

Effectiveness And Efficiencies

In Pupil Transportation Safety

Department of Transportation

National Highway Transportation Administration

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## Executive Summary

Pupil transportation is one of the largest transportation programs in the United States. Over 400,000 school buses transport 22 million children to and from school each day. School buses are traveling the highways at the busiest times of the day exposing children to many safety hazards. About 100 children a year are killed and 5,000 injured in 60,000 crashes due largely to driver error.

Because this is an exceptionally good safety record, no programs have been researched to effectively demonstrate reliable countermeasures. Local, State, and federal safety specialists believe there are a number of programs which have not yet proven effective but which have significant potential. Some of these are careful selection and training of drivers; uniform school bus stop laws and identification of buses; safety instruction for all pupil riders; and, complete maintenance and inspection of each vehicle.

Coordinated administration of this safety program reduces cost and duplication or omissions of effort. A single State agency having primary administrative responsibility and employing at least one full-time professional is essential. Having a system for collecting and reporting information needed to improve the safety of school bus operations is also essential.

Selecting good people is partly dependent on good driver license files which identify accident repeaters. Effective training programs depend on the police identifying accident causes and the educators preparing relevant curriculum

materials. Removing high risk bus drivers depends on effective supervision by staff and police as well as reliable reports from students, parents, and the motoring public.

Therefore we believe that support for programs which bring into the driver ranks capable people, which reduce driver error, strive for uniform operating procedures and provide strong administrative support will result in a safe trip for every student who rides a school bus.

This report describes briefly the current problems, some of the programs being implemented at the State, local, and federal levels and the need for public support of these efforts.

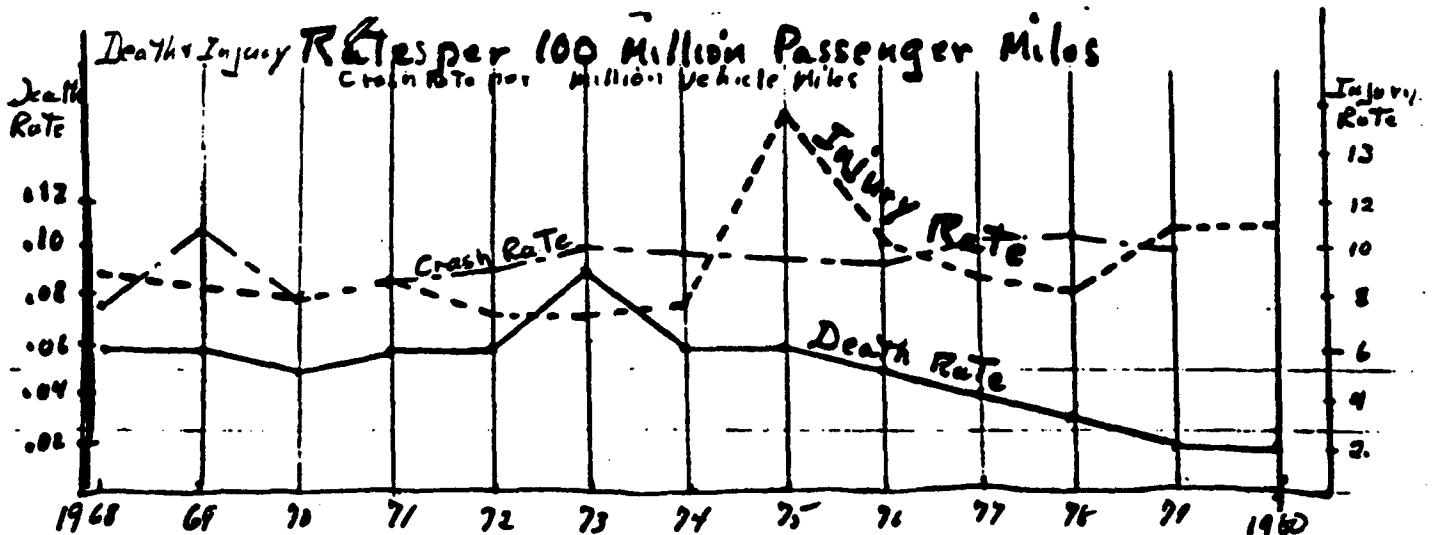
EFFECTIVENESS PAPER: PUPIL TRANSPORTATION

I. Scope of the Problem

The Fatal Accident Reporting System (FARS) report for 1980 indicates that pupil fatalities totalled 60, the lowest figure in four years. 1/ According to the National Safety Council (NSC), school bus crashes dropped to 55,000 in 1980; and, pupil injuries were up to 4,600. 2/

Figure 1 shows the death, injury, and crash rates for 13 years (NSC data). Note the crash rates are shown per million vehicle miles while death and injury rates are per 100 million passenger miles.

FIGURE 1



Injuries and fatalities occur to pupils as bus passengers and as pedestrians. They are killed and injured inside the buses primarily from driving errors committed by school bus drivers. Outside the bus as pedestrians, they are killed and injured during loading and unloading operations. About one-third of pupil fatalities occur inside the buses. 1/

School bus driver error has been recognized, by a number of States, as the major cause of school bus accidents. In their Highway Safety Plans (HSP) for 1979, Connecticut reported 77.1 percent of the school bus accidents were due to school bus driver error and Hawaii reported 61 percent. Iowa reported 79 percent in the 1970's; and 44 percent in their 1980 HSP. Other States have made similar reports in newsletters and annual reports for different years; i.e., Maryland 55.5 percent; Mississippi 63.2 percent; New Mexico 51 percent; and Vermont 76.4 percent. 3a/

Responding to Docket 81-12, the School Transportation Supervisors organization of New Jersey stated that "approximately 90 percent of all school bus accidents are caused by driver error." 3/

Pupils are killed and injured outside their school buses when other motorists pass the buses or, when school buses run over the children. The pupil fatalities occurring outside the bus, about two thirds of the annual total, are about evenly divided between "their own buses" and "other motorist" running over the pupils. 1/

Highway Safety Program Standard 17, "Pupil Transportation Safety" was promulgated in May 1972. The Standard was amended in May 1973 to provide requirements for large buses operated by privately or publicly owned local transit systems and used for regular common carrier transit route services as well as special school route service.

Congress, in passing the Motor Vehicle and School Bus Safety Amendments of 1974, defined "school bus" in terms of function rather than design. In line with this mandate, all vehicles manufactured on or after April 1, 1977, which are designed for carrying more than 10 persons and which are sold or introduced in interstate commerce for purposes that include carrying students to and from school or related events shall be considered school buses.

Each State has established conditions and regulations under which all "school buses" shall meet identification and equipment requirements (lights, color, markings); and, whether or not other vehicles (10 persons or less) shall either comply with all, or none, of the "identification" requirements.

Therefore, the traveling public is exposed to a variety of vehicles which carry children to and from school and related events. This variety of vehicles includes "school buses" painted glossy yellow with at least four alternately flashing red signals, and which may or may not have four alternately flashing yellow warning lights. Further, swing type "stop arms" are affixed to most of the buses in more than 40 States.

Other non-"school bus" vehicles; (private school vans, private autos, transit buses, and military buses) are often non-yellow in color and carry little or no legible indication that the vehicle is carrying school children.

Added to the foregoing, the traveling public is subjected to varying "school bus stop" laws and State and local operating procedures for loading and unloading pupils. 4/ Motorists, with the best intentions may find that an act, legal in their States' of residence, is specifically prohibited in the States where they are driving or, vice versa. Such differences provide situations which are unreasonable for motorists and hazardous for school bus passengers especially at times of loading and unloading.

Based on information gathered by NHTSA staff over the years, there is a wide difference in the amount, quality, and content of pupil instruction related to safe riding practices; emergency evacuation drills; and, pedestrian safety related to "going to" and "coming from" school buses. Bus vehicle defects are found contributing to a very small percentage of all school bus accidents (on the order of 2-3 percent) but apparently play a more prominent role in injury producing accidents. 5/

The National Transportation Safety Board, which investigated all types of accidents, has identified several problem areas regarding school buses. First, they operate over many ungarded railroad crossings which are areas of extreme hazard; second, school buses operate at times and in places where adverse weather conditions such as dense fog create extreme hazards; third, the structural strength and interior design need to be improved to minimize



disintegration and injury causation; fourth, that activity and field trips require a higher level of inspection and supervision due to higher speeds and longer distances that are experienced; fifth, that school bus drivers do not have or do not use suitable restraint systems nor do pupil passengers; and sixth, that in a head or rear end collision, pupil passengers in the forepart and rearpart are in the greatest danger. 6/

Indirectly related to the deaths and injuries caused by bus crashes is the system support provided at the State level. Traditionally, the administration of pupil transportation has been (almost 100 percent) the responsibility of State educational agencies. Beginning about 1966, program responsibility became divided among two or more agencies. The State enforcement agencies inspect the buses; educational agencies handle finances; transportation departments train the bus drivers; the motor vehicle agencies title and register buses; and, complete statistical reports for the total program are not readily available from any central source. Also, in a number of States, private and parochial school buses are operated under regulations emanating from several State agencies. Problem identification and countermeasure application are compartmentalized and invariably, programs are not rigorously evaluated.

#### Activity Buses

In a 1979 study of activity buses made by the National School Transportation Association, it was found that these buses are used by all age and grade groups; driven by a variety of drivers, some trained and some not, and these buses are involved in a disproportionate number of accidents where multiple fatalities occur. 7/

In summarizing the scope of the problem, areas which may be amenable to countermeasure application seem to be "in-bus" and, "out of bus" with sub-areas being "own-school bus"; "other school bus"; and "other motorist." Five distinct countermeasures have been applied to the problem areas. The countermeasures (varying within each other) are: school bus driver training; uniform identification of school buses; school bus stop laws; pupil instruction; and, system support. Little rigorous evaluation has been accomplished in relation to countermeasure effectiveness in achieving accident reduction or in other program improvements.

## II. Program Overview

Pupil transportation holds a unique place in today's traffic picture. School buses make up one of the largest fleets in the nation and have one of the best safety records. These 400,000 vehicles transport 22 million children each day; are bigger and heavier than most other vehicles; they travel 3 billion miles each year and exercise legal authority to control other traffic while making 2.7 billion stops to load and unload children.

Pupil transportation evolved as a response to the needs of students living in sparsely populated areas. Until 1869, transportation to and from school was the total responsibility of parents. School administrators had no official responsibility in the matter. The decrease in rural area populations and the regionalization of school centers increased the need for pupil transportation. A relatively new aspect of the program is the use of school buses for field trips and other school related activities. Approximately 40,000

buses are used each year to take 15 million students 30 million miles to athletic events and to visit zoos, factories, businesses, and museums.

While Massachusetts enacted (in 1869) the first legislation authorizing the transportation of pupils at public expense, it wasn't until some 50 years later that all States provided this free transportation for public school children.

School bus crashes, pupil deaths and injuries increased through the 1930's. After World War II, the transportation program continued to expand due to the baby boom; training programs for school bus drivers were initiated 8/; and, minimum standards were established for the design and construction of school buses. 8/ By the 1950's, distinctive bus colors, warning light(s), and "stoparms" were beginning to be used. In the 1960's, pupil instruction and bus driver instructor training were initiated. 8/ In 1963, the NSC established a School Transportation Section to deal with pupil transportation safety matters, one of which was uniform school bus stop laws.

During the 1970's, NHTSA conducted crash research which resulted in a number of new Federal Motor Vehicle Safety Standards (FMVSS) affecting the design and construction of school buses. 9/ Recent crash testing involved wheel chairs and other seating for the handicapped. 10/

In addition to developing school bus driver and instructor training programs, NHTSA provided "An Acceptable Level" (a slide/tape presentation) to acquaint National, State, local officials, and others with the pupil transportation

program and its various facets. NHTSA's RD is developing school bus-pedestrian related training; examining a model school bus stop law; and, planning to re-examine school bus accident data in order to identify countermeasures for development and tests.

NHTSA staff interviews, with State and local director's of pupil transportation, indicate that schools usually pay less than union wages for mechanics and vehicle maintenance personnel. In spite of difficulties in finding, and retaining, good mechanics, most school garages are noted for rapid repairs and maintenance of an "on the road" fleet rather than long "down time" with buses in the garage.

Funding for pupil transportation was received from State and local sources until the late 1960's. Then, NHTSA funded a few State bus driver training projects under Highway Safety Program Standard (HSPS) No. 4, Driver Education. Since 1972, HSPS 17, Pupil Transportation Safety, has provided the Section 402 accounting location for a variety of activities related to State and local pupil transportation programs. A review of the 10 year accounting under Standard 17 shows that States obligated less than \$5 million (0.4 percent) of all Section 402 funds made available for all highway safety program areas. In 1974, Congress created Section 406 of the Highway Safety Act and authorized funds specifically for training school bus drivers. 11/ Monies for School Bus Driver Training made available for obligation are shown in Figure 2.

FIGURE 2 12/

Funds Made Available Under Section 406

<u>Fiscal Year</u>	<u>Congressional Authorization</u>	<u>Funds Available for State Obligation</u>
1977	\$7.5 M of \$241.500 M	* Included in Basis Section 402 Program Funds
1977	\$7.0 M of \$162 M	"
1978	\$7.0M of \$177 M	"
1979	\$2.5 M of \$257.5 M	(-)
1980	\$2.5 M of \$280 M	\$2.5 M (Section 406 Contract Authority)
1981	\$2.5 M of \$510 M	\$2.5 M (Section 406 Contract Authority)
1982	\$2.5 M of \$112.5 M	\$5.0 M (picks up FY'79 @ \$2.5 M)
<hr/>		
TOTALS:	\$31.5 M of \$1,480.5	

### III. Effectiveness of Programs, Projects, and Countermeasures

Areas which provide opportunities for countermeasures application are "in-bus"; and "out of bus" fatalities and injuries with sub categories of "own school bus"; "other school bus", and "other motorist." Distinct countermeasures have been applied and their relationship to the problem areas are shown in Figure 3.

FIGURE 3

<u>Problem Area</u>	<u>COUNTERMEASURES</u>				
<u>Crashes, Fatalities, Injuries</u>	<u>School Bus Driver Training</u>	<u>School Bus Identification</u>	<u>School Bus Stop Laws</u>	<u>Pupil Instruction</u>	<u>Systems Support-FMVSS, INSP, Maintenance</u>
In-Bus	X	X	X	X	X
Out of Bus					
Own Bus	X			X	X
Other Bus	X		X	X	X
Other Motorists		X	X	X	X

## School Bus Driver Training

1. In 1970, California initiated a series of 3 week Instructor Training Courses. This first series of courses provided 500 trained instructors. 13/ The training was repeated in the mid '70's because of personnel turnover.

The California Code (Title 5, Section 14220) requires that every school bus driver present evidence of having successfully completed a school bus driver training course.

The State Department of Education reported that during the last five years school bus driver caused crashes were reduced from 48 to 38 percent. No pupils were killed during 1979 or 1980. In previous years 5 or 6 pupils were killed annually. 14/

2. Minnesota has benefited from monies made available under Sections 402 and particularly 406. Since 1973, over 27,000 school bus drivers have received training, audio visual materials have been purchased, and the statewide fleet has been painted glossy yellow and equipped with the 8-light warning system. Fatal crashes dropped 67 percent between 1972 and 1980 while mileage increased 43 percent (see Docket 81-12 #213, Center for Driver Education and Safety, St. Cloud University). Workshops to improve driver performance are conducted at the basic and advanced levels and total 56 hours. Approximately 2,000 drivers attend these sessions annually.

3. Ohio's in-service bus driver training program is noted for its broad content and breadth of coverage throughout the State. The curriculum covers skills, knowledge, and operational procedures. It also includes proper radio communications and fuel conservation.

Nine professional instructors provide the training on a regional basis.

Thirteen hours of curriculum material is available for in-service training. 15/

4. The Volusia County, Florida, School Transportation Department, conducts an annual 5-day in-service bus driver training program. All drivers are required to attend. 16/

Sponsored by the local community college, the program is held immediately following the last day of school. Multi-media techniques are used and behind-the-wheel training is provided on a one-to-one basis.

5. One school bus contractor conducts one-on-one in-service training for school bus drivers who have been involved in accidents. The company's driver trainer receives accident reports, and after reviewing the reports, schedules individual accident site visits with the involved drivers. With a bus on-site, the driver and trainer re-enact the accident and review preventive measures. Then, the driver practices until the trainer is satisfied with the driver's skills, knowledge, and understanding related to the accident.



The Van Der Aa Bus Lines thus effectively provides individual in-service training on a timely basis. 16/

6. New Mexico regulations require that all newly employed school bus drivers attend the Pupil Transportation Institute during their first year of driving and every three years thereafter. First year non-certificated drivers are required to take the basic school bus safety course and the multi-media First-Aid Course. 17/

The 40th Institute (one-week in duration) was conducted in August 1981 on the campus of Western New Mexico University.

7. Commentors to Docket 81-12 gave little or no specific data or information on effective programs. Many favorable and supportive comments were made about the need for school bus driver training. New Jersey attributes a decline in their school bus accident rate to the expanded training effort made possible by Federal funding. Accidents dropped from 675 to 562 between 1977 and 1980.

#### School Bus Identification

There is no statistical evidence available resulting from rigorous evaluations of: yellow vs. other colors for school buses; four warning light vs. eight warning light systems; "stoparm" use; mirror systems; the words "School Bus" and/or other motorist information on the buses; and temporary signs used by transit buses when transporting children.

As early as 1939, "school bus glossy yellow" had been determined to be the most visible (conspicuous) in the environments where school buses operate. 18/

Most States are using the eight light warning system. Only 12 States still use the four light (red only) warning system (see Figure 4). Results are not yet available on studies using strobe lights or the inter-connection of the flashing warning lights and the stop/turn signals. This latter study will examine a wig-wag "X" effect in providing advance warning to motorists.

In addition to the uniform words "School Bus," printed on the front and rear of buses, some States still use additional legends, such as "Stop on Signal," "Stop-State Law," and "Stop When Bus Stops" on the rear of the bus. Standard 17 has disallowed these additional legends. The effectiveness of these rear door legends is unknown.

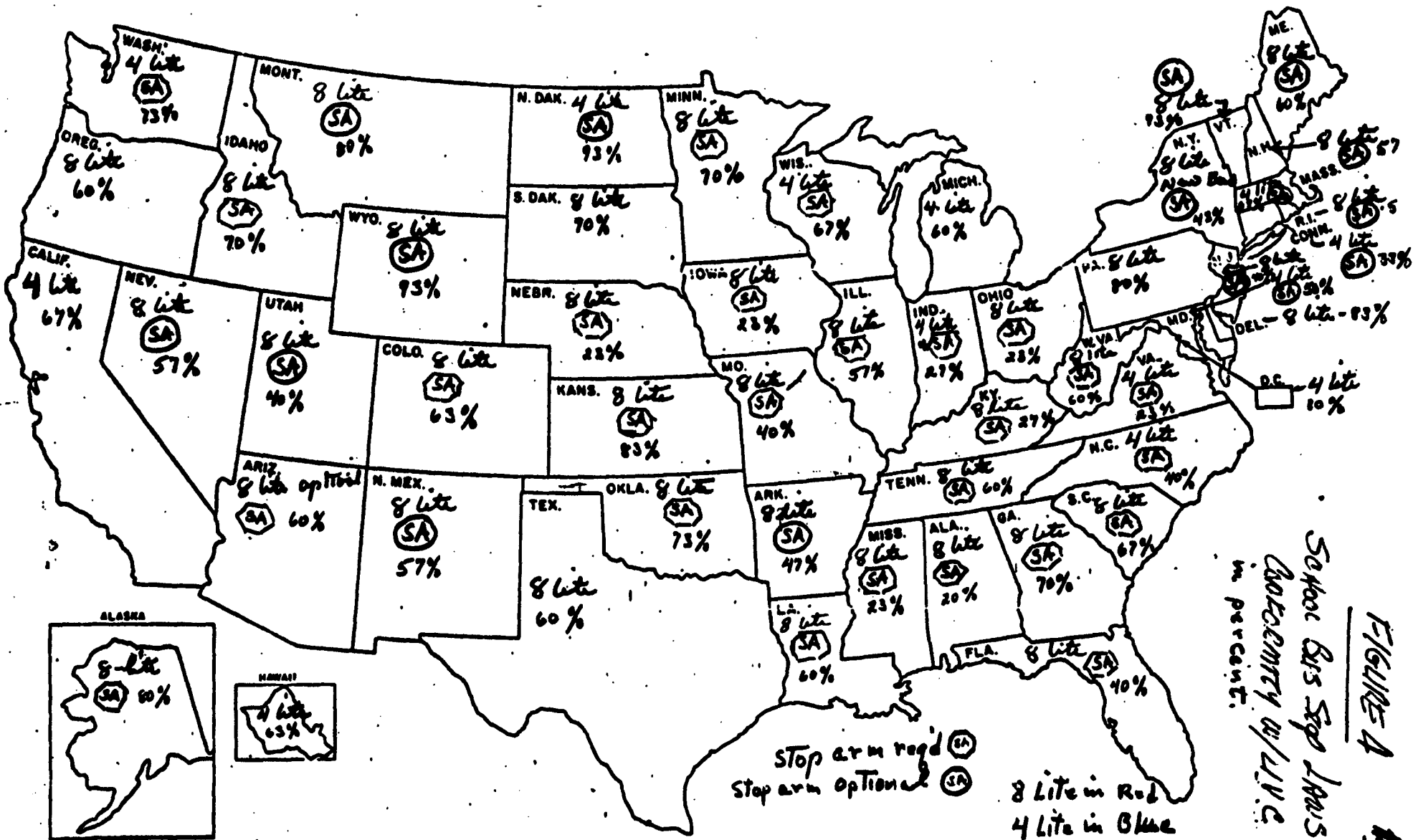


FIGURE 1  
 SCHOOL BUS STOP ARMS  
 ADOPTED BY STATE  
 IN PERCENT.

10-10-68

Figure 4

School Bus Stop Laws Conformity w/UVC in Percent

### School Bus Stop Laws

NHTSA encourages reasonable conformity with appropriate sections of the Uniform Vehicle Code (UVC) pertaining to school bus stop laws. By 1978, 33 States had laws which achieved better than 50 percent conformity with the UVC. Six States had better than 75 percent conformity. 19/ (See Figure 4.)

No statistical evidence is available yet regarding effectiveness in using the UVC guidelines or any of the State laws. However, NHTSA's Office of Research and Development has developed a Model School Bus Stop Law (formulated from the UVC and other State laws) and is planning to test its effectiveness in a study to be initiated during 1982.

NOTE: In relation to the foregoing two sections (Identification and Stop Laws), it may be helpful to consider the effect that the NHTSA's Model Ice Cream Truck Ordinance (MICTO) had when tested in Detroit, Michigan. MICTO, among other requirements, mandated flashing warning lights front and rear and a wing type stoparm on all ice cream trucks. When vending, the equipment was activated and other vehicles were required to stop, and proceed with caution when safe. When MICTO had its first full vending season, accidents among the children dropped 77 percent. (From a three-year average of 48.7 accidents to 11.)

## Pupil Instruction

### 1. PEDSAFE--Rural Pedestrian Safety Curriculum

PEDSAFE is a K-12 pedestrian safety training curriculum designed by NHTSA to combat pedestrian accidents which victimize suburban/rural children. 20/ Research conducted jointly by NHTSA and FHWA had previously identified the kinds of pedestrian accidents occurring to suburban and rural pedestrians.

The PEDSAFE project determined which of the accident types could be best countered by training administered through the school system. A K-12 curriculum aimed at protecting the children against ten kinds of accidents was developed.

PEDSAFE is composed of three programs:

1. An elementary program consisting of separate units for grades K-6 with films, slide/tape programs, and parent participation materials.
2. An on-bus program conducted by the school bus driver with teacher support for grades K-6. 20/
3. A Junior/Senior High School program which is a series of five projects designed for use in English, mathematics, science, health, and driver education classes.

The types of pedestrian accidents addressed by PEDSAFE include:

1. Mid-block Dash
2. Intersection Dash
3. Dart-out First Half
4. Dart-out Second Half
5. Walking Along Roadway
6. School Bus Related
7. Vendor--Ice Cream Truck
8. Multiple Threat
9. Mailbox Related
10. Hitchhiking

A field test of the K-12 curriculum in three Pennsylvania rural school systems was conducted with behavior and knowledge-change measures being the primary indices. Significant reductions were observed in various unsafe pedestrian behaviors, e.g., in mid-block and intersection crossings and walking along the roadways. Significant gains in safety knowledge were made at the high school level. Thus, PEDSAFE has demonstrated that it can modify children's

unsafe pedestrian behaviors which are known to lead to common types of suburban/rural pedestrian accidents, and it can improve their pedestrian safety knowledge.

## 2. School Bus Riders

In St. Louis, Missouri, a school bus rider training program is geared primarily for handicapped children. 16/ A behavior coordinator acts as liaison between the schools, parents, and transportation department. She maintains files identifying the special need of each child and is responsible for selection, training, and supervision of bus monitors.

She assists teachers and principals in developing and implementing behavior modification programs.

The program functions to regulate pupil behavior on the bus and thereby enhances the safety of the trip for all children.

A weekly safety program is presented in the Memphis, Tennessee, schools. The Board of Education receives a monthly report regarding the program presentations. 16/ Instruction is organized into four areas, one of which is bus safety. The program includes speakers and demonstrations sponsored by the School Transportation Department.



IV. Systems Support-Federal Motor Vehicle Safety Standards (FMVSS); Inspection; and Maintenance.

1. Protection for School Bus Occupants

While NHTSA was still engaged in school bus research, the Congress enacted the School Bus and Motor Vehicle Safety Amendments of 1974 which directed the agency to issue standards on several aspects of school bus safety. Bus seating was among the standards to be issued, so the agency duly undertook rulemaking, and on February 22, 1973, issued Federal Motor Vehicle Safety Standard (FMVSS 222), School Bus Passenger Seating and Crash Protection, which became effective April 1, 1977.

The Standard addresses principally three aspects of seating occupant protection: (a) seat and seat anchorage strength; (b) seat and restraining barrier height and surface area; and (c) padding on contactable surfaces within the occupant's seat space. FMVSS 222 relies on the concept of compartmentalization between well-padded and well-constructed seats to provide occupant protection on buses over 10,000 pounds. The buses under 10,000 pounds are required to have belts. Seat belts are required in the lighter buses because they experience more severe crashes than larger vehicles when involved in similar collisions.

The requirements of FMVSS 222 provide the essential elements for the compartmentalization concept. These elements also provide the impetus for NHTSA's

position relative to occupant protection in school buses. This position reflects the results of seat and vehicle construction research as well as assessment of actual use of school buses.

NHTSA agrees that children should be protected on school buses, but does not support a requirement for seat belts for passengers in large school buses. Improving the seating compartment eliminates the need for seat belts and provides sufficient crash protection.

2. Tennessee has promoted a program, in the Memphis public schools, in which high school vocational education students participate in maintenance of the school buses. During the school year, two shifts of students worked on the buses days and nights. Summer support for the program was provided by the comprehensive Employment and Training Act. 16/

This program represents a substantial financial saving to the school transportation department. It also gives participating students an opportunity to develop skills through actual work experience and ensures that the school buses are maintained on a consistent basis.

3. School Bus Driver Training 21/

Most of the more than 400,000 school bus drivers are hired for less than a full day's work. Bus drivers are generally people who have from 7 to 9 a.m. free and 3 to 5 p.m. free. One of NHTSA's first tasks was to help those who hire school bus drivers to select and train these people carefully.

The Human Resources Research Organization (Hum RRO) reviewed the literature related to safe driving, analyzed the driver's tasks, interviewed fleet supervisors and bus drivers before establishing a set of selection and training requirements. Their 240 page report describes and interprets an applicant's personal history, physical examination, knowledge tests, and measures of attitudes. All States and many school districts have made intensive use of this research.

Following this effort an actual "core" and "advanced" school bus driver curriculum was developed by a contractor 22/ for NHTSA. These two courses of study are divided into modules totaling about 60 hours. There is both an instructor's manual and a student manual for each course.

In order to assist the States in implementing this training program, five instructor training institutes were held across the country to which two trainers from each State were invited. These one week institutes provided the most recent techniques in how to teach and each student prepared a presentation using material from the School Bus Driver Instruction Program. 25/

#### 4. Inspection and Maintenance

Although vehicle failures cause only 2-3 percent of the school bus crashes, a great deal of time and money goes into keeping specifications current, doing maintenance and inspecting buses.

Following the investigation of several tragic crashes where there were multiple fatalities, the NTSB identified a number of structural defects in school buses and made a number of recommendations to correct these deficiencies 23/. NHTSA through field investigations identified a number of additional problems which were brought to the attention of school bus operating and maintenance personnel via a booklet entitled School Bus Safety Problems 26/. This survey gave special attention to more than 25 brake problems and also identified a number of clutch, steering, suspension, and exhaust system problems. The problems are usually depicted by photograph.

Exhaust system problems led several years later to a special study "School Bus Carbon Monoxide Intrusion" from which it was discovered that neither the federal nor State governments define the maximum allowable carbon monoxide (CO) level in the passenger compartment of a school bus.

Using 20 ppm as a reference level, NHTSA estimates that on a daily basis about 2.1 million people would be exposed to CO levels in excess of 50 ppm. There is no question but that comprehensive maintenance and inspection programs are necessary to control CO intrusion into the bus passenger compartment.

Industry has been particularly helpful in providing guidelines and resource material for keeping vehicles in safe operating condition. The Chevrolet Division of General Motors presents a model procedure for drivers to conduct a daily pre-trip inspection 27/. Two national organizations have special aids for improving school bus inspections 28/ 29/.

Systems support for pupil transportation is extensive throughout the country. Congress has passed several Acts, NHTSA has conducted research and done surveys and the NTSB investigated a number of school bus crashes with the specific intent of making each students' bus ride safer. The States have taken much of this work and incorporated it into their selection and training programs and into their maintenance and inspection programs.

## V. Summary of Docket 81-12 Pupil Transportaton Material

There were 12 submissions to this docket that mentioned transportation safety; six from the State level, one from the city of Lincoln, Nebraska, four from Pupil Transportation Associations, and one from a University Safety Center.

The States generally felt that Federal support was helpful, but the Federal Government should leave it to the States as to where the money should be spent to meet the greatest safety need. They felt the standard should remain as a guideline to leave them free to allocate funds as they wish. Several States give strong support for school bus driver training.

Only two of the Associations made substantive remarks about the safety program. The National School Transportation Association felt that more reliable data is needed and program evaluation is essential. The New Jersey School Bus Owners Association and the Bus Supervisors Association support Federal-Aid for school bus driver training but point out that the private sector has not benefited as required by the law.

St. Cloud University recommends that the program be retained and cited data indicating fatal crashes were down 67 percent over the period 1972 to 1980.

VI. References

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## VII. Abstracts

1. Exemplary Programs Involving the Use of School Buses, Lawrence Johnson and Associates, Inc., Washington D.C., February 1979 HS-803-383.

The purpose for which this contract was awarded was to identify and describe some of the exemplary programs being conducted by selected public school transportation systems. The objective was to make available to the 15,000 transporting school districts in the United States descriptions of exemplary pupil transportation activities which they could adapt or adopt to improve their own programs. The record of safety achieved by operators of school busing has been growing an average of 3 percent a year for many years and along with more buses, more children and more miles traveled, have come more school bus crashes, topping the 60,000 mark two years ago. One of the major roles of NHTSA is that of leadership and direction in addressing the emerging critical needs and problems of this growing pupil transportation industry.

This report is a resource for current information on pupil transportation safety programs and the innovative use of school buses, and will be useful to State and local administrators of pupil transportation departments across the country. As a resource, the report will provide ideas to States and communities for improvement in many areas attendant to the operation of a safe pupil transportation program. The report includes 43 detailed descriptions of exemplary activities involving the use of school buses.

The exemplary nature of an activity is based on the criteria of safety/efficiency, innovation and replicability. Each criterion is explained below:

Criterion 1. Safety/Efficiency

The activity must have a discernible impact on safety and/or either bus passengers, pedestrians, or drivers of other vehicles.

Efficiency refers specifically to the improved utilization of vehicles.

Criterion 2. Innovation

The activity must be to some degree innovative and creative. The activity should be new or uncommon among the activities engaged in by the majority of pupil transportation departments.

Criterion 2. Replicability

The activity must be capable of replication. The activity should have the potential to be adopted by other pupil transportation programs.

Replication does not require excessive expense or dependence on exceptionally skilled personnel.

Exemplary activities appear in ten categories which influence the quality of pupil transportation safety. These categories are:

Driver Training

Maintenance

Field Trips

Recordkeeping

Pupil Instruction

Community Services

Special Education

Safety Techniques

Public Relations

Administration

2. Selection and Training of School Bus Drivers, Human Resources Research Organization, Alexandria, Virginia, February 1971, HS-800-545.

The purpose for which this contract was awarded was to initiate a study intended to assist the States and their school districts in employing drivers capable of operating school buses safely and efficiently. The objectives of the study were to establish a set of selection requirements and training objectives that would enable pupil transportation administrators to assure, within the resources available, that newly employed drivers have the required qualifications.

- o A comparison of the characteristics of experienced drivers with their performance as rated by supervisors showed that the better drivers had the following characteristics:
  - o Over 30 years of age
  - o At least three years of school bus driving experience
  - o Married
  - o No pre-school children
  - o Between 8 and 12 years of formal education

- o The knowledge and performance tests showed significant differences between newly employed and experienced drivers, while the knowledge tests correlated significantly with the rated performance of the newly employed drivers. The attitude measures showed the results in the expected direction; however, they lacked statistical significance.
  
- o The results of the surveys of driver tasks, school bus operators, selection procedures, and training procedures, as well as the results of the survey of State selection and training standards, are summarized in the body of the report and described in the Appendices.