

NHTSA Proposes Upgrades to School Bus Regulations; Big Yellow Buses Get another Pass on Three-Point Belts

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WASHINGTON, D.C. – Five years after it issued a comprehensive report on its school bus safety research, the National Highway Traffic Safety Administration declined to propose a requirement that three-point seatbelts be installed in full-size school buses – which agency research has shown to provide better occupant protection than lap belts or compartmentalization alone – because it is too expensive to implement, it said.

Instead, the agency is proposing to require shoulder/lap belts on small buses, to improve compartmentalization on large school buses and to establish lap/shoulder belt requirements for districts that wish to install them voluntarily.

The agency suggested raising the seat backs from 20 to 24 inches to prevent occupant override – meaning the occupant vaulting over the seat back and crashing into some other part of the bus interior, or another occupant. The agency also proposed to require seats with bottom cushions that can be removed for easy cleaning to be equipped with a self-latching device – a measure the National Transportation Safety Board urged to be implemented more than 20 years ago.

In 1984, the NTSB issued this recommendation, but closed it three years later, after school bus manufacturers indicated in a survey that they would voluntarily install the latching devices. In 1987, the NTSB also released a study in which seat cushions came loose in 16 school bus crashes out of 44 analyzed. The Safety Board noted that loose cushions could strike and injure occupants, or create openings through which occupants could fall; block exit routes or hide injured passengers. But, bus manufacturers did not keep their promises to install latching devices and NHTSA observed the same flying cushion phenomenon in its own frontal crash testing.

Under the proposed rulemaking, children and adults riding in school buses with a GVWR of 10,000 lb or less would receive more optimal occupant protection. Shoulder/lap belts in small school buses would have to fit all passengers ages 6 through adult, and be equipped with retractors. They would also have to meet the existing anchorage strength requirements under FMVSS No. 210 and be subject to the new requirements for belt anchor location and torso belt adjustability. FMVSS No. 207 would be amended to apply to passenger seats in small school buses, and a newly-developed “quasi-static” test requirement would be adopted into FMVSS No. 222 to test school bus seats with lap/shoulder belts, to help ensure that seat backs incorporating lap/shoulder belts are strong enough to withstand the forward pull of the torso belts in a crash and the forces imposed on the seat from unbelted passengers to the rear of the belted occupants.

For large school buses with voluntarily installed lap belts, the vehicles would be required to meet FMVSS No. 210 requirements of a loading force of 22,240 Newtons of 5,000 pounds per seating position.

The proposal disappointed many advocates of three point belts in school buses, including the American Academy of Pediatrics.

In its submission to a 2003 docket of school bus safety, the Academy, and other bus safety organizations pointed out that compartmentalization – the theory that the seat backs in front and behind the occupant form an protective envelope – is an incomplete strategy.

Compartmentalization may have benefits in some frontal crashes, for some occupants, they argue, but it does not protect occupants in rollover and lateral crashes.

“Recent studies have revealed that compartmentalization does not offer optimal protection and is not consistent with current technology and messages for children and families regarding the use of car safety seats and seat belts in all motor vehicles. Quite bluntly, compartmentalization is an antiquated system. Even as major advances have been made in protecting the occupants of other motor vehicles, school buses have remained a determined dinosaur in terms of technology, design and innovation,” the AAP wrote.

NHTSA’s own research program consisted of a full school bus crash test into a frontal barrier at 30 mph, with 50th percentile male, 5th percentile female and 6-year-old dummies, to determine the crash pulse. The agency followed with sled-test simulations using a variety of dummies to assess the injury values and occupant protection counter measures and analyzed the efficacy of three strategies: compartmentalization alone; lap belts and three-point belts. It found that three-point belts offered the best protection. Specifically: “head, chest and neck injury values were low for all size dummies and below those seen in the compartmentalization and lap belt results, and that the average head injury values were, at most, about half those seen in the compartmentalization and lap belt results.”

Other agency research on bus safety has showcased the inadequacies of compartmentalization in rollover crashes. Under a joint program with Transport Canada, researchers used a computer simulation of the European Union ECE Regulation 66 rollover test to establish the crash forces that motor-coach occupants would exert on windows during a rollover and the impact forces on the roof. The study found that some occupants would be thrust out of their compartments in a rollover with considerable force and loading. The investigation into roof crush also produced preliminary indications that, under certain loading conditions, the windows would not be retained.

While the bus industry, in general, has promoted compartmentalization as the state-of-the-art in occupant protection for at least 30 years, school transportation officials have resisted seatbelts on school buses because, they argue, they take up too much room and turn the current three-occupant seat into a two-occupant seat. At a 2006 public meeting on the issue, Charles Hood, the Florida Department of Education’s Director of School Transportation argued that the expense of adding lap/shoulder belts combined with the costs of buying extra buses to address the lost capacity could be daunting. He estimated that it would cost Florida \$14 million to equip its current fleet with three-point belts and require the district to purchase 506 more buses to make up the lost capacity. The total capital and operational impact to Florida schools’ finances would be \$68 million, Hood said.

That type of argument persuaded the agency to, once again, take a pass at requiring shoulder lap belts for school buses:

“Our best practices recommendation seeks to reflect real world considerations about the safety record of school buses, the economic impact on school systems incurred by the costs of seat belts and the impact that lap/ shoulder belts have on the seating capacity of large school buses. Our laboratory test results indicate that our test dummies measured better head protection performance when lap/shoulder belts were properly used with compartmentalization than compared to compartmentalization alone. However, best practices compel us to acknowledge that installation of lap/shoulder belts, as currently designed, reduce the number of seats offered to students, resulting in fewer children riding school buses, exposing more children to higher safety risks in

alternative forms of transport to or from school or related events, and a probable overall net safety disbenefit due to their installation.”