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## **Child Seats on School Buses**

They are on our roads from September to June – yellow buses loaded with children. We see them at the busiest times of the day. Morning and afternoon, they ferry children to school and back home again. As drivers, when we see the flashing lights, we watch more carefully, and as parents we trust that our children are safe.

But what do we really know about school buses? As drivers and parents, how much do we know about their safety features? Here is some information about school bus safety.

### **Safety Standards and Regulations**

A school bus is a vehicle used mainly in Canada and the United States to transport large numbers of children safely to and from school. In Canada, the design of the vehicle is governed by approximately 40 federal regulations and by Canadian Standards Association standard D250. These requirements cover such things as the colour of the bus, interior and exterior body design, mirrors, lighting systems and seat design. In addition, provincial and territorial regulations, bus company rules and local school board policies apply to the operation of the vehicle, the bus routes and stops, requirements, if any, for attendants on the bus, hours of operation and licensing requirements for drivers.



## **Transport Canada's Role**

Transport Canada determines requirements for child seats in Canada. In addition, Transport Canada defines the appropriate size categories for infants and children. The provinces and territories determine in what circumstances, and in which vehicles, child seats must be used.

## **A Good Safety Record**

School buses are simply the safest way to transport children to school. The size and weight of the vehicle and the safety features designed into it offer substantial protection to bus occupants in a collision. Despite the large number of children transported and the distances travelled, serious injuries and fatalities are very rare. In fact, less than 0.02 per cent of all Canadian road deaths involve an occupant of a school bus.

## **Outside The Bus**

The greatest risk to the safety of children is *outside* the bus, either from the bus itself or from the surrounding traffic. To address these dangers, buses are painted a distinctive shade of yellow to make them stand out. They have a set of warning lamps on the front and rear to indicate to drivers of other vehicles that the bus is stopped or stopping, and that children may be on the road. The bus also has a stop arm on the left-hand side to warn motorists that children are entering or leaving the bus and it is equipped with special mirrors. Many buses have a pedestrian crossing control arm so that children will cross far enough in front of the bus that the bus driver can see them.

The interior of the bus has also been designed to protect the occupants in case of a collision, there are no sharp objects and the roof is very strong. Each seating position is designed to protect the child without the use of a seatbelt. This system, called compartmentalization or passive protection, provides excellent protection to school-aged children without the use of seatbelts. It does not require specific actions by the children to ensure their safety.

## **Compartmentalization and Seat Belts**

The key to compartmentalization is that the back of each seat is padded and is a specific distance from the seat behind it. If the bus comes to a sudden stop, the padded seat back absorbs the forward energy of the child seated behind. Without a seat belt, the child's body slides forward and hits the seat back in such a way as to distribute the force of the impact over the entire upper body. If a lap belt were used, the child's body might pivot on the belt, focusing the force of the blow onto the head and neck. And if the seat belt is not worn correctly (it should be worn low on the hips) the stomach or spine might be damaged. As a result, Transport Canada does not recommend using lap belts in school buses.

Another type of seat belt is the three-point belt, also called the lap/shoulder belt. While this system is available, it would require structural design changes to the interior of many buses. However, safety is the main issue. Transport Canada has no evidence that three-point seat belts would improve the overall level of safety on a school bus. In addition, there are concerns that instead of wearing their belts, children might play with them, potentially injuring other children on the bus.

### **Pre-schoolers on School Buses**

Young children present a different challenge. In recent years, pre-school-aged children are travelling more and more on school buses. Transport Canada has conducted tests to evaluate the safety implications of this trend

Canadian and U.S. research suggests that appropriately installed infant or child restraints would improve occupant protection for small children. The research concluded that a child who weighs less than 18 kilograms (up to approximately age 4½) travelling in a school bus would be better protected if properly restrained in an appropriate child restraint.



Based on this study, Transport Canada recommends that children, under the age of about 4½ and weighing less than 18 kilograms, be transported in an appropriate child restraint system while on a school bus. The restraint system should be correctly attached, using a set of new lower anchorage attachments, with a properly installed tether strap. Care should be taken that the child's height, weight and age correspond to the child seat manufacturer's recommendation, which is attached to the seat. Children weighing 18 kilograms or more, who would be either in a booster seat or using a seat belt in a passenger car, are well protected by the normal compartmentalized seating in a school bus.

Transport Canada is considering a new regulation that will require all new seats on school buses to have at least one set of lower anchorage attachments and associated tether anchorages.

For more information, please see the Questions and Answers section, as well as Transport Canada's publication and video *Keep Kids Safe: Car Time 1-2-3-4.*

## Questions and Answers

### **Is a school bus safe?**

School buses are the safest form of transportation for children. Children are many times safer riding a bus than any other form of transportation to school.

### **Other vehicles have seat belts – why don't school buses?**

The passive safety system preferred for use in school buses is called compartmentalization. This system uses the seats, and the bus interior, to form a protective compartment in case of a collision. Consequently, seatbelts are not recommended on school buses. In fact, research has shown that the use of lap belts only on school buses increases the risk of injury.

### **What's wrong with lap-only belts?**

The child's body may pivot around the belt, causing the head and neck to hit the seat back in front of the child. In addition, it is difficult to ensure that all children are wearing the belt correctly, low over the hips. If the belt rides up, the force may be concentrated in the stomach and spinal area, causing serious internal organ or spinal cord damage.

### **How does compartmentalization work?**

The seat backs are a specific distance apart and are made of energy-absorbing materials. In a collision, the body of the passenger behind the seat moves forward, knocking against and deforming the energy-absorbing materials, and distributing the force of the crash across the entire upper body area.

### **Does compartmentalization work for everybody?**

Recent Transport Canada research suggests that children under 18 kilograms, or younger than approximately 4½ years old, do not benefit from compartmentalization as much as older children do. (This size corresponds to Stage 1 and Stage 2 children in the Transport Canada publication and video *Keep Kids Safe: Car Time 1-2-3-4*.) The heads of younger children are proportionately larger, causing them to move forward faster and make contact with the seat back in a different fashion. In addition, their bodies don't weigh enough to take full advantage of the energy-absorbing seat back design. Instead, they may bounce off awkwardly. Therefore, for children under 18 kilograms, or younger than approximately 4½ years old, Transport Canada recommends the use of a standard car child seat that is appropriate to the child's height and weight.

### **How can a child restraint be connected if there are no seat belts?**

Transport Canada currently requires that all new, small (approximately 20 seats) school buses be equipped with two sets of lower anchorages, which allow for the base of a child seat to be installed in the bus. Transport Canada is reviewing the option of extending this requirement so that all new school bus seats would have at least one set of lower anchorage attachments, as well as a tether anchorage location. The tether anchorage allows the top of a child seat to be attached to the school bus seat.

### **Is my child safer in a school bus?**

Yes, school buses are the safest method for transporting children. Statistics indicate that transportation by school bus is safer than by passenger car. School buses are large and heavy vehicles, which protect the occupants in case of a collision. Also, the use of large school buses reduces the number of smaller passenger vehicles required to transport students.