



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: January 22, 2002

In reply refer to: H-01-43

Mrs. Linda C. Schrenko
State Superintendent of Schools
Georgia Department of Education
2066 Twin Towers East
Atlanta, Georgia 30334-5001

The National Transportation Safety Board 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 your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses disconnecting radio speakers used for music or entertainment on school buses to enhance school bus safety at passive grade crossings. The recommendation is derived from the Safety Board's investigation of the collision of a CSX Transportation, Inc., (CSXT) freight train and Murray County, Georgia, district school bus at a railroad/highway grade crossing in Conasauga, Tennessee, on March 28, 2000,¹ and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has reiterated 1 safety recommendation and issued 10 new safety recommendations, 1 of which is addressed to the Georgia Department of Education. Information supporting this recommendation is discussed below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

On March 28, 2000, about 6:40 a.m. (sunrise was at 6:33 a.m.), a CSXT freight train traveling 51 mph struck the passenger side of a Murray County, Georgia, School District school bus at a railroad/highway grade crossing near Conasauga, Tennessee. The accident occurred as the school bus was crossing the tracks at a speed of approximately 15 mph. During the accident sequence, the driver and three children were ejected. Two ejected passengers received serious injuries and one was fatally injured. The driver, who had been wearing a lap/shoulder belt that broke during the crash sequence, received minor injuries. Of the four passengers who remained inside the bus, two were fatally injured, one sustained serious injuries, and one, who was restrained by a lap belt, received minor injuries. The two train crewmembers were not injured.

¹ For more information, read: National Transportation Safety Board, *Collision of CSXT Freight Train and Murray County, Georgia, School District School Bus at Railroad/Highway Grade Crossing in Conasauga, Tennessee, on March 28, 2000*, Highway Accident Report NTSB/HAR-01/03 (Washington, DC: NTSB, 2001).

Locomotive event recorder data from the train involved in the Conasauga accident indicate that the train horn was activated for about 3 seconds when the train was 952 feet from the crossing and then continuously for 9 seconds (a minimum of 574 feet) before the collision. The busdriver had the radio and overhead speaker on. Additionally, the two panels above the driver's head were covered with sound attenuation material.²

With the door closed and the radio on (the conditions at the time of the accident), audibility testing revealed that the sound of the horn was only 4 decibels greater than the ambient noise when the train was 1,268 feet from the crossing; the horn was barely detectable to a volunteer busdriver. To be identified, a sound must be 3 to 9 decibels above the threshold of detection;³ to reach the alerting level, it must be at least 10 decibels above the ambient noise level.⁴ Since the sound level increases by about 6 decibels when the distance is halved, at 574 feet (the point where the horn was sounded continuously), the sound of the horn would have been about 11 decibels above the threshold of detection. During the accident sequence, with the radio on and the door and window closed, the audio portion of the videotape did not pick up the sound of the horn over the ambient noise. During testing, with the radio off and the door open, even at 1,268 feet, the sound level of the horn was 25 decibels above that of the ambient noise, and a driver would probably be able to detect the sound and be alerted to the approaching train. Therefore, the Safety Board concluded that the driver did not stop, had the radio on, and the door closed; thus she had difficulty detecting the train horn and was probably unaware of the presence of the train.

The Safety Board made two recommendations concerning bus speakers to the National Association of State Directors of Pupil Transportation Services (NASDPTS) in the 1996 Fox River Grove, Illinois, highway accident report.⁵

H-96-50

Develop guidelines for the appropriate placement of radio speakers and use of radios on school buses and disseminate these guidelines to your members.

H-96-51

Advise your members to check their school district buses and disable any radio speakers located immediately adjacent to the school bus drivers' heads.

The NASDPTS informed the Safety Board that it had surveyed the States and found that a majority of the States had prohibited, or had legislation pending that prohibited, radio speakers in

² While it is unclear how much this material contributed to the driver's inability to hear the train horn, it may have absorbed some of the horn sound. The Safety Board remains concerned about the effects of sound attenuation material on a driver's ability to hear an alerting signal. As explained in the Fox River Grove, Illinois, report, sound attenuation material reduced the volume of both the train horn and the warnings shouted by bus passengers in that accident. For more information, read: National Transportation Safety Board, *Collision of Northeast Illinois Regional Commuter Railroad Corporation (METRA) Train and Transportation Joint Agreement School District 47/155 School Bus at Railroad/Highway Grade Crossing in Fox River Grove, Illinois, on October 25, 1995*, Highway/Railroad Accident Report NTSB/HAR-96/02 (Washington, DC: NTSB, 1996).

³ The "threshold of detection" is the level at which a person is aware of a sound.

⁴ Stanley C. Skeiber, Robert L. Mason, and R. C. Potter "Effectiveness of Audible Warning Devices on Emergency Vehicles, Sound and Vibration," February 1978, pp. 14-22.

⁵ NTSB/HAR-96/02.

the driver's compartment. The remaining States reviewed their policies on use of radios and radio speakers in school buses and stated that the policies were adequate to ensure that drivers can hear critical auditory information. Georgia informed its local school districts of the need to follow proper procedures, including turning off speakers, when crossing railroad tracks. The State did not require school districts to disconnect the speakers adjacent to the driver's head; Georgia left that decision to the local school districts. In October 1998, the National Safety Council revised its "Recommended Procedures for School Bus Drivers at Railroad Grade Crossings" to remind drivers of the importance of turning off radios at railroad/highway grade crossings; the revision was incorporated in the *2000 National School Transportation Specifications and Procedures*. Based on the NASDPTS survey and the association's efforts to inform its members of the hazards of not turning off the radio at grade crossings, Safety Recommendations H-96-50 and -51 were classified "Closed—Acceptable Alternate Action"⁶ on February 19, 1999.

Despite the NASDPTS' efforts, the 1-year-old school bus involved in this accident was equipped with a radio speaker adjacent to the driver's head. Speakers adjacent to a school bus driver's head probably contribute the most to masking exterior sounds, such as train horns, but air conditioning, heaters, defrosters, wiper motors, and other sounds also help mask exterior sounds. In addition, to exacerbate the audibility problem, the driver in the Conasauga accident did not follow prescribed policy to turn down the volume at railroad/highway grade crossings. The Safety Board understands from the NASDPTS' response to Safety Recommendations H-96-50 and -51 that the speakers are also used to transmit important information to the driver via two-way radio from the school district dispatcher. While the Safety Board agrees that information from the dispatcher is important, use of the speakers for music or entertainment broadcasts is not critical and can hamper the driver's ability to hear external auditory alerts. Therefore, the National Transportation Safety Board recommends that the Georgia Department of Education:

Require all school districts to disconnect radio speakers used for music or entertainment that are adjacent to school bus drivers' heads. (H-01-43)

The Safety Board also issued safety recommendations to the States, the National Highway Traffic Safety Administration, the Federal Highway Administration, the National Association of State Directors of Pupil Transportation Services, and the school bus manufacturers. The Safety Board also reiterated a recommendation to the U.S. Department of Transportation. In your response to the recommendation in this letter, please refer to H-01-43. If you need additional information, you may call (202) 314-6607.

⁶ The recommendations received this classification because the actions taken met the intent of the recommendations, even though formal guidelines were not developed, and school districts were reminded of the hazards of speaker use when approaching railroad tracks, but were not specifically told to disable the speakers.

Chairman BLAKEY, Vice Chairman CARMODY, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

Original Signed

By: Marion C. Blakey
Chairman