— 01-11-ANPRM-018 —

SERVICE TO THE INDUSTRY — OUR OBJECTIVE

SCHOOL BUS MANUFACTURERS INSTITUTE
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Same as 1-11-29

December 4, 1967

Dr. William Haddon, Jr.
Director, National Highway Safety Bureau
Federal Highway Administration
U. S. Department of Transportation
Donohoe Building
6th & D Streets, S.W.
Washington, D. C.

Dear Dr. Haddon:

In accordance with the advance notice of proposed rule making issued in Federal Register Volume 32, Number 200, the School Bus Manufacturers Institute wishes to go on record with the attached comments concerning Docket 1-11, Rear Underride Guard; Docket 1-18, Control Location and Identification; Dockets 2-11, Passenger Seats, 2-12, Anchorage of Seats, 2-13, Seat Belt Installations, 2-14 Seat Belt Assembly Anchorages; Docket 4-2, Warning Devices for Stopped Vehicles.

After reviewing the attached discussion papers, if there are any questions concerning the data furnished or the need for additional information pertaining to the subject matter covered, please ask our cooperation.

Sincerely yours,

Berkley C. Sweet
Secretary

BCS:kds

Attachments

SCHOOL BUS MANUFACTURERS INSTITUTE

DISCUSSION PAPER

DECEMBER 4, 1967

PROPOSED MOTOR VEHICLE SAFETY STANDARDS

DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

(23 CFR, Part 255)

[Docket 1-11]

REAR UNDERRIDE GUARD--TRUCKS, BUSES AND TRAILERS

The Administrator is considering the issuance of a Federal Motor Vehicle Safety Standard specifying performance requirements for rear underride guards to minimize the probability of injury to occupants of vehicles colliding with the rear of trucks, buses, and trailers.

Comments due: December 4, 1967

SCHOOL BUS MANUFACTURERS INSTITUTE COMMENTS

The School Bus Manufacturers Institute does not concur fully with this proposed standard.

Reference: SAE Report 670040 entitled School Bus Passenger Protection, Page 158.

"The bumpers of all buses (and other large vehicles) should be capable of effectively transferring collision forces to heavier structural members of the bus frame and should be positioned with the base not more than 16 inches above the pavement for the unloaded vehicle. This standard is very much needed to reduce the chances of extreme underriding of heavy vehicles by smaller vehicles."

While such a bumper height might protect the occupant of a vehicle striking another vehicle, it could also be entirely probable that the force of the collision, if bumpers matched, would not result in a crumpling effect of metals as an energy absorbant and greater damage to the occupants of both vehicles would result. In many instances, the present design of the bus, its prime purpose being to transport its school children passenger safely, would probably afford greater protection to its occupants.

Another comment in this report suggests that rear wheels be placed closer to the end of the bus to assist in absorbing the shock of a rear end collision. Such a statement does not give consideration to the proper design of the vehicle in relationship to weight distribution and handling of the bus in operation by the driver.

When designing a bus, there are three fundamental design factors that are and must be considered in its development. These can be classified as follows:

1. Design requirements of the chassis.

2. Design requirements of the body.

3. Design requirements of the operation.

1. Chassis requirements. The chassis which must carry the loads and furnish the motive power must have certain characteristics to adequately carry out its function. It must have a frame of sufficient strength to support the loads both static and dynamic that are imposed upon it. It must also be properly designed for the loads which will be placed on the axles, brakes, wheels, tires and springs. All these factors contribute to the measurement which will be obtained from the ground to the top of the frame.

2. Body requirements. The body when placed on the chassis must obviously have a flat floor to minimize accidents while moving within the vehicle. The wheel housings must provide proper tire clearance. The entrance stepwell must have reasonable step heights to reduce the chance of an accident occurring by the passenger when entering or leaving the bus. The center of gravity must be designed as low as possible to minimize any swaying effect of the vehicle in operation.

3. Operation requirements. To properly operate a vehicle, a certain balance is necessary on the front and rear axles and on the tires. A rule of thumb in the industry is that the weight distribution be approximately 1/3 on the front and 2/3 on the rear. Using such a formula, you then locate the rear axle and establish a wheel base for each size of vehicle.

Another factor that influences the wheel base is the turning radius. This factor is critical when the areas where most buses are operated is taken into consideration such as country roads, school driveways, etc. The longer the wheel base, the greater the turn radius.

Other factors that must be considered are railroad crossings that are above or below the road and the drainage channels along roads that must be crossed in order to enter the school grounds.

As prescribed in SAE Passenger Car Standard J689, the angle of departure should not be less than 10° for a loaded vehicle. We assume this is a satisfactory angle to be used for buses since nothing has been developed specifically for a bus.

It is quite evident from this information that it is essential to take into consideration a number of factors pertaining to a special purpose vehicle such as a school bus in attempting to determine bumper heights.