

## Chapter 20

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### **Federal Safety Initiatives**

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## **Introduction**

On September 20, 2001, Secretary of Transportation Norman Mineta addressed the Senate Committee on Commerce, Science, and Transportation, assuring the public of a transportation system that is safe, secure, and stable. Safety is a fundamental societal goal and a longtime priority for the U.S.

Department of Transportation. The Department is committed to safety for all transportation modes; this chapter describes the programs used by the Department and its partners to improve safety on highway and transit systems specifically. Safety data is examined in Chapter 5.

## Highway Safety Programs

Over the past four decades, the U.S. Department of Transportation has used a variety of tools to reduce highway fatalities and injuries. The Department has worked to improve safety through regulation; for example, Federal laws are implementing penalties on States that do not enforce intoxicated driving standards. The Department has also made grants to States to promote responsible driving and partnered with industry and public interest groups on public education campaigns. The Department also supports engineering and technological research so that State and local agencies can construct and maintain safer transportation systems.

The Department's highway safety program is comprehensive and extensive. Rather than adopting a single policy to improve safety, the Department uses many initiatives and interacts with both the public and private sectors.

### **Safety Restraint Systems**

The public's acceptance of safety restraint systems represents one of the great public policy success stories of the past two decades. This resulted because of a two-pronged effort involving education and enforcement. Prompted by an intense public service campaign, public acceptance of safety devices steadily increased during the 1980s and 1990s. By 2000, about 71 percent of American motorists used shoulder belts, compared with 58 percent in 1994. Additionally, 49 States and the District of Columbia had mandatory safety belt laws by 2002, and 17 States and the District of Columbia had primary enforcement laws that allow police to stop a vehicle when they observe a safety belt violation.

Safety belts were the earliest type of automobile restraint system. Air bags were installed later in motor vehicles to provide additional safety for passengers. An estimated 106 million passenger vehicles in 2000 were equipped with air bags. This number will increase as aging cars are retired, since all passenger vehicles sold in the 1998 model year and thereafter have been required to have driver and passenger air bags. A third safety mechanism, child restraint systems, are also increasingly used by parents to reduce the likelihood of harm to young passengers.

Exhibit 20-1 shows the number of lives estimated to have been saved by restraint systems between 1994 and 2000. Safety belts saved an estimated 11,889 lives in 2000; air bags saved 1,584 lives; and child restraints saved 316 lives that year. Safety belts alone are estimate to have prevented 135,102 deaths between 1994 and 2000.

The U.S. Department of Transportation is engaged in several initiatives to increase passenger safety. Section 1403 of TEA-21, for example, contains a safety incentive grant program to encourage States to enforce **seat belt** use. Under this program, funds are allocated each Fiscal Year from 1999 until 2003 to States that exceed the national average for **seat belt** use or that improve their State's **seat belt** use rate. The authorized level for this program increased from \$82 million in FY 1999 to \$112 million in FY 2003.

Section 2001 of TEA-21 reauthorized the State and Community Highway Safety formula grant program to broadly reduce traffic crashes and resulting fatalities, injuries, and property damage. The authorized level increased from \$149.7 million in FY 1998 to \$165 million in FY 2003.

**Estimated Number of Lives Saved by Restraint Systems, 1994-2000**

	1994	1995	1996	1997	1998	1999	2000	ANNUAL RATE OF CHANGE 2000/1994
<b>Restraint Type</b>								
Seat Belts	9,206	9,790	10,414	10,750	11,018	11,197	11,889	3.7%
Air Bags	276	470	686	842	1,043	1,263	1,584	29.9%
Child Restraints	308	279	365	312	299	307	316	1.2%

Source: Fatality Analysis Reporting System.

Section 2003 of TEA-21 established a new program of incentive grants to encourage States to implement child passenger protection programs. This program was authorized at \$7.5 million in FY 2000 and FY 2001. Section 2003 also established a new program of incentive grants to reduce highway deaths and injuries resulting from individuals who ride unrestrained or improperly restrained in motor vehicles. The authorized level for this program increased from \$10 million in FY 1999 to \$20 million in FY 2003.

**Responsible Driving Initiatives**

The U.S. Department of Transportation has worked with industry partners, States, and local governments to improve driver behavior. During the 1980s and 1990s, for instance, an aggressive public relations campaign helped educate millions of Americans about the dangers of impaired driving, which led to a sharp decline in highway fatalities and injuries.

There are numerous Departmental initiatives to promote responsible driving. Section 1404 of TEA-21, for example, established a new program of incentive grants to encourage States to establish a 0.08 percent blood alcohol concentration (BAC) as the legal limit for drunk driving offenses. The authorized level for this program increased from \$55 million in FY 1998 to \$110 million in FY 2003. In October 2000, Congress passed legislation that made .08 BAC the national standard for impaired driving. States that did not adopt .08 BAC laws by FY 2004 would have certain highway construction funds withheld.

**Operations Strategies**

Chapter 21 describes how operations strategies can improve the performance of the highway system. Operations strategies

**Q. How can public awareness campaigns improve highway safety?**

**A.** Public awareness campaigns have helped reduce the number of alcohol-related crashes. Similar campaigns have educated the public about the importance of safety restraint systems and helmets. Recently, there has been interest in using public awareness campaigns to spotlight “cutting edge” issues such as the dangers of fatigued and distracted driving and the importance of rural emergency management services. Speeding is also a perpetual problem; in 2000, speeding was a contributing factor in 30 percent of all fatal crashes.

include actions taken by public agencies to maintain capacity and highway safety by controlling traffic, responding to incidents, clearing snow and other obstructions, and providing information to users on highway conditions and alternatives. Operations strategies can also, however, improve the safety of the driving public.

Intelligent Transportation System (ITS) infrastructure, for example, has substantially affected highway safety. This has been accomplished by smoothing traffic flow, warning drivers of hazardous conditions, and providing technology for better incident response and enforcement.

Ramp metering technology has helped reduce crashes. The Minneapolis-St. Paul area has implemented ramp metering on its freeway onramps since 1969. In late 2000, the entire system of more than 400 ramp meters was turned off for several weeks to collect baseline data on system performance without metering. The evaluation report estimates that the ramp metering system helps prevent approximately 1,041 vehicle crashes per year.

Another ITS initiative is video surveillance. Over the last 5 years, video surveillance has become a common feature on freeways in many urban areas. These video systems help identify and verify incidents. It is much easier to clear the roadway if the right emergency services can be dispatched quickly. This minimizes traffic back-ups and associated secondary crashes. A Minnesota study found that 13 percent of all peak period crashes were the direct result of a previous incident. A separate field test in San Antonio determined that surveillance in that area resulted in a 15 percent reduction in injury-related crash rates.

ITS technology can also provide drivers with specific information to help them avoid crashes. The Dynamic Downhill Truck Speed Warning System in Denver's Eisenhower Tunnel measures truck weight, speed, and axle configuration. The system then computes a recommended safe speed for each truck, which is displayed on a variable message sign. Since deployment of this system, truck-related crashes have declined on steep downhill grade sections (even though truck traffic volume has increased by an average of 5 percent per year).

Operations managers are also trying to improve safety by making drivers better aware of weather conditions. Washington State posts mountain pass conditions on its road weather information World Wide Web site to help travelers avoid delays and dangerous conditions. During the 1997–1998 winter season, this site was visited 10 million times. Based on this response, State officials are integrating into the Web site observations from 400 weather sensor sites around the State. Utah, Alabama, California, Georgia, South Carolina, and Tennessee are also experimenting with fog detection and warning systems on roads or bridges. Tennessee, for example, installed a system of fog detection devices, variable message signs, and variable speed limit signs on a section of Interstate-75 that was the site of more than 200 fog-related vehicle crashes between 1973 and 1993. There were no fog-related crashes in the six years after the system was implemented.

Another innovative operations strategy is the increasing use of service patrols. Service patrols in Illinois, Indiana, and Georgia have been well-received by the traveling public. Hoosier Helper patrols in Indiana, for instance, provide assistance to drivers on 16 miles of Interstate-80 and Interstate-94 and eight miles of Interstate-65 near Gary. Patrols provide support for the State Police during incidents and assist drivers free of charge by changing flat tires, supplying fuel, and calling tow trucks. A recent study of the effectiveness of this program showed that daytime operations yielded a 4.7-to-1 benefit-to-cost ratio, and that 24-hour operations yielded a 13.3-to-1 benefit-to-cost ratio.

## **Motor Carrier Safety**

The Federal Motor Carrier Safety Administration (FMCSA) has primary authority within the U.S. Department of Transportation for regulating motor carrier safety. FMCSA is involved in numerous safety initiatives, only some of which are described below.

FMCSA implements the cross-border truck and bus provisions of the North America Free Trade Agreement (NAFTA). Since trucking is the principal means of commercial transportation between Mexico, Canada, and the United States, NAFTA includes a number of provisions that will greatly affect commercial vehicle operations. In preparing to implement the NAFTA access provisions fully, FMCSA has been working aggressively with the States and Mexico to increase enforcement and compliance and to improve safety systems on both sides of the United States-Mexico border.

FMCSA has invested heavily in infrastructure and personnel along the United States-Mexico border. For example, the agency provided special funding above allocated Motor Carrier Safety Assistance Program (MCSAP) grant levels to increase commercial motor vehicle inspections and other enforcement activities along the border. Between 1995 and 2001, the agency provided over \$23 million for border related enforcement and compliance activities, and State and Federal inspectors conducted nearly 225,000 inspections of Mexican trucks. By 2002, FMCSA had deployed 60 full-time Federal inspectors to inspect inbound motor carriers from Mexico at the border.

FMCSA also implements the Performance and Registration Information Systems Management Program (PRISM). The goal of PRISM is to improve motor carrier safety through a comprehensive system of identification, education, awareness, safety monitoring and treatment. The PRISM initiative has two major elements. The Commercial Vehicle Registration Process establishes a system of accountability by insuring that no vehicle is registered without identifying the carrier responsible for the safety of the vehicle during the registration year. The second element is the Motor Carrier Safety Improvement Process, designed to improve the safety performance of motor carriers that have repeated safety problems. Carriers that do not improve their safety performance face progressively more stringent penalties, including a Federal “unfit” or “imminent hazard” designation and the possible suspension of vehicle registration by the State.

## **Infrastructure Enhancement**

There are numerous research initiatives underway to determine how physical infrastructure improvements can improve safety. The Federal

### **Q. What results did the PRISM pilot program produce?**

**A.** The PRISM pilot program produced significant results. First, it increased accountability since better identification allowed safety incidents to be traced to a specific motor carrier. PRISM also led to improved productivity. It increased efficiency by developing a more accurate process to target high-risk motor carriers and efficiently allocate scarce enforcement resources. Warning letters proved to be an effective and inexpensive alternative to a compliance review for carriers with less severe safety performance problems. Third, the program improved data quality; for example, it led to a procedure for obtaining operational data on motor carriers as part of a State’s annual vehicle registration renewal process. Finally, the program improved customer service. Under the PRISM initiative, a State could issue truck identification numbers. This is more customer-friendly because it reduces the number of government agencies that a motor carrier must deal with to get on the road.



Highway Administration (FHWA) has identified four focus areas: run-off-the-road crashes, speeding-related crashes, crashes at intersections, and pedestrian and bicyclist crashes. Infrastructure improvements can lower these types of crashes in different ways. Typically, the number of fatalities prevented from infrastructure improvements on a rural highway can be higher than the number of fatalities prevented on an urban highway, and the number of injuries prevented is higher for an urban road than a rural road.

There were 15,905 single vehicle run off the road crashes in 2000 (about 38 percent of all fatal crashes). These crashes could be reduced through engineering techniques: better geometric design, more durable pavement markings, more visible roadside signs, and increased skid-resistant roadway surfaces. One of the measures to help prevent run off the road crashes is the installation of rumble strips that create a noise effect when a driver drifts off the road onto the shoulder.

Rumble strips are funded through FHWA's Hazard Elimination Program. This program is designed to improve safety at dangerous highway locations. Typical projects include intersection improvements, new or upgraded traffic signals, highway lighting, pavement and shoulder widening. Additionally, FHWA provides assistance to States to improve the safety of rail crossings. The Highway-Rail Grade Crossings Program is designed to reduce the number and severity of train collisions with vehicles and pedestrians. All public crossing safety improvements are eligible for Federal funding. Typical projects include the installation of signs and markings, upgrades to active warning devices, sight distance improvements, grade separations, and the elimination of crossings.

Since these programs began, they have produced benefits for communities across the United States. These benefits include an overall reduction in the number and severity of crashes or reductions in specific types of crashes. For example, a hazard elimination project was implemented at an intersection in Lawrence, Kansas. A study of this intersection indicated a pattern of left turn and rear end collisions. Local officials added left-turn lanes and upgraded the traffic signals and, within a year of the improvements, minor crashes had declined from 28 to 12; injury crashes dropped from 12 to 3; and left turn crashes declined from 14 to 4. Rear end crashes remained the same, but the number of injuries resulting from these crashes declined from 7 to 2.

### **Uniform Traffic Standards**

FHWA works with NHTSA, FMCSA, and the National Committee on Uniform Traffic Laws and Ordinances to develop uniform traffic laws and regulations. Traffic laws must clearly and accurately define the responsibilities of drivers and pedestrians; if not, traffic signs, markings, and signals will

**Q. How effective are rumble strips in reducing run off the road crashes?**

**A.** Maryland installed continuous shoulder rumble strips along 195 miles of its highways in 1999. An evaluation was conducted using 2000 crash data to determine if the installation of rumble strips reduced fixed-object crashes and crashes in the opposite direction, both of which are very severe and likely to result in injuries or fatalities. The results were very positive. The number of fixed-object crashes declined by 104, and there were 4 fewer opposite direction crashes. The study concluded that the installation of rumble strips resulted in an estimated safety benefit of \$182 for every dollar spent.

A separate study in New York concluded that run-off-the-road crashes declined by 65 percent between 1993 and 1998, after rumble strips were installed on that State's highways. This has resulted in a savings of \$18 million a year from reduced fatalities alone.

fail in their purpose. Laws must also state who has authority to provide and enforce the observance of traffic control devices. FHWA recently published a new version of the Manual on Uniform Traffic Control Devices, which defines the standards used by road managers nationwide to install and maintain traffic control devices on all streets and highways.

### **Data Collection**

Data collection is an important part of the Department's safety efforts, allowing problem areas to be identified and guiding the allocation of resources to address those problems. Numerous agencies are involved in collecting data about fatalities and injuries. For example, FHWA's Safety Core Business Unit represents the Department of Transportation at the International Traffic Records Forum, an annual meeting that addresses worldwide crash data collection efforts. FHWA's Safety Core Business Unit has also supported the National Model, a software package that helps local law enforcement agencies collect accurate crash information.

FHWA, FMCSA, and the National Highway Traffic Safety Administration (NHTSA) are collaborating on study to determine the causes of large truck crashes that result in a fatality or serious injury. The Large Truck Crash Causation Study involves studies at 24 sites nationwide. Data collection will end once statistics have been collected on at least 1,000 crashes, probably by mid-2003.

Data collection is often problematic, since statistics must be gleaned from crashes that occur at the local level. FMCSA maintains a Motor Carrier Management Information System Crash File that is designed to be a census of all large commercial truck and bus crashes. However, many States do not return reports to FMCSA that meet the crash criteria. Additionally, many reports that are received are incomplete or inaccurate. FMCSA and NHTSA are now working jointly to improve this system.

Section 2005 of TEA-21 established a new program of incentive grants to encourage States to collect safety data in a more timely, comprehensive manner. The authorized level for this program increased from \$5 million in FY 1999 to \$10 million in FY 2002. Accurate crash information is needed to determine the extent of safety problems, but data must first be reported by State and local authorities.



## Transit Safety Programs

FTA has six programs designed to work continuously to improve the safety and security of the Nation's transit systems: (1) Modal Safety; (2) Information Sharing/Technical Assistance; (3) Training Education; (4) Substance Abuse; (5) Security and (6) Data Collection and Analysis. Additionally, FTA works to improve safety through the Department's Intelligent Vehicle Initiative.

### **Modal Safety Program**

The Modal Safety Program has three key components:

- Rail Fixed Guideway
- Railroad
- Bus

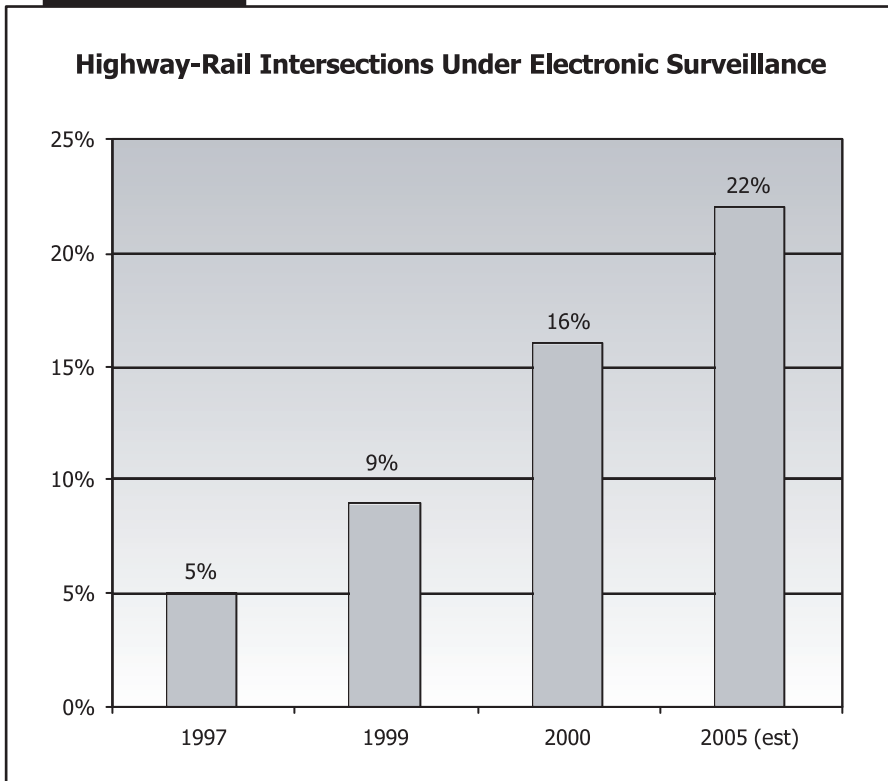
The Rail Fixed Guideway component of the Modal Safety Program was implemented in 1995; when FTA published a final rule requiring States with fixed guideway systems to designate an independent oversight agency to oversee the safety of rail systems not regulated by the Federal Railroad Administration (FRA). Currently 22 States and 36 systems are included in this program, but this number will change as new systems are opened. FTA audits the affected States for compliance with the rule and provides technical assistance.

The Railroad component consists of an ongoing coordination program with FRA on issues that affect the transit industry. FTA participates with FRA in the development of shared track and shared corridor safety standards as well as the granting of waivers for shared track operations. FTA is a member of the Rail Safety Advisory Committee for matters relating to commuter railroads. Three subprograms under the railroad component are (1) Railroad Grade Crossing Safety; (2) Rail Vehicle and Materials Safety; and (3) Train Control Centers Safety.

Under the Railroad Grade Crossing Safety subprogram, FTA demonstrates, evaluates, and deploys innovative grade crossings technologies. The strategic deployment of these technologies enhances transit's ability to: alert motorists and pedestrians of oncoming trains; improve passive and active warning signs and signals for light rail and commuter rail transit develop cost-effective off-track train presence detection systems; and assess safety data to determine target areas for technology enhancements. As shown in Exhibit 20-2, the percentage of highway-rail intersections under electronic surveillance increased from 5 percent in 1997 to 16 percent in 2000, and is expected to continue to climb.

Under the Rail Vehicles Materials Safety subprogram, FTA is working with FRA to develop fire safety standards (flammability and smoke emissions) for materials used in the interior of rail vehicles and to test these standards. FTA is also working with the Interagency Fire and Materials Working Group of the Federal government to produce uniform fire performance guidelines for any materials that may be used by government agencies. This effort includes testing new composites that may be considered for use in new railcars and buses.

**Exhibit 20-2**



Source: US Department of Transportation, ITS Tracking, Survey Results.

Under the Train Control Centers subprogram, FTA is working with FRA to assess the adequacy of rail control centers for rail transit systems operating on rights-of-way with freight and intercity passenger services. FTA is in the process of evaluating control centers' equipment and personnel, focusing on the effectiveness of these centers during peak times. Additional work burdens will fall on control centers with the expansion of commuter service on freight railroad rights-of-way.

The Bus component of FTA's modal safety program is comprised two parts. The Bus Testing Program ensures that deficiencies in new bus

models are corrected before being put into revenue service. Since its implementation, this program has successfully identified more than 4,000 malfunctions ranging from minor problems to serious design deficiencies. A state-of-the-art facility in Altoona, PA, has tested 150 new bus models since 1992. In 1998, FTA initiated the Modal Transit Bus Safety and Security Program. This program established the core safety and security program elements that all transit bus agencies should implement. These core program elements are security, driver/employee selection, driver/employee training, vehicle maintenance, drug and alcohol abuse programs and safety data acquisition and analysis.

### **Information Sharing and Technical Assistance Program**

FTA's Information Sharing and Technical Assistance Program includes a clearinghouse that is the focal point for all requests for information, materials and resources currently available on transit safety, security, and related technologies; a transit safety and security website describing ongoing programs and new initiatives; and technical assistance, guidelines, and newsletters on safety issues.

### **Training and Education**

FTA provides safety and security training to the transit industry through the Transportation Safety Institute, the National Transit Institute and the Volpe Center. The curriculum includes courses such as: Transit Workplace Safety and Security: System Security Awareness for Transit Employees and Security Incident Management for Transit Supervisors; Effectively Managing Transit Emergencies; Transit Rail Accident Investigation; Transit Rail System Safety; Fundamentals of Bus Accident Investigation and Substance Abuse Management. Through the Transit Safety Institute, FTA has provided training to

over 70,000 transit industry employees since 1971, including more than 23,000 since 1998. Through the National Transit Institute, FTA has conducted three Workplace Safety and Security train-the-trainer courses in FY 2002 and has four additional courses planned in FY 2002, as well as three FY 2003 sessions. In FY 2002, through the Volpe Center, FTA conducted 13 drug and alcohol seminars, drawing over 1,100 people.

### **Substance Abuse Program**

The Omnibus Transportation Employee Act of 1991 authorized the U.S. Department of Transportation to mandate substance abuse management for safety-sensitive employees in the transit industry. In February 1994, FTA published final drug and alcohol testing regulations for transit employers. FTA is responsible for implementing these regulations and auditing the compliance of transit operators with these rules. As of July 29, 2002, FTA has conducted 126 audits since the inception of the drug and alcohol audit program in 1997. Thirty-eight audits are scheduled for FY 2002.

### **Security Review Program**

Between February 1997 and July 2002, FTA conducted 59 Security Reviews and 20 follow-up Security Reviews of transit agencies. Security reviews are independent security and emergency management reviews of transit agencies plans, procedures, and training to ensure the highest level of transit system security against major crimes and acts of terrorism, and to assess the ability to quickly and effectively respond to the consequences of a critical emergency incident. Specifically, the reviews have included an evaluation of the:

- Transit agency system security program, including plan and procedures
- Threat and vulnerability assessment (TVA) process used
- Emergency management plan and response procedures
- Countermeasures to transit crimes and terrorism
- Training of transit personnel in security and emergency response procedures
- Training of emergency response personnel in transit operations and procedures
- Coordination of emergency response agencies with the transit agency during an emergency incident

Based on the review, FTA makes recommendations to the transit agency to mitigate vulnerabilities and improve emergency response capabilities.

FTA security programs are discussed in more detail in Chapter 12.

### **Data Collection and Analysis Program**

All transit agencies must submit safety and security data into the FTA National Transit Database Safety and Security Module. This data on transit safety and security is published annually in the Transit Safety and Security Report (formerly the Safety Management Information Statistics Report). It provides FTA and the transit industry with a basis for identifying key safety concerns as well as possible solutions. FTA has extended its efforts by collecting transit vehicle accident and incident causal data through the State Safety Oversight Annual Reporting requirement and the February 2002 revision of the National Transit Database, which expands the range of causal data collected and the frequency of its reporting.

## ***Intelligent Vehicle Initiative***

FTA is also working to improve safety through the DOT's Intelligent Vehicle Initiative (IVI). Among the elements under investigation are precision docking systems and collision warning systems. Precision docking systems will allow buses to be automatically maneuvered into a loading zone or maintenance area, allowing easier access for passengers and more efficient maintenance operations. Collision warning systems will help the bus driver and surrounding vehicle drivers operate their vehicles more efficiently.