



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** February 8, 2012

**In reply refer to:** H-11-39 through -45

The Honorable Jay Nixon  
Governor of Missouri  
Post Office Box 720  
Jefferson City, Missouri 65102-0720

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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 recommendations in this letter. The NTSB is vitally interested in these recommendations because they are designed to prevent accidents and save lives.

The recommendations address the need to (1) ban the nonemergency use of portable electronic devices (other than those designed to support the driving task) for all drivers, supported by high visibility enforcement and targeted communication campaigns; (2) revise state regulations to require a periodic safety review of motor carrier operations for carriers involved in pupil transportation; (3) modify state vehicle inspection regulations regarding explicit school bus inspection procedures and modify those procedures to identify brake defects during biannual inspections; (4) revise the state vehicle inspection form; (5) audit the vehicle inspection program for conformance with state vehicle inspection requirements; and (6) revise bus evacuation regulations to require pretrip safety briefings. These recommendations are 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, 7 of which are addressed to the state of Missouri. These recommendations are consistent with the evidence we found and the analysis we performed. Information supporting these recommendations 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 recommendations.

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.

### **Portable Electronic Devices**

There is evidence that the driver of the GMC pickup may have been distracted immediately before the initial collision. Records from the cellular telephone provider indicate that from 9:58–10:09 a.m., the driver received 5 text messages and sent 6—for a total of 11 messages. Because the records do not document transmission times to the second, the final incoming message could have arrived at any time between 10:09:00–10:09:59 a.m. This pattern of communication strongly suggests that the driver was in an active text messaging conversation; because the final exchange was an incoming text, it can be assumed that it was the driver's turn to reply.

A witness traveling near the GMC pickup reported that the driver appeared to lean to the right before the pickup struck the rear of the Volvo tractor. The witness stated that he did not see brake lights illuminate, which is consistent with data from the pickup's sensing and diagnostic module, indicating that the brakes were not applied in the last second prior to impact. The driver of the pickup might have been engaged in reading an incoming text, typing an outgoing text, or leaning to the right to retrieve his cell phone. The NTSB concluded that the absence of a timely

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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/>>.

brake application, the cellular provider records indicating frequent texting while driving, the temporal proximity of the last incoming text message to the collision, and the witness statement regarding the driver's actions indicate that the GMC pickup driver was most likely distracted from the driving task by a text messaging conversation at or near the time of the accident.

The National Highway Traffic Safety Administration (NHTSA) estimates that in the year 2009, nearly 5,500 people died and 450,000 people were injured in distraction-related accidents.<sup>2</sup> The findings from analysis of police-reported crashes indicate that 11 percent of crashes involve some form of distraction. NHTSA's "100-car study" found that 23 percent of recorded crashes can be attributed to driver distraction.<sup>3</sup> Texting while driving is one distraction that has consistently been found to impair driving performance. A study of commercial driver distraction conducted by the Virginia Tech Transportation Institute (VTTI) found that drivers were 23 times more likely to experience a safety-critical event when they were involved in texting.<sup>4</sup> In one simulator study, drivers engaged in text messaging had slower reaction times (35 percent slower) and poor lateral vehicle control.<sup>5</sup> Another simulator study found that sending and receiving text messages led to poorer performance on safety-critical driving measures, including lateral position maintenance, detection of road signs, and time with eyes off the road.<sup>6</sup> A fourth study reported that texting drivers in a simulator responded more slowly to the onset of brake lights and demonstrated forward and lateral control impairments. In addition, text-messaging drivers were involved in more simulated crashes.<sup>7</sup> A Texas Transportation Institute study found that drivers responded more slowly when either reading or writing text messages.<sup>8</sup>

In addition to texting devices, the use of other forms of portable electronic devices<sup>9</sup> (such as music players and gaming units, cell phones, and computer tablets) has been found to result in visual, auditory, manual, and cognitive distractions—which have been shown to increase the likelihood of an accident. A VTTI study found that, among light vehicle drivers, the use of handheld wireless devices was the most common type of distraction and resulted in the most near crashes.<sup>10</sup> A safety-critical event was 6.7 times more likely when a driver was reaching for or

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<sup>2</sup> See <[http://distraction.gov/stats\\_and\\_facts/index.html](http://distraction.gov/stats_and_facts/index.html)>, accessed October 26, 2011.

<sup>3</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>4</sup> R. Olson and others, *Driver Distraction in Commercial Vehicle Operations*, Report No. FMCSA-RRR-09-042 (Washington, DC: Federal Motor Carrier Safety Administration, 2009).

<sup>5</sup> N. Reed and R. Robbins, *The Effect of Text Messaging On Driver Behavior: A Simulator Study* (Berkshire, UK: Transport Research Laboratory, 2008).

<sup>6</sup> S. Hosking, K. Young, and M. Regan, "The Effects of Text Messaging on Young Novice Driver Performance," *Distraction While Driving* (Sidney, NSW: Australasian College of Road Safety, 2007), pp. 155–187.

<sup>7</sup> F. Drews and others, "Text Messaging During Simulated Driving," *Human Factors*, vol. 51, no. 2 (2009).

<sup>8</sup> J. Cooper, C. Yager, and S. Chrysler, *An Investigation of the Effects of Reading and Writing Text-Based Messages While Driving*, Report No. 476660-00024-1 (College Station, Texas: Texas Transportation Institute, August 2011).

<sup>9</sup> This use includes, but is not limited to, dialing, answering, e-mailing, accessing the Internet, and viewing, reaching, locating, and operating portable electronic devices.

<sup>10</sup> T. Dingus and others, *The 100-Car Naturalistic Driving Study, Phase II: Results of the 100-Car Field Experiment* (Washington, DC: National Highway Traffic Safety Administration, 2006).

using an electronic device, such as a cell phone.<sup>11</sup> A VTTI study of commercial drivers found that a safety-critical event was 163 times more likely if a driver was texting, e-mailing, or accessing the Internet.<sup>12</sup> This research also found that portable music players can divert a driver's attention from the driving task for prolonged periods.

Many states have enacted laws ranging from banning texting for younger drivers to banning the use of portable electronic devices by all drivers because of the associated driving risks.<sup>13</sup> In addition to the 35 states that ban texting, 30 states ban all cell phone use for novice drivers, and 10 states ban the use of handheld cell phones. The District of Columbia has bans for all three usages. However, a recent study by the Insurance Institute for Highway Safety (IIHS) found that these bans have not reduced vehicle accident insurance claims accordingly.<sup>14</sup> Some states that enacted bans actually experienced increases in accident insurance claims. The IIHS suggests that the bans may not have shown their intended benefits because drivers continued to text but in a more discreet manner, or drivers switched to a nonbanned activity that can also be distracting. The IIHS study did not attempt to examine the effects of enforcement or education along with the bans.

Other IIHS studies have found that cell phone and texting bans were effective in reducing observed handheld cell phone or texting behavior.<sup>15</sup> Observational studies conducted in New York, Connecticut, and Washington, DC, found that cell phone and texting bans reduced cell phone and texting behavior by more than 40 percent immediately after taking effect. Although cell phone use while driving trended upward in all three cases following implementation of the bans, it is still much lower than would be expected without the bans. A little over 1 year after going into effect, compliance with the bans was lower in New York than in Washington, DC.<sup>16</sup> One explanation for this discrepancy in the rates of compliance may be differing levels of enforcement and media attention.<sup>17</sup>

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<sup>11</sup> FMCSA-RRR-09-042.

<sup>12</sup> J. Hickman, R. Hanowski, and J. Bocanegra, *Distraction in Commercial Trucks and Buses: Assessing Prevalence and Risk in Conjunction With Crashes and Near Crashes*, Report No. FMCSA-RRR-10-049 (Washington, DC: Federal Motor Carrier Safety Administration, 2010).

<sup>13</sup> Connecticut General Statutes 14-296aa bans the use of mobile electronic devices (such as a text messaging device, a paging device, a personal digital assistant, a laptop computer, equipment that is capable of playing a video game or a digital video disk, or equipment on which digital photographs are taken or transmitted) while such vehicle is in motion.

<sup>14</sup> "Texting Laws and Collision Claim Frequencies," *Highway Data Loss Institute*, vol. 27, no. 11 (Arlington, Virginia: Insurance Institute for Highway Safety, September 2010).

<sup>15</sup> A. McCartt and others, "Long-Term Effects of Handheld Cell Phone Laws on Driver Handheld Cell Phone Use," *Traffic Injury Prevention*, vol. 11, no. 2 (2010), pp. 133–141.

<sup>16</sup> See <[http://www.iihs.org/research/topics/cell\\_phones.html](http://www.iihs.org/research/topics/cell_phones.html)>, accessed October 26, 2011.

<sup>17</sup> A. McCartt, L. Hellinga, and K. Bratiman, "Cell Phones and Driving: Review of Research," *Traffic Injury Prevention*, vol. 7, no. 2 (2006), pp. 89–106.

Past safety campaigns have shown that laws aimed at changing behavior are much more likely to experience long-term success when combined with highly visible enforcement and public information campaigns,<sup>18,19</sup> such as the “Click It Or Ticket” campaign for promoting seat belt use. A recent study analyzing the first 7 years of the campaign found that states that had enacted primary laws (where a motorist could be cited solely for being unbelted) had substantially higher seat belt use and higher levels of enforcement than states with only secondary enforcement (where a motorist could be cited for being unbelted only if stopped for a different violation).<sup>20</sup> The study found that seat belt use had increased in states that converted from secondary to primary laws and was higher among states with high visibility enforcement. Additionally, communication campaigns have been found to improve long-term shifts in attitudes and behavior, especially when implemented in conjunction with laws and high visibility enforcement.<sup>21,22,23</sup> The European Union recently completed a project to assist policymakers in implementing and evaluating road safety communication campaigns to inform motorists about new laws, educate them on the safety risks of unwanted behaviors, and ultimately decrease the frequency and severity of accidents.<sup>24</sup>

The U.S. Department of Transportation (DOT)—along with the Governors Highway Safety Association (GHSA) and other organizations—has long recognized the benefits of combining laws, high visibility enforcement, and communication campaigns. Examples of past campaigns in which the DOT has used this approach include the aforementioned “Click It or Ticket,” as well as the “Over the Limit Under Arrest” campaign to reduce drinking and driving. The DOT driver distraction program calls for evaluating laws and high visibility enforcement, developing targeted media messages, drafting sample laws for states, publishing guidance on banning texting while driving for Federal workers, evaluating training programs, and developing resources through the World Health Organization.<sup>25,26</sup>

In 2010, the GHSA examined distracted driving as a state priority, data collection, outreach to novice drivers, education, public/private collaborations, state laws, and enforcement. Missouri has banned drivers under 21 years of age from texting and driving, implemented an

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<sup>18</sup> A. McCartt and others, 2010.

<sup>19</sup> See <[http://www.nts.gov/doclib/reletters/1997/H97\\_1\\_6.pdf](http://www.nts.gov/doclib/reletters/1997/H97_1_6.pdf)>, accessed October 26, 2011.

<sup>20</sup> J. Tison and A. Williams, *Analyzing the First Years of the “Click It or Ticket” Mobilizations*, Report No. DOT-HS-811-232 (Washington, DC: National Highway Traffic Safety Administration, 2010).

<sup>21</sup> M. Regan, K. Young, and J. Lee, “Driver Distraction Injury Countermeasures, Part 1: Data Collection, Legislation and Enforcement, Vehicle Fleet Management, and Driver Licensing,” in M. Regan, J. Lee, and K. Young, eds., *Driver Distraction: Theory, Effects, and Mitigation* (Boca Raton, Florida: CRC Press, 2009).

<sup>22</sup> B. Elliot, *Road Safety Mass Media Campaigns: A Meta Analysis*, Federal Office of Road Safety, Report No. CR 118 (Canberra, Australia: Federal Office of Road Safety, 1993).

<sup>23</sup> P. Delhomme and others, *Evaluated Road Safety Media Campaigns: An Overview of 265 Evaluated Campaigns and Some Meta-Analysis on Accidents*, GADGET Project (Bron, France: National Institute for Transport and Safety Research, 2000).

<sup>24</sup> P. Delhomme and others, *Manual for Designing, Implementing, and Evaluating Road Safety Communication Campaigns* (Brussels, Belgium: Belgium Road Safety Institute, 2009).

<sup>25</sup> For additional information on DOT programs, see <[www.distraction.gov](http://www.distraction.gov)>.

<sup>26</sup> Overview of the National Highway Traffic Administration’s Driver Distraction Program, <[http://www.distraction.gov/files/dot/6835\\_DriverDistractionPlan\\_4-14\\_v6\\_tag.pdf](http://www.distraction.gov/files/dot/6835_DriverDistractionPlan_4-14_v6_tag.pdf)>, accessed October 26, 2011.

enforcement campaign, made distracted driving a priority issue, developed traditional and electronically based educational materials for young drivers and their parents,<sup>27</sup> and conducted public awareness campaigns. However, Missouri's enforcement campaign has been hindered by the difficulty law enforcement has had in identifying and stopping only drivers who are underage.<sup>28</sup> Recent efforts to change the law so that it applies to all drivers failed in the state legislature.

Although there is recognition that combining laws, enforcement, and communication campaigns is the most effective way to change driver behavior, not all states have fully adopted this multifaceted approach to mitigate the risks associated with portable electronic devices. In fact, many states are just beginning to address distracted driving. Several state efforts to curb distracted driving are limited to reaching out to novice drivers and driver education. Three states have not developed any programs; and six states have implemented only one of the three approaches. The NTSB concluded that a combination of enforceable state laws, high visibility enforcement, and supporting communication campaigns can reduce the number of accidents caused by drivers distracted by the use of portable electronic devices. Therefore, the NTSB recommends that the 50 states and the District of Columbia: (1) ban the nonemergency use of portable electronic devices (other than those designed to support the driving task) for all drivers; (2) use the NHTSA model of high visibility enforcement to support these bans; and (3) implement targeted communication campaigns to inform motorists of the new law and enforcement, and to warn them of the dangers associated with the nonemergency use of portable electronic devices while driving.

### **Safety Review of Pupil Transportation Carriers**

The Missouri Department of Motor Vehicle Inspections regulates school bus inspections, and each school bus is subject to an inspection twice a year. Per 5 *Code of State Regulations* (CSR) 30-261, the Missouri Department of Elementary and Secondary Education has authority to adopt and enforce regulations for the operation of all school buses used for transporting school children. This authority includes reviewing school bus driver qualifications, insurance, operation of school buses, school bus routing, and school bus design.

A comprehensive carrier oversight program includes not only evaluation of a carrier's drivers and vehicles, but also inspection of its operation, administration, and policies. Copeland Bus Services—an intrastate passenger carrier of school children, operating from St. James, Missouri—did not have an accident history that would signal to authorities that its operation was deficient. However, the NTSB documented numerous examples of bad record-keeping, neglected maintenance, and poorly performed maintenance.

Copeland did not have a written vehicle maintenance plan or an organized method of retaining maintenance records. The entire set of maintenance records for the fleet of 23 school

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<sup>27</sup> *Curbing Distracted Driving: 2010 Survey of State Safety Programs* (Washington, DC: Governors Highway Safety Association, 2011).

<sup>28</sup> (a) See <<http://www.mshp.dps.missouri.gov/MSHPWeb/Root/DistractedDrivingFeaturedStatute.html>>, accessed January 20, 2011. (b) See <<http://www.mshp.dps.missouri.gov/MSHPWeb/Root/Anti-textingstickrelease.html>>, accessed January 20, 2011.

buses—the sole transportation source for the St. James School District—was contained in a small spiral-bound notebook. Some repairs or service checks, such as topping off fluid and checking tire pressure, were not written in the notebook. The company was also unable to produce inspection reports for a number of buses. Because of the lack of comprehensive maintenance records, it was difficult for NTSB investigators to determine the maintenance history of the two accident school buses, including which components had been repaired, when they were repaired, and what items were scheduled for maintenance. The condition of the brakes on the accident vehicles was a consequence of the lack of scheduled maintenance; so, too, were the neglected fire extinguishers in the buses, one of which bore an inspection sticker that had been expired for more than 1.5 years.

Combining a carrier oversight program with effective oversight of drivers and vehicles would help ensure that all pupil transportation carriers operate safely. The lack of oversight in driver, vehicle, and carrier operations could lead to mismanagement, poor maintenance practices, and other errors that could endanger pupil safety. The NTSB concluded that the state of Missouri had no effective oversight of the operations of Copeland Bus Services. Therefore, the NTSB recommends that the state of Missouri revise state regulations to require a periodic safety review of motor carrier operations for those carriers involved in pupil transportation.

### **School Bus Inspections**

Missouri requires all school buses used in public school transport to be inspected twice a year; yet, the NTSB found several serious problems during postaccident inspection of the lead school bus, as noted below:

- The master cylinder was wet in appearance, showing hydraulic fluid seepage over the body of the unit.
- A hydraulic fluid leak in the area of the brake lines ran from the master cylinder back to the hydraulic antilock braking system (ABS) unit.
- When the brake pedal was depressed, the movement of the pedal was soft and spongy, and fluid squirted out of the brake lines behind the left side of the front axle.
- The leaking hydraulic fluid had caused paint on the adjacent frame rail to blister and disbond from the metal.

The level of corrosion, the size of the hole in the brake line, and the degradation of frame rail paint in the area of the brake line strongly suggested that the lines might have been leaking for months prior to the accident.<sup>29</sup>

According to the *Missouri Motor Vehicle Inspection Regulations* (MMVIRs), a leak in a hydraulic brake line would cause a bus to fail inspection. Yet, the hydraulic fluid leak was not discovered when the Missouri State Highway Patrol (MSHP) inspected the 23 buses from

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<sup>29</sup> Although the brake reservoir was found to be full after the accident, investigators were unable to determine when brake fluid had last been added to the vehicle due to Copeland's inadequate maintenance records.

Copeland in March 2010, nor when a private state inspection station (Ray's Tire) inspected the same buses 10 days before the accident. A properly conducted inspection should have identified this leak.

Although the MMVIRs—under “Passenger Car and Truck Inspection”—contain sections on “Brake Performance,” “Brake Components,” and “Air and Vacuum Brake Systems,” there is no such discussion of brakes under “School Bus Inspection” other than a single line of text, at 11 CSR 50-2.320(1), that states: “In addition, the items listed in this rule will be inspected on all school buses.” According to the MSHP, this statement means that school buses are then also subject to all of the inspection criteria under “Passenger Car and Truck Inspection,” including the sections pertaining to brakes. However, because the MMVIRs do not explicitly describe all items that should be inspected on a school bus and the corresponding inspection procedures, inspectors might have overlooked, misinterpreted, or ignored that single line of text.

Unless the MMVIRs more clearly specify all inspection areas and procedures applicable to school buses, school bus inspectors working for the MSHP and the state-certified inspection stations may fail to identify defects in critical systems, such as brakes. Therefore, the NTSB concluded that the MMVIR “School Bus Inspection” section does not adequately delineate the bus systems to be included in an inspection.

According to the hydraulic brake system discussion in the MMVIRs, at 11 CSR 50-2.160, a vehicle fails inspection if any brake system defects are found, including leaking or cracked tubing, and worn, broken, or loose brake components. This section further states that, in the absence of brake performance testing, one front or one rear wheel must be removed to inspect brake components on passenger vehicles and pickups or similar vehicles “not equipped with dual rear wheels.” As with many school buses, the accident buses were equipped with dual rear wheels, and many of the brake defects listed in the MMVIRs would not have been visible without removal of the wheels. The NTSB concluded that the state’s current inspection procedures do not allow for the identification of all school bus brake defects included in the MMVIRs. Therefore, the NTSB recommends that the state modify the MMVIRs so that all inspection areas and procedures that apply to school buses are contained within the “School Bus Inspection” section. Further, the NTSB recommends that the state modify its school bus inspection procedures so that all brake defects specified in the MMVIRs can be identified during biannual inspections.

The MVI-2 form used in Missouri to document inspections is contained on a single page that requires inspectors to describe the defects found on a vehicle. Unlike most of the school bus inspection forms gathered by the NTSB, the MVI-2 does not list the school bus components to be inspected, nor does it include checkboxes for inspectors to easily indicate vehicle defects. A review of inspection forms developed by other states revealed that most contain a detailed checklist of vehicle components to be inspected, primarily based on interstate inspection requirements in the *Federal Motor Carrier Safety Regulations*. Inspectors and mechanics in Missouri would benefit from a form that contains all of the vehicle components marked for inspection in the MMVIRs and thereby prompts them to assess the condition of all critical items. For example, had the MVI-2 form included checkboxes prompting inspectors to check the condition of the brake lines for the presence of air and fluid leaks, the brake defects found on the lead school bus might have been detected months before the accident. The NTSB concluded that



the MVI-2 vehicle inspection form is insufficient because it does not effectively prompt state inspectors to evaluate all of the safety-critical items listed in the MMVIRs. The NTSB, therefore, recommends that Missouri revise its MVI-2 vehicle inspection form so that it lists all items to be inspected, as required by the MMVIRs; and include on the form a means of succinctly describing whether each of those items passes inspection.

Vehicle inspection problems were not restricted to the two accident buses. In March 2010, when the MSHP inspected all 23 Copeland buses, each bus passed inspection. After the NTSB's postaccident inspection uncovered numerous issues with the brake pads and brake lines on the lead school bus—as well as the out-of-place ABS sensor on the following school bus—the MSHP conducted an unannounced vehicle inspection of Copeland's fleet and rejected 8 of the 20 buses present due to defects. Among the problems identified were inoperable warning lights, tire defects and low tread depths, and defective and inoperable brakes. Ray's Tire had also inspected the eight rejected buses in July 2010, yet records showed that no defects were found and none of the brake inspection boxes were checked. Following the postaccident inspection, the MSHP revoked the inspection station certification for Ray's Tire and the inspector permit for the lead mechanic for the maximum term of 1 year.

The NTSB accident investigation uncovered what appears to be lax vehicle inspections by both the MSHP and Ray's Tire. The problems identified during the postaccident inspection were not limited to brake systems, making it unlikely that these oversight deficiencies were solely due to the lack of clarity in the MMVIRs regarding brake system inspections for school buses. Therefore, the NTSB concluded that both the MSHP and a state inspection facility conducted inadequate vehicle inspections of buses operated by Copeland Bus Services. Improvements in the thoroughness and quality of vehicle oversight are needed to ensure that both state and state-certified inspection facilities conduct adequate vehicle inspections according to the MMVIRs. Accordingly, the NTSB recommends that the state of Missouri audit its vehicle inspection program to ensure that inspections conform to requirements of the MMVIRs.

### **Evacuation Instruction**

Under 5 CSR 30-261.010(1)(J), Missouri requires that all students in kindergarten through sixth grade participate in emergency evacuation drills on school buses at least once each semester. In addition, the St. James School District requires emergency evacuation drills for students in seventh and eighth grades. During postaccident interviews, the majority of students said that they had drills at least once while in grade school and that they were aware of where the exits were located, though some students were not familiar with how to operate the window exits. None of the interviewed occupants of either accident bus mentioned ever receiving a pretrip briefing on emergency evacuation prior to traveling to school sports activities or other school-sponsored events. To date, Missouri does not require emergency evacuation briefings prior to school activity trips on either a school bus or a school-chartered bus.

Despite the mandatory evacuation training required by the state and the St. James School District, students who do not normally ride a bus may not pay attention to the information because they feel that it does not apply to them. Instituting evacuation training prior to school activity trips would ensure that both regular bus riders and occasional bus riders alike obtain training at an applicable time. In an emergency evacuation situation, the success of any one

person in unlatching an exit window affects how quickly and safely others can exit the bus. The NTSB concluded that the lack of school bus evacuation briefings prior to activity trips may hinder evacuation and pose a risk for all students. Accordingly, the NTSB recommends that the state of Missouri revise its bus evacuation regulations to require that pupils traveling to an activity or on a field trip in a school bus or a school-chartered bus be instructed in safe riding practices and on the location and operation of emergency exits prior to starting the trip.

To summarize, as a result of its investigation of the Gray Summit accident, the National Transportation Safety Board makes the following safety recommendations to the state of Missouri:

(1) Ban the nonemergency use of portable electronic devices (other than those designed to support the driving task) for all drivers; (2) use the National Highway Traffic Safety Administration model of high visibility enforcement to support these bans; and (3) implement targeted communication campaigns to inform motorists of the new law and enforcement, and to warn them of the dangers associated with the nonemergency use of portable electronic devices while driving. (H-11-39)

Revise state regulations to require a periodic safety review of motor carrier operations for those carriers involved in pupil transportation. (H-11-40)

Modify the *Missouri Motor Vehicle Inspection Regulations* so that all inspection areas and procedures that apply to school buses are contained within the “School Bus Inspection” section. (H-11-41)

Modify your school bus inspection procedures so that all brake defects specified in the *Missouri Motor Vehicle Inspection Regulations* can be identified during biannual inspections. (H-11-42)

Revise your MVI–2 vehicle inspection form so that it lists all items to be inspected, as required by the *Missouri Motor Vehicle Inspection Regulations*; and include on the form a means of succinctly describing whether each of those items passes inspection. (H-11-43)

Audit your vehicle inspection program to ensure that inspections conform to requirements of the *Missouri Motor Vehicle Inspection Regulations*. (H-11-44)

Revise your bus evacuation regulations to require that pupils traveling to an activity or on a field trip in a school bus or a school-chartered bus be instructed in safe riding practices and on the location and operation of emergency exits prior to starting the trip. (H-11-45)

The NTSB also issued new safety recommendations to the National Highway Traffic Safety Administration, the other 49 states and the District of Columbia, the Missouri Department of Elementary and Secondary Education, CTIA–The Wireless Association and the Consumer Electronics 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 recommendations in this letter, please refer to Safety Recommendations H-11-39 through -45. 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 these recommendations. 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