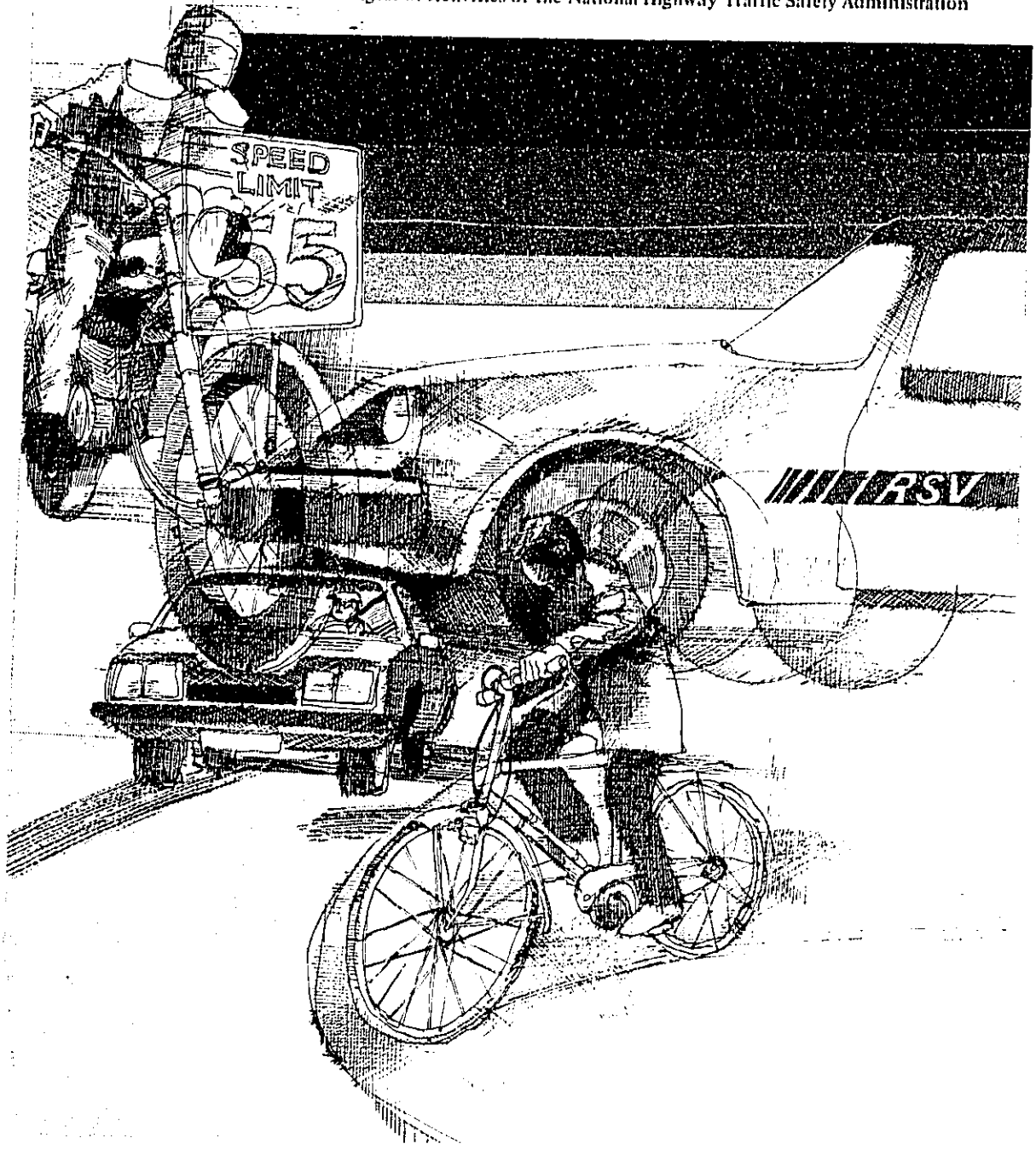
Traffic Safety '76

A Digest of Activities of the National Highway Traffic Safety Administration



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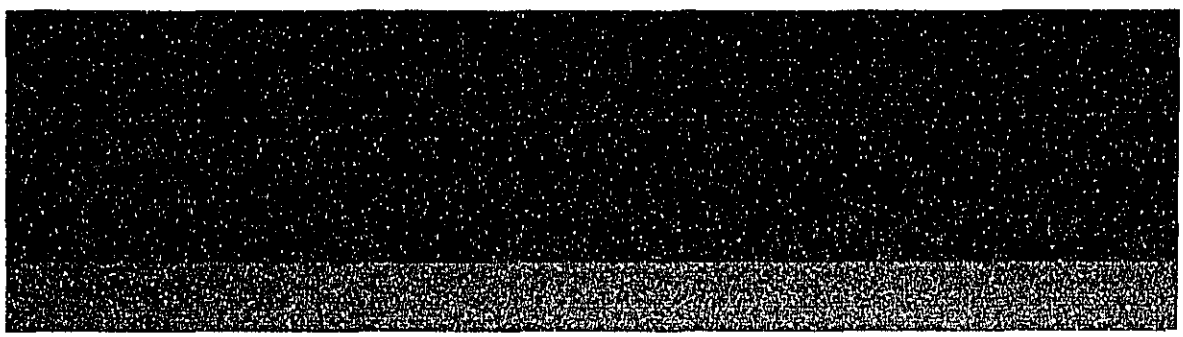
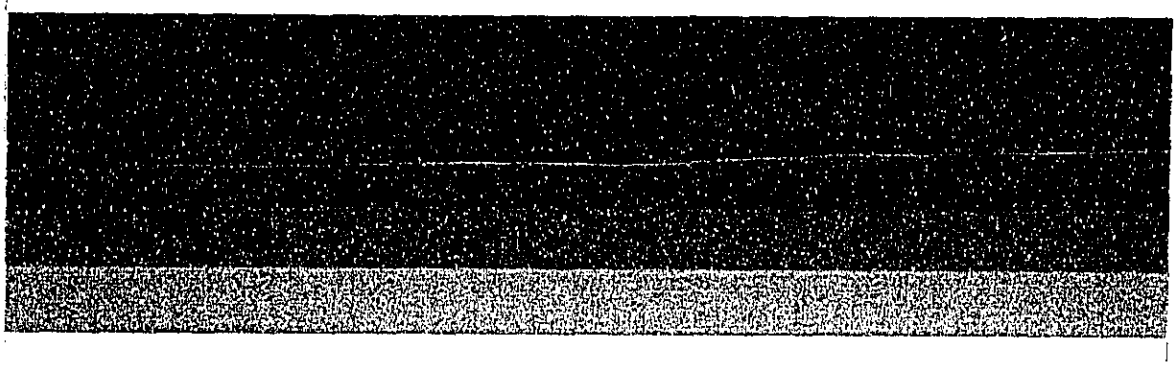


Foreword



The national traffic safety effort is based upon the National Traffic and Motor Vehicle Safety Act and the Highway Safety Act of 1966. Each of these Acts requires that the Secretary of Transportation submit an annual report on the administration of the statute to the President for transmittal to Congress.

In addition, Title I of the Motor Vehicle Information and Cost Savings Act of 1972 carries a provision for an annual report to the Congress on the administration of that Title – Bumper Standards. In the Highway Safety Act of 1973, the Congress expressed special interest in certain aspects of highway safety, such as bicycle safety, drugs and driver behavior, and traffic violations adjudication. The Federal Aid Highway Amendments of 1974 made permanent the 55 mile per hour national speed limit. The Highway Safety Act of 1976 provides for incentive grants to those States which have significantly reduced the number of traffic fatalities, and similar grants for reductions in highway fatality rates. Each of these topics is covered in the principal reports.

This publication is made up of excerpts from the two traffic safety reports for 1976. It is intended for wide distribution to give the public an appreciation of the gravity of the problem, the changes that have taken place during the past ten years, and the purposes and scope of the programs designed to increase the safety of the motoring public which are being carried out by Federal, State and community governments, industry, private organizations and cooperative citizens.

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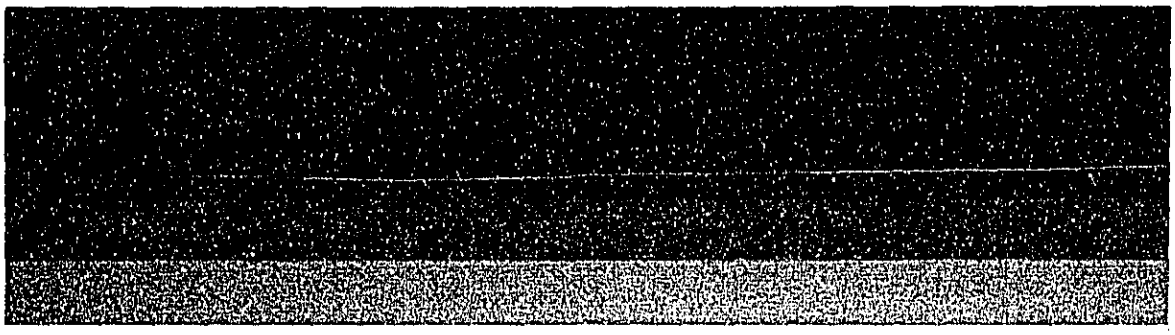

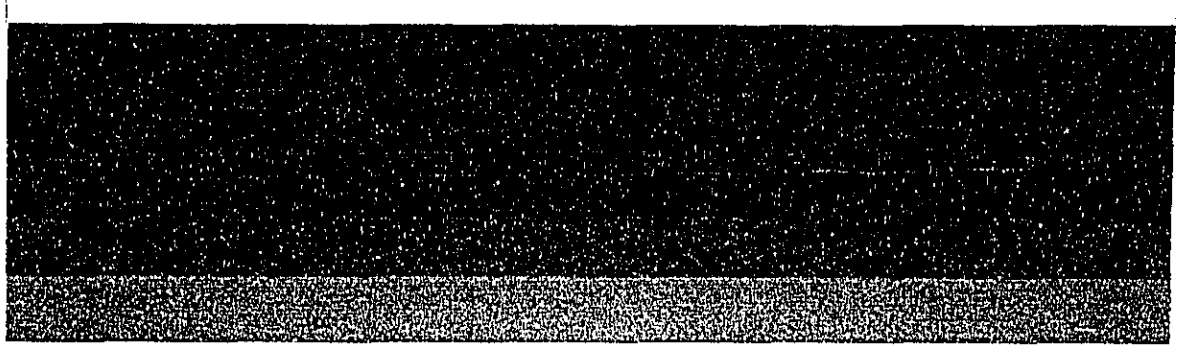

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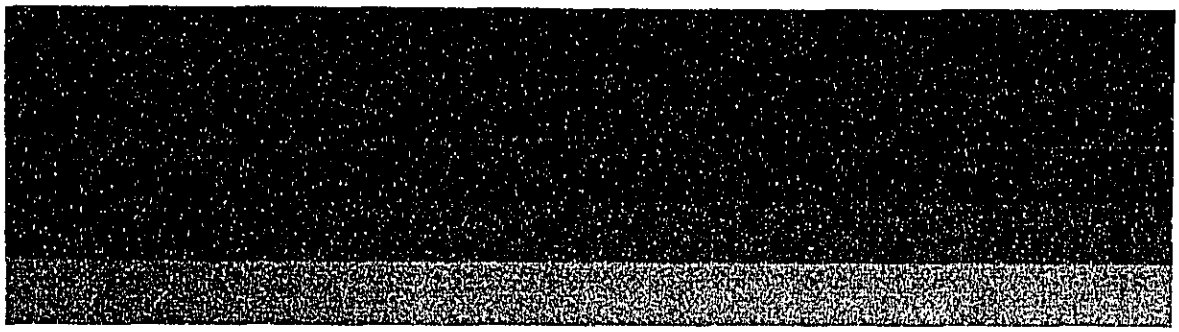
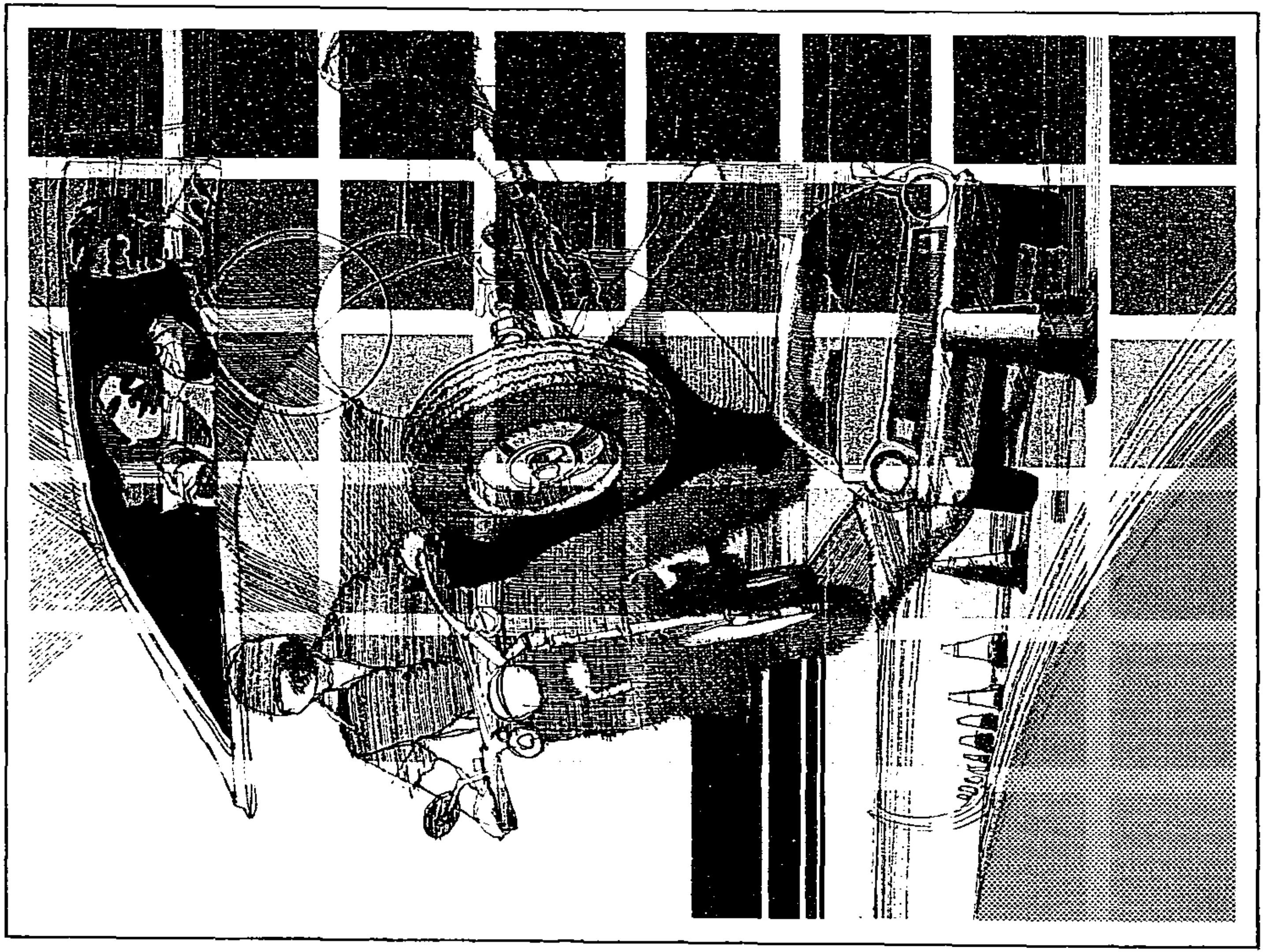




Introduction

The Lifesaving Record

Safe travel on our streets and highways merits a prominent position on our national list of priorities and concerns. The enormous cost of unsafe roads, drivers and vehicles touches us all, every driver, every rider, every pedestrian—and every taxpayer. The trauma of pain and suffering reaches all walks of life and all levels in our society. As 1976 entered its final month, a brother of the President was added to the toll of approximately 45,000 traffic deaths during the year. In addition to the thousands killed, nearly 4 million people annually receive minor to very serious injuries in highway accidents.

Since automobiles first appeared on our streets and highways in large numbers, motor vehicle accidents have been a major cause of death and injury. By the mid-1960's the figures had reached epidemic proportions with over 50,000 fatalities annually. Congress reacted in 1966 by launching a national traffic safety effort, creating the predecessor agency of the National Highway Traffic Safety Administration (NHTSA).

In the 5-year period prior to the establishment of NHTSA and its predecessor, fatalities increased 40 percent, an average annual increase of 7 percent. In the 7-year period following initiation of the traffic safety program, traffic fatalities increased only 5 percent, from 51,933 in 1966 to 54,590 in 1973, in spite of sizeable increases in the number of drivers (up 20 percent), vehicles (up 36 percent) and annual vehicle miles of travel (up 41 percent) (see Table 1). Partly because of these relative increases, the fatality rate per 100 million vehicle miles of travel declined 25 percent (from 5.58 to 4.17) over the 7-year period.

In 1974, fatalities dropped to 45,536, a decrease in one year of over 16 percent. This was the result of the energy crisis of late 1973, the imposition of a national maximum speed limit (NMSL) of 55 miles per hour (mph), and reduced travel. In spite of increases in fuel availability and travel, traffic fatalities remained at approximately the same level in 1975 and 1976, with the fatality rate declining to an all-time low of 3.3. In addition to the fuel saved, it is estimated that approximately 50 percent of the 9,000 lives saved annually may be attributed to a continuation of the 55-mph NMSL (Figure 1).

The components of the traffic safety problem have changed since passage of the highway and motor vehicle safety acts of 1966. Figure 2 indicates the relative increases and decreases of motor vehicle occupant, pedestrian, motorcyclist, and bicyclist fatalities. The greatest changes were in pedestrian and motor vehicle occupant fatalities.

The Nation's streets and highways were safer in 1976 than in 1966, as evidenced by the steadily declining fatality rate and the leveling off of annual fatalities. Among the reasons are continuation of the 55-mph NMSL, a higher rate of seat belt use, elimination of roadside hazards, improved highway design standards, increased number of people with driver training, and fewer accidents in which alcohol is a factor. Continued progress is needed in all of these areas and in pedestrian, bicycle, and

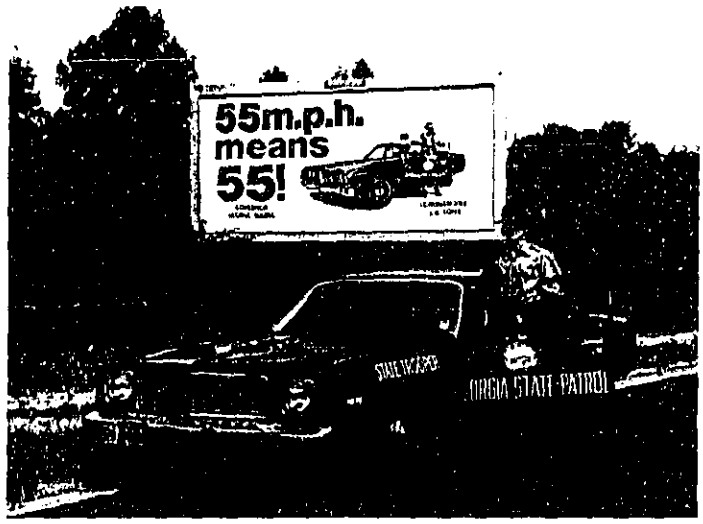


Figure 1: "A Law We Can Live With"

The fatalities and rates in this Table, for years 1975 and 1976, represent the latest statistics available, and differ slightly from the earlier figures used in the text.

Year	Traffic Fatalities*	Fatality Rate**	Drivers (mil)	Vehicles (mil)	Vehicle Miles (bil)
1961	37,025	5.02	88.9	76.6	737.5
Average annual change	+ 7.0%	+ 2.1%	+ 2.6%	+ 4.6%	+ 4.8%
Total change	+40.3%	+11.2%	+13.6%	+24.9%	+26.2%
1966	51,933	5.58	101.0	95.7	930.5
1966	51,933	5.58	101.0	95.7	930.5
Average annual change	+ .7%	- 4.2%	+ 2.7%	+ 4.5%	+ 5.0%
Total change	+ 5.1%	-25.3%	+20.3%	+35.8%	+40.6%
1973	54,590	4.17	121.5	130.0	1,308.6
1974	45,536	3.54	125.4	134.9	1,285.6
Change from 1973	-16.6%	-15.1%	+ 3.2%	+ 3.8%	- 1.8%
1975	44,995	3.38	129.8	137.9	1,330.1
Change from 1974	- 1.2%	- 4.5%	+ 3.5%	+ 2.2%	+ 3.5%
1975	44,492***	3.35***			
1976	45,113***	3.24***	133.9	142.4	1,391.3
Change from 1975	+ 1.4%	- 3.3%	+ 3.2%	+ 3.3%	+ 4.6%

Source: Traffic Fatalities – National Center for Health Statistics, DHEW,
Traffic Fatalities (30 Day Definition) – Fatal Accident Reporting System, NHTSA,
Drivers, Vehicles, Vehicle Miles – Federal Highway Administration.

* Traffic fatalities are deaths resulting from motor vehicle accidents occurring on trafficways. Statistics represent deaths occurring within one year after the date of the accident unless otherwise noted.

** Traffic fatalities per 100 million vehicle miles.

*** Fatalities that occur within 30 days after the accident. If based on a one-year definition, the rate for 1976 would be 3.3.

Table 1: Traffic Fatalities, Fatality Rates, Drivers, Vehicles and Vehicle Miles of Travel

motorcycle safety; road conditions; and drug involvement as well.

The traffic safety problem with respect to the vehicle and its interactions with human injury is illustrated in Table 2. Motorists account for the greatest portion of the total, and consist primarily of passenger car and truck occupants, with small numbers in buses and other motor vehicles. Deaths of persons, other than occupants of motor vehicles, consist primarily of pedestrians, motorcyclists, and bicyclists. Though motor vehicle occupants accounted for 73 percent of total fatalities, this percentage has declined from 77 percent in 1966. The passenger car occupant percentage of total fatalities has decreased even more markedly, from 66 percent in 1966, to less than 60 percent in 1975.

The data show that automobiles and other vehicles are notably safer than they were in 1966. Among the most important improvements have been the requirement for safety belts and their continual upgrading, safer occupant compartments, increased side strength, safer windshields, energy-absorbing steering columns, and head restraints (Figures 3 and 4). In addition, better vehicle brakes and lighting systems have contributed to accident avoidance.

Progress has been made, but much remains to be done before the highway slaughter is brought under control. Continued pressure by the public and by the Government for new and improved safety features can contribute to this end.

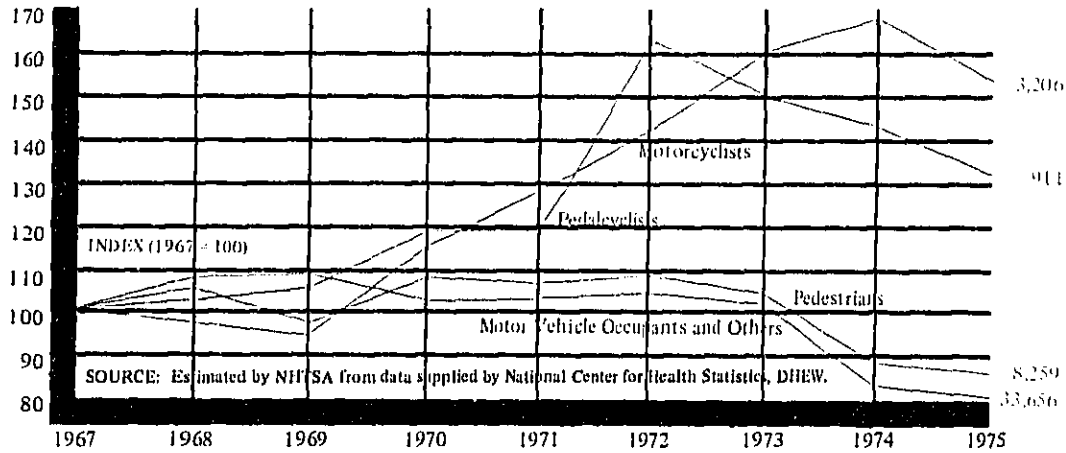


Figure 2: Relative Changes in Motor Vehicle Fatalities by Principal Categories, 1967-75, Estimated

Total Fatalities 46,032
Motor Vehicle Occupants 33,572 Deaths
Passenger Car Occupants 27,474 Deaths
Truck Occupants 5,677 Deaths
Bus Occupants 52 Deaths
Other MV Occupants 369 Deaths
External to Motor Vehicles 12,460 Deaths
Pedestrian 8,259 Deaths
Motorcyclists 3,206 Deaths
Pedalcyclists 911 Deaths
Others 84 Deaths

SOURCE: Estimated by NHTSA from data supplied by Fatal Accident Reporting System, NHTSA, National Center for Health Statistics, Department of Health, Education and Welfare.

* 1975 figures are used as this is the latest year for which final statistics are available.

Table 2: Analysis of 1975 Motor Vehicle Accident Fatalities

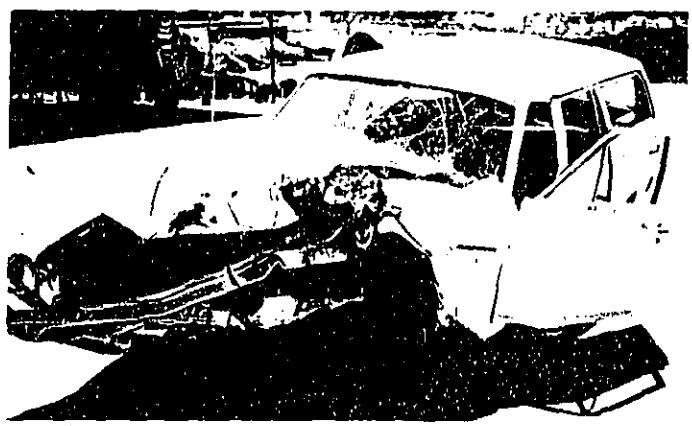
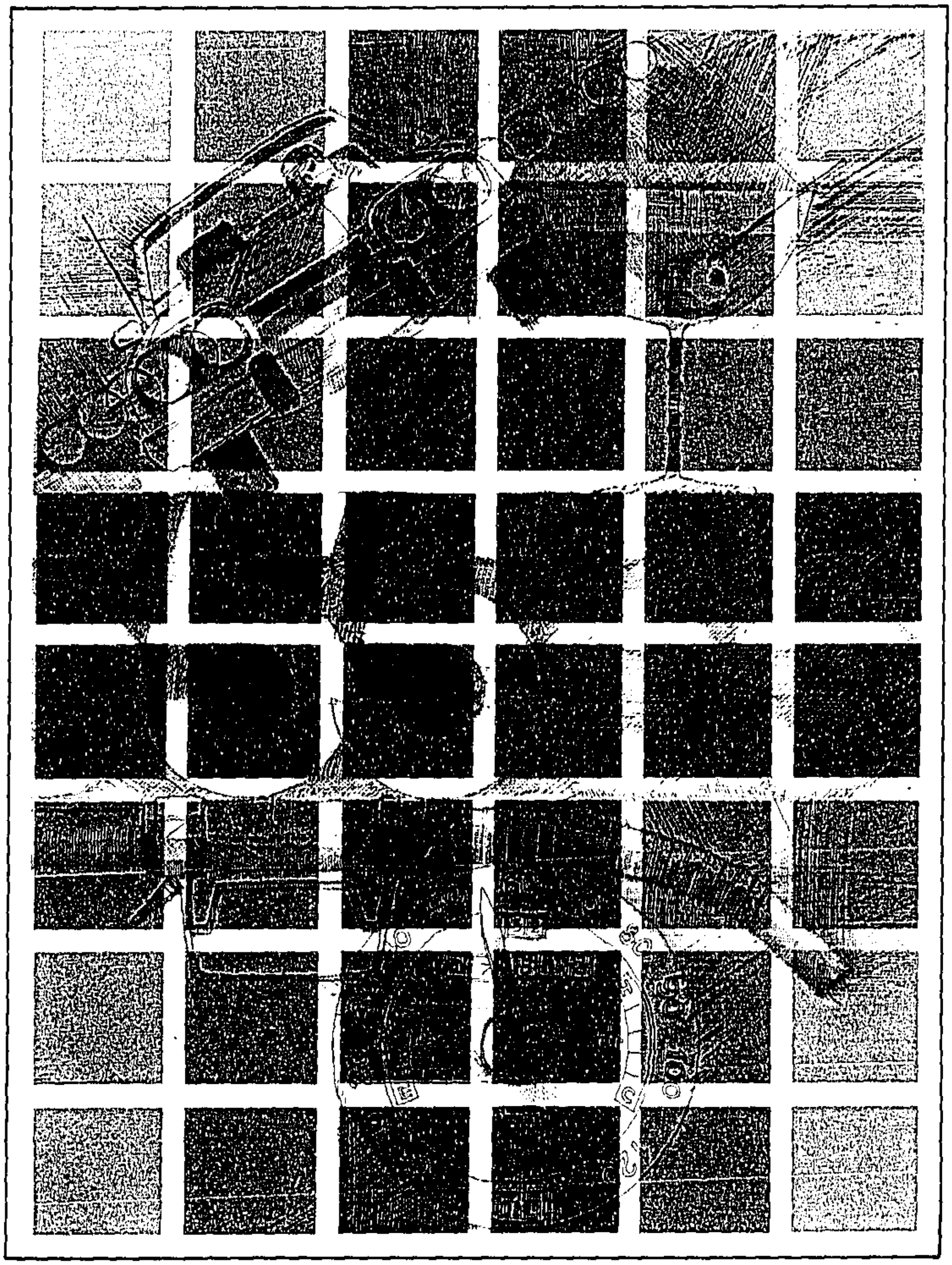


Figure 3: Both Occupants Unbelted, Ejected, Seriously Injured

Figure 4: Restraint System Deployed, Driver Received Minor Injuries



Priority Programs

NHTSA places emphasis on solutions to problems that produce the most effective results at the lowest cost. Limited resources and the diversity of highway and vehicle safety and fuel economy problems make the establishment of priorities essential. Priority programs are: (1) the reappraisal of highway safety standards, (2) fuel conservation, (3) data collection and analysis, (4) enforcement of the 55-mph NMSL, (5) occupant safety and (6) the campaign against drunken driving.

(1) Highway Safety Standards Reappraisal

The Highway Safety Act of 1966 stipulates that each State shall have a highway safety program approved by the Secretary of Transportation; and that these programs be in accordance with uniform Federal standards which are expressed in terms of performance criteria.

There are 18 standards currently in force governing such matters as obtaining drivers' licenses and periodic motor vehicle inspections. When the standards were written, they represented the consensus of the national safety community. Substantial progress has been made by all States in their implementation.

In order to make these standards even more effective, the Congress recently directed the Secretary, in cooperation with the States and the private sector, to evaluate the adequacy and appropriateness of the standards and report his findings and recommendations.

The reappraisal will:

- Assess the adequacy and appropriateness of the standards in light of the various elements involved in accidents, and recommend efficient approaches for dealing with them.
- Examine the basic purpose, structure, management, and future priorities of the program.
- Analyze high impact programs and support activities to assess their adequacy, appropriateness, and necessity.
- Examine the relationship between the National Highway Traffic Safety Administration (NHTSA), the Federal Highway Administration (FHWA), and the States in the development and implementation of highway safety activities, and the sources and uses of highway safety funds.

(2) Fuel Conservation

In 1975, the Congress amended the Motor Vehicle Information and Cost Savings Act of 1972 to include new provisions for "Improving Automotive Efficiency." The Secretary of Transportation is to carry out a program for improving the fuel economy of new automobiles in the United States market. The responsibilities, which have been delegated to NHTSA, are to:

- Establish, adjust, and enforce new automotive fuel economy standards.
- Grant exemptions and modifications from applicable fuel economy standards.
- Receive reports from automobile manufacturers.
- Report to the Congress on the fuel economy program.

NHTSA's responsibilities for fuel economy include standards for passenger automobiles, vans, and general purpose vehicles weighing less than 10,000 pounds (gross vehicle weight rating). Fuel economy requirements for passenger automobiles have been set by Congress for model year (MY) 1978 at 18 miles per gallon (mpg), for MY 1979 at 19 mpg, and for MY 1980 at 20 mpg. NHTSA will issue regulations governing applications by automobile manufacturers for reductions of these standards.

NHTSA is to issue standards for MY 1981-1984 by July 1977. The goal for MY 1985 and thereafter is established by Congress at 27.5 mpg, but may be amended by the Secretary of Transportation to a level he determines to be the maximum feasible average fuel economy. Any changes which increase the level above 27.5 mpg or below 26 mpg would require Congressional approval. The standards for nonpassenger automobiles are to be established by NHTSA, and are to be effective for MY 1979. In addition, NHTSA assesses penalties for failure to meet, or allows credits to manufacturers for exceeding these standards.

(3) Data Acquisition, Analysis and Reporting

Progress in vehicle safety is directly dependent upon the breadth and validity of data upon which it is based. To evaluate existing and proposed standards, identify problems, formulate better safety systems,

and develop improved standards and remedial measures, a strong analytical foundation is required.

A major step was taken in 1976 when the National Center for Statistical Analysis (NCSA) was established, incorporating the existing statistical unit. Through a graduated national program of field studies and pilot tests, the Center will collect timely and reliable accident data on drivers, pedestrians, vehicles, collision types, injuries, environmental factors, and exposure.*

Full implementation of the Center is underway. Three nationally representative data collection systems are, or soon will be, in operation: the Fatal Accident Reporting System (FARS), the National Accident Reporting System (NARS), and the National Accident Sampling System (NASS).

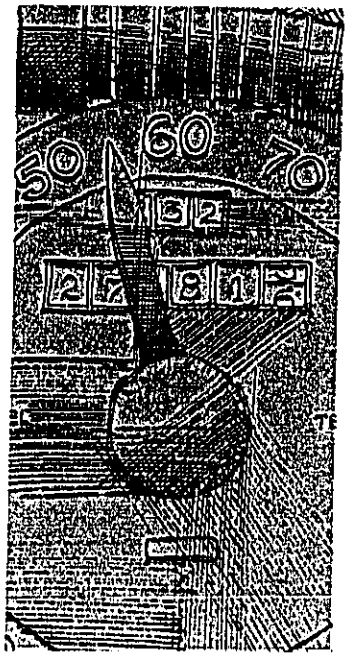
NCSA will collect and analyze information now kept by the States and communities. Police accident reports, driver licensing, motor vehicle registrations, highway inventories, medical and other records will be included. In addition, trained professionals will investigate accidents in the field.

When NCSA is fully operational, NHTSA will be able to funnel results of scattered, or general, programs into one office. For the first time, highway safety problems will be treated as a whole rather than in fragmented parts. The statistics resulting from this extensive data collection will permit a deeper understanding of the causes and consequences of accidents, and constitute a firm basis for setting and evaluating safety standards.

*Exposure refers to numbers of vehicles on the roads, speed and volume of traffic or frequency of "exposure" to accidents.

(4) The 55-MPH National Maximum Speed Limit

The last "normal" year insofar as highway statistics are concerned was 1973, when traffic deaths numbered 54,590. Primarily as a fuel conservation measure, a 55-mph speed limit was imposed in January 1974 and has since become the law of the land. Traffic deaths declined dramatically, and have remained down for the ensuing 3 years.



Initially, the scarcity of gasoline and altered driving habits contributed to the number of lives saved. But, since October 1974, fuel has been available, the number of miles driven, the number of cars on the road and other indicators of rising death tolls have increased. All studies, surveys and statistics point to the 55-mph limit as being the primary cause for the leveling off of annual traffic fatalities around the 45,000 mark--a saving of 9,000 lives each year for the past 3 consecutive years. Approximately 50 percent of these may be attributed to the 55-mph NMSL.

NHTSA is giving assistance to the States and their enforcement agencies to achieve the greatest possible compliance with the 55-mph limit by formulating the most effective enforcement techniques and procedures for State use.

Under the 55-mph law, the Governor of each State is required to certify to the Secretary of Transportation by January 1 of each year that the NMSL is in effect and being enforced on State roads. The Secretary is empowered to withhold approval of all Federal-aid highway construction projects in any State failing to certify enforcement of the NMSL. In 1976, Arizona, California, Georgia (Figure 5), Kansas, Maryland (Figure 6), Massachusetts, and Rhode Island received NHTSA's Public Service Awards for their enforcement programs.

Following imposition of the NMSL, average speeds on Interstate and rural primary roads decreased between 5 and 7-mph in 1974. The Highway Safety Needs Report rates the 55-NMSL as second only to safety belt usage in its potential to forestall fatalities.

To complement and strengthen the law and its effect, a new Federal Motor Vehicle Safety Standard (FMVSS) is anticipated which will specify speedometer accuracy and limit speedometer maximum speed readings. Its purpose is to deter drivers, particularly the young, from testing the speed of automobiles which have high-speed indicators. The standard also would specify anti-tampering requirements for odometers.

(5) Occupant Safety

All automobiles manufactured and offered for sale in the United States are equipped with restraint systems consisting of lap and shoulder belts for outboard front-seat passenger protection. This system is termed "active", because it requires the occupant to buckle the belt across his lap and torso.

Failure of the large majority of drivers and passengers to use the restraints has stimulated an interest in the development of "passive restraints." A system is termed "passive" when no action is required by the occupant to activate the system, so that they are virtually certain to be used. One of the most technologically advanced concepts in passive restraint systems proposed and developed is the Air Cushion Restraint System (ACRS), commonly called "air bag."

Air bag technology has advanced to the stage where driver and front passenger systems exist in a few automobiles. These restraints offer protection in large and compact-size automobiles in frontal barrier impacts at speeds up to 30 mph (Figure 7).

Passive front impact protection has made a major contribution toward increasing crash survivability. As a result, NHTSA funds research to increase occupant protection at higher crash speeds and in subcompact cars.

With regard to front passenger passive protection in compact and subcompact cars, NHTSA is considering: (1) the use of inflatable belts, (2) force limiting belts, (3) air bag-crushable dash panel systems, (4) aspirator air bag systems, and (5) advanced all-pyrotechnic air bag systems (Figure 8). The specific objective is to integrate these systems into automobiles weighing less than 3,000 pounds to determine the crash survivability potential.

Figure 5: NHTSA's Public Service Award Presented to Georgia State Police

Figure 6: Maryland State Police Use Unusual Method to Enforce 55-MPH

The aspirator air bag system is another promising protective device and has been demonstrated successfully in large cars. This system fills the air bag by using air in the occupant compartment as well as the energy stored in the inflator. The primary advantages of the aspirator system are that less energy has to be stored than for conventional systems, and there is reduced impact on the out-of-position occupant during deployment.

Data from front barrier crash simulation tests with aspirator air bags in standard-sized cars confirmed that the standard satisfied injury criteria for all adult dummy sizes up to 45 mph. The system does not present a hazard to the out-of-position child, and satisfies injury criteria for the normally seated 6-year-

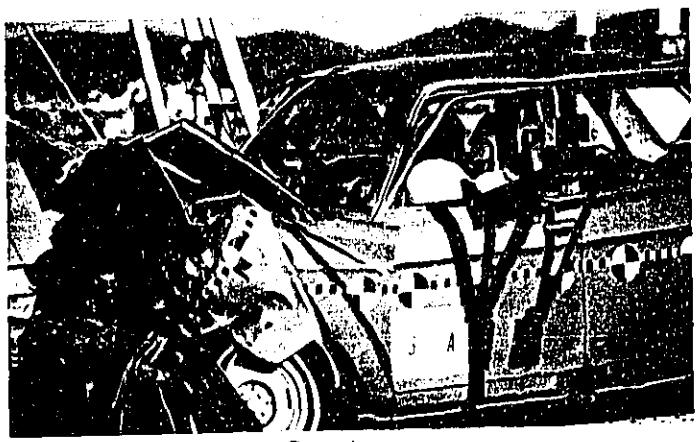


Figure 7: Air Bags Offer Passive Protection

old child dummy through 45 mph.

Improvements are needed in belt comfort and convenience to increase safety belt use. It is estimated that each 10 percent increase in the usage rate of lap and shoulder belts results in about 1,115 lives saved and over 90,000 injuries prevented annually.

(6) The Campaign Against Drunk Driving

Alcohol continues to be the number one highway killer. It is involved in over 50 percent of all highway fatalities, including about 25 percent of pedestrian fatalities. To combat and eventually overcome this deadly problem, new and more cost-effective remedies are vital. Needed are: more effective criminal justice systems, alcoholic treatment and referral programs in all communities, and a fundamental change in the public's attitude toward tolerance of the drunken driver.

The Alcohol Safety Action Project (ASAP) is the first such program to have as its objective the improvement of the whole traffic safety system. This program has produced new knowledge, some concrete achievements and successes, and some failures.

Experience with ASAP programs has demonstrated that each is unique. Each can be made effective only after local drinking/driving problems have been identified and measured.

The ASAP's demonstrated that:

- An integrated systems approach to control the drunk driver is feasible and practical.
- The systems approach requires, and can obtain, considerable cooperation and understanding among individuals and agencies in the highway safety system, the criminal justice system, and the health care system.
- A health care system can be established in which the problem drinker-driver can be identified and efficiently processed through the court system into a rehabilitation program.
- State and local governments can be motivated to improve their alcohol safety programs.
- A remedial program can be run at minimal cost to the taxpayers. Most of the support

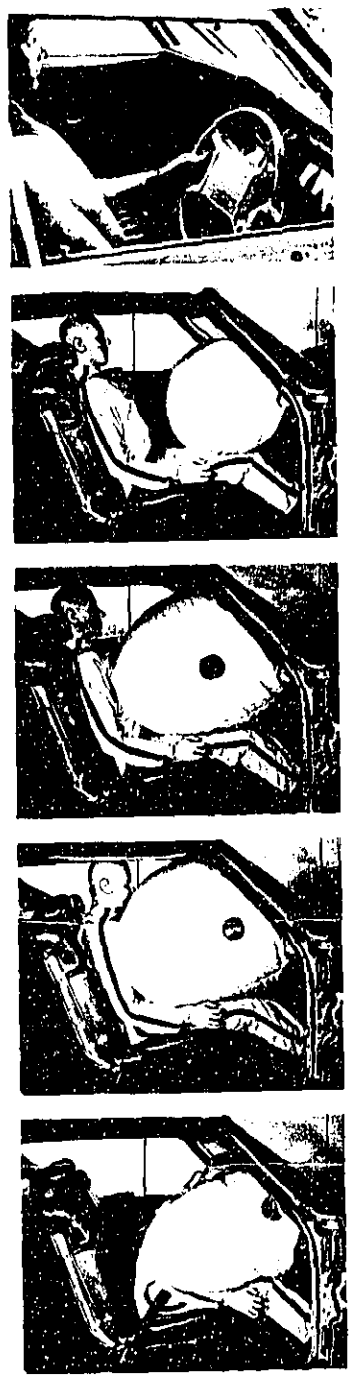


Figure 8: Passive Restraint Test Sequence

can come from the offenders themselves.

Conversely, the ASAP's found that:

- The systems approach could not produce an immediate and dramatic reduction in alcohol-related highway deaths at all project sites.
- No optimal arrest rate surfaced as a means of deterring drinking/driving.
- A model court system that can be applied to all locations could not be determined because of diversity among jurisdictions.

NHTSA has accumulated a fund of experience invaluable to new sites, particularly in methods of establishing a public information and education campaign (Figure 9). A wealth of materials has been created by the ASAP's so that new jurisdictions need not waste time or money in the preparation of new information.

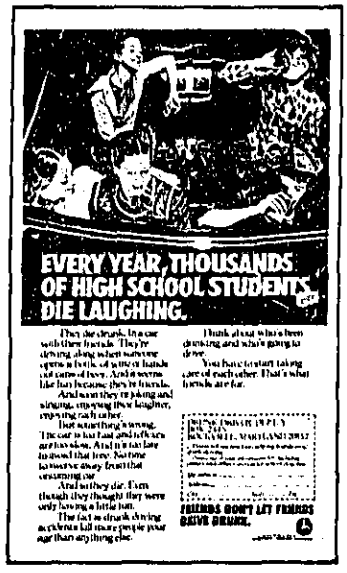
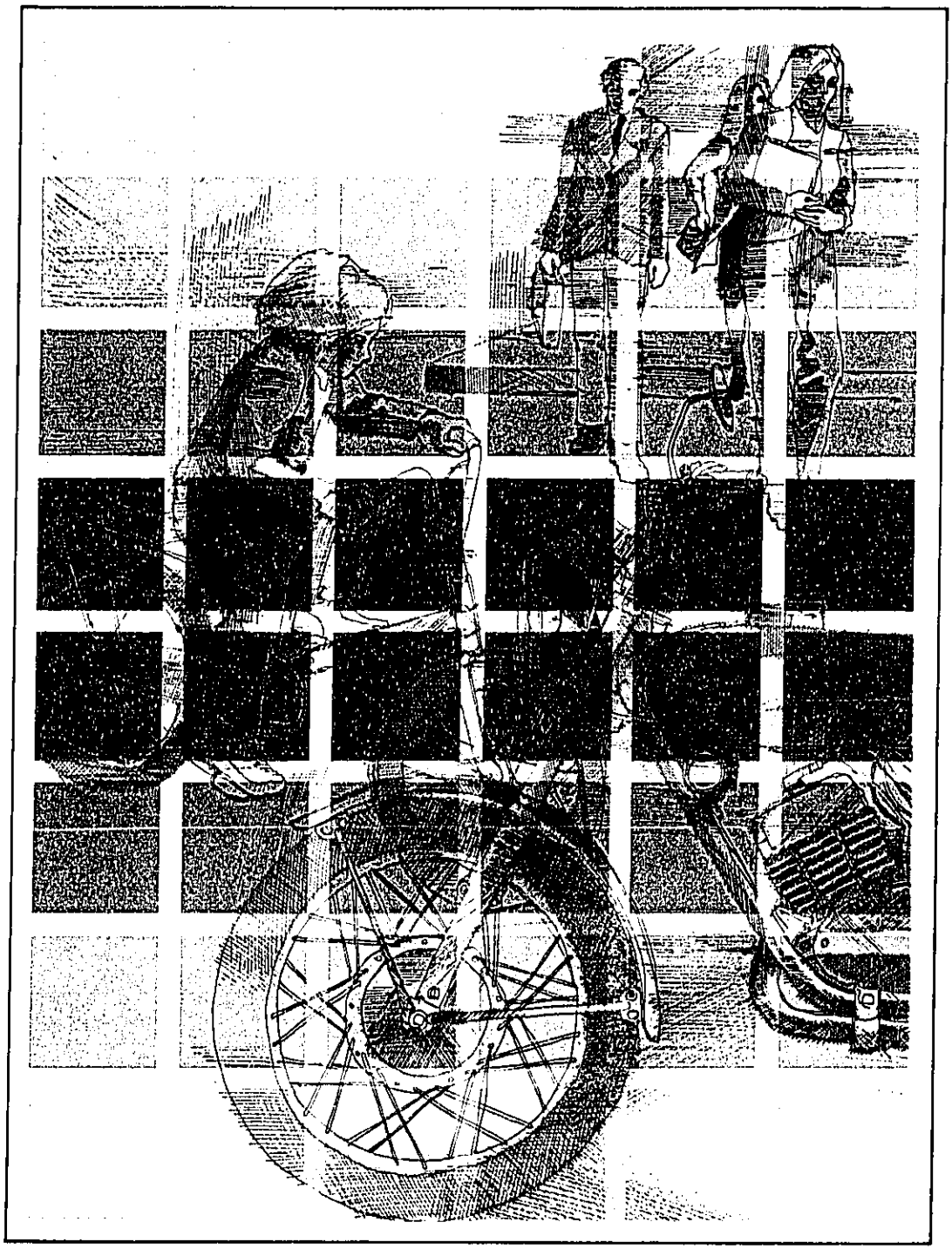


Figure 9: Public Information Campaign Posters



People and Traffic Safety

Of the principal components of traffic safety, or the lack of safety, the human element is the most unpredictable, the least amenable to permanent change. It is difficult to persuade people to buckle up every time they get in a car, to drive prudently, to obey speed limits, to refrain from drinking before driving, to always cross streets at intersections, to modulate youthful exuberance and experimentation. In earlier years, the solution was thought to be a matter of apprehending and penalizing the errant driver or pedestrian.

Today, work in highway safety has become more sophisticated and includes analyses of many factors:

- The events that lead to the accident, the happenings that constitute the crash, the factors that cause injury and death, and the action that immediately follows.
- The skid characteristics of road surfaces, the gradients of slopes and curves, the crashworthiness of vehicles and survivability of the people in them, the quality and rapidity of emergency responses.
- The history of crashes at a given site or time or in a particular environmental situation.

All of these factors are subject to remedial measures.

The Use of Safety Belts

Safety belts are one of the least costly and most effective life and injury-saving devices available to the motoring public. They became mandatory on all new passenger car models as of January 1, 1968, and were in use as an option before that. In spite of their proven effectiveness, the rate of use has stabilized at about 20 percent.

If safety belt usage had been increased to 70 percent during 1976, 9,000 more lives could have been saved in addition to the 3,000 lives saved by belt usage. These estimates are based on results of a study of some 15,000 tow-away accidents which showed that the effectiveness of lap belts in saving lives is 31 percent, and for lap and shoulder belts the value is 57 percent. In addition, the study showed that, particularly in small cars, use of both lap and shoulder belts is essential for adequate protection (Figure 10).

Research on the effectiveness of the light and buzzer safety belt warning system (limited to an 8 second duration) indicated that it does not have a positive effect on belt usage. However, by modifying this system to include a repeating buzzer *and* by making the warning light remain on until the belts are fastened, a substantial increase in belt use can be obtained.

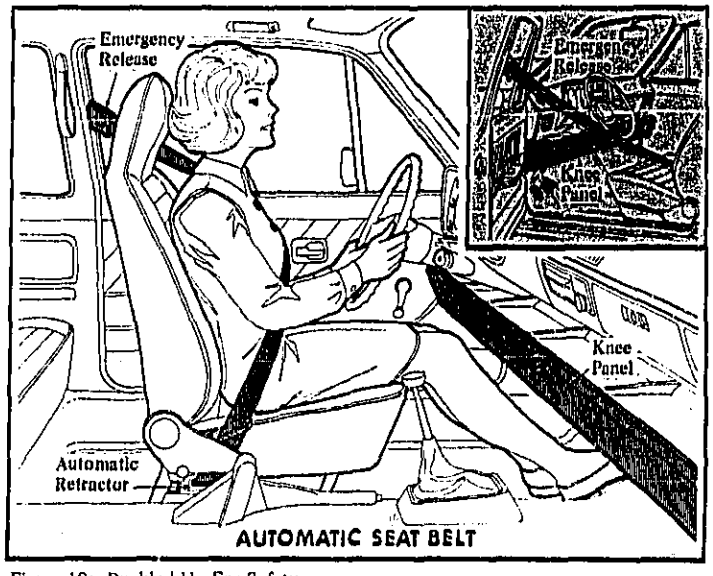


Figure 10: Buckled-Up For Safety

Interviews with owners of new cars found that discomfort and inconvenience are the major reasons given for not using belts. Such problems have not been solved in most new cars being sold in the U.S. Indeed, the problem seems to have been aggravated. Many cars are equipped with safety belts that are not easily accessible, are difficult to operate, and in some cases may compromise the crash protection of the automobile. Based on such findings, NHTSA has issued an Advance Notice of Proposed Rulemaking intended to materially upgrade the comfort and convenience of the belt systems, as well as to provide more effective warning systems.

The many pamphlets, booklets, and the audio-visual programs on safety belt use developed by NHTSA several years earlier have been revised and updated (Figure 11). This material will be sent to teachers, safety directors, and other community leaders who will encourage students, employees, license applicants and others to use safety belts.

State and local governments have been urged to promote greater use of belts. Some examples of such activities follow:

- Public exposure of *local* accident statistics showing the life saving potential of safety belt use.
- A Governor's safety belt conference in New Jersey.
- Consideration in 40 States of laws requiring the use of belts.
- Requirement in 39 States that school bus drivers wear belts.
- Use of Federal aid safety funds in 7 States to further their safety belt programs.

Traffic Safety Education

Human error is responsible in some degree for approximately 85 percent of all traffic accidents. NHTSA has increased the effectiveness of traffic safety education programs, with particular emphasis on the young driver and the drinking driver. The Congress has required a determination as to whether driver education programs do, in fact, reduce crash involvements.

The Driver Education Evaluation Program is focused around evaluation of a model secondary school driver education program (Figure 12). It involves assigning several thousand students to receive either: (1) the new curriculum, (2) minimal instruction, or (3) secondary school instruction. Following training, driver records for each group will be maintained for a 2-year period. Accident/fatality experiences then will be compared. The Dekalb County (Georgia) Board of Education was awarded the evaluation contract in 1976.

Drivers under the age of 25 constitute about 22 percent of all licensed drivers, but are involved in 37 percent of fatal crashes. Their accident rate per vehicle mile is almost 4 times the average rate for older drivers. The youth safety programs are to: (1) identify problem subgroups of young drivers, (2) develop remedial measures especially tailored to them, and (3) demonstrate and assess the value of their effectiveness through State education, driver education, driver licensing and other programs.

An educational project for drivers aged 15 to 24, who are known to be problem or near-problem drivers, consists of a new therapy approach coupled with innovative visual presentation techniques. It was prepared by the Texas Transportation Institute in conjunction with the Texas Department of Public Safety. At 6 project sites, 8,000 young drivers will be assigned to either instruction or control groups, and the driving records of each group will be monitored for 2 years.

The Comprehensive Driving Under the Influence (DUI) Offender Treatment Project is to evaluate both educational and therapy-oriented programs in terms of crash and non-crash criteria. More than 12,000 DUI offenders from Sacramento County, California, will be categorized according to the severity of their drinking problem. Within each drinker category (i.e., social drinker, mid-range problem drinker and severe problem drinker) offenders will be assigned to short-term education programs, some to therapy programs, and some will receive no treatment. Each group will be monitored for a minimum of 2 years to determine the effects of the various options on driving behavior.

The 35 Alcohol Safety Action Projects (ASAP's) used a variety of approaches to curb drinking and driving incidents. Innovative and expanded enforcement, adjudication, investigation, rehabilitation and educational techniques were demonstrated. It was found that:

- Funds were best invested in equipment, training, and design of procedures (both arrest and court).
- Better and standardized procedures can reduce the processing time for arrest of a DUI.
- The problem of the abusive drinking driver is amenable to a medical/legal approach.
- Presentencing investigation coupled with probation/rehabilitation works.
- A small investment of ASAP funds supplemented by a large public information and education campaign increases public awareness and support of measures to curb drinking and driving.

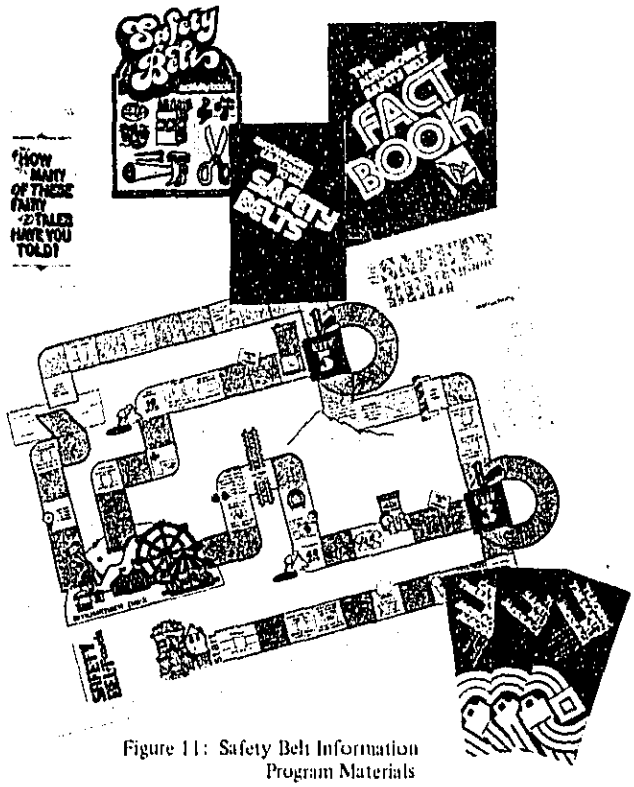


Figure 11: Safety Belt Information Program Materials

Pedestrian Safety

Pedestrian deaths account for over 17 percent of total fatalities, more than 8,000 in 1976. The toll is particularly high in many of the large cities, where pedestrians struck and killed by motor vehicles constitute 40 to 50 percent of all traffic fatalities. More than half of the victims are under 14 or over 64 years old.

NHTSA pedestrian safety research has been concentrated in the urban areas. A series of measures to counter the seven pedestrian accident types, which account for 57 percent of all urban pedestrian accidents, have been developed and are being field-tested. The most common pedestrian accidents are:

- *Dartouts* 33 percent: the victim runs into the street between parked cars.
- *Intersection Dashes* 8 percent: similar to dartouts, but at corners.
- *Vehicle Turn/Merge* 6 percent: a driver turning into or merging with traffic fails to see the pedestrian.
- *Multiple Threat* 3 percent: a stopped vehicle is joined by another going in the same direction. The victim is hit when he steps out from in front of the stopped vehicle.
- *Bus Stop* 3 percent: pedestrian crosses the road in front of a stopped bus and is hit by a car.
- *Vendor* 2 percent: similar to bus stop accidents.
- *Backing Up* 2 percent: pedestrian struck by car, neither driver nor victim sees one another.

Utah has developed a pedestrian safety management information system to pinpoint the cause of increasing pedestrian fatalities. The Utah problem is primarily urban, which is in accord with the national picture. Information from the accident analysis will enable the Utah Highway Safety Office to select remedies designed for those age groups and accident types most often cited.

Virginia has developed an educational TV program (Figure 13) to reach the young pedestrians who are victims in 20 percent of the 200 pedestrian fatalities and 33 percent of the 2,000 pedestrian injuries each year in that State. The program is designed to help children understand they are part of the traffic stream and have certain rules to follow.

To protect the pedestrian in the event of an accident, a program is underway to determine whether the front of automobiles can be modified to lessen pedestrian impact injuries, and yet retain the strength necessary to meet low-speed/no-damage and high-speed/crash-energy-management requirements. To this end, extensive experiments and analyses are underway:

- A computer study to find the vehicle front end shape which produces minimum injury.
- Experimental tests to substantiate the results of the computer study.
- Experimental pedestrian impacts utilizing dummies and current as well as modified vehicles (Figure 14) to evaluate the benefits of modifications.

Cyclist Safety

Largely as a result of the energy crisis, there has been a sharp increase in the use of motorcycles and bicycles. In 1976, there were 3,300 motorcycle fatalities and 900 bicyclist fatalities. Approximately 25 percent of all motorcyclists involved in accidents are novice riders with less than 6 months' experience. Bicycle fatalities now include more adults than before, because bicycles are being used more and more as a means of adult transportation.

Comprehensive training programs are lacking for cyclists of all ages. The rules of the road for bicyclists, and the enforcement of those rules among the States, are sometimes confusing. Better motorcycle licensing programs and bike rider regulations, codes and laws are being formulated in the States with the assistance of NHTSA.

The Motorcyclist (Figure 15)

An NHTSA demonstration project, "Improved Motorcyclist Licensing and Testing" is underway in Sacramento and San Diego, California. Thirty-six thousand motorcycle driver license applicants will be assigned to take either the present California motorcycle driver licensing test or an improved skill and knowledge test developed for this project. Driving and accident records of the test subjects will be studied for up to 2 years. Drivers successfully completing the testing program are expected to have 10 to 15 percent fewer accidents during the first 6 months of motorcycle operation. Six States (Tennessee, Mississippi, Pennsylvania, Kansas, Utah and Alaska) will reproduce and distribute motorcycle operator handbooks produced for the California project. Three more are considering its use. Additionally, a Spanish-language version of the handbook has been produced.

Nine States have either repealed or substantially weakened their motorcycle helmet laws.* In South Dakota and Oklahoma studies will be made of the ef-

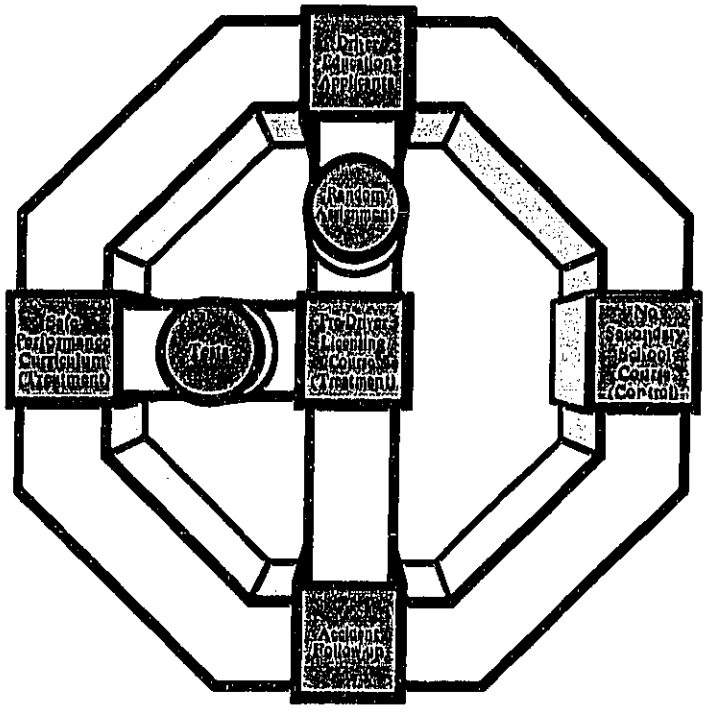


Figure 12: Safe Performance Curriculum Demonstration Project

*Since January 1, 1977, six more States have repealed their helmet laws.

Figure 13: Virginia's "Rules for Happy Walking" Teaches Pedestrian Safety to Children

fects of helmet law repeal on helmet use and on serious and fatal head injuries to helmeted and unhelmeted motorcyclists. Colorado, which has not repealed its helmet law, will serve as a control in these studies.

Based upon preliminary estimates, the 1976 motorcycle helmet experience indicates the following: (1) in those States which repealed their helmet laws (most of them effective July1, 1976), motorcycle deaths in the last 6 months rose 18 percent over the same period in 1975; (2) in the 2 States which have no helmet laws, motorcycle deaths were up 14.8 percent; (3) in the 41 States and the District of Columbia which have helmet laws, motorcycle deaths were down 8.5 percent; (4) throughout the U.S. motorcycle deaths declined 1.6 percent in spite of a 3 percent increase in the number of motorcycles on the road.

Pedalcyclist Safety

A notice of proposed rulemaking in January 1976 published a Pedalcyclist Highway Safety Program Standard for comment (for bicycles and other people-powered vehicles). More than 100 responses were received on the draft standard which are being reviewed prior to publication.

The States and communities are concentrating on bicycle safety through improved bicycle riding conditions and through education and enforcement programs (Figure 16). Richfield, Minnesota, with a population of 50,000 issued more than 2,500 citations for bicyclist violations. Richfield police feel that their stringent enforcement program is responsible for the dramatic drop in bicycle accidents from 35 in 1975 to 7 in the first 10 months of 1976.

Pupil Transportation Safety

Since the Pupil Transportation Safety standard was issued in 1972, the number of children transported has increased 16.7 percent and the number of buses 15.2 percent. Those aspects of State programs needing attention are bus driver education, uniform bus stop laws, pupil safety instruction including evacuation drills, and vehicle inspection and maintenance.

The most tragic accident in pupil transportation history occurred near Martinez, California, in 1976. The vehicle was not a regular school bus, but was chartered from a private firm for a school band trip. One advisor and 28 pupils were killed in this crash. Analysis shows that a disproportionate number of fatal accidents occur while school buses are transporting children for outside activities.

This and other tragic accidents have underlined the need for safer school buses. Surveys have been conducted to pinpoint unsafe conditions. For instance, a recent school bus survey de-

Figure 14: Pedestrian Impact Test -- Child and Adult

tected 360 components which could cause safety problems. Copies of the survey have been sent to school bus chassis and body manufacturers, interviewers, and state school bus officials for review and for corrective action in regard to their buses. All States were notified of the corrosive attacks on steel hydraulic brake tubing in vehicles exposed for 4 years or more to road splash which contained salt, dirt, or chemicals used for snow and ice control. A small scale field test to detect the presence of carbon monoxide in school buses found that no detrimental exposure is apt to occur.

To correct problems that have been uncovered, and to improve school bus safety in general, 5 new or amended standards were issued to become effective in 1977:

- School buses must have either one rear door or one door on each side of the rear half of the bus for emergency use.
- Seat back height and strength have been increased to prevent breaking loose in accidents typically experienced by school buses. Padding has been added which with the increased height will reduce facial injuries.
- Vehicle roof strength has been increased.
- Body panel joint tensile strengths have been increased.
- Upon impact from any direction, fuel leakage has been limited to avoid the threat of fire.

Traffic Law Adjudication

Traffic court studies evaluated traffic adjudication approaches and innovative methods of disposing of traffic cases. A traffic case processing model was used by California in preparing a report which concluded that a system of administrative adjudication of traffic offenses would be economically and legally feasible.

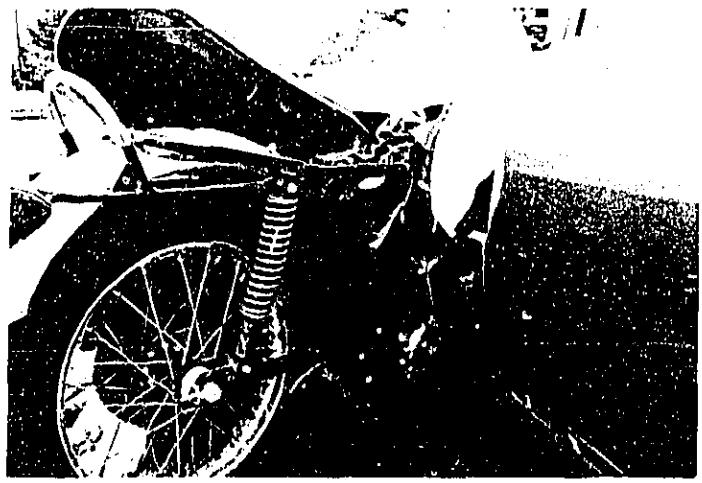
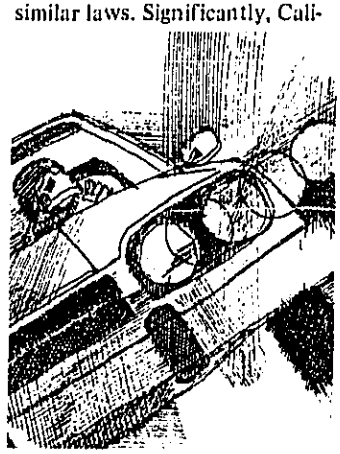


Figure 15: Motorcycle-Car Crash Fatal to Motorcyclist

Sixteen States have adopted innovative approaches to processing noncriminal traffic cases. Wisconsin and Oregon have decriminalized the first offense of driving while intoxicated.

In 1975 and 1976, Maine, Oregon, and Washington enacted major statewide traffic infraction laws. Judicial case processing is retained in these jurisdictions. Several jurisdictions, such as California, Kentucky, and Michigan, are considering the adoption of similar laws. Significantly, California conducted a feasibility study that recommended administrative adjudication of traffic infractions through the use of licensing hearing officers in the urban centers and justices of the peace in the rural areas.



Based upon over 17,000 cases, the first report on the Special Adjudication for Enforcement (SAFE) project at Seattle, Washington, showed that:

- Defendant appearances took an average of 45 minutes to complete.
- Twenty percent of the defendants were referred to some form of driver retraining.
- Administrative costs were $13.10 per case.
- The costs for defendant entry, hearing, and fine payment amounted to $5.40 per offender, and for the diagnostic rehabilitation component, $7.70.
- When defendants were examined who received no sanction beyond a fine, no contact with a driver improvement analyst, and no rehabilitation follow-up, the periods to the next citations were 77 days for SAFE, 68 days for forfeit and 56 days for court.

- Informal magistrate hearings resulted in better driving behavior than court trials or forfeiture without an appearance.
- Fines did not deter repetition; in fact, lower fines were associated with better driving.
- Municipal court efficiency improved during the period of SAFE.
- The docket backlog decreased, and trials of non-traffic offenses and fine revenues increased.

Driver Licensing

Since driver error is a contributing factor in approximately 85 percent of vehicle crashes, improvement in driver performance and in the licensing functions is essential to any major reduction in total crashes. The national highway safety program provides a framework for better State licensing practices, and since 1967 there has been a steady improvement from 60 percent to 84 percent compliance with the Federal standard. Driver licensing records have been computerized in 25 States, permitting direct access at all times for purposes of driver records review and license issuance.

The following were accomplished in 1976:

- A comprehensive review was made of State medical advisory boards used by the States for advice on medical questions involving licensed drivers and prospective licensees.
- A series of 6 driver examiner training films to assist examiners in recognizing certain physical and mental disabilities.
- A series of driver manuals for different groups of license applicants, namely: novice, aged, renewals, violators, accident repeaters, and drinkers.

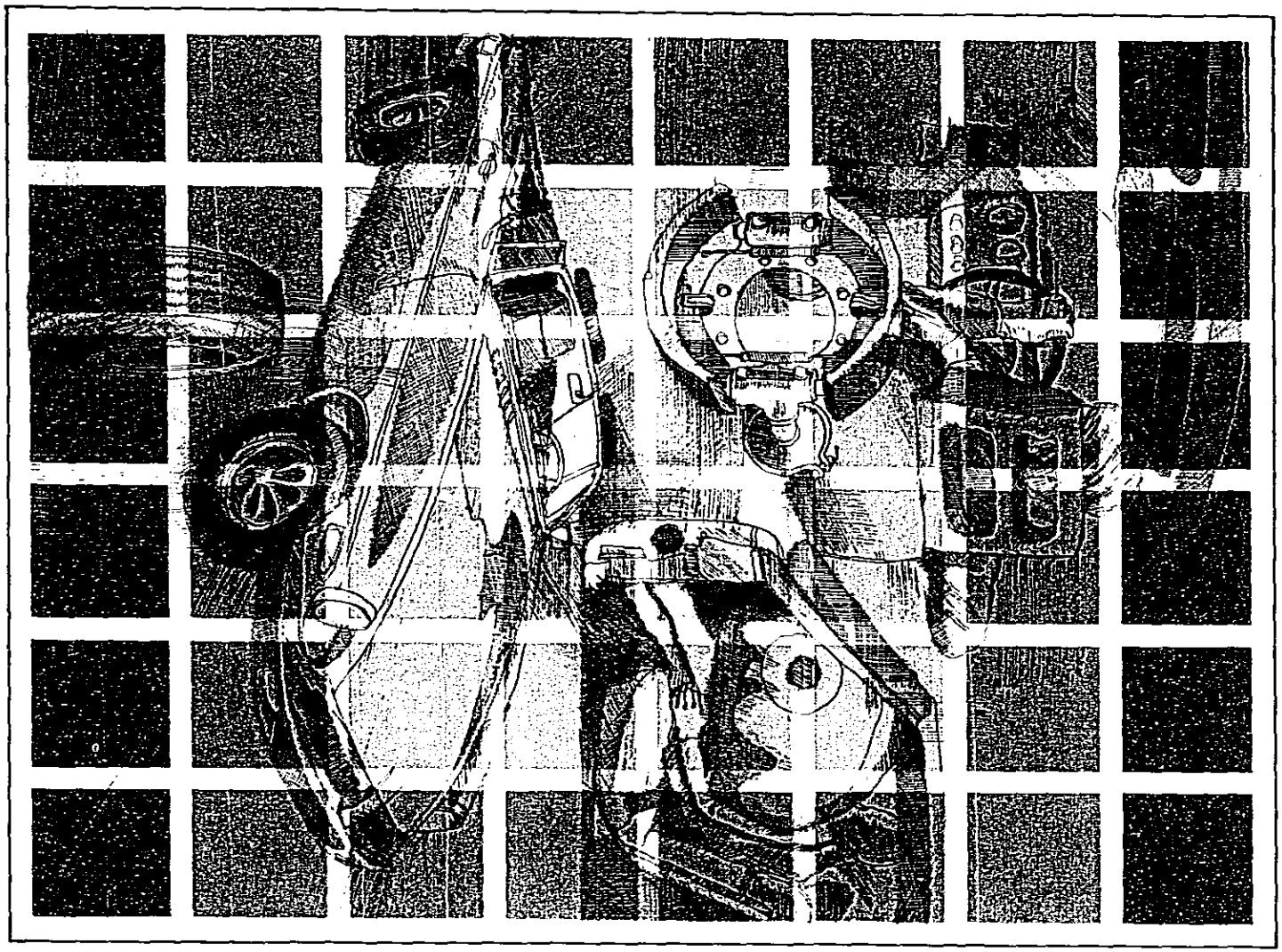
National Driver Register

Prior to 1960, an individual with a revoked driver's license had merely to reapply in a neighboring State to obtain a valid permit. To curb this practice, Congress established the National Driver Register (NDR) for the purpose of maintaining a central directory of drivers whose permission to drive has been suspended, revoked, or denied.

State participation in the program is voluntary. However, the more than 22 million requests for file checks received annually (88,000 daily) are indicative of the value the various jurisdictions ascribe to this cooperative Federal-State driver record exchange system. During 1976, inquiries resulted in more than 200,000 identifications of license applicants with a history of license denial or withdrawal.

Alcohol-related driving convictions account for 52 percent of the records on file, another 12 percent are for repeated violations (points), and 9 percent concern failure to appear for a hearing or trial, or for failure to file a required report. Driving while a license is suspended or revoked and speeding violations account for 5 and 4 percent, respectively. The remaining 18 percent is divided among 25 other categories.

Figure 16: Police Campaign to Reduce Bicycle Accidents in Richfield, Minnesota



Safer Vehicles

To reduce injuries and deaths it is essential that:

- The vehicle be built so that there will be no massive deformation of the passenger compartment, especially in small cars.
- Automobiles be designed to minimize pedestrian injury.
- School children be protected from injury in school bus accidents.
- Cars be maintained in safe operating condition during their useful lifetimes.

Of equal importance is the avoidance of accidents. This necessitates ease and predictability of maneuver; stability under a variety of conditions; safe tires, wheels and brakes; as well as lights and mirrors to increase the driver's range of vision.

In addition to the safety aspects, cars must be responsive to the requirements of fuel economy and pollution control.

Vehicle Structures

Data on the structures of lightweight (less than 2,000 pounds) four-passenger automobiles have been developed from crash and crush testing (Figures 17 and 18). Current research will develop lightweight modifications to the side structure of these vehicles and determine the weight penalty for a given level of structural integrity.

Three types of car-to-car aggressiveness have been investigated among vehicles of varying weights and structural characteristics. These are geometric, mass, and structural aggressiveness.

- Geometric aggressiveness occurs when one vehicle generates a concentrated force against a soft part of the structure of another vehicle in a crash, such as the overriding bumper in head-on crashes.
- An example of mass aggressiveness would be a vehicle with a heavy engine located in the front of an automobile colliding against the side of another vehicle. The engine weight results in lethal penetration of the other vehicle.
- Structural aggressiveness refers to the force balance between 2 collapsing vehicles in a crash whereby a more rigid vehicle structure forces the softer vehicle to absorb most of the crash energy (Figure 19).

The energy crisis created the necessity to reduce automobile weights. The primary objective of vehicle structure safety research is to insure that lightweight vehicles are crashworthy. Research on the use of materials in future automobiles could form the basis for rulemaking in both safety and fuel economy areas.

Biomechanics

Crash protection standards and compliance testing techniques must be based upon a knowledge of man's injury tolerance levels

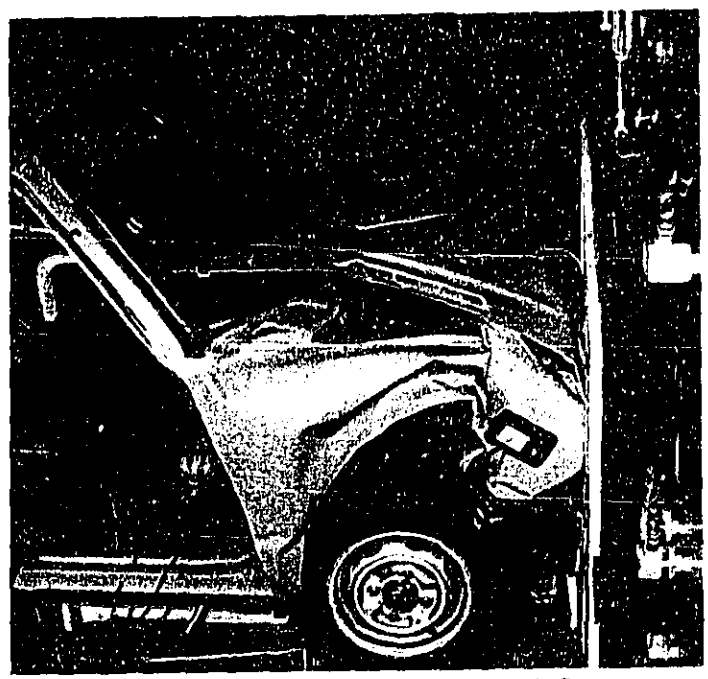


Figure 17: Crash and Crush Testing of Structures in Lightweight Cars

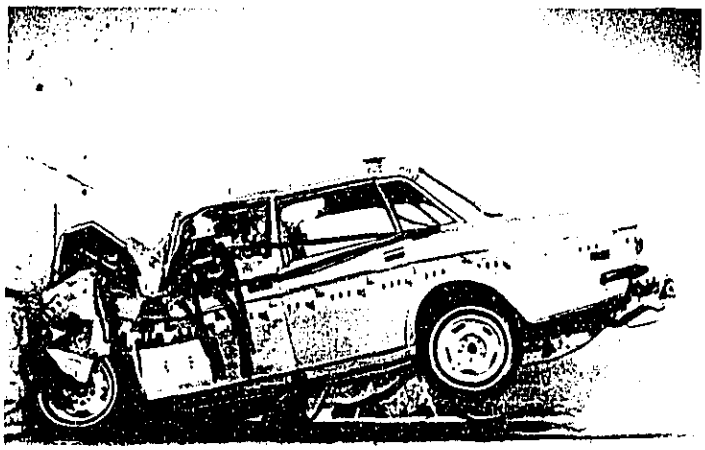


Figure 18: Testing Air Bag-Equipped Volvos

and the ability to predict body motions during a crash.

Computer models are being developed to study injury tolerance and human motion. These models will be used to integrate results from laboratory and field investigations into a description of injury mechanisms. Man's tolerance and motion response in lateral impact crashes and the effects of vehicle side stiffness (Figure 20), padding, and intrusion on injury also are undergoing analysis.

Integrated Test Vehicle Programs

The objective of these programs is to integrate the various motor vehicle standards which have been, or are being, developed by several agencies in the Federal Government. It is essential to guarantee that the standards are compatible and to determine how changes in the standards will affect this compatibility. The NHTSA Integrated Test Vehicle Programs are advancing technology to make it possible to achieve national goals for the automobile in terms of safety, energy conservation, environmental protection, and economic considerations, referred to as the S3E concept. Testing and evaluation are expected to verify that there can be a reasonable balance among these possibly conflicting S3E goals in a car that is practical, producible, affordable, acceptable to the consumer, and the environment.

The current Research Safety Vehicle (RSV) Program is addressing passenger cars in the 3,000-pound-or-less class and will furnish data applicable to automobile safety performance anticipated for the mid-1980's. Phase II, which is underway, consists of final design and prototype fabrication by 2 firms.

The Calspan RSV (Figures 21 and 22) involves the modification of an existing vehicle—the Simca 1308. The vehicle is a 4-door, 5-passenger sedan with a front-mounted transverse engine. Fuel economy is forecast at over 25 mpg, EPA combined cycle, while maintaining emission at lower than Federally mandated levels.

Major structural improvements incorporated in this vehicle include: zero damage in a 7 mph frontal impact, reduction in pedestrian injuries at impacts up to 20 mph, protection in 45 mph side impact, and occupant protection in 45 to 50 mph front barrier crashes without serious injury to occupants of other vehicles involved. An advanced inflatable belt system is used. Materials are selected that can be recycled economically with anticipated technology to conserve energy and resources. The Calspan design is an evolutionary approach, and should be readily producible and acceptable to consumers.

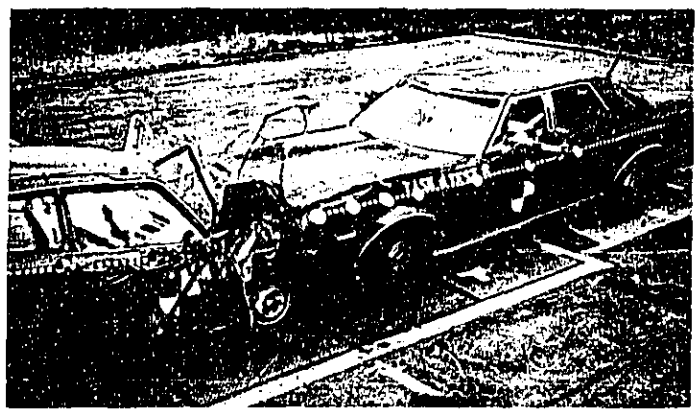


Figure 19: Big Car-Little Car Crash Test

The Minicars RSV (Figures 23 and 24) is a 2-door, 4-passenger sedan with a transverse engine mounted just forward of the rear axle. The production car weight is targeted at 2,000 pounds well below the RSV Program limit of 3,000 pounds. Fuel economy is expected to exceed 33 mpg, EPA combined cycle, with emission levels that will more than satisfy Federal regulations.

The front section of the Minicars RSV incorporates a plastic material which will withstand frontal crashes up to 10 mph with no permanent structural damage. Behind the non-damage section is a bolt-on, damage-limiting section. This easily replaceable section will deform in frontal crashes up to 20 mph and prevent damage from extending to other parts of the vehicle. Many of the exterior body surfaces are made of a resilient composite plastic material which resists rust, dents and scratches, and can be replaced in sections if heavily damaged.

The Minicars RSV front and side structures are made of lightweight sheet metal chambers filled with energy-absorbing foam. The soft, resilient, foam front-end is designed to reduce pedestrian injuries. Front seat occupants are protected in barrier crashes up to 40 mph. A second-generation antilock brake system is included, as well as a lightweight radar system to monitor the road ahead for hazards.

No-Damage Bumper Systems

A prime irritant to the consumer is vehicle damage experienced from low speed impacts. Elimination of such damages would substantially reduce consumers' costs.

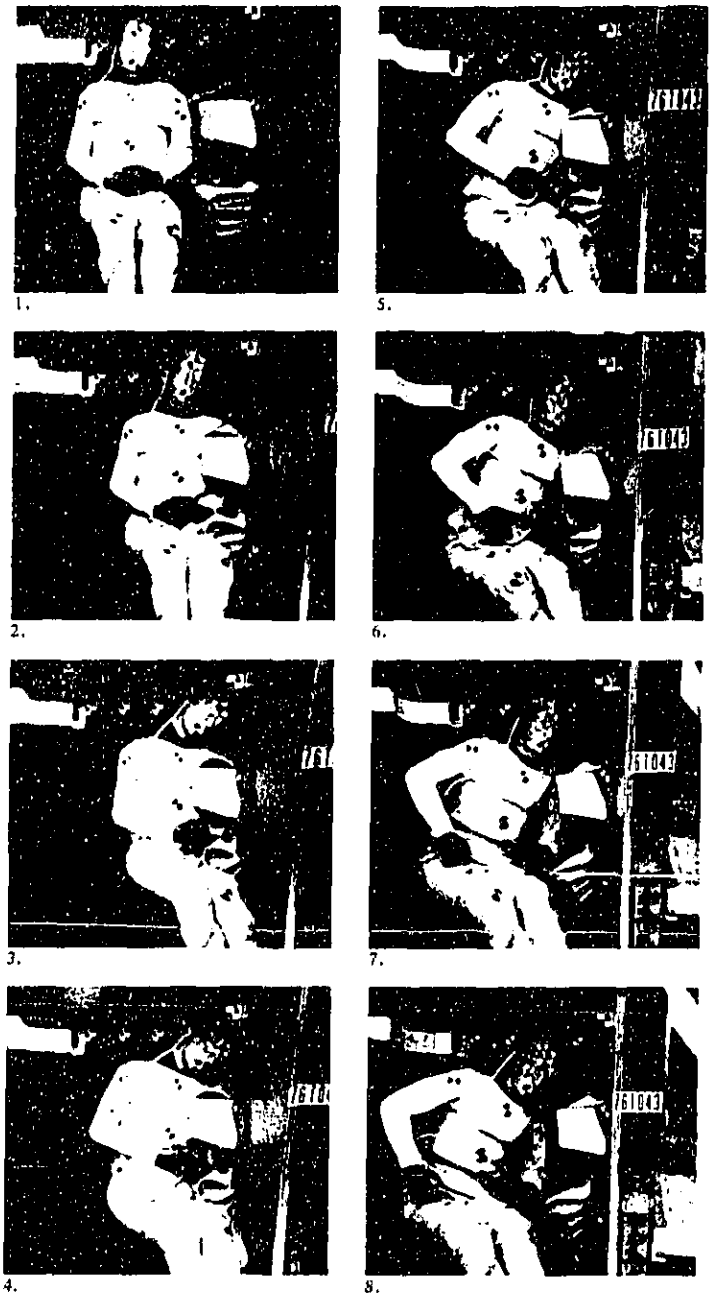


Figure 20: Dummy Motion During Side Impact Sled Test

Each RSV includes an innovative no-damage bumper. Both incorporate a thick, inner core of low density, energy-absorbing urethane foam covered by a high density urethane skin, and both are consistent with anticipated production technology (Figure 25). The Calspan design prevents damage in barrier impacts up to 7 mph. The minicars design provides the same kind of protection in speeds up to 10 mph.

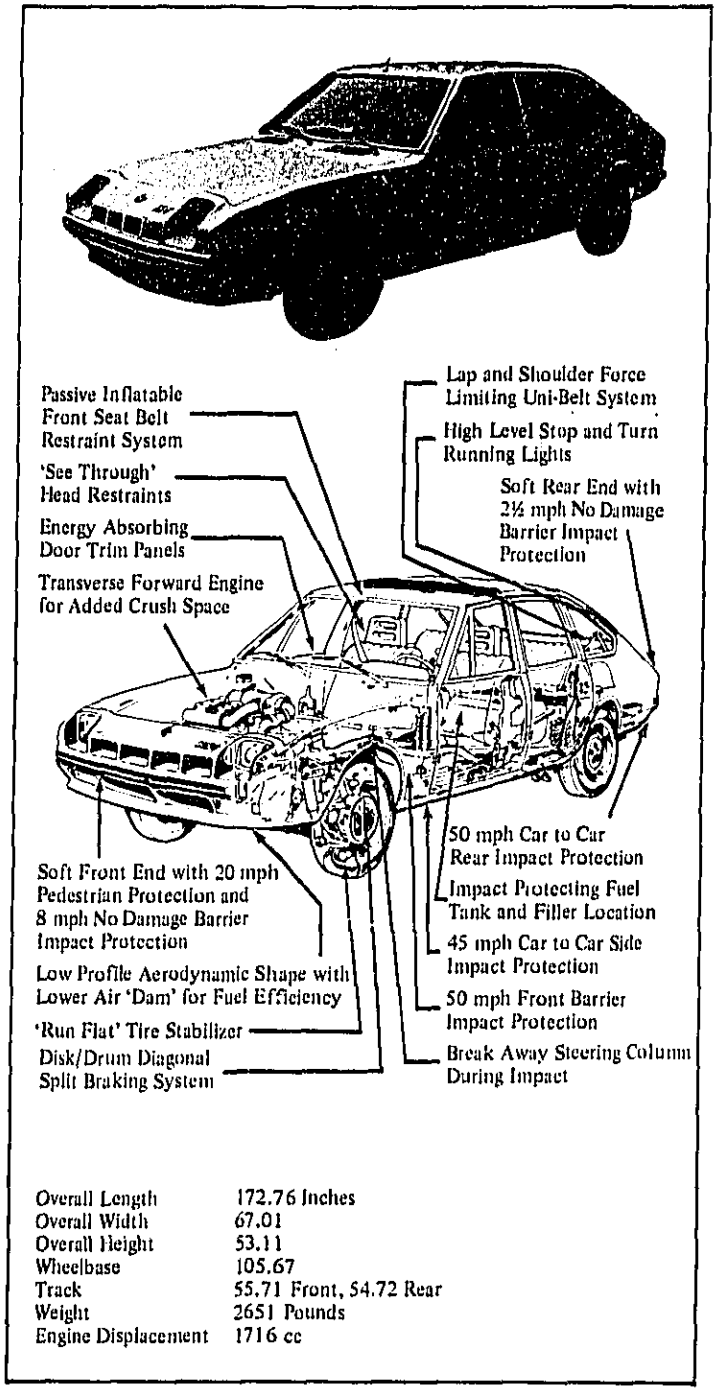
Vehicle-In-Use Inspection Programs

Costly breakdowns, repairs and accidents can be prevented by early detection of faults. A good inspection program identifies systems needing adjustment or repair before a dangerous failure or wear-out occurs. The NHTSA approach is to encourage all States to adopt Periodic Motor Vehicle Inspection (PMVI) (Figure 26).

Eleven States without PMVI programs were conducting trial substitute inspection programs. To date, 3 States have completed these projects but have been unable to establish a satisfactory alternative to PMVI.

In addition to safety programs centered around the vehicle itself, inspection programs are being strengthened by a special effort to upgrade the skills of inspector-mechanics. NHTSA has put together a set of training materials and courses for this purpose and made them available to the States. As part of this program, advanced inspection equipment is being developed to eliminate subjective judgement during vehicle inspection.

NHTSA's 1976 motor vehicle diagnostic inspection demonstra-



Overall Length	172.76 Inches
Overall Width	67.01
Overall Height	53.11
Wheelbase	105.67
Track	55.71 Front, 54.72 Rear
Weight	2651 Pounds
Engine Displacement	1716 cc

Figures 21 & 22: Calspan/Chrysler RSV Features

tion program was conducted under cooperative agreements with Alabama, Arizona, the District of Columbia, Puerto Rico, and Tennessee (Figure 27). The program provides the consumer with specific information to facilitate the repair of safety and emission system defects.

Based on analysis of data from over 125,000 inspections, it is estimated that 36 percent of the cars on U.S. roads may have serious brake system defects. Over 75 percent of the vehicles enrolled in the program failed the initial motor vehicle diagnostic inspection. In States without PMVI programs, the percentage of vehicles that failed the initial inspection was more than 90 percent. An average failed car had 2.9 defects. These were distributed primarily among tires, suspension, brakes, steering, electrical lighting, exhaust system and engines (Figure 28).

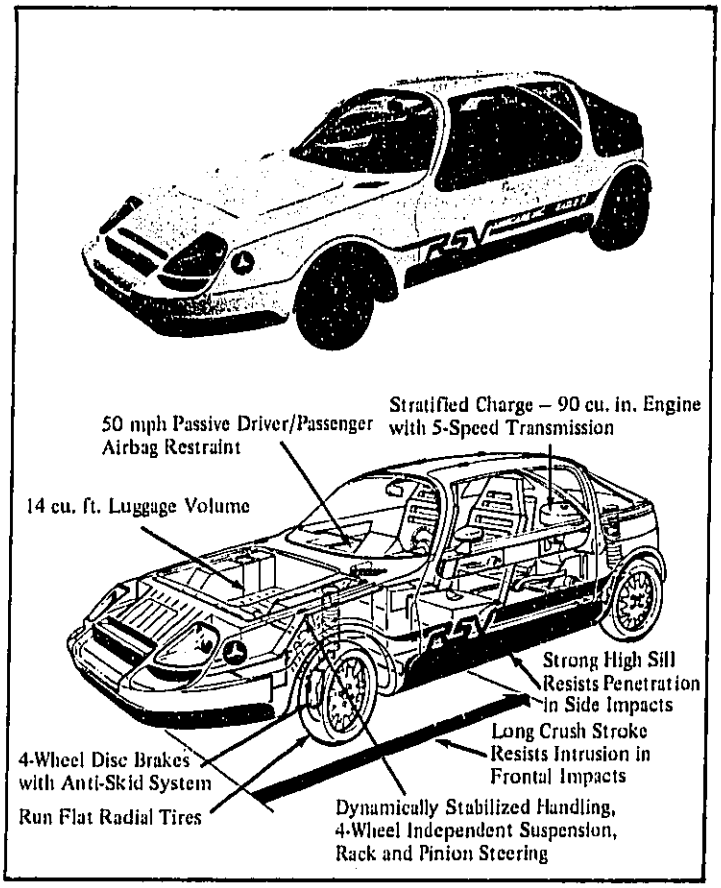
Inspection standards covering all critical operating systems and components of school buses were developed, and proposed for public consideration and comment.

Vehicle Handling

Vehicle handling involves the interaction between the vehicle's dynamic properties and the driver.

Initially, research centered upon vehicle handling capabilities uninhibited by driver limitations. Then it sought to determine how close to vehicle limitations drivers are willing to push their vehicles. An analysis of these programs will form the basis for a vehicle handling standard.

The problems of trailer towing, including fifth-wheel location on



Figures 23 & 24: Minicars RSV Features

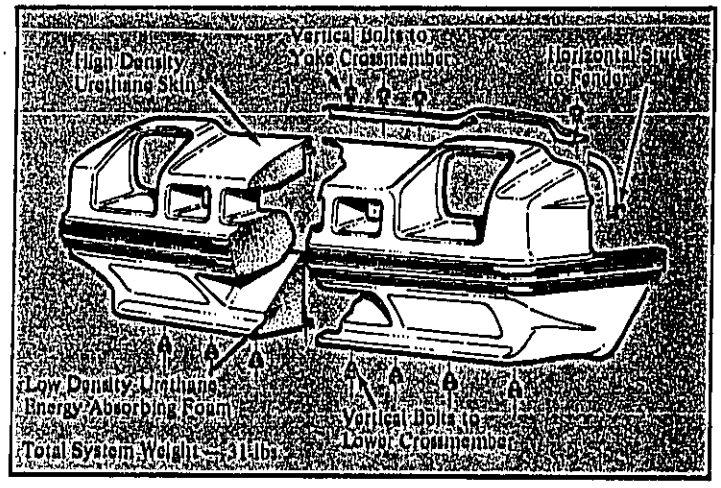


Figure 25: No-Damage Bumper Design and Installation

tractor trailers, are under study to determine test procedures and associated requirements. Several other 1976 projects addressed the technological basis of vehicle handling:

- A reliable lightweight towing instrument package to eliminate many of the shortcomings in older test devices.
- A mobile parametric device to measure vehicle data for handling studies.
- A comprehensive study of truck tire characteristics to determine differences in the quality of performance of truck tires relative to passenger car tires and also those characteristics such as truck frame torsion bending that may affect the turning stability of commercial vehicles.

Tires and Rims

Standards have been issued covering all new tires and rims for passenger and other vehicles. The manufacturer of the rims must designate them as suitable for use with specific tires. Each rim must comply with standardized identification markings (size and type designation) to assure proper fit to the tire.

The retread industry has shown great interest in the *transmission ultrasonic system* for non-destructive tire testing which was developed for NHTSA. It accurately rejects faulty casings,

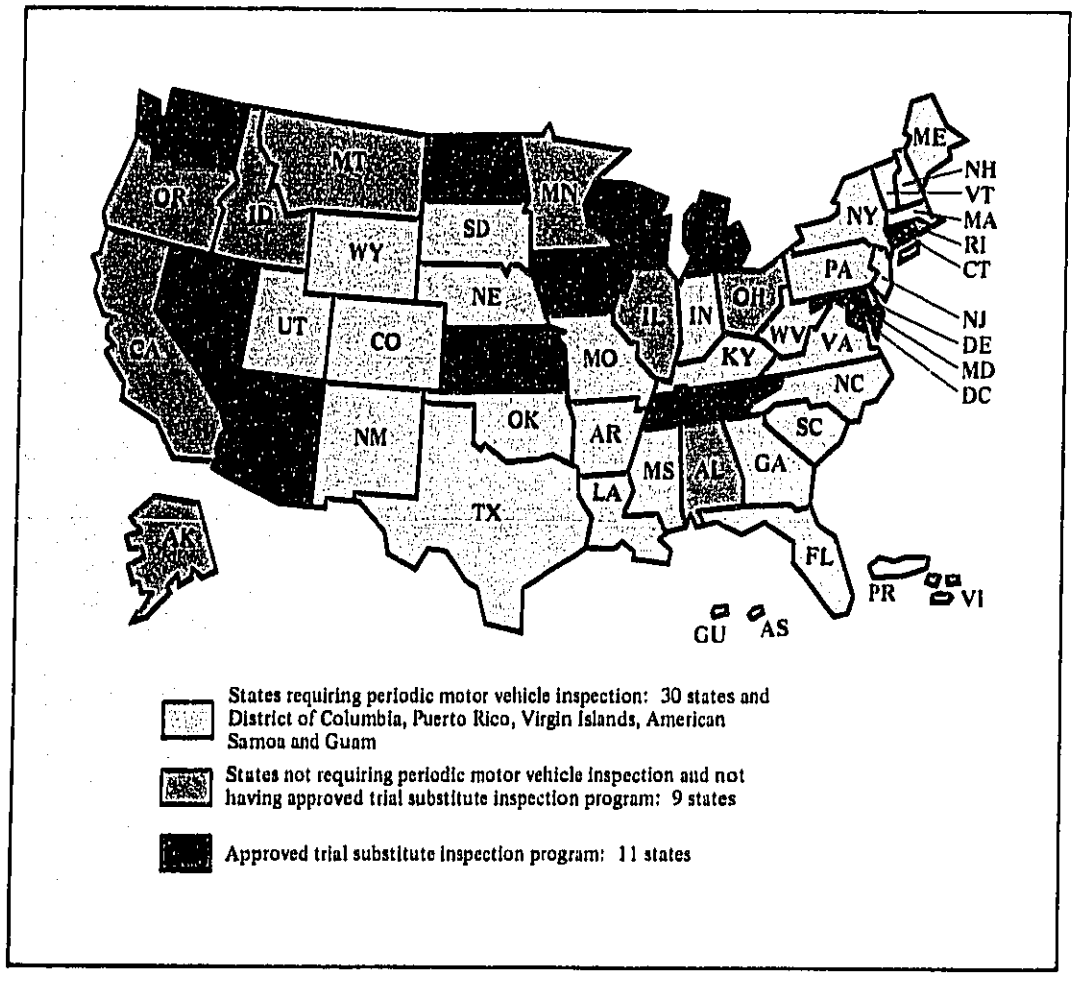


Figure 26: Status of Periodic Motor Vehicle Inspection Programs Nationwide

reduces manufacture waste and adjustment costs, and results in the production of higher quality and safer retreaded tires.

The *reflection ultrasonic system* for use with new tires is undergoing final validation testing. The validation consists of identifying flaws within new tires and running these tires for the full treadlife. Road failures will be correlated with the flaws to discover which are safety-related and which are not. This system can be used in compliance testing and by tire manufacturers for 100 percent quality control.

Better Automobile Wheels

Approximately 700 million wheels are manufactured annually in the U.S. Each year defects involving wheel failures and malfunctions are reported. NHTSA anticipates issuance of new standards dealing with wheel safety as follows:

- A standard to assure that wheels used on motor vehicles have the strength and durability for safe performance, and are labeled for identification.
- A standard on road wheel selection to require that motor vehicles be equipped with wheels of proper rating, strength, and durability, and that the wheels are correctly installed for safe performance.

Brakes

Many accidents are preceded by inadequate braking or by the lack of braking. Accidents and their severity can be reduced by:

- Better controlled stopping capability.
- Braking compatibility among vehicles.
- Good operating condition of the brakes during the vehicle's lifetime.
- Automatic braking maneuvers before an impending collision.

Studies have shown that in approximately 50 percent of all accidents no braking action is taken. For this reason, NHTSA has a continuing interest in radar and other automatic braking systems (Figure 29). During 1976, research focused on radar sensor target discrimination and preliminary specifications for system performance.

Lighting and Driver Visibility

Studies, field tests, and laboratory investigations are considering several safety-related lighting innovations:

- High-mounted stop and turn signal lamps, separated tail and brake/turn function rear lamps, and rapid deceleration warning lamps.
- Experimental headlamps for motorcycles.
- Advanced headlighting systems for adequate roadway illumination, which avoid excessive glare to oncoming drivers and pedestrians.

Figure 27: Motor Vehicles Undergo Diagnostic Inspection

- Improved signal lighting systems for emergency vehicles, service vehicles, and school buses, and more effective fog lamps for all vehicles.

The standard on rearview mirrors was amended to upgrade the truck and bus mirror requirements. Cross-view mirrors were specified for school buses so that the driver could see children crossing directly in front of the bus. Motorcycles must be equipped with a mirror to help the driver in lane changing maneuvers. Larger mirrors have been specified for trucks to improve rearward visibility.

Enforcement of the Standards

Since passage of the National Traffic and Motor Vehicle Safety Act in 1966, more than 108 million vehicles have been produced by American manufacturers, and another 14.8 million have been imported. This means that over 80 percent of the passenger cars in use today incorporate the original 21 standards which became effective in January 1968. Since that time, 29 additional standards and many amendments have been issued which extend coverage to vehicles other than passenger cars.

The Record

From January 1968 through September 1976 the following has been accomplished:

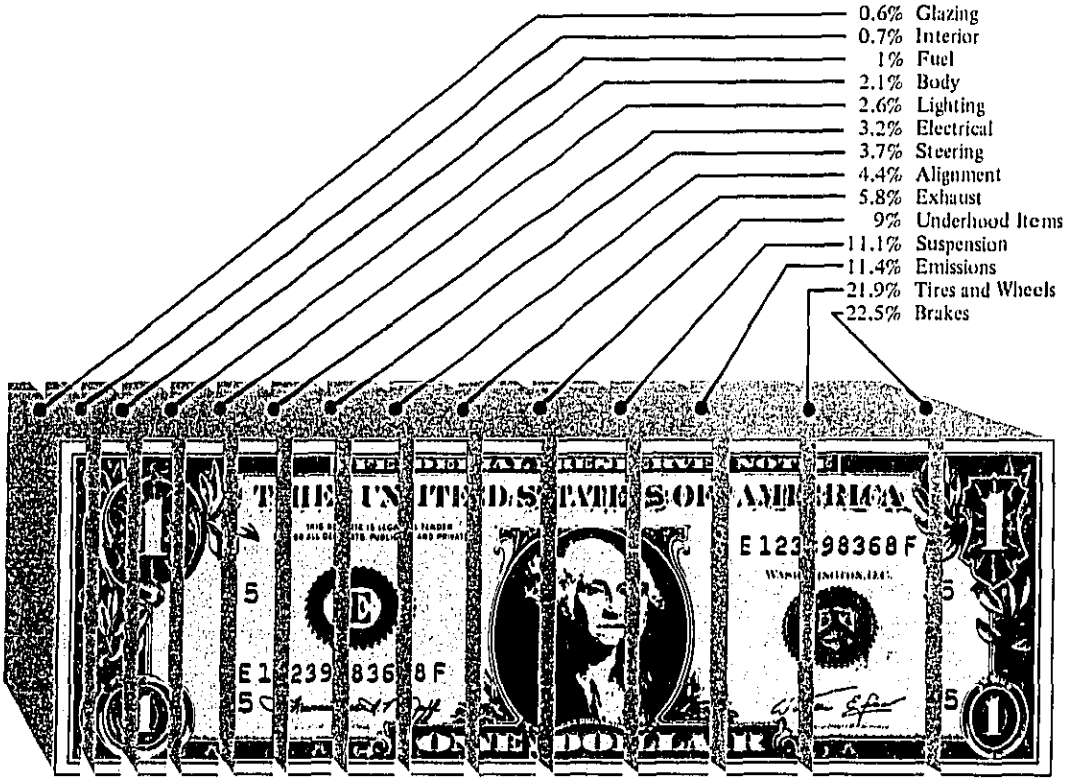


Figure 28: Distribution of Vehicle System Repair Costs

- 59,000 pieces of equipment or components of equipment have been tested for compliance with 13 different standards.
- 832 vehicles have been tested for compliance with 20 different standards, a total of 1,574 tests.
- Tests have averaged a failure rate of 6.0 percent for all vehicles and equipment, which is less than the 10.1 percent recorded for 1968/69.
- On the average, 18 standards have been tested per year for compliance at an average annual cost of approximately $2 million.

Supervision and enforcement of safety requirements applicable to imported cars have been modernized and streamlined. What was originally a manual operation is now computerized. The processing of declarations (Form HS-7) by importers of motor vehicles not certified for the U.S. market has been accelerated. NHTSA is able to notify importers within 10 days after receipt of declarations of the specific standards for which they will be required to submit compliance statements, in order to obtain release of their entry bond. The computer printouts also give importers general guidance on the requirements of the Act and the implementing regulations.

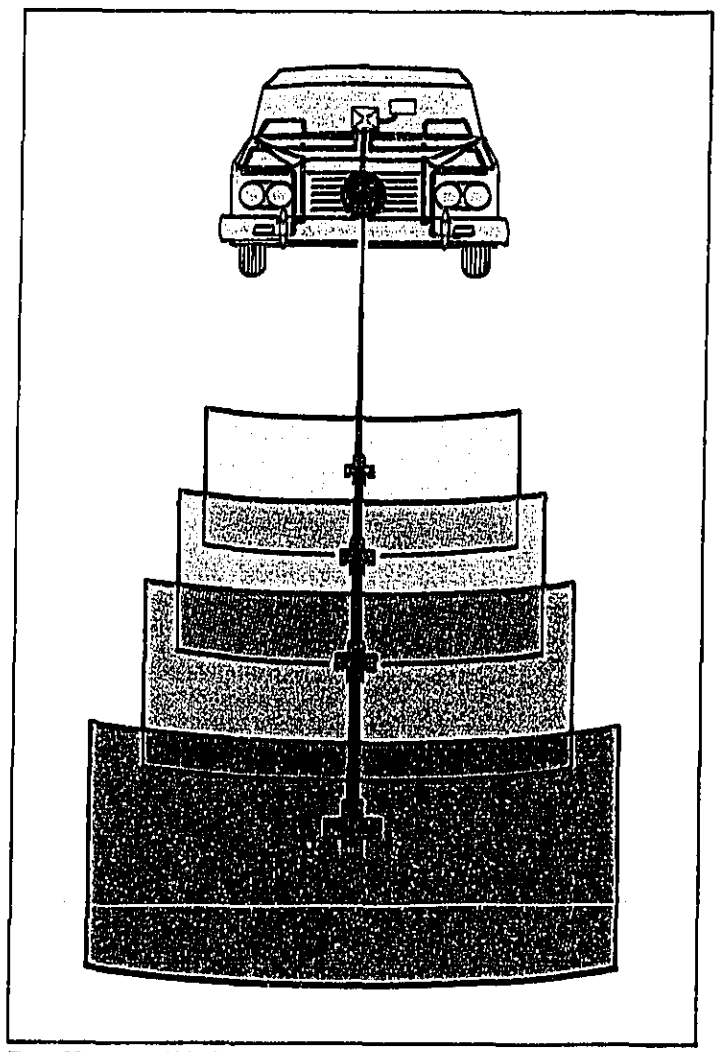


Figure 29: Motor Vehicle Radar Braking System

The Act places responsibility for compliance certification of motor vehicles or motor vehicle equipment on the manufacturer or distributor. The Government is authorized to conduct inspections as necessary to enforce the safety standards.

The role of standards enforcement is to establish a level of surveillance that will insure compliance. Through selected test programs, potential or actual instances of noncompliance are disclosed. The program includes review of certification data, analysis of new standards or amendments, testing and investigative activities for all of the standards in force.

Since 1968, there have been over 2,208 investigations as a result of failures and suspected noncompliance on the part of industry. Eighty-five percent of these investigations have been terminated without a finding of noncompliance. Ten percent of the completed investigations have yielded $1,239,000 in compromise civil penalties without resort to court action. An additional $317,000 has been collected through court action on regulations including defect notification, and one noncompliance with a standard resulted in a penalty of $7,000.

Number of Civil Penalties and Dollar Amounts (1968-1976)									
	68	69	70	71	72	73	74	75	76
Civil Penalties	0	3	7	15	26	47	45	21	20
Dollars (Thousands)	0	90	124	194	176	193	230	138	94

Annual revisions of the NHTSA booklet outlining the standards and the Import and Certification Regulation have been issued. Worldwide distribution has been made by the Department of State; Department of the Treasury, U.S. Customs Service; Department of Defense, Publication Distributions Branch; and through Embassies and Consulates.

Since the percentage of foreign vehicles which fail to comply remains high, the need has increased for verification inspections of motor vehicles for which compliance statements have been submitted by the importers. The inspections have resulted in numerous assessments of damages.

Defects Investigation

Motor vehicles and motor vehicle equipment occasionally are produced with safety-related defects that are not covered by standards and therefore are not a matter of compliance. Such defects should be revealed through investigation to determine whether a defect recall campaign should be initiated. NHTSA's ability to confirm possible safety defects has been improved by:

- A better data information system for analyzing information (vehicle owner letters, accident reports, consumer group complaints, NHTSA hotline reports, parts return program reports, manufacturer's service bulletins, research reports, etc.) to detect possible safety defect trends.
- Stronger investigation and technical expertise to determine, through testing, field investigations, and surveys, whether or not defects exist.
- Surveillance of manufacturer's defect notification program, remedy system (recall campaign), and procedures to correct safety-related defects.

The majority of recall campaigns are initiated voluntarily by the motor vehicle or equipment manufacturer. When a manufacturer determines that a safety defect exists, it submits a "defect report" and a copy of its letter to the owner. This report contains information on the number of vehicles or items of equipment involved, a description of the problem, and the manufacturer's plan to correct it.

Of the 122.8 million cars produced or imported since 1966, some 52.4 million have been recalled in 2,150 campaigns; 8.2 million vehicles and 400 campaigns involved foreign vehicles. Of these campaigns, 310 were influenced by NHTSA investigative action involving 25.4 million vehicles. In addition, since January 1971, there have been 120 tire manufacturer recalls involving 2.3 million units (Figure 30).

The National Traffic and Motor Vehicle Safety Act of 1966 as amended in 1974:

1. Requires manufacturers to recall defective vehicles and to provide free repair for a period of 8 years, or, if a tire manufacturer, for a period of 3 years, after production of the vehicle or tire.
2. Allows anyone to petition the Secretary of Transportation for investigation and recall of

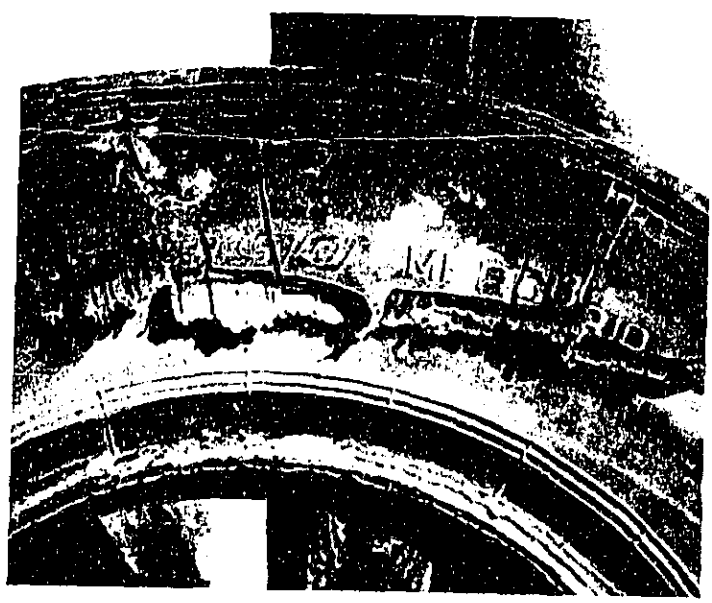


Figure 30: Defective Tire Recalled by Manufacturer

a vehicle that he believes contains a serious safety defect or noncompliance.

NHTSA has analyzed hundreds of complaints in such areas as wheel failures, carbon monoxide intrusions, fuel leakage, and steering and brake failures. As a result, several manufacturers have conducted safety defect recall campaigns voluntarily; and several formal defect investigations were initiated. Three voluntary recall campaigns by the manufacturer and 4 formal investigations followed the conclusion of 33 analyses in 1976.

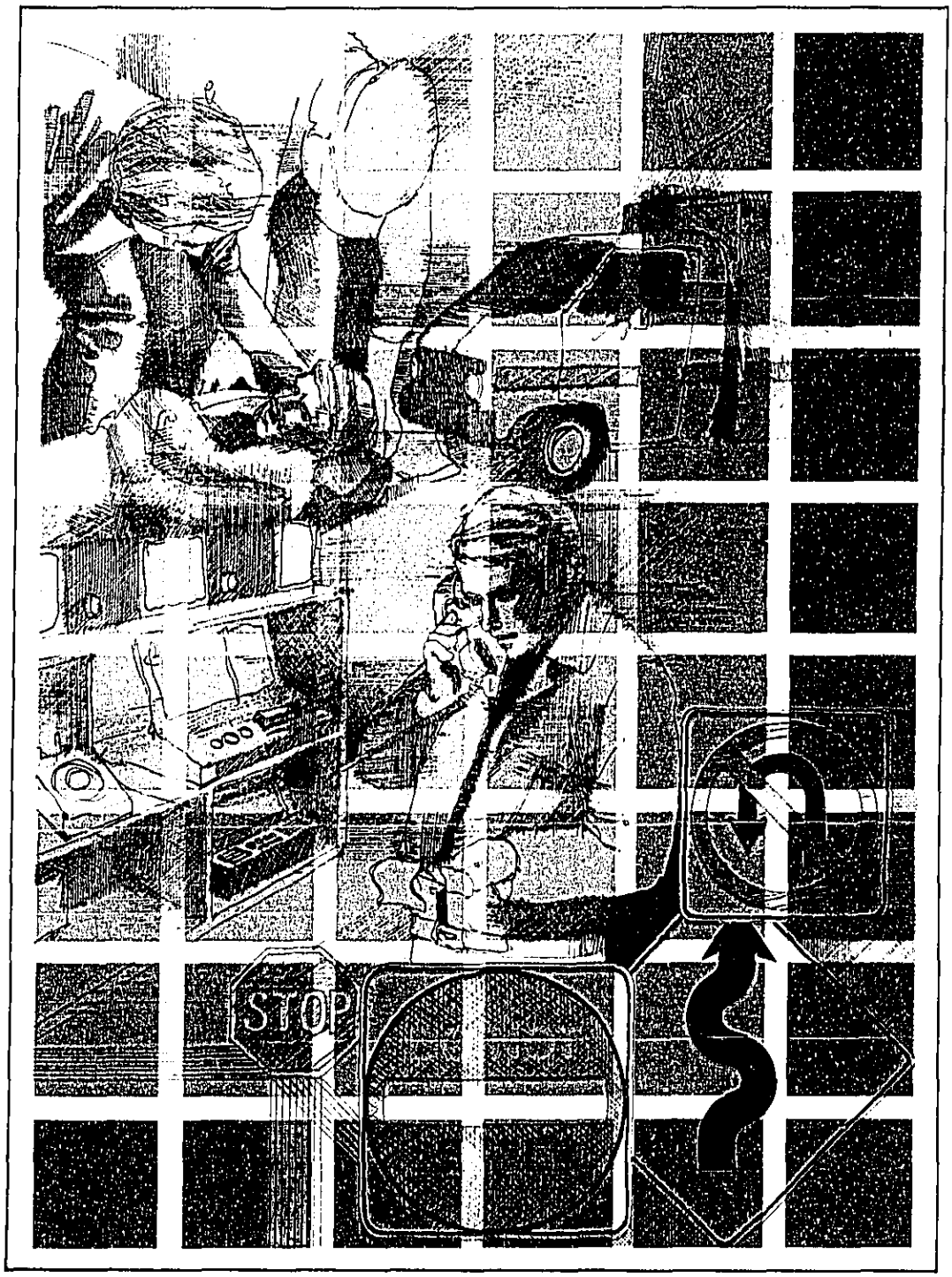
An unusual case opened in 1976 which involved matching Alcoa wheels and Kelly Springfield tires. The case was closed when the manufacturers were persuaded to work together to correct the hazard. Another inquiry which prompted quick reaction by the manufacturer was separation of the filter coupling hose from the fuel line, which allowed raw gasoline to flood the engine compartment and caused fires in 1976 Ford Pintos, Mustang II's and Mercury Bobcats. This recall involved 370,000 vehicles.

Engineering Test Facility (ETF)

To meet the new time constraints for defects testing imposed by the Motor Vehicle and School Bus Amendments of 1974, a small NHTSA testing facility has been leased. East Liberty, Ohio, was chosen for the site of the ETF, because safety defects testing often requires driving surfaces such as those available there. The ETF began its first testing procedures late in 1976. Some compliance testing to supplement the work of contract testing laboratories is scheduled to begin in October 1977.

Parts Return Program (PRP)

The PRP has been in operation for 5 years. During the reporting year, 942 defective parts were received from 232 commercial repair shops and garages which participated. More than one-third involve brake systems. The PRP has provided parts and data which prompted 31 defect investigations.


STOP

Services That Make Traffic Safer

Many kinds of services and skills go into making the streets and highways safer for motorist and pedestrian. Some of these have been mentioned such as the 55-mph speed limit, the campaign against drunken driving, driver education, measures to protect pedestrians, and motorcyclist safety. Others which contribute heavily to safer, more orderly traffic patterns are discussed here. These include, medical services for crash victims, training in numerous technical skills, uniformity of traffic laws, and modernized traffic records.

Emergency Medical Services (EMS)

The pre-hospital phase of the emergency medical services system often determines survival or death for the seriously injured crash victim. The purpose of NHTSA's EMS program is to bring trained personnel and modern equipment promptly to the scene of an accident.

NHTSA training courses for ambulance, rescue, and other "first responder" personnel have been accepted as national standards. These courses will be used in training 5,000 U.S. Navy corpsmen each year at Great Lakes and San Diego training stations, and have been adopted by the other branches of the armed forces.

When accidents occur, every available resource must be mobilized to save lives, lessen the severity of injuries, protect property, and restore the movement of traffic. Fast response time is essential to ameliorate unsafe conditions and save lives; and this depends on communication links which mobilize, manage, and coordinate emergency response resources.

NHTSA, with other Federal agencies, is assisting States in the following communications activities:

- *Universal Emergency Telephone Number (911)*—NHTSA is the lead agency in extending this system nationwide. More than five hundred 911 systems, serving over 60 million people, have been put in operation.
- *Citizens Band Radio*—The NHTSA National Emergency Aid Radio Program (NEAR) authorizes the use of highway safety funds to provide increased citizen participation by monitoring Channel 9 of the CB radio service.
- *The MECCA Program*—The Medical Emergency Communications Coordinating Assessment (MECCA) is a transportation program for a rapid-response EMS system currently being tested in Philadelphia, and in Washington, D.C. (Figure 31).

In 1973, Congress authorized the Secretary of Defense to provide medical emergency helicopter transportation service to civilians, to the extent that it does not interfere with the military mission. The program, Military Assistance to Safety and Traffic (MAST), augments

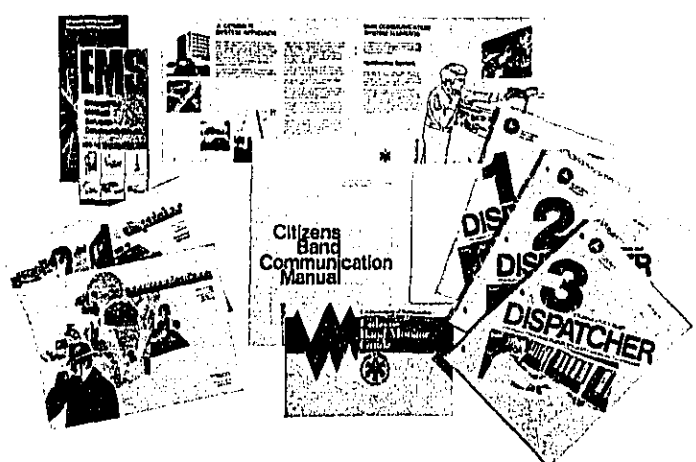


Figure 31: Rapid Response Emergency Medical System

the emergency medical services system, and is not intended to replace any part of that system (Figure 32). The present MAST program is a joint endeavor of DOT, and Departments of Defense and Health, Education and Welfare.

The MAST organization consists of 23 active MAST sites serving portions of 29 States. MAST units flew 2,749 missions during 1976 to assist 2,751 patients. A total of 6,302 mission hours were flown, with an average mission flight time of 2½ hours per case.

Approval has been granted for the establishment of the 24th MAST site at Homestead Air Force Base in southern Florida and the 25th site at Myrtle Beach Air Force Base in South Carolina. These new organizations are expected to go into service in 1977.

Technical Training

Adequate manpower, qualified to perform specific functions, is an essential component of every highway safety program. Each State is expected to develop its own manpower staffing, training requirements, and programs. The Federal role is to provide guidance, some resources, and to demonstrate various solutions to the States.

Three essential aspects of manpower training were supported by NHTSA during 1976: (1) upgrading State program management, (2) State highway safety training programs, and (3) national highway safety program objectives. Under the first were:

- A new manual, "Highway Safety Program Evaluation: A Manual for Managers," served as a textbook for 9 regional workshops on evaluation, concept and methodologies for Federal, State and local highway safety program managers.
- Curriculum materials were developed and instructors trained to teach highway safety planning and problem identification.
- A total of 74 State and Federal highway safety personnel participated in an 8-day basic course in program management.
- Six self-study units were completed in 1976: (1) Highway Safety Programs, (2) Highway Safety Standards, (3) Funding of Highway Safety Programs, (4) Annual Work Program, (5) Comprehensive Plan, and (6) Motor Vehicle Safety Programs. Distribution is being made to the States.
- A graduate program in Traffic Safety Program Management is offered at USC's Los Angeles, California, and Washington, D.C. campuses. Twelve fellowship-internship stipends were awarded in 1976.

Figure 32: MAST Augments Emergency Services to Civilian Crash Victims

Under the second heading, the following State traffic safety training programs were conducted during 1976:

- Curriculum materials were prepared for Driver Licensing Administrative Hearings, Traffic Case Adjudication, Motor Vehicle Inspection, and Driver Licensing.
- Coordinators and administrators of emergency medical service programs in 10 States were instructed in the use of the training package for Emergency Medical Service Technician-Paramedic.

Training programs under the third heading were held in 7 cities throughout the country on programs of probation, diagnosis, and referral in alcohol safety programs.

Uniformity of Traffic Laws

Problems associated with the mingling of vehicles of various sizes on the American highway system are essentially the same in every State. Driver and pedestrian conduct, therefore, can be regulated uniformly regardless of location. A comparison of State rules of the road with the Uniform Vehicle Code (UVC) show that most States have moved toward more uniform laws since 1967.

The most drastic change in traffic laws concerns the right-turn-on-red rule, due primarily to studies showing savings in both travel time and fuel. There have been 2 rules permitting a right turn when facing a steady red traffic light. Under one rule (Eastern), a driver can turn on red where permitted by a sign. The second rule (Western) allows drivers to turn on red unless prohibited by a sign. This latter rule has now been adopted by 43 States, including 12 States in

1976. Seven States continue with the Eastern rule, while only the District of Columbia permits no turns at all. Right turns are allowed in Massachusetts when signs so state, even though there is no law dealing specifically with right-turn-on-red. State experiences with right-turn-on-red are under close scrutiny in NHTSA to reach the best compromise between safety and fuel economy (Figure 33).

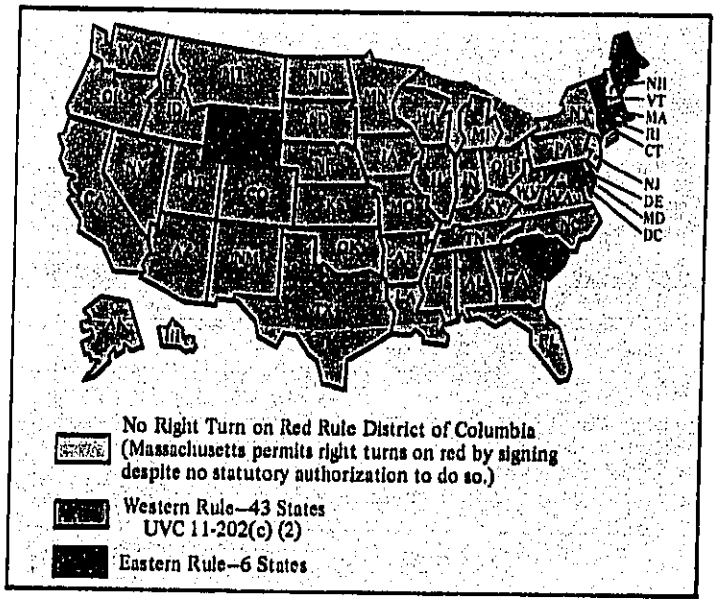


Figure 33: Status of Right-Turn-on-Red Laws Nationwide

Traffic Records and Information Systems

The Traffic Safety Programs Management Information System (TSP/MIS) is an extensive, automated information base on all aspects of motor vehicle transportation and highway safety. Its purpose is to assist highway safety program managers by giving them up-to-date information on the breadth, scope and quality of traffic safety in the 50 States, the District of Columbia and the 5 U.S. territories and possessions. Managers can follow improvements in the traffic safety system, identify those projects and remedies responsible, and be better able to achieve the greatest benefit for the least amount of money. Administrators can inventory highway safety resources and concentrate them on priority problems.

Motor Vehicle Registration

The registration program is an identification, information and control mechanism. All States have a central system which identifies and describes each vehicle and its owner. This capability aids law enforcement, the courts, accident research and commercial needs. For example, the State of Michigan reports that its vehicle file was queried 15 million times in 1 year. Titling procedures are being promoted to deter thieves from transferring stolen vehicles.

During 1976, States utilized advanced electronic data processing to enter and retrieve vehicle data rapidly: (1) Massachusetts has a project to increase computer data storage, (2) Montana's EDP system is operational, and (3) Wisconsin is improving its vehicle data files and procedural training of registrars.

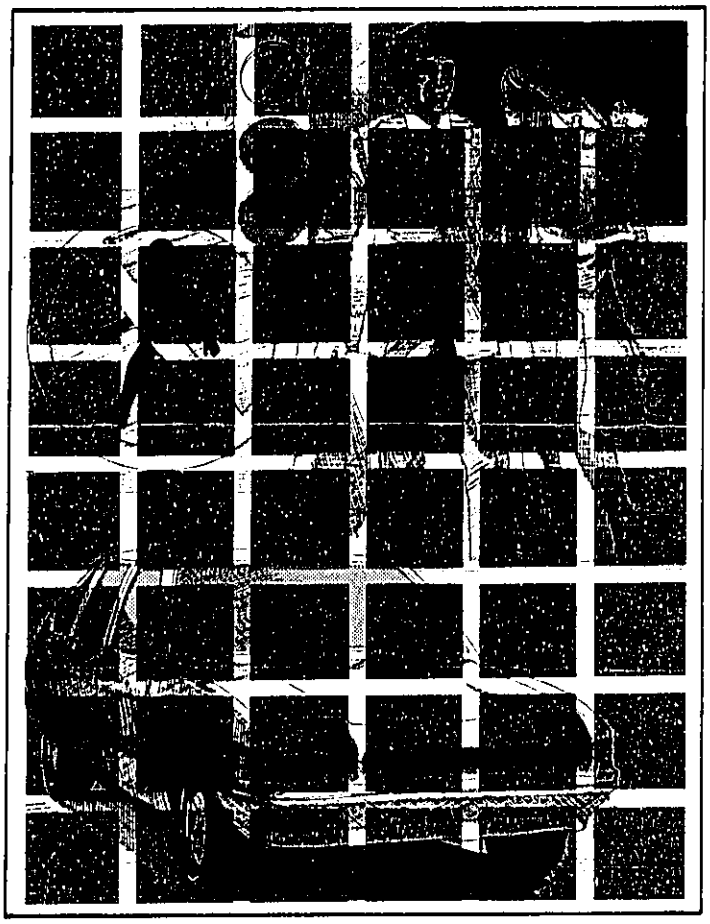
State Traffic Records Systems

A shift in the approach to highway safety from standards compliance to problem identification and has placed greater emphasis on better traffic records. NHTSA aids the improvement of State traffic records systems through:

- A technical manual which is available to instruct data analysts in problem identification and to train instructors.
- A set of computer statistical analysis programs which have been prepared and will be installed free for States that want them.
- A "model" traffic record system is being developed in New Hampshire. The model can be transferred and adapted to other State systems.

International Cooperation

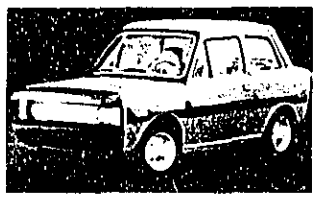
With traffic fatalities in the non-communist world conservatively estimated at 250,000 annually, and rising, road safety has become a matter of global concern. NHTSA participates in a variety of international activities and organizations, and assists foreign officials seeking traffic safety information. Through this effort, there is an exchange of experience, program and research data among nations, as well as some progress in ensuring the compatibility of motor vehicle and highway safety standards in the international community.

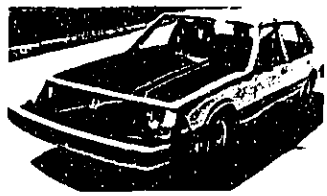


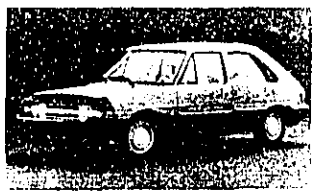
There were continuing activities during 1976 relating to a "Road Safety Pilot Study" done under the aegis of NATO's Committee on Challenges of Modern Society:

- A 2-year evaluation follow-up was completed.
- A special joint research group on pedestrian safety was established in the Organization for Economic Cooperation and Development (OECD) at the instigation of the European Conference of Ministers of Transport.
- An OECD accident investigation working group has selected safety belt effectiveness as the first cooperative task in the collection and exchange of accident data findings.
- OECD undertook a review of new research on alcohol and drugs as they affect traffic safety.
- CITA (Committee International de l'Inspection Technique Automobile) became the focal point for the CCMS road safety Motor Vehicle Inspection Project follow-up. It will develop used vehicle performance/inspection requirements and standardize the minimum acceptable techniques and equipment.
- The International Experimental Safety Vehicle (ESV)

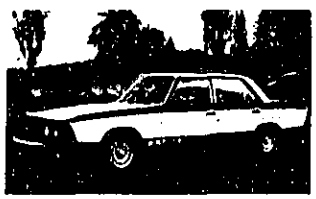
Program is led by the U.S. through the NHTSA Research Safety Vehicle Program (RSV). U.S. participation includes testing and evaluation of ESV's produced by other countries. In prior years the U.S. has tested ESV's provided by Fiat, Nissan, and Toyota. In 1976 NHTSA tested and evaluated vehicles provided by British Leyland and Renault. The ESV Project has been a major stimulus for extensive automotive safety research, and for the international exchange of data and conclusions (Figure 34).


Italy Fiat 1720 lbs.

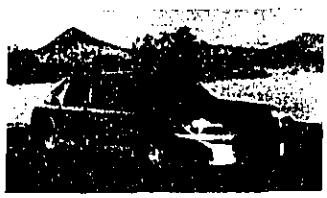

Sweden Volvo 3190 lbs.

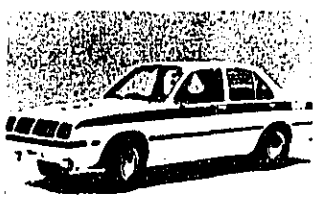

Italy Fiat 2570 lbs.

UK British Leyland 2480 lbs.


FRG Mercedes 4620 lbs.


Italy Fiat 2840 lbs.


USA AMF 6000 lbs.


FRG Opel 2600 lbs.

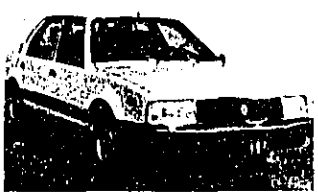

Japan Honda 1700 lbs.

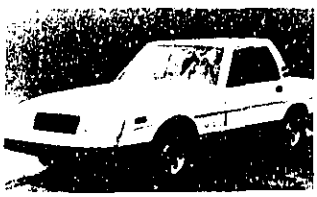

USA Fairchild 5500 lbs.


FRG Volkswagen 3200 lbs.


Japan Nissan 2750 lbs.


USA Ford 5700 lbs.


France Renault 2640 lbs.


Japan Toyota 2924 lbs.

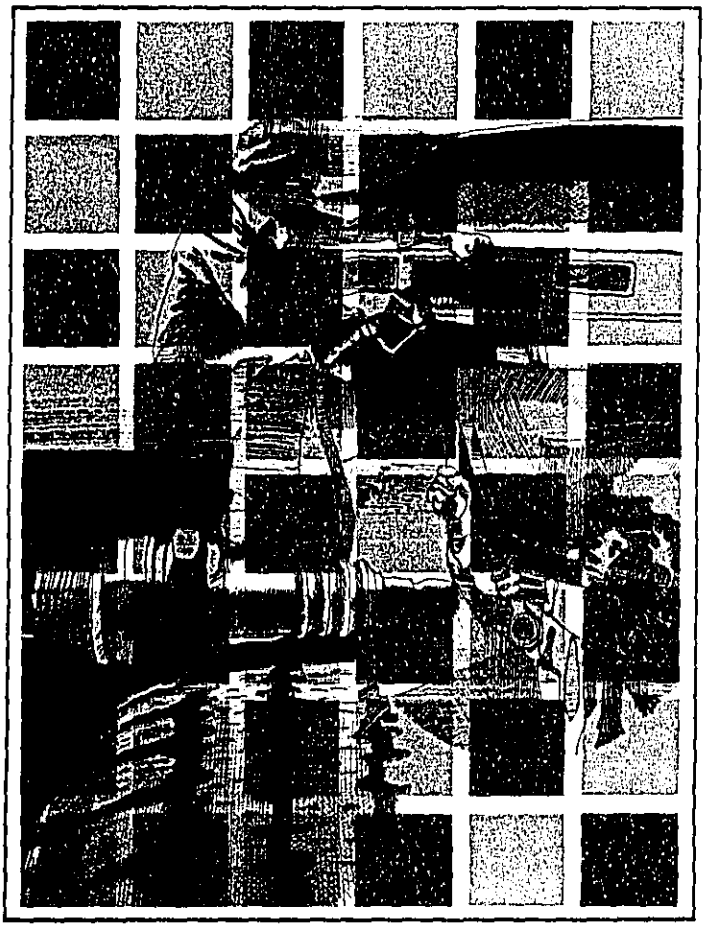

USA GM 5050 lbs.

Figure 34: International ESV Program Stimulates Extensive Automotive Safety Research

The Consumer's Advocate

Informing the Press and the Public

The public affairs initiatives of NHTSA are determined in large part by the agency's priorities and the interest shown by the press and public inquiries. For example, as procedures affecting new vehicles (rulemaking and standards issued) declined in number, other programs dealing with the driver and driver behavior moved to the fore. New responsibilities in the field of fuel conservation, legislated by the Congress, as well as continuing concern over energy problems, stimulated interest in the law. The beginnings of an organization to carry out fuel conservation responsibilities, and issuance of the first rulemaking proposals also stirred considerable interest.



Enforcement and observance of the 55-mph NMSL by the public brought about a decline in highway fatalities, and focused attention on the NHTSA monthly fatality reports (Figure 35).

The national campaign to reduce drinking and driving among teenagers addressed the people directly—"Friends Don't Let Friends Drive Drunk." This is part of a continuing program to reduce drinking and driving, and is a matter of interest among educators, parents and writers for specialized publications.

Three major automotive safety meetings were held during the reporting period to deal with the Government's role with regard to passive restraints in passenger automobiles, exterior protection (bumpers), and truck air brakes (anti-lock brake systems).

Serving the Consumer

The Departmental Consumer Representation Plan was placed in operation. Many of its precepts reflect functioning NHTSA programs. The plan formalizes an aggressive program to publicize important consumer issues through special mailings, and guidelines to insure the appraisal

and presentation of consumer interest.

The agency's Auto Safety Hotline expanded in mid-year from a 10-State experiment to a national toll-free consumer service (800-424-9393) (Figure 36). Some 300 citizen inquiries are handled daily. The Hotline generates a steady flow of safety-related data, and the public receives direct services of NHTSA expertise, and/or referral to the proper jurisdiction.

New Fact Sheets and brochures respond to the problems or hazards most frequently reported by consumers. New titles included Passenger Car Brakes, Engine Stalling, Vehicle Exhaust Systems, Motor Vehicle Emergencies, and Common Sense and Safety in Buying a Used Car.*

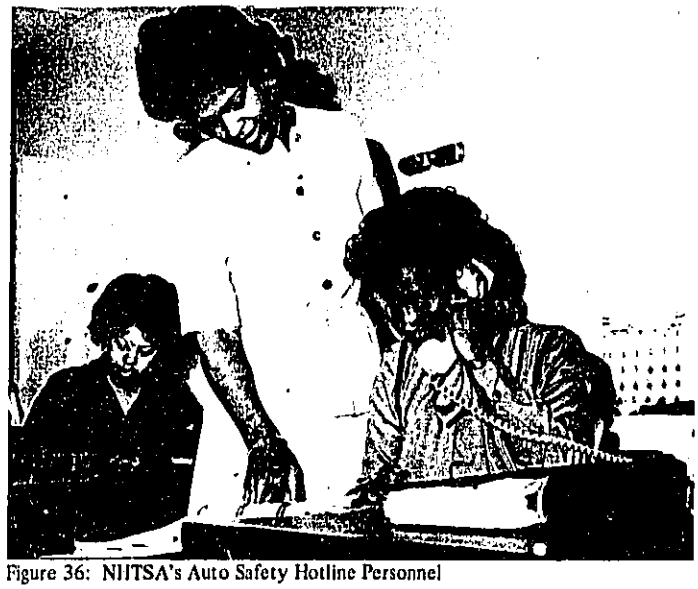


Figure 36: NHTSA's Auto Safety Hotline Personnel

Protecting the Consumer (Uniform Tire Quality Grading Standards)

Section 203 of the National Traffic and Motor Vehicle Safety Act requires the issuance of a uniform quality grading system.

The final Uniform Quality Grading Standards regulation was issued in May 1975, and requires tire manufacturers to provide grading information for passenger car tires covering treadwear, traction and temperature resistance. Treadwear and traction testing may be performed by manufacturers at the NHTSA test course at San Angelo, Texas, and temperature resistance testing on standard laboratory test wheels. The respective grades are to be molded into or onto the sidewall of the tire, and must be printed on a label affixed to the tread area of each tire sold as replacement equipment. An explanation of the grades must be contained in literature distributed at the point-of-sale.

Eight domestic tire manufacturers challenged the regulation, and requested a delay in its enforcement and effective dates pending judicial review of its validity by the Court. In September 1976, the Court of Appeals upheld, in the main, the provisions of the standards. The tire manufacturers then petitioned the Supreme Court of the United States to delay the implementation of the standard, but the Supreme Court ruled in favor of NHTSA.

*Available from NHTSA, General Services Division, 400 7th Street, S.W., Washington, D.C. 20590.

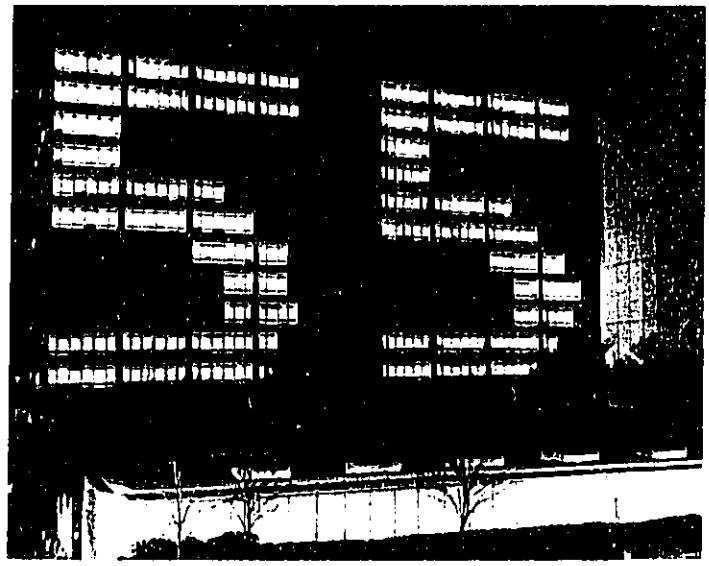


Figure 35: Transport and Safety Building, Harrisburg, Pa.