{slide=Why don't large school buses have seat belts like cars do?}

Many parents are worried about the contradiction between the need to use seat belts and child passenger seats in automobiles and the lack of these safety devices in school buses, which don't require seat belts. One reason seat belts are not required on school buses is that the greater weight and mass of a school bus means that passengers are less vulnerable in a school bus than in an automobile, and they sit above the usual point of impact. Another is the school bus passengers are not seated near doors or large window openings, so they are not likely to be thrown from the vehicle. Protection from ejection is a primary function of automobile seat belts.

But the main reason is that school buses incorporate a passive restraint system called compartmentalization, which is designed to protect children without seat belts.{/slide}

{slide=What exactly does compartmentalization mean? And why is it so important?}

The term was coined in the late 1960s by researchers at UCLA. Broadly, the term compartmentalization. denotes a safety envelope or "compartment" around passengers in school buses. The idea is that if a crash occurs, the child may be thrown around within the compartment but the design of the seat compartment absorbs the crash forces and protects the child. However, the seats currently installed in school buses are different from those recommended by UCLA researchers. The seats they proposed were 8" higher, were more energy absorbing, and were equipped with a massive side arm at the aisle to complete the compartment.{/slide}

{slide=Is compartmentalization the reason why school bus seat belts are not required?}

Seat belts are not required in school buses over 10,000 lbs. gross vehicle weight rating (G.V.W.R.) because the federal government concluded from available research that compartmentalization is a better safety measure. Some of the key arguments favoring compartmentalization rather than seat belts are as follows:

Compartmentalization is more manageable. The protection exists and is in force without depending on any action by the children or any extra special supervision by drivers or monitors. Seat belts require discipline and supervision to keep them clean, unraveled, in use, and properly adjusted.

Compartmentalization works equally well for one, two or three students per seat during a frontal- or rear-impact crash. Today's 39-inch wide standard seats may contain three small children or two large ones or any combination in between. Arranging seat belts to properly handle any combination is difficult, if not impossible; the best known solution with seat belts is to restrict each seat to two students and two belts, which has the disadvantage of sharply reducing the carrying capacity of bus fleets.

Compartmentalization works whether students have fully developed abdominal areas or not. Conventional seat belts, which are lap restraints only, are not suitable for small children (under 8 years of age) whose abdominal area and bone structure are not adequately developed to take the force of a lap belt alone. They need the help of chest harnesses also, which adds to the complexity of a proper safety belt solution.

Compartmentalization, once it has done its energy absorbing job, leaves the student free to escape the bus. Seat belts could leave students strapped in, upside down, perhaps unconscious, in burning or flooding buses.

Compartmentalization is most affordable. Although not a part of the DOT reasoning, this is a factor to be considered. In evaluating the cost of seat belts, one should include the cost of retractors and chest restraints, also, since those appear to be needed. Even more important to cost projections is the probability that a seat belt solution will lead to two students per seat and greater spacing between seats, thereby requiring more buses for the same student load.{/slide}

{slide=If seat belts are required in school buses nationwide, what will be the effect? Cost?}

First of all, the National Highway Traffic Safety Administration mandated in the spring of 2009 that all small school buses manufactured as of October 2011 must be equipped with 3-point lap/shouler restraints. Previous NHTSA studies found that lap belts in school buses provide no

additional occupant safety beyond compartmentalization provided by federally mandated high and padded seat backs. NHTSA also prefers the use of 3-point lap/shoulder restraint sytems similar to those mandated in passenger vehicles because they better protect passengers in collisions and rollovers. It found lap belts may increase abdominal and head injuries.

Now, assuming there a lap-belt requirement applied only to new buses, and that retrofitting would not be required, about 25,000 to 30,000 large buses would be equipped annually. That's how many large school buses are manufactured in a typical year. At an estimated cost of $1,500 to $3,000 per bus to install two-point lap belts, which is about 2 percent of the cost of a typical small $60,000 school bus. The additional cost to install two-point lap belts on all new large school buses would range between $37,500,000 to $60,000,000 annually. Historically it takes about 12 to 15 years to convert the entire fleet, though a small percentage of pre-1977 buses remain in service. During the transition, the total cost to install two point lap belts would range between $450,000,000 and $900,000,000, and this leaves aside annual maintenance and replacement costs. These costs increase to the tune of about $7,000 to $16,000 per bus for three-point lap/shoulder belts that require not only more material but stronger anchorage points and bus floors, according to school bus vehicle and school bus seat manufacturers. Thomas Built Buses says that it may cost up to $750 more per seat to install lap/shoulder belts than a bus that is not equipped with the restraint systems. One school bus contractor company in Connecticut has cited costs as high as $20,000 per bus to install lap/shoulder belts. Meanwhile, the National Highway Traffic Safety Administration reports the nationwide seat belt cost would be between “$183 and $252 million” for all school buses, and “save about 2 lives per year” and “prevent 1,900 crash injuries per year.”{/slide}

{slide=Why not just retrofit the existing fleet? Wouldn't that be less costly?}

Retrofitting assumes the underfloor of the bus is sound, and that's not necessarily the case. Road damage, rust and other weathering factors are known to weaken the underfloor after a couple of years. Since the seat which holds the seat belt is anchored to the floor, you can't be sure of the strength of the anchorage. Anyway, bus manufacturers have stated they won't assume any liability if their buses are retrofitted, and it is unlikely insurance companies will either.{/slide}

{slide=Aren't 3-point lap/shoulder safety belt systems safer than 2-point lap belts?}

Since NHTSA published its study on the Next Generation of Occupant Protection in School

Buses, 3-point lap/shoulder occupant protection systems have become the preferred solution, mandated for small buses and optional for large buses effective September of 2011. C.E. White with its Student Safety Seat System, IMMI with its SafeGuard Flex Seat product line and M2K/Takata now offer 3-point systems that are fully compliant with all federal requirements and fit either three smaller children to a seat or two large middle school or high school students, resulting in virtually no reduction in capacity.{/slide}

{slide=Hasn't there been a great increase in school bus injuries in recent years?}

Maybe. But the problem is that no one knows for sure. Injury data is harder to come by, in large part because there is no standardized method to collect the data. Scarcely any two states use the same reporting criteria, so it is difficult to compare data with previous years' experience. Never-the-less, the National Safety Council surveys states annually for school bus injury information, but its data is not based on actual incidents. It is survey data. In its Jan. 18, 1998 broadcast CNN reported, based on its interpretation of information supplied by the National Safety Council, that injuries on school buses increased 94 percent over a recent 12-year period: 13,000 injuries nationwide in 1995-96 school year, up from 6,900 injuries in 1985.

A more exacting and reliable interpretation of injury data comes from General Estimating System (GES) of the National Highway Traffic Safety Administration. The GES is a companion database to the Fatal Accident Reporting Systems (FARS) which is based on police accident reports submitted to the U.S. Dept. of Transportation in a standardized reporting format by all police agencies nationwide. The GES is desinged to estimate accident and injury phenomen. Unlike the National Safety Council, which gather its school bus accident data by surveying state departments of education, the GES is based on statistically valid methodology. In late 1997, based on GES data of nearly 1,800 school bus crashes drawn from the FARS data base covering 1985 to 1994, statataticians from NHTSA found an average of 8,551 school bus injuries annually. Of these 96 percent were minor to moderate (bumps, bruises and scratches) while the remaining four percent were serious to critical. The American Academy of Pediatrics reported in 2007 that actual school bus injuries were three times as high as federal estimates. But it was an apples to oranges comparison. The federal estimates rely on actual crash reports while the AAP study gauged all emergency room visits by students over a three-year period that were tied to any school bus injury, such as those resulting from a crash, a student fight, slipping down on the stairwell, etc. It's also important to note that most school districts have a policy that all students engaged in a crash, whether it be serious or a minor fender bender, be transported to a hospital for evaluation. {/slide}

{slide=Why are 39-inch seats for three children when they will accommodate only two?}

The school bus seat manufacturers currently offer seats with seat belts systems that can accomodate both three and two passengers based on age, height and weight. These are referred to as "flex" seats so as to not decrease passenger capacity, even when lap/shoulder seat belts are present. The rated capacity of a 39-inch wide passenger seat was devised many years ago by the committee then making recommendations to the National Minimum Standards for School Buses. In determining seating capacity of a bus, an allowable average rump width standard was established. Accordingly, 13-inch of rump width was suggested when a 3-3 seating plan was used. This works reasonably well for children through about the sixth grade. It absolutely doesn't work for junior high and high school students. Especially with the increase in tiered bell times for different grade levels, schools now have additional options for transporting their students.{/slide}

{slide=Why are school bus seats spaced so closely together?}

The basic purpose in spacing school bus seats so closely is to "contain" the child in a cushioned compartment with a minimum amount of space between energy-absorbing surfaces.

After extensive research during the 1970's, the Department of Transportation and its agency, the National Highway Traffic Safety Administration (NHTSA), determined that the safest and most practical arrangement for school bus seating would be a "compartmentalization" concept. Accordingly, the new safety regulations that were effective for school buses manufactured on or after April 1, 1977, included this requirement among other improvements made that year.

Under the compartmentalization concept, seat backs in school buses are higher, wider and thicker than before. All metal surfaces are covered with foam padding. This structure must then meet rigid test requirements for bending and absorbing energy, such as would be required if a student's body were thrown against the padded back. In addition, the equivalent of a seat back, called a "barrier," is placed in front of the first row of seats at the front of the bus.

In addition to padding, today's seats also must have a steel inner structure that springs and bends forward to help absorb energy when a child is thrown against it. The steel frame must "give" just enough to absorb the child in the seat ahead. Also, of course, the seat is required to be anchored to the floor so strongly that it will not pull loose during this bending action. And the floor itself must be so strong that it will not be torn by the pulling action of the seat anchors

during a crash.

Seats are spaced close together as another safety protection to ensure containment of children after a crash. If the seats are spaced too far apart, the student could be thrown too far before being cushioned and/or could be thrown outside the compartment altogether.

Current regulations require that seats are no more than 24-inches apart{/slide}

{slide=Why do small buses or mini-buses have seat belts if large buses do not?}

Seat belts are required on small school buses under 10,000 lbs G.W.W.R. by FMVSS No. 222. The reason for requiring safety in small school buses is that these vehicles are closer in size and weight to passenger cars, light trucks and vans, and thus do not automatically afford the same protection of the heavier, larger school buses. Currently, the federal law requires two-point lap belts on these buses. Beginning in September 2011, all newly manufactured "Type A" school buses will be required to have three-point lap/shoulder belts. Meanwhile, a standard will also be implemented that gives guidance on how to best install lap/shoulder belts in larger conventional Type C and transit-style Type D school buses. {/slide}

{slide=What is Federal Motor Vehicle Safety Standard 222 all about?}

This regulation, titled School Bus Passenger Seating and Crash Protection, specifies occupant protection requirements for school bus passenger seating and restraining barriers. This standard provides increased protection to passengers through a range of engineering requirements collectively known as compartmentalization. This standard only applies to school buses and covers all styles of school bus. FMVSS 208 applies to automobiles.{/slide}

{slide=How much does it cost to add seat belts to school buses?}

According to bus manufacturers, adding seat belts and the attendant structural reinforcement at

the time of manufacture adds about $10,000 to $15,000 to the cost of a new, 66- to 78-passenger school bus. Maintaining, repairing and replacing damaged belts can add $500 or more per bus to annual maintenance costs.{/slide}

{slide=What about retrofitting existing buses?}

Retrofiting is a very controversial subject. Mainly because no one knows the condition of the outside of the bus floor. Is there any rust? Road damage? Can the floor of an older bus offer the strength needed for seatbelt equipped seats to meet FMVSS 222? Those questions, most knowledgeable experts agree that seat belts should not be added or retrofitted to an older school bus unless the bus was originally manufactured "seat belt ready." This means it was built with stronger seats and additional reinforcement in the structure of the bus, including the anchorages that hold the seat to the floor to withstand the added "loading" of belted passengers during a crash. The cost to retrofit has been estimated by one bus manufacturer to range between $2,700 to $3,400 for a 66- to 78-passenger school bus, to a cost estimated to range between $5,000 to $11,000 per bus by an agency of the New Hampshire state government.{/slide}