of driver inattention, the need for proper scanning behavior, and the necessity of keeping a safe following distance.  
(H-11-46)

The NTSB also issued new safety recommendations to the National Highway Traffic Safety Administration, the 50 states and the District of Columbia, the state of Missouri, the Consumer Electronics Association and CTIA–The Wireless Association, and the National Association of State Directors of Pupil Transportation Services, the National Association for Pupil Transportation, and the National School Transportation Association. The NTSB reiterated previously issued recommendations to the Federal Motor Carrier Safety Administration, the National Highway Traffic Safety Administration, and the American Association of Motor Vehicle Administrators.

In response to the recommendation in this letter, please refer to Safety Recommendation H-11-46. If you would like to submit your response electronically rather than in hard copy, you may send it to the following e-mail address: [correspondence@ntsb.gov](mailto:correspondence@ntsb.gov). If your response includes attachments that exceed 5 megabytes, please e-mail us asking for instructions on how to use our secure mailbox. To avoid confusion, please use only one method of submission (that is, do not submit both an electronic copy and a hard copy of the same response letter).

Chairman HERSMAN, Vice Chairman HART, and Members SUMWALT, ROSEKIND, and WEENER concurred in this recommendation. Chairman Hersman, Vice Chairman Hart, and Member Sumwalt each filed concurring statements, which are appended to the accident report.

*[Original Signed]*

By: Deborah A.P. Hersman  
Chairman