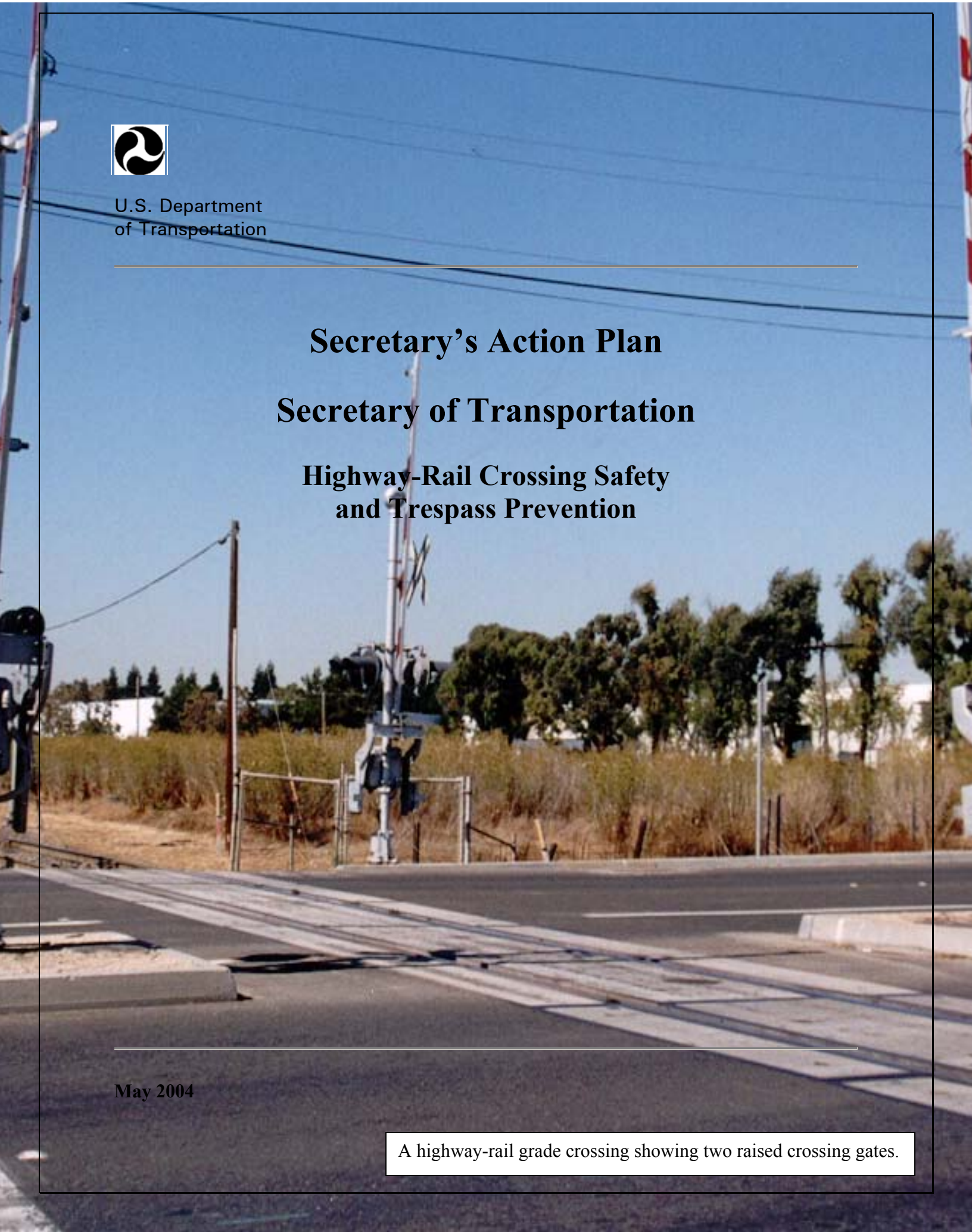

U.S. Department
of Transportation

Secretary's Action Plan

Secretary of Transportation

Highway-Rail Crossing Safety and Trespass Prevention

May 2004

A highway-rail grade crossing showing two raised crossing gates.

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Executive Summary

In the conference report (108-10) accompanying the FY 2003 appropriations for the Federal Railroad Administration (FRA), the conferees directed the Secretary of Transportation to submit an Action Plan to "improve safety at both public and private grade crossings." H. Rpt. 108-10, p. 1286. As specified in the conference report, as well as the Senate Report (107-224, p. 96) accompanying the Department of Transportation and Related Agencies Appropriations bill, 2003, the Action Plan should outline specific efforts to be pursued by FRA, the Federal Highway Administration (FHWA), the Federal Motor Carrier Safety Administration (FMCSA), the National Highway Traffic Safety Administration (NHTSA), and the ITS Joint Program Office. The plan will serve to guide the efforts of the Department of Transportation and its partners in improving safety at both public and private grade crossings.

The aftermath of a collision between an Amtrak train and a tractor-trailer truck (lower left foreground) in Bourbonnais, IL, in March 1999.

The FRA was designated to coordinate the creation of this Action Plan, and it solicited participation from both the public and private sectors in developing and implementing the plan. To facilitate and oversee this project, DOT formed a steering committee comprised of representatives of the railroad industry, labor organizations, State and local agencies, Operation Lifesaver, Inc. (OLI), researchers, and other grade crossing partners.

Trespassing on railroad property and collisions at highway-rail grade crossings are the two leading causes of death in the entire railroad industry, far surpassing employee or passenger fatalities. In 2002, highway-rail crossing and trespasser deaths accounted f or 94.3 percent (897) of all rail-related deaths (951). In fact, based upon statistics from 2002, a train strikes someone nearly every 115 minutes in the United States.

The original Rail-Highway Crossing Safety Action Plan was presented by the Secretary of Transportation on June 13, 1994. The plan identified 55 initiatives in six broad categories to be undertaken by the DOT to enhance safety at grade crossings. The plan had as its goal a fifty percent reduction in the number of accidents and fatalities at highway-rail crossings, to be accomplished over a ten-year span. From 1994 through 2002, the number of fatalities at highway-rail crossings declined by 42 percent (613 vs. 356).

Elements of the 2004 Action Plan

DOT's goal is to continue reducing in the rate of vehicle-train collisions at highway-rail grade crossings.

This new Action Plan stresses nine initiatives that carry forward the principal themes of the original action plan, while providing a more specific focus on important work that remains to be accomplished. Although calling attention to specific program activities, the Action Plan is intended to be sufficiently flexible to permit adjustments to changed circumstances, including knowledge gained from research and program evaluations.

A modern freight locomotive leading a train across a two-lane rural highway-rail grade crossing. The lights and gates have been fully activated.

1. Establish Responsibility for Safety at Private Crossings

Over the years, DOT has initiated a number of safety projects and taken a number of steps to determine safety needs at private crossings and to help close unsafe and redundant private crossings. However, each year approximately one out of every ten fatalities at highway-rail crossings occurs at private crossings, and many private crossings lack even minimal signage to guide users.

The FRA will lead an effort to define responsibility for safety at private highway-rail crossings, including provision of minimum criteria for signage. Criteria for traffic control devices at private crossings will benefit from guidance set forth in the *Manual on Uniform Traffic Control Devices* (MUTCD) and Technical Working Group (TWG) documents.

There are circumstances under which the very presence of at-grade crossings present an impediment to rail transportation. The FRA and FHWA will facilitate an effort to determine what constitutes a "public purpose" for evaluating the provision of public access at private crossings, especially on high-speed rail corridors.

2. Advance Engineering Standards and New Technology

In the future, Intelligent Transportation Systems (ITS) will provide the ability to use an in-vehicle warning of danger at highway-rail crossings and, perhaps, even provide the means to intervene before a collision occurs. Railroad Positive Train Control (PTC) systems will provide information on the direction, speed, and routing of each train; and highway-side systems will utilize this information to communicate a warning to individual motor vehicles. As we envision the means of accomplishing this long-term objective, the Department will also be focusing on more discrete and readily achievable advances in engineering and technology that can materially contribute to highway-rail crossing safety.

With the increasing use of devices such as "Light Emitting Diode (LED) blank-out" signs to prohibit turns from a parallel roadway across a crossing when a train is present, the DOT will work to advance the standardization of these sign displays, as well as their location and operation. The Department will continue to encourage and evaluate the use of highway traffic pre-signals where appropriate at grade crossings close to a signalized highway intersection.

Triple signage at a private grade crossing in the mountains. A standard STOP sign sits atop a private crossing sign and a railroad sign for emergencies.

A low-ground-clearance sign alerts motorists of a grade crossing obscured by vegetation and a sharp curve. A crossbuck sign can be seen in the background, with a boxcar above the vegetation on the right.

The category of high-profile (or "hump") crossings presents a critical issue for motor carriers and buses. These crossings have vertical alignment profiles that could cause vehicles with long wheelbases or low-hanging equipment on the underside of the trailer to hang up on the crossing. The FHWA is funding a study to measure and analyze the underside configuration and wheelbase of longer-wheelbase and lower-profile vehicles upstream of known high-profile "hump" crossings. This system would be able to identify those vehicles whose configuration and wheelbase would make them likely candidates for becoming stuck on the crossing.

The Department will continue to encourage States to consider the use of innovative traffic control devices as supplements to currently installed automatic warning devices at public crossings that continue to experience collisions. Approved traffic control devices used in standardized applications, such as flexible traffic channelizing devices or median barriers, should be considered at crossings that continue to have collisions or frequent violations after the installation of automatic warning devices.

A pair of locomotives leads a long freight train across a four-lane, divided, urban arterial, highway-rail grade crossing. The crossing has cantilevered flashing lights and gates fully activated, and several vehicles can be seen stopped behind the gate and pavement stop line.

The Department will assemble and disseminate guidance information on the use of traffic channelization devices at grade crossings, in accordance with the MUTCD, the Roadside Design Guide, and the TWG documents. This guidance will be made available within two years of issuance of this Action Plan.

A narrow, paved road curves to the right while crossing a two-track mainline railroad. This crossing is equipped with crossbuck signs.

The Department will take the lead in the development, testing, evaluation, and implementation of low-cost safety improvements or devices for passive crossings. Previous attempts to develop low-cost automatic systems have failed due to the prototype system's lack of reliability or escalating costs resulting from the earlier, unsuccessful designs that were tried.

Research shows that many drivers interviewed did not know that the X-shaped crossbuck sign conveyed the message to first look before crossing over the railroad tracks. As a result, efforts are underway to determine if the MUTCD guidelines should include: the use of either a YIELD sign (in most cases) or, when warranted by local conditions, a STOP sign on the same post as the crossbuck at passive crossings.

The DOT will work with the U. S. Access Board, a Federal agency committed to accessible design, and the community, together with the railroad industry, labor organizations, and suppliers, to identify all issues related to both crossing surfaces and wheelchair configurations

that impact on the ability of wheelchair users to safely cross the flangeway gaps found in all grade-crossing surfaces.

3. Expand Educational Outreach

Since the establishment of the OLI, Inc., effort in Idaho on the Union Pacific Railroad in 1972, significant strides have been made in enhancing public awareness of highway-rail crossing safety issues through targeted education, media campaigns, State driver license programs, and other means. New program models may make outreach more effective. Widespread access to the Internet provides important new opportunities for reaching drivers and pedestrians who need to receive the crossing safety message, as well as children and others who need to learn the dangers of trespassing on rail rights-of-way.

The FRA and the Illinois Commerce Commission (ICC) have funded the Public Education and Enforcement Research Study (PEERS) program, which will use education and enforcement in a number of Illinois communities as a potential alternative safety measure to support the establishment of a "quiet zone." An independent consultant will analyze video recorder data on violations by motorists at selected crossings. For enforcement, once a month the local police department, in association with Metra (commuter rail) and the ICC's police departments, will focus on safety enforcement "blitzes" on selected grade crossings.

Future emphasis will also be on the vast potential of the Internet as an interactive teaching and communication tool. The DOT and its partners will continue to use technology and electronic media to deliver safety messages while developing frameworks and relationships with user groups and other modal administrations.

4. Energize Enforcement

Under the 1994 action plan, the Department conducted extensive outreach to the law enforcement and judicial communities in aid of highway-rail crossing safety and trespass prevention. The FMCSA implemented a sanction system under the Commercial Drivers License program for crossing violations, and several communities across the Nation began experiments with automated enforcement at highway-rail crossings.

Under this plan, the Department will continue to expand successful programs with law enforcement agencies and the judicial branch to recognize grade crossings and trespass violations as serious problems. Law enforcement agencies will be shown the benefits of more vigorously patrolling highway-rail crossings, and enforcing the traffic and trespassing laws. Judges will be encouraged to adjudicate these cases in a way that more effectively discourages dangerous and illegal behavior. Program knowledge acquired in automated traffic enforcement efforts at highway intersections will be used to address crossing safety.

The FRA will work to capitalize on the wide support for the FRA Law Enforcement Liaison Officer Program by seeking ways of making participation more acceptable to law enforcement agencies.

Trespass prevention has proven very difficult to accomplish. The modal administrations will work to better identify the impact of suicides on reported trespasser fatalities. Selective use of well-designed fencing, pedestrian channelization, and video monitoring of known trespassing locations have had some effect; and the Department will encourage the expanded use of these techniques where they are feasible and cost effective.

The DOT will continue to identify successful prevention strategies within the U.S. and in Canada, which has reduced trespasser fatalities. There is a compelling need to obtain participation by local law enforcement officials. The FRA must communicate to all concerned the need to be mindful of the potential national security issues related to trespassing on railroad property.

A two-track mainline railroad passes through a recently removed grade crossing.

5. Close Unneeded Crossings

In 1991, the Federal Railroad Administrator endorsed a goal of closing 25 percent of all highway-rail crossings, and the 1994 action plan included several program elements intended to help achieve that goal. Although that target has not been met yet, DOT leadership has provided significant support for efforts by States and railroads to eliminate redundant and particularly hazardous crossings through the consolidation of nearby crossings on major rail lines, grade separations, and other means. Outreach conducted in developing this plan revealed a conviction among highway-rail crossing experts that a strong emphasis on closures must be continued. Notably, the American Association of State Highway and Transportation Officials (AASHTO) is on record supporting highway-rail crossing closures and consolidations.

The Department supports efforts to close crossings and limit the creation of new highway-rail crossings except where the public interest clearly provides justification. DOT will concentrate

on presenting "best practices" and successful initiatives in providing technical assistance and support to States and local governments in the consolidation of at-grade crossings. Flexibility contained in existing law for the use of Federal-Aid highway funds for expenses associated with crossing closures should be carried forward as surface transportation legislation is reauthorized by the Congress.

The Department notes with alarm the numerous requests for new crossings on the busiest rail lines (e.g., 40–100 trains per day). It will explore defining a policy structure for "Limited Access Rail Lines" in order to enhance safety on high-density rail lines. Such rail lines also host passenger trains in many cases.

The FRA will complete the update of its crossing consolidation manual and work to reiterate departmental support for closure and consolidation where appropriate, while maintaining essential, alternate, and safe access. It will also stress the importance of successfully rerouting pedestrian traffic that traveled over a closed crossing. DOT will encourage States to formulate their own annual goals for closure or consolidation of redundant or unneeded crossings.

A three-track "common corridor" railroad alignment with a highway-rail grade crossing in the foreground. The left-most two tracks carry a light-rail system, and the right-most track carries a freight railroad. The lowered grade crossing gates can be seen in the left foreground.

6. Improve Data, Analysis, and Research

Many improvements in highway-rail crossing safety over the past decade resulted from a sharp focus on improving data quality, conducting careful analysis, and targeting research at opportunities for breakthroughs in crossing safety. Under this new Action Plan, the Department will redouble its efforts to identify new strategies for risk reduction.

The Department sent legislation to Congress, which was adopted by the Senate as a part of S. 1402, the Federal Railroad Safety Improvement Act, requiring railroads and States to periodically update information in the National Inventory of Highway-Rail Crossings. The Administration will continue to seek the enactment of this form of legislation, which is fundamental to the improvement in data quality that will be required for future research and analysis. Both States and railroads benefit from public investments in highway-rail crossing safety, and it is critical that they provide the data necessary to evaluate the effectiveness of crossing safety efforts.

Focused research can open the window to new solutions. For example, the FRA is supporting the Norfolk Southern Railway and the North Carolina Department of Transportation in their cooperative effort to gather data using a locomotive camera system, known as Rail View. This system will gather video and telemetric on-track data, provide insight into rail-highway at-grade crossing crashes and trespasser incidents, and validate at-grade crossing-safety treatments.

The FRA will examine current accident data to identify those States that have a significant frequency of multiple collisions at grade crossings that have previously been equipped with lights and gates. The FRA will send a letter to the States identified in this study to encourage them to examine these crossings in order to determine what the causal factors may be that are leading to these multiple collisions at crossings that already have sophisticated warning devices in place.

Through its Grade Crossing Characteristics Inventory Database Project, the Federal Transit Administration (FTA) will be able to design and promote initiatives intended to reduce rail grade crossing accidents and improve operational efficiency. With notable exceptions, transit grade crossings are not assigned USDOT crossing inventory numbers and transit operators are not required to participate in this program. This Inventory Project will enable FTA to cross-reference grade crossing profiles with safety information collected in its National Transit Database (NTD). Additional analysis will encourage the development of recommendations for standardized grade crossing warning devices that conform to the MUTCD. This project will also reduce costly retrofits and redesigns that can result from poor planning and design. This new Inventory Project will allow FTA to provide transit operators, traffic engineers, transportation consultants, and city planners with support in selecting effective crossing warning devices, and provide direction for further research needs.

The FRA will continue to make available its GradeDec software package, which estimates the costs and benefits of grade crossing improvements. This useful tool enables designers and planners to perform corridor analyses and estimate the impacts on the highway system of traffic diversions due to crossing closures or grade separations. GradeDec also considers environmental and travel-time impacts, as well as the safety of improvements.

7. Complete Deployment of Emergency Notification Systems

When vehicles stall on crossings or warning devices fail, quick action is needed to protect safety. During the past decade, FRA sponsored projects that demonstrated the usefulness of emergency notifications system (ENS) programs, and larger freight railroads implemented them (beginning at crossings with automated warning devices). Under this Action Plan, FRA will help facilitate the universal implementation of ENS systems and the posting of MUTCD-compliant signs on all railroads.

A freight train enters a two-lane rural grade crossing. The flashing lights and gates are fully activated.

8. Issue Safety Standards

During the past decade, FRA adopted regulations for the inspection, testing, and maintenance of automated warning devices and requirements for the installation and use of alerting lights on all locomotives that traverse highway-rail crossings at greater than 20 mph.

The FRA published a report in April 1995 on the impact of whistle bans nationwide. An Interim Final Rule on the use of locomotive horns at highway-rail grade crossings was published in the Federal Register on December 18, 2003. The interim rule requires that locomotive horns be sounded as a warning to highway users at public highway-rail crossings. In accordance with the Railroad Safety Authorization Act of 1996, the interim rule will not take effect until one year from the date of its publication on December 18, 2003. Until December 18, 2004, the sounding of the locomotive horns at crossings will remain the subject of applicable State and local laws. The FRA will provide technical assistance to local communities implementing this rule.

The FRA published a Notice of Proposed Rulemaking (NPRM) on November 6, 2003, that would require retro-reflective material on the sides of freight rolling stock (freight cars and locomotives) to enhance the visibility of trains to reduce the number of collisions at highway-rail grade crossings. Based upon a review of the comments received, FRA will promptly complete this rulemaking.

A narrow, rural, two-lane road stretches to a grade crossing occupied by the lead locomotive of a freight train. The flashing lights and gates are fully activated.

9. Evaluate Current Safety Efforts for Effectiveness

Together with its modal partners, FRA will undertake a comprehensive evaluation of the effectiveness of all grade crossing collision-mitigation and trespass-prevention efforts to ensure that "best practices" are being maintained and that resources are devoted first to those strategies that have the highest return on investment.

Introduction

This Action Plan, like its predecessor, presents a multi-faceted, multi-modal approach for improving safety at our Nation's highway-rail crossings and for the prevention of trespassing on the rights-of-way of our Nation's railroads. Collisions at highway-rail grade crossings and trespassing on railroad property are the two leading causes of death in the entire railroad industry, far surpassing employee or passenger fatalities. The reality is that, based upon statistics from 2002, a train strikes someone nearly every 115 minutes in the United States. In 2002, highway-rail crossing and trespasser deaths accounted for 94.3 percent (897 of 951) of all rail-related deaths.

The original Rail-Highway Crossing Safety Action Plan was presented by the Secretary of Transportation on June 13, 1994. The agencies contributing to the Plan included the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the National Highway Traffic Safety Administration (NHTSA), and FRA. The plan identified 55 initiatives in six broad categories to be undertaken by the Department to enhance safety at grade crossings. The six categories were:

- Enhance the Enforcement of Traffic Laws at Crossings
- Enhance Rail Corridor Crossing Reviews and Improvements
- Expand Public Education and Operation Lifesaver Activities
- Increase Safety at Private Crossings
- Improve Data and Research Efforts
- Prevent Rail Trespasser Tragedies

The plan had as its goal a fifty percent reduction over ten years in the number of accidents and fatalities at highway-rail crossings. In 1994, the year the plan was issued, FRA documented 4,979 highway-rail grade crossing incidents, resulting in 615 fatalities.

As part of the conference report (108-10) accompanying the FY 2003 FRA Safety and Operations appropriation, the conferees directed the Secretary of Transportation to submit to Congress an Action Plan.

This new 2004 Action Plan was created with the valuable input of the four modal administrations

A freight train becomes a blur as it passes through a grade crossing that has flashing lights, fully activated gates, and a warning sign to the right.

involved in the 1994 effort, this time joined by two new modal partners: the Federal Motor Carrier Safety Administration (FMCSA) and the ITS Joint Program Office (ITS). Additionally, a steering committee was formed to involve grade-crossing safety partners from the railroad industry and rail labor, as well as State rail agencies and other interested parties. The 2004 Action Plan highlights lessons learned during the lifetime of the original plan, and outlines the direction needed to finish the work of the original plan and accomplish new initiatives. Among its many uses, the plan serves as a teaching document that communicates past activities and accomplishments while featuring numerous success stories in trespass prevention and grade crossing safety. This plan outlines a number of new initiatives and focuses attention on those areas where additional resources may be most beneficial to highway-rail grade crossing safety and trespass prevention in the 21st Century.

Review of the 1994 Rail-Highway Crossing Safety Action Plan

The Secretary of Transportation presented the original plan on June 13, 1994. Taken together, the initiatives set out in the plan represented a comprehensive Departmental effort, adopting a uniform strategy across the modal administrations to deal with issues related to highway-rail grade crossings and trespassing. Each modal administration was committed to targeting the six initiatives as resources permitted. The plan had as its goal a reduction in the number of collisions and fatalities at highway-rail crossings of at least fifty percent over 10 years beginning in 1994.

The Action Plan was issued concurrently with the implementation of the FRA Grade Crossing Managers Program, and these personnel were counted on to perform an essential role in achieving the plan's goals. The grade crossing managers are assigned to regional offices to interact closely with State agencies and local communities in their territories. A brief update on many of the completed or ongoing activities under each of the six initiatives follows.

Law Enforcement and Judicial Initiatives

Increased Enforcement of Traffic Laws at Crossings - Experience has shown that visible, high-profile law-enforcement programs reduce the number of highway traffic violations, and programs targeting traffic violators at highway-rail crossings are also effective. Such efforts would be more easily promoted if police and local officials were more familiar with the problems inherent at grade crossings. Consequently, FRA determined that an effort would be made to reach local civic and police officials where they work and meet.

Law Enforcement Liaison Program - The FRA recruits law-enforcement liaison officers to work with the FRA staff to conduct extensive outreach activities to both the law enforcement and judicial communities. Officers assigned to regional programs work closely with FRA's 16

regional crossing-trespass-prevention managers to reach the enforcement community at the local level. The FRA has had a significant impact on reaching the law enforcement community through this program and will continue its commitment to work closely with these resources to improve highway-rail crossing safety and trespass prevention. In cooperation with OLI, FRA has distributed more than 1,000 copies of a new professional education video entitled "Roll Call" to law enforcement entities nationwide. As part of its outreach to citizens, FRA created a partnership with law-enforcement officials to provide ticket jackets that contain information about the hazards of grade-crossing violations. The jackets are to be distributed by law enforcement officers when they issue warnings or citations for crossing or trespass violations. This program is ongoing.

Outreach to Judiciary - Over the past several years, FRA has worked diligently to increase awareness throughout the judicial community on the importance of highway-crossing safety and trespass prevention. Academic studies and data analyses suggest that consistent enforcement of existing laws pertaining to grade-crossing safety and trespassing have a significant potential to reduce the frequency of such incidents. In the past, too many judicial authorities at all levels of government have treated such offenses as trivial or too administratively burdensome to address in courtroom proceedings. Consequently, FRA initiated dedicated outreach to the judiciary by publishing a brochure entitled, *Partnering in Safety: Judicial Outreach.* In cooperation with OLI, FRA participated in developing the OLI judicial awareness video entitled, "It's Your Call," and continues to be a primary distributor of the video. Finally, FRA has worked with the National Judicial Conference to bring about the formal integration of this subject into the annual American Bar Association's *ABA Traffic Court Seminar* curriculum. This program is ongoing.

Compilation of State Laws and Regulations Affecting Highway-Rail Grade Crossings - This FRA publication provides an aggregation of the various State laws and regulations governing driver behavior at highway-rail grade crossings, as well as a compilation of laws and regulations concerning trespassing on railroad rights-of-way and equipment. It also includes laws and regulations concerning the responsibility for vegetation clearance at grade crossings and it examines the various State laws regarding photographic enforcement of traffic laws at highway-rail grade crossings. An updated edition is currently in production, and should be completed by October of 2004. By working with FHWA to develop model legislation for traffic laws at grade crossings, FRA is providing some guidance in the promulgation of effective grade-crossing safety laws.

Funds Available Under 23 USC 402 ("Section 402") - The DOT has advised the States that where problem identification data indicate that highway-rail crossings are a significant local problem, Section 402 funds are available to promote targeted public education and law-enforcement strategies within a comprehensive program approach to the problem. The NHTSA and FHWA continue to promote State funding for targeted public education and law-enforcement initiatives.

Rules of Evidence - The Transportation Research Board (TRB) researched State laws and published the article "Photographic Traffic Law Enforcement" in the December 1996 National Cooperative Highway Research Program (NCHRP) *Legal Research Digest.* The FRA continues

to monitor the effectiveness of automated enforcement efforts, and participates in a study with the Illinois Commerce Commission to determine the effectiveness of education and enforcement in improving safety in four communities in Illinois. DOT is providing funding to Downers Grove, Illinois, to support its video-enforcement study at the Fairview crossing. This project is ongoing.

Rail Corridor Crossing Safety Improvement Reviews

An efficient way to conduct a comprehensive engineering review of highway-rail crossings is to conduct a multi-disciplinary, diagnostic examination of all crossings, public and private, within a specified rail corridor. Routes with significant passenger traffic, heavy rail freight volumes, or

A freight train passes through a grade crossing equipped with four-quadrant gates. The near-side exit and entry gates are visible and fully activated.

with high-train speeds are likely targets for such a corridor analysis. This analysis may identify potential crossing-closure or consolidation candidates. Other enhancements are possible by this process, such as needed upgrades to train-detection circuitry or the installation of signal-event recorders (to enable more effective diagnosis of signal malfunctions).

In North Carolina's high-speed corridor between Raleigh and Charlotte, the State is implementing its "Sealed Corridor Initiative." The risk presented by highway-rail grade crossings is a major issue for North Carolina (with about one crossing per rail-mile), just as it is for most developing high-speed passenger rail corridors nationally. The North Carolina Department of Transportation (NCDOT) developed a very creative approach, by analyzing all of the crossings in the corridor, identifying redundant crossings for closure, and proposing improvements to all those crossings that remain.

Demonstrations of innovative, practical, cost-effective improvements such as median barriers, long gate arms, four-quadrant gates, and video enforcement have improved safety in the corridor significantly. For example, the placement of plastic traffic channelizing devices between opposing lanes of traffic to create a visual median "barrier" was found to cut crossing-gate violations by over 80 per cent.

A freight train occupies a grade crossing equipped with flashing lights and fully activated gates. An additional set of flashing lights serves to signal traffic on a side street.

An assessment report submitted by FRA to Congress in 2001 analyzed 52 crossings between Charlotte and Greensboro that were improved between March 1995 and September 2000. The report estimates that at least five lives have been saved by these improvements, by direct comparison with the pre-improvement accident and fatality experience at those crossings. These improvements will continue to yield safety benefits. Planners and engineers developing additional railroad corridors are paying close attention to the success of the North Carolina demonstration, and are beginning to implement similar improvements on their corridors. Other States have used "Safety Corridor Projects" to enhance safety at highway-rail crossings. Recently, Alabama, Mississippi, Virginia, Pennsylvania, and Ohio have worked

with the Norfolk Southern Railroad on upgrading and/or closing crossings on specific line segments within their States.

Principal Railroad Lines (PRLs) - The FRA has completed the task of defining a national system of PRLs. The system consists of approximately more of the following attributes: they have Amtrak service; they are essential to national defense; or, they have annual freight volume exceeding 20 million gross-tons. Under the program, "Federal Railroad Administration Rail Network Model," the FRA developed maps and encouraged reviews of PRLs and their crossings.

The FHWA has an ongoing project that encourages States to include upgrades or eliminations of crossings on the National Highway System (NHS) in their State planning processes. The Office of the Secretary of Transportation (OST) Strategic Assessment Plan includes "continued safety improvements" at these crossings.

Upgrade Signing and Markings - The DOT has sought to improve safety by enhancing the conspicuity of signs and markings at crossings. The FHWA issued a memorandum in December 1994 to encourage the use of higher-quality materials for pavement markings and signing. The Department has participated in the development and updating of the *Manual on Uniform Traffic Control Devices* (MUTCD) to address emerging safety issues at highway-rail grade crossings, and will continue to do so. The current edition of the MUTCD may be found at the FHWA's website.

Responsibilities for Selection and Installation of Traffic Control Devices at Public Crossings - The Technical Working Group (TWG) established by the Department was led by representatives from DOT working with national experts in highway and railroad engineering. The cooperation among the various representatives of the TWG was a landmark effort to enhance communication between highway agencies, railroad companies and authorities, and governmental agencies involved with developing and implementing policies, rules, and regulations. The report produced by the TWG provides guidance to assist engineers in selecting traffic control devices or other measures at highway-rail grade crossings. It is not to be interpreted as policy or standards. The goal was to provide a guidance document for users who understand general engineering and operational concepts of grade crossings.

Use of STOP or YIELD Signs at Passive Crossings - The FRA and FHWA have been working on the effective use of STOP or YIELD signs to supplement the crossbuck sign at passive crossings. The National Committee on Uniform Traffic Control Devices voted at its January 2004 meeting to study the effectiveness of STOP or YIELD signs.

Increased Public Education and Operation Lifesaver

Marketing Materials Plan - The FRA developed an effective low-cost national Public Service Announcement (PSA) print and broadcast campaign intended to increase the awareness of trespasser and highway-rail crossing safety. The *Always Expect A Train* (AEAT) campaign

debuted in the summer of 1996, and continued to receive widespread circulation by regional mass media until 1999. Under an FRA-funded contract, FRA conducted an evaluation of the AEAT campaign. In accordance with the recommendations, FRA submitted to Congress a request for $350,000 to develop an updated, focused public-service rail-safety campaign. In the annual FRA grant to OLI, Congress earmarked $350,000 for the development of a rail-safety PSA campaign in consultation with FRA and the law-enforcement community. As a result, FRA has actively participated in the development and continues to participate in the dissemination of newer, but similarly themed, general PSA campaigns in cooperation with OLI. A series of educational videos also have been created for target audiences such as professional drivers, law enforcement officers, and the judicial community. Such tools lend themselves to regional and local outreach to select audiences or constituencies.

An example of other types of regional outreach to address trespasser and crossing safety issues is the in-kind placement of advertisements on milk cartons, for which an FRA Regional Crossing manager developed camera-ready art specifically designed to fit such packaging. Similarly, Regional Crossing managers have successfully joined with professional sports teams at their host venues and, in some cases, OLI to sponsor awareness days during games. Another example of this kind of outreach is the strategic placement of illustrated trespass-prevention messages on donated billboard space secured by FRA regional staff in partnership with the private sector, such as the Frito-Lay Company. These initiatives are ongoing.

Safety at Private Crossings

In 1994, there were approximately 110,000 private highway-rail crossings in the United States. More than 400 accidents and 40 deaths have occurred at these crossings every year. In most years, the number of deaths occurring at private crossings exceeded the number of on-duty deaths among railroad employees in all rail operations. Private crossings are categorized as either farm, residential, commercial, recreational, or industrial/business. Nearly two-thirds are farm crossings. However, most private crossing accidents occur at industrial/business crossings.

Improve Data, Analysis, and Research

Toll-free ("1-800") Emergency Notification System - Legislation in 1994 required the Secretary of Transportation to conduct a pilot program in two States to demonstrate an emergency notification system using a toll-free telephone number for the public to report malfunctions or other safety problems that might occur at highway-rail grade crossings. The FRA has developed software for a Toll-Free Emergency Notification System (ENS) for use by States and railroads. It enables the timely reporting of emergencies, problems, and malfunctions at highway-rail intersections to a centralized emergency-response communication center or railway dispatch center.

The FRA implemented the ENS software at three installations: one for a statewide program in Texas; a second in Pennsylvania for eight short-line railroads; and a third on the Paducah and Louisville Railroad, a regional railroad in Kentucky. These programs have been in operation for

over two years, and the benefits have been enormous in preventing accidents and reducing the cost of operating railroad maintenance. The FRA is currently analyzing the two-years worth of data produced during the pilot program, and will be completed with the analysis by the summer of 2004.

All Class I railroads currently have operable ENS systems in place to provide for the notification to law enforcement from railroads, motorists, and others of obstructions or other dangerous conditions at highway-rail grade crossings. This allowed for coverage of about 70 percent of the crossings in the Nation, leaving approximately 30 percent of the crossings without any emergency notification system. The FRA began working with the American Shortline and Regional Railroad Association (ASLRRA) to develop emergency notification systems for small- and medium-sized railroads. The FRA developed the software for use in a pilot project.

Together with the Commonwealth of Pennsylvania, a group of eight short-line railroads and the "9-1-1" Clinton County Communications Center are using the software for one centralized call-in-center to handle calls from all the participating railroads. The State of Texas is also using the software.

Automated Video Image Analysis - Automated video-image-analysis technology was demonstrated through a Transportation Research Board's IDEA project, with DOT support. The video-imaging technology was used in Florida to determine the proper functioning of automatic warning devices and vehicle detection at crossings. Other uses of automated video-imaging-analysis technology include recording violations by motorists at crossings equipped with automatic warning devices, as part of an overall program of automated traffic law enforcement; and detecting trespassers on bridges and other areas of railroad rights-of-way. Several commercially available video-enforcement systems are suitable for this purpose.

Light Rail Crossing Gates for Left Turn Lanes - The Federal Transit Administration has been investigating alternatives for left-turn lanes with parallel tracks. A project to test 4-quadrant gates on light-rail crossings is underway in Los Angeles in cooperation with the Los Angeles County Metropolitan Transportation Authority.

GRADEDEC (Grade Crossing Risk Assessment Tool) - The FRA developed the GradeDec highway-rail grade-crossing investment analysis tool as a stand-alone software package to provide grade-crossing investment-decision support. GradeDec provides a full set of standard benefit-cost metrics for a rail corridor, a region, or an individual grade crossing.

GradeDec's purpose is to assist State and local transportation planners in identifying the most efficient grade-crossing investment strategies. The GradeDec modeling process can encourage public support for grade crossing improvements, including closure and separation, where project success often depends on getting the community involved in the early planning stages.

GradeDec, as part of TEA-21's Next-Generation High-Speed Rail Program, implements the corridor approach to reducing accident risk. This approach can be an effective means of reducing the overall capital costs involved in constructing facilities for high-speed passenger rail

service (at speeds between 111 and 125 miles per hour), where grade crossing hazards and mitigation measures can be a major cost factor. GradeDec can perform corridor analyses and estimate the impacts on the highway system of traffic diversions due to crossing closures or grade separations. It considers environmental and travel-time impacts, as well as the safety of improvements. Six States are using it as of this writing.

GradeDec uses simulation methods to analyze project risk and generate probability ranges for each model output, including benefit-cost ratios and net present value. The software also analyzes the sensitivity of project risk to GradeDec model inputs to inform users which factors have the greatest impact on project risk. Information on the GradeDec software may be found on the FRA website.

Trespass Prevention

Trespass Prevention Workshop - The FRA held a National Workshop on Trespass Prevention in November 1995 in Atlanta, Georgia. Five additional workshops were held in 1996. The FRA has worked with OLI and Transport Canada to update a community-based problem-solving methodology to assist communities in preventing trespassing. Additionally, in May 2000, FRA, OLI, and the Class I railroads met to explore ways to create a snapshot demographic portrait of trespassers. It was decided to use railroad police eviction-contact reports to gather specific data for use with demographic software. This demographic study is moving forward, as more data are gathered for analysis. Sufficiently large databases of specific and accurate trespasser demographic information have been difficult to obtain, for tort liability and other reasons.

Working with Canadian Officials on Trespasser Issues - The FRA has worked with Canadian officials in the area of trespass prevention. In Canada, several different initiatives have yielded positive results. Right-of-way fencing has been used in concert with pedestrian channelization devices to discourage cut-throughs and to redirect pedestrian traffic to legal pedestrian crossings. The Canadians have also used increased law enforcement and community outreach programs to good advantage. They are adopting a community-oriented process to identify where and why the problems exist, and to locate in a GIS database all trespass incidents and develop maps to identify hot spots.

State Model Trespass Legislation - In April 1997, FRA developed and distributed to each State a Model Trespass Legislation package. Several States have used this as a basis for new railroad-specific legislation. A copy of the model legislation is available in hard copy and on the FRA website.

A steam locomotive pulls a passenger train as it approaches a rural grade crossing on a sunny day.

Evaluation of 1994 Action Plan Results
Statistics and Graphs

Public crossings are generally defined as those for which the roadway approaches are open to public travel and are maintained by a public highway authority. However, many exceptions to this definition exist. A passive highway-rail grade crossing has traffic control devices that are not activated by trains. The calendar year 2002 was the most recent year for which complete statistics were available for inclusion in this document.

Number of At-Grade Crossings, as of 2002
Active = HWTS, WW, Bells, Flashing Lights, Gates
Passive = Crossbucks, STOP Signs, Other

	Unknown	None		Passive	Total
Public	5,093	--	63,563	84,581	153,237
Private	--	69,905	1,201	26,910	98,016
Total	5,093	69,905	64,764	111,491	251,253

Accidents at Grade Crossings, 2002
Active = Watchman, HWTS, WW, Bells, Flashing Lights, Gates
Passive = Crossbucks, STOP Signs, Other

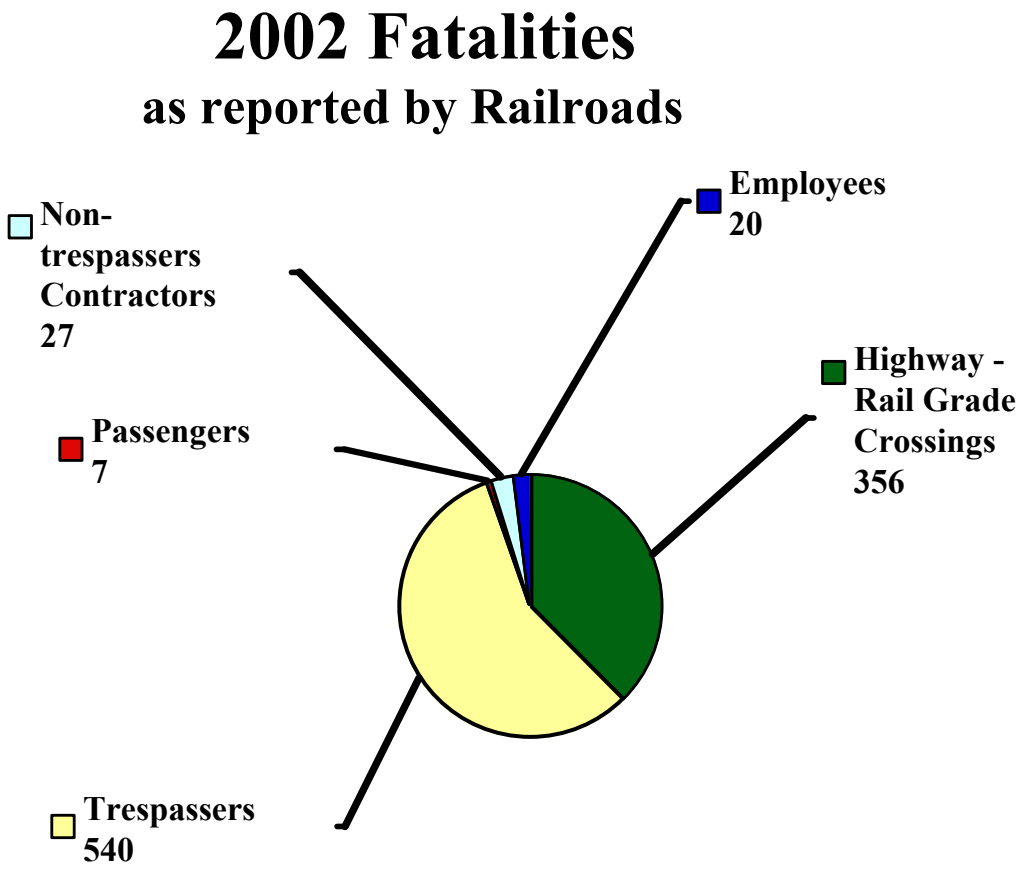
	None	Active	Passive	Total
Public	13	1,507	1,187	2,707
Private	70	39	257	366
Total	83	1,546	1,444	3,073

Fatalities at Grade Crossings, 2002
Active = Watchman, HWTS, WW, Bells, Flashing Lights, Gates
Passive = Crossbucks, STOP Signs, Other

	None	Active	Passive	Total
Public	1	161	153	315
Private	8	4	29	41
Total	9	165	182	356

HWTS = Highway Traffic Signal WW – Wigwag Signal

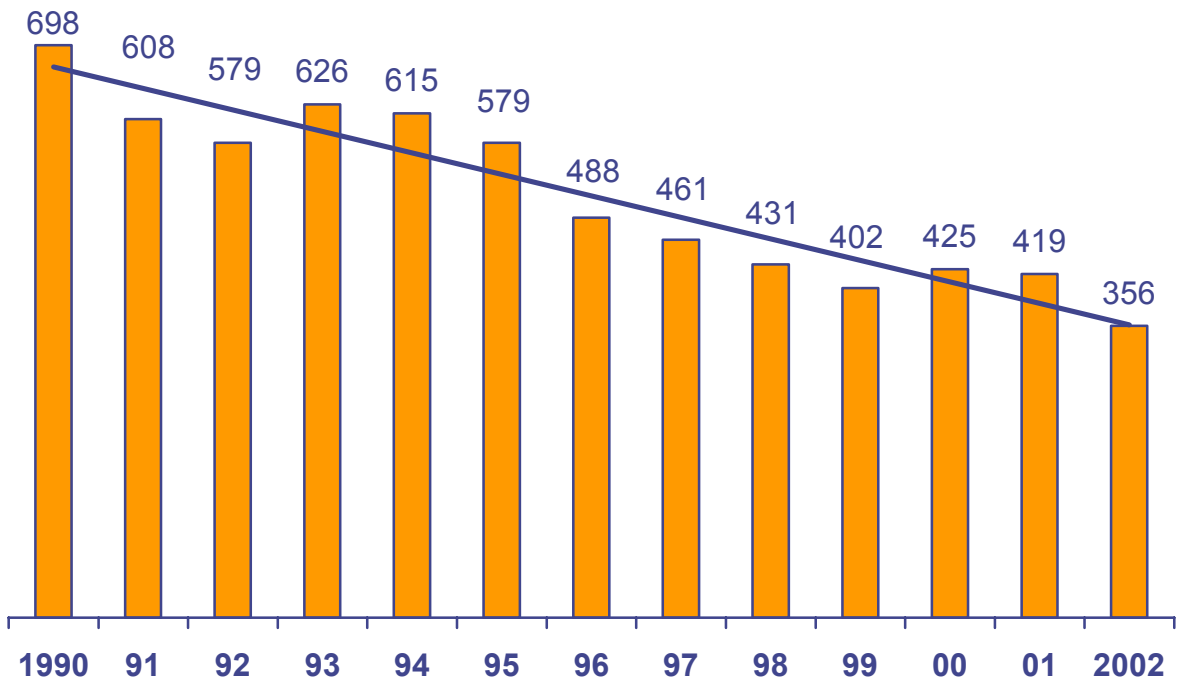
As seen in the following charts, the successes achieved over the this period have been a direct result of the efforts of DOT modal administrations, the States, local road and traffic authorities, the railroad industry, rail labor, OLI, and many others, with the support of the Congress. A continuation and renewal of this partnership will enable us to attain the goal of a rate of 1.28 accidents at grade crossings per million train-miles times trillion vehicle-miles-traveled.



The pie chart represents the railroad-related fatalities for the calendar year 2002, as reported by the railroads. The pieces of the pie are as follows:

Trespassers	540
Highway-Rail Grade Crossings	356
Non-trespassers, Contractors	27
Employees	20
Passengers	7

Fatality Trends at Highway-Rail Grade Crossings 1990 - 2002

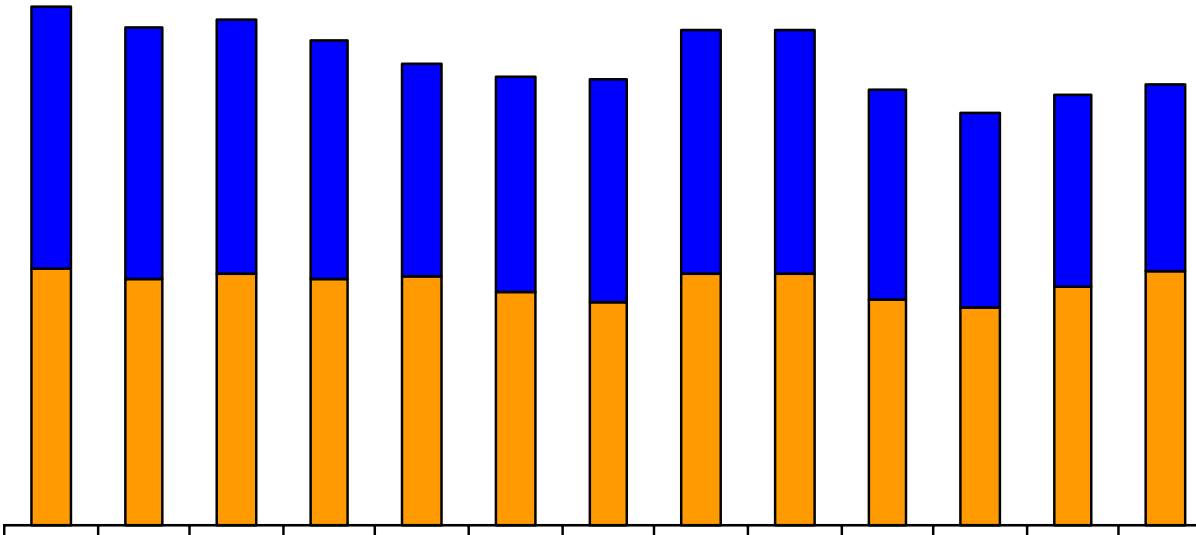


This bar chart depicts the fatality trends at highway-rail grade crossings for the years 1990 through 2002. The trend line descends from left to right, from a total of 698 fatalities in 1990 to 356 fatalities in 2002. The figures are as follows:

1990, 698 fatalities	1991, 608 fatalities	1992, 579 fatalities
1993, 626 fatalities	1994, 615 fatalities	1995, 579 fatalities
1996, 488 fatalities	1997, 461 fatalities	1998, 431 fatalities
1999, 402 fatalities	2000, 425 fatalities	2001, 419 fatalities
2002, 356 fatalities		

Reduction in Fatalities at Highway-Rail Grade Crossings - From 1994 through 2002, the number of fatalities at highway-rail grade crossings has been reduced by 42 percent (615 vs. 356).

Fatality and Injury Trends for Trespassers
1990 - 2002



	90	91	92	93	94	95	96	97	98	99	00	01	02
Injuries	560	534	540	509	452	461	474	516	513	445	414	404	394
Fatalities	543	524	533	523	529	494	471	533	536	479	463	508	540

This stacked bar chart shows the figures for injuries and fatalities for trespassers for the years 1990 through 2002. The figures are as follows:

1990, 560 injuries, 543 fatalities
1991, 534 injuries, 524 fatalities
1992, 540 injuries, 533 fatalities
1993, 509 injuries, 523 fatalities
1994, 452 injuries, 529 fatalities
1995, 461 injuries, 494 fatalities
1996, 474 injuries, 471 fatalities
1997, 516 injuries, 533 fatalities
1998, 513 injuries, 536 fatalities
1999, 445 injuries, 479 fatalities
2000, 414 injuries, 463 fatalities
2001, 404 injuries, 508 fatalities
2002, 394 injuries, 540 fatalities

2004 Highway-Rail Grade Crossing Safety Action Plan

This Action Plan showcases some of the efforts at the Federal level that have been undertaken in highway-rail crossing safety and trespass prevention, and to point to the unprecedented level of cooperation among the various modal partners, industry, and other stakeholders. Goals were set with a realistic view of resources and the manpower available, while at the same time focusing on Departmental policy aims.

In this updated Action Plan, the objectives are more generic in nature and include illustrative examples for each objective.

The 2004 Senate Report restated the earlier direction for the Action Plan that originally appeared in the 2003 Conference Report that the Secretary of Transportation submit a Grade Crossing Action Plan, outlining specific efforts to be pursued by FRA, FHWA, FMCSA, NHTSA, and ITS Joint Program Office, to improve safety at both public and private grade crossings.

Overall, suggestions for the Action Plan were provided by members of a public/private steering committee. Goals were set with a realistic view of available resources while, at the same time, focusing on departmental policy aims.

FRA coordinated this Action Plan with a variety of user groups, both within and outside DOT. In addition to the modal administrations within DOT, partners in efforts to enhance safety include the American Bus Association, the American Public Transportation Association, the American Short Line and Regional Railroad Association, the American Trucking Associations, the Association of American Railroads, the Commercial Vehicle Safety Alliance, the National Association of County Officials, the National Association of County Engineers, the Railway Progress Institute, the Transportation Research Board, the United Motorcoach Association, labor unions, railroads, States, and individuals.

Input was also gleaned from discussions at Railroad Safety Advisory Committee (RSAC) meetings, the Volpe Center Research Needs Workshop held in June of 2003, the Standing Committee On Rail Transportation of the American Association of State Highway and Transportation Officials, DOT grade crossing regional workshops, Operation Lifesaver meetings, and Institute of Transportation Engineers meetings and conferences.

New Goals and Initiatives

Goal

We are establishing our goals in accordance with the current GPRA goals established as of the issue date of this Action Plan.

Our goal for reduction in vehicle-train collisions at highway-rail grade crossings is based upon the rate of collisions per million train-miles times trillion vehicle-miles-traveled, which are the same units used in the corresponding GPRA goal. We anticipate achieving the following rates:

Year	2004	2005	2006	2007	2008	2009
Crossing collision rate	1.29	1.28	1.27	1.26	1.25	1.24

The DOT is not able to establish a quantitative goal for reduction in trespass-related casualties because the demographic characteristics of the problem are not yet well understood. Accordingly, it is not possible to estimate the effectiveness of strategies directed at the problem. However, DOT does commit to completing within the first three years of this Action Plan a demographic study of trespass-related casualties; and within two years thereafter, quantitative goals for fatality and injury reductions will be specified together with program resources needed to achieve those goals.

DOT will urge its state, local and private partners to join in pursuing the following nine new program initiatives:

1. Establish Responsibility for Safety at Private Crossings

Even when they provide public access (e.g., to a business or educational institution), private crossings are largely unregulated by States and the Federal Government. Public funds are available for closing or improving these crossings only under highly specialized circumstances (most often when a governmental jurisdiction "adopts" the crossing and gives it public status).

Railroads work to close unneeded private crossings and seek protection from liability where the underlying property law is favorable. However, provisions for signage, surface and other safety attributes of private crossings are largely unaddressed at many locations.

The FRA will lead an effort to define responsibility for safety at private highway-rail crossings, including provision of minimum criteria for signage. Criteria for traffic control devices at private crossings will benefit from guidance set forth in the MUTCD and TWG documents. In the first quarter of calendar year 2006, the FRA will initiate a series of public workshops, during which

the FRA will encourage discussion and gather information on the current state of safety at private grade crossings, and to identify known safety needs. It is foreseeable that efforts to improve safety at private crossings will generate disputes between railroads and holders of private crossing rights. FRA will seek to identify alternative dispute resolution mechanisms that can short-circuit costly litigation that would deplete resources needed for safety improvements.

A freight locomotive approaches a two-track rural grade crossing, with maintenance-of-way equipment visible on an adjacent track. There is a vehicle stopped at the crossing.

Over the years there has been increasing emphasis on safety projects to establish responsibility for or close private crossings. North Carolina (NC) and FRA have undertaken a pilot project called the "Private Crossing Safety Initiative (PCSI)" with Next Generation funding for 47 crossings on the NC Sealed Corridor between Raleigh and Charlotte, a part of the Southeast High Speed Rail Corridor. The PCSI study was completed in November of 2003, and the implementation of the findings is now underway. The near-term improvements are targeted for completion by mid-2005. FRA and FHWA will continue their efforts to support closure or improvement of private crossings on candidate high-speed rail corridors.

The DOT will facilitate an effort to arrive at a consensus about what constitutes a "public purpose" for evaluating the provision of public access at private crossings, especially on high-speed rail corridors.

There should also be consideration given to making those private crossings that provide "public access" eligible for Federal surface transportation safety funding where public benefits will result. It may also be of value to include another category of crossing, that of "commercial" crossings. The North Carolina PCSI project embraces the concept of certain private crossings as public use "private vehicular accesses (PVA)" if they are open to public use, such as the entrance roadways to a shopping center or a business.

The DOT modal administrations will continue to work to develop and implement standardized signs and pavement markings for use at private crossings. All traffic control devices at private crossings should be consistent with the standards and guidance set forth in MUTCD and TWG documents. However, innovative treatments may be in order to address low-volume private crossings where high train speeds present a special risk.

A set of three locomotives runs across a rural grade crossing equipped with flashing lights and gates, which are fully activated. The roadway has been recently paved, and a stop bar is visible at the crossing.

2. Advance Engineering Standards and New Technology

The Department and its partners will exploit the rapid advances in electronic technology, and experience in the application of unconventional safety measures, to strengthen ongoing programs and improve the safety of highway-rail crossings.

There are a number of continuing activities under this category that DOT will continue to pursue, such as the increasing the use of "LED blank-out" signs to prohibit turns from a parallel roadway across a crossing when a train is present. These signs are currently being used with some success on the Los Angeles METROLINK commuter system as well as on several light rail transit systems nationwide. The use of such a sign is a standard in North Carolina. The DOT will work to advance standardization of these blank-out left turn sign displays, as well as their location and operation, through the National Committee on Uniform Traffic Control Devices. This will also involve efforts to standardize innovative devices by adopting symbols, text legends, and flash modes that can be shown to be understood by the wider community of road users.

The DOT will continue to encourage and evaluate initiatives such as the use of highway traffic pre-signals where appropriate, through its participation in working groups formed by engineering organizations such as the Institute of Transportation Engineers' Traffic Engineering Council. The Volpe Center Research Needs Workshop of June 2003 identified as its second highest research priority the need to develop design criteria and signal warrants for the selection, design and installation of highway traffic pre-signals where appropriate at grade crossings in close proximity to a signalized highway intersection. The DOT intends to work in concert with our partners in the traffic engineering community, along with the railroad industry and rail labor, to expand the work already accomplished in this area by groups such as the TWG and the Institute of Transportation Engineers.

FRA and FHWA in partnership with railroad labor and industry and State DOTs will study the use of battery backup and other fail-safe devices for highway traffic signals. In the first quarter of 2006, the FRA will begin an analysis to determine the scope of the problems that may be caused by power failures at railroad preempted highway signalized intersections. In the event that significant issues are discovered, an investigation of possible mitigations will be undertaken. When preemption of those traffic signals is present by an adjacent highway-rail grade crossing's advanced train detection circuitry, standards will be included in study findings that conform to the MUTCD guidance.

The category of high profile or "hump" crossings presents a critical issue for motor carriers and buses. These are crossings with vertical alignment profiles that could cause vehicles with long wheelbases or low-hanging equipment on the underside of the trailer to hang up on the crossing. The DOT is committed to working through the FMCSA to increase grade crossing safety messages through the American Bus Association, the American Trucking Associations (ATA), the Commercial Vehicle Safety Alliance, the International Brotherhood of Teamsters, and the United Motorcoach Association.

But awareness alone cannot effectively address the "hump crossing" issue. The FHWA is funding a study to measure and analyze the underside configuration and wheelbase of longer wheelbase and lower profile vehicles upstream of known high profile "hump" crossings. This system would be able to identify those vehicles whose configuration and wheelbase would make them likely candidates for getting stuck on the crossing.

The DOT, working through the FRA, FHWA and FMCSA, will develop ways to encourage the provision of better highway route guidance for public agency permitting organizations, and motor carrier dispatchers. This will help to prevent drivers from becoming disoriented on unfamiliar highways, and accidentally driving onto a hump crossing while trying to find their way back to their intended route.

The Department will also explore and evaluate the need for Federal safety funds to support an examination of the potential impacts of the roadway geometry of hump crossings on key truck routes. The State of North Carolina developed and implemented a formula for ranking high profile and narrow crossings in 2001, perhaps pointing the way for other States.

A grade crossing on a four-lane divided roadway in suburbia. Highway traffic signals are visible in the foreground, along with "RXR" pavement markings before the grade crossing. The crossing in the near distance has its lights and gates visible, but not activated.

The Department will continue to encourage States to consider the use of innovative traffic control devices as supplements at highway-rail crossings equipped with automatic warning devices. Approved traffic control devices used in standardized applications, such as flexible traffic channelizing devices or median barriers as appropriate to each crossing site, should be considered at crossings that continue to have collisions or frequent violations after the installation of automatic warning devices. These devices should be used only in accordance with accepted standard practices as in the MUTCD and the Roadside Design Guide and the TWG document.

The Department will work with its partners to assemble and disseminate guidance information on the use of traffic channelization devices at grade crossings, in accordance with the MUTCD, the Roadside Design Guide, and the TWG document. This guidance will be made available by December of 2006.

The DOT will take the lead in the development, testing, evaluation and implementation of low-cost safety improvement or devices for use at passive crossings. Previous attempts to develop low-cost automatic systems have failed due to the prototype system's lack of reliability or escalating costs resulting from the earlier, unsuccessful designs that were tried. The FRA will continue to monitor and support low cost proposals such as the Minnesota Low Cost Highway-Rail Intersection system, which is to be demonstrated at rural crossings in MN.

Even while working to implement new technology, the crossing safety community needs to address unmet basic needs. Research shows that many drivers do not know what the X-shaped crossbuck sign conveys. As a result, efforts are underway that may prompt the inclusion within the MUTCD standards and guidelines for the use of either a YIELD sign (in most cases) and, where warranted by local conditions, the use of a STOP sign on the same post as the crossbuck at passive crossings. Current initiatives to standardize the installation of STOP or YIELD signs at passive crossings, once adopted and included in the MUTCD, are anticipated to be a cost-effective improvement.

There is interest in the development of low-cost grade separation structures and roadway approaches, primarily for use on low-volume roads. For certain cases, where the railroad line is located on an elevated landform such as a high earthen fill, there is the possibility of constructing a roadway undercrossing by using a culvert structure while keeping the rail line running over this work in service. California has been successful in developing partnerships with local communities and businesses to construct highway undercrossings for $1 million or less on their high-speed rail corridors.

North Carolina DOT in December of 2003 conducted an evaluation of the new crossing signal under development by EVA Signal Corporation. The results and conclusions from this project will be included in a report scheduled for release in the second quarter of 2004.

The DOT will take the lead in working with the U. S. Access Board, a Federal agency committed to accessible design and the access community in partnership with the railroad industry, labor organizations, and suppliers to identify all the issues related to both crossing surfaces and

wheelchair configuration that impact on the ability of wheelchair users to safely traverse the flangeway gaps found in all grade crossing surfaces. The Department will convene a Technical Working Group to perform an update to the existing TWG guidance document. This new version will reflect the current state of the practice in the selection and installation of warning devices at grade crossings. This updated TWG document will be made available in 2007, five years after the posting of the original report on the FHWA website.

Four-quadrant gates, with the entrance gates down and the exit gates starting to descend. No trains or road users are visible.

As a part of this project, the FRA will partner with interested parties to develop guidelines for choosing between a four-quadrant gate system and a two-quadrant gate system with raised median separators. Each has advantages and potential drawbacks. The necessity for maintaining curb openings and nearby streets and driveways, as well as the width of travel lanes may negate the use of raised medians in some cases. Long-gate arms that cover from two-thirds to three-quarters of the width of a two-lane roadway continue to warrant evaluation at crossings selected based on traffic and geometry. The actual length of these longer gate arms will be dictated by site-specific factors such as overhead clearances.

The FRA has been encouraging States and localities to consider the use of traffic channelization devices at "two quadrant" gated crossings that are found to be in need of additional mitigation in addition to the lights and gates already in place. By the end of 2004, as a continuation of these efforts, the FRA will develop and distribute a brochure on the merits and benefits associated with the appropriate use of approved traffic channelization devices at grade crossings with the more common "two quadrant" installations of flashing lights and gates.

In 2007, the DOT will undertake an investigation, in concert with its partners, to determine the effect of system age and technical characteristics of existing crossing devices on crossing safety program planning. This information will be helpful to States as they undertake long-range planning for upgrading their crossing warning systems.

The Volpe Center Research Needs Workshop of June 2003 identified the need to investigate and develop replacement criteria for older grade crossing warning devices. In order to maintain the

highest possible level of safety at grade crossings, DOT will work together with States, railroads, rail labor organizations, and other concerned industry partners to determine factors such as typical design life spans for train detection systems and their component parts. In addition, it will be valuable to research and establish replacement criteria related to age, condition, installation site climate factors, and level of sophistication whereby a replacement schedule might be created for warning devices that are worn out, faded, obsolete, or otherwise in need of upgrading. Remote "health monitoring" devices (such as those being deployed under the FRA Next Generation HSR Program on the NC Sealed Corridor) used to report on performance of warning devices can also serve to give a rapid alert to the railroad if a safety-critical device fails or is damaged.

A freight, intermodal, stack train moves through a two-lane grade crossing, which is equipped with fully activated flashing lights and gates.

3. Expand Educational Outreach

New adaptations of traditional outreach techniques, and innovative uses of the Internet, will be required to reach Americans with the crossing safety and trespass prevention messages in this new century.

For example, the FRA and the Illinois Commerce Commission (ICC) have funded the Public Education and Enforcement Research Study program to use education and enforcement in a number of Illinois communities as a potential alternative supplemental safety measure that could be used to maintain, or support establishment of, a "quiet zone". The demonstration began in 2002 and now involves eight communities. There are plans to solicit other communities in Illinois to participate.

The ICC is working with interested communities to develop education campaigns that include:

- Developing 15-second TV and radio commercials promoting safety at grade crossings and a 5-minute education video for broadcast at transit stations.

- Conducting an "It's the Law" poster campaign – displaying safety posters in store windows and at other high foot traffic locations.

- Using utility bill inserts, and playing recorded safety messages on city government telephone systems when on hold; and

- Conducting monthly Operation Lifesaver presentations targeted at specific local audiences, and focused Town Hall meetings to inform residents who live near grade crossings what the program is attempting to accomplish.

For enforcement, once a month, the local Police Department, in association with Metra (commuter rail) and ICC police departments, will conduct a focused safety enforcement "blitz" on selected grade crossings.

As part of the statewide enforcement program, the ICC anticipates making available a number of small grants to Illinois police departments to provide an incentive for those departments to allocate additional enforcement resources. The grants will be used to offset a community's expense to have specific police details assigned to grade crossing safety enforcement activities.

Future emphasis will also be on the vast potential of the Internet as an interactive teaching and communication tool. The DOT and its partners will continue to use technology and electronic media to deliver safety messages while developing frameworks and relationships with road user

groups and other modal administrations to get these media in the hands of the public. The DOT will develop internet-based interactive grade crossing safety educational tools for use by commercial vehicle drivers by the end of 2005.

The FRA will continue to work with OLI in partnership with insurance industry representatives that are interested in dissuading policyholders from engaging in risky behavior. The FRA will also partner with the industry to disseminate safety messages to client personnel and foster a closer safety partnership with the Insurance Institute for Highway Safety.

The FMCSA will try to encourage States to use their Motor Carrier Safety Assistance Program contacts to distribute grade crossing safety materials focused on motor carrier needs and issues at crossings. The DOT will work with the FMCSA to develop informational packages for firms just starting out in the motor carrier industry.

A four-lane divided highway at a grade crossing, with lights and gates fully activated. In the distance, a pair of freight locomotives can be seen moving toward the crossing.

4. Energize Enforcement

The DOT will continue to expand the successful programs with law enforcement agencies and the judicial branch to improve their understanding of the dangers surrounding grade crossings and trespassing. Law enforcement agencies will be shown the benefits of more vigorously patrolling highway-rail crossings, and enforcing the traffic and trespassing laws. Judges will be encouraged to adjudicate these cases in such a way as to more effectively discourage dangerous and illegal behaviors.

The FRA will work with the railroad industry and the law enforcement community to develop new creative alternatives to improve enforcement and emergency response, elements of railroad train control signaling systems, Emergency Notification System (ENS) dispatcher communication, and transportation management operations center communications to alert law enforcement to any unusual activity that might impact these essential local services.

One project that offers potential is the Train-Vehicle Crash Reduction (TVCR), a joint effort of Ohio Operation Lifesaver and its railroad partners. Collectively, they assist law enforcement officers to proactively monitor specific highway-rail grade crossings and corridors during the time trains are in-transit and encourage strict enforcement of railroad grade crossings and pedestrian trespass violations.

The FRA will work to take advantage of the fact that there is wide support for the concept of the FRA Law Enforcement Liaison Officer program, despite the fact that it has proven difficult to obtain officers for these positions. Often the individual officers are quite enthusiastic, but their upper management does not feel that they can spare the personnel resource for a year at a time during this era of heightened security, and tight staffing levels. To overcome these barriers, FRA is expanding its recruitment efforts to include recently retired officers, or officers from the railroad or from a transit property as an alternative resource source.

Trespass prevention has proven very difficult to accomplish. DOT will work within its modal administrations to better identify the impact of suicides on reported trespass fatalities. Fencing, pedestrian channelization and video monitoring of known trespassing locations have been shown to be effective under specialized conditions where risk is known to be concentrated.

The video surveillance project underway for the railroad bridge in Pittsford, NY, can serve as a template for similar efforts elsewhere. The original intent was to implement a detection and monitoring system that was installed and operated completely off of railroad property, so that localities could set it up and operate it themselves. The FRA will publish a report on the trespass prevention initiative at Pittsford, NY, by the end of 2005.

The FRA will work to investigate the suggestion to use geographic information systems and related computerized systems to tag and identify each trespass incident, thereby facilitating the identification of trends and "hotspots" of trespass activity.

Work will continue on identifying successful prevention strategies from Canada, (which has reduced trespass fatalities) and also from within the U.S. There is a compelling need to obtain participation by local law enforcement.

It will also be necessary to work to persuade the judiciary to take trespassing seriously and impose appropriate sanctions on those cited for trespassing on railroad property. This effort takes on heightened importance given the potential security issues related to trespassing on railroad property.

There have been significant changes in recent years in the Commercial Driver License (CDL) requirements, which have resulted in the enactment of sanctions such as CDL suspensions for violation of grade crossing warning devices. Currently, there must be a CDL suspension of at least 60 days for the first conviction, six months for the second, and at least one year for the third conviction. Another area being investigated is to develop an assessment tool to enable a motor carrier to assess those grade crossings that they use frequently.

Each year Federal and State motor carrier safety personnel conduct approximately 13,000 on-site comprehensive evaluations of truck and bus company compliance with the Federal Motor Carrier Safety Regulations. Federal and State personnel also conduct each year approximately 3 million commercial motor vehicles (trucks and buses) roadside driver and vehicle inspections. At the direction of Congress, FMCSA is now developing a new program to evaluate the safety stature of new truck and bus companies. This program, the New Entrant Program, will result in an additional 40,000 companies being contacted by Federal and State safety personnel each year. During these contacts with company officials and the front-line commercial vehicle drivers, Federal and State safety personnel could distribute grade crossing safety materials. The DOT believes it worthwhile to work to develop information packages for the "new starts" just starting business. The DOT will work to develop pamphlets directed toward the truck and bus driver that can be distributed during the roadside driver/vehicle inspections.

The result of a collision between a freight locomotive and a truck. The locomotive has derailed but remains upright, with the truck visible still in contact with the front of the locomotive.

The DOT believes it is very useful to work closely with the railroad industry to develop articles on grade crossing safety issues relevant to truckers, and getting these articles published by trucking associations, or in the trade magazines and newsletters prevalent in this industry. In addition, such materials will be posted on websites that drivers can view at their own pace.

A small pickup truck crosses a two-track railroad on a gravel-surface road, with steep vertical slopes on both sides of the tracks. The steep grade is visible because of the steep angle of the truck as it starts across the tracks. The crossing has flashing lights and gates, but they are not activated, and no train is visible. There is a sign below the flashing lights with the black legend HIGH SPEED TRAINS on a white background.

5. Close Unneeded Crossings

In 1991, the Federal Railroad Administrator endorsed a goal of closing 25 percent of all highway-rail crossings, and the 1994 Action Plan included several program elements intended to help achieve that goal. Although that target has not yet been achieved, DOT leadership has provided significant support for efforts by States and railroads to eliminate redundant and particularly hazardous crossings through consolidation of nearby crossings on major rail lines, grade separations, and other means. Outreach conducted in developing this plan revealed a strong conviction among highway-rail crossing experts that a strong emphasis on closing closures must be continued. Notably, the American Association of State Highway and Transportation Officials (AASHTO) is on record as a supporter of highway-rail crossing closures and consolidations as well as a statement from DOT endorsing such a program.

For the past decade, DOT, through the FRA, has worked towards this goal of a 25 percent reduction in rail/highway at-grade crossings. Closing redundant and particularly hazardous crossings frees resources to address safety at the remaining highway-rail crossings, reduces hazards to trains associated with disturbance of the track structure by large motor vehicles, and permits road authorities and railroads to focus maintenance resources on crossing surfaces at the remaining locations. Very often crossings can be closed with no other adjustments to the road network. In other cases short extensions of access roads are required. The Department remains confident that many additional highway-rail grade crossings, public and private, can be eliminated without detriment to local mobility; and completing this effort is necessary to ensure the ability of freight and passenger railroads to play a constructive role in the National transportation system.

During the development of this Action Plan, there has been much discussion about the need to provide a strong endorsement of the practice of crossing closures and consolidations where appropriate, and to provide a strong mission statement supporting this approach at the Federal level. A number of partners urged that a stronger Federal endorsement of crossing consolidation will assist States in obtaining success with these projects at the local level. The Department unequivocally supports continued efforts to consolidate grade crossings and make more effective use of scarce public safety resources. The Department will also continue to advocate flexibility in Federal-Aid highway programs for crossing closure projects.

While the goal of completing the 25 percent reduction will still be pursued under this new Action Plan, the FRA will concentrate on presenting "best practices" and successful initiatives in providing technical assistance and support to States and local governments in the consolidation of at-grade crossings. Efforts will center on fostering and participating in the development of "tools" - incentives, guidance, and regulations - that will help States, local agencies and railroad companies to facilitate the process and to move closure and consolidation proposals forward. The DOT will encourage States to formulate their own annual goals for closure or consolidation of redundant or unneeded crossings.

The FRA has recently documented North Carolina DOT's Traffic Separation Study (TSS) technique to consolidate crossings, implement mitigation projects and safety improvements at crossings as a best practice. The TSS approach evaluates traffic through and across the railroad corridor, and involves the local government(s) at the beginning of the analysis. The FRA will work to develop an approach to local government that emphasizes closure of redundant and unsafe crossings as crucial to pubic safety and economic development.

In addition, there is a need for a sharper focus on the numerous requests for new at-grade crossings on rail lines with 40 – 100 trains per day. This disturbing trend, which could threaten gains in grade crossing safety, suggests the need for a concept of "Limited Access Rail Lines" in order to enhance safety on high-density rail lines. Such rail lines also host passenger trains in many cases. Tools such as FRA's GradeDec analysis software, along with the TSS process, could be used to determine the decision point between denying access, providing a grade separation, or requiring an upgrade of warning devices, and recommend a program of near and long term projects.

Before the end of 2004, the FRA will complete the update of its grade crossing consolidation and closure manual. This document will serve to emphasize DOT support for closure and consolidation of grade crossings where appropriate, while maintaining essential, alternate and safe access for local communities.

It will also be important to stress that existing pedestrian traffic over a crossing to be closed must be rerouted and accommodated as part of the grade separation or consolidation project.

Pedestrian traffic is also an issue with at-grade crossings. Some railroads are concerned that there are no national engineering or MUTCD standards applied to at-grade pedestrian crossings, thus creating safety and liability issues. The DOT will work within the MUTCD process to obtain adoption of pedestrian traffic control standards in Part 8 of the MUTCD as related to at-grade railroad street and highway crossings and at at-grade pedestrian-only crossings.

By then end of 2005, the FRA will make available a compilation of pedestrian safety devices in use at grade crossings. This will represent the current state of the practice of pedestrian accommodation at grade crossings, including pedestrian-only crossings.

A fully activated pedestrian gate and flashing light signal across a sidewalk adjacent to a highway-rail grade crossing, which itself cannot be seen. A single-track railroad is visible in the lower foreground.

Pedestrian crossing safety approaches such as Florida's Plant City "Z" at-grade pedestrian crossing and North Carolina's proposed Clayton pedestrian grade-separation should be further evaluated for application elsewhere.

A small, yellow school bus stops at a grade crossing, with the crossing gate visible in front on the bus, and another vehicle beside the bus. The lead locomotive of a freight train is on the crossing directly in front of the bus. A diamond-shaped warning sign with the legend BUMP is to the right of the stopped bus. No children are boarding or alighting the bus.

6. Improve Data, Analysis, and Research

Recognizing that the trespass casualty problem is actually an aggregation of disparate problems involving children, teenagers, the homeless, vandals, and illegal immigration patterns, FRA will continue to develop data and perform analysis of demographic information related to trespass incidents and collisions, and compare available data with medical examiners and coroners to verify demographic trends. FRA will issue a report on the demographic trends identified by this project before the end of December of 2005.

The Department has been working to improve the quality of data it collects at highway-rail crossings with an objective of having the best information possible to be able to improve highway-rail crossing safety. The improved data will greatly help the DOT focus its resources to those areas with the greatest risk. The Accident Reports Act currently requires railroads to report all highway-rail crossing collisions on the general system to FRA. FRA's Interim Final Rule on the Use of Locomotive Horns at Highway-Rail Grade Crossings issued on December 18, 2003 requires communities that have quiet zones, or are requesting quiet zones, to update their Highway-Rail Crossing Inventory and keep it up-to-date. The Administration's current Safety Bill is requesting authority to mandate frequent collection and submission of physical attributes of the crossings.

A grade crossing in a downtown area, with flashing lights and gates in their inactive state. To the right is a sign for a nearby commuter rail station.

The FRA will examine current accident data to identify those States that have a significant frequency of multiple collisions at grade crossings that have previously been equipped with lights and gates. The FRA will send a letter to the States identified in this study to encourage them to examine these crossings in order to determine what the causal factors may be that are leading to these multiple collisions at crossings that already have sophisticated warning devices in place.

Through its Grade Crossing Characteristics Inventory Database Project, the FTA will be able to design and promote initiatives intended to reduce rail grade crossing accidents and improve operational efficiency. With notable exceptions, transit grade crossings are not assigned USDOT crossing inventory numbers and transit operators are not required to participate in this program. This Inventory Project will enable FTA to cross-reference grade crossing profiles with safety information collected in its National Transit Database (NTD). Additional analysis will encourage the development of recommendations for standardized grade crossing warning devices that conform to the MUTCD. This project will also reduce costly retrofits and redesigns that can result from poor planning and design. This new Inventory Project will allow FTA to provide transit operators, traffic engineers, transportation consultants, and city planners with support in selecting effective crossing warning devices, and provide direction for further research needs.

The FRA will continue to make available its GradeDec software package. The package was developed for estimating the cost-benefits for grade crossing improvements. GradeDec is now available as a web-based application. This is a very useful tool, and it can enable designers and planners to perform corridor analyses and estimate the impacts on the highway system of traffic diversions due to crossing closures or grade separations. It considers environmental and travel time impacts as well as the safety of improvements.

The FRA is participating in a cooperative effort undertaken by the Norfolk Southern Railway and the North Carolina Department of Transportation (NCDOT) to gather data using a locomotive camera system known as Rail View. This system will gather video and telemetric on-track data and provide insight into highway/rail at-grade crossing crashes and trespasser incidents, and help to validate at-grade crossing safety treatments. Using a grant from the FRA, this data will be collected and documented for use in studies related to railroad operations, trespasser and crossing safety. Norfolk Southern Corporation plans to equip 500 locomotives with these systems, and NCDOT will equip the locomotives used on The Piedmont, a daily passenger train that makes a round trip between Raleigh, Greensboro and Charlotte, NC. This route is also the Sealed Corridor.

7. Complete Deployment of Emergency Notification Systems

Stalled vehicles, malfunctioning warning devices, and deliberate acts intended to derail trains all present immediate threats that should be communicated swiftly to railroad control centers. With FRA encouragement and analytical support, the railroad industry is on way to deployment of Emergency Notification Systems.

All Class I railroads currently have operational emergency notification systems in place. However, they have installed signs that are no longer compliant with current MUTCD standards, making some of these signs very difficult to read from the highway, and signs have not been uniformly installed at all public and private crossings. Therefore, DOT will work with the Class I railroads to ensure that MUTCD-compliant signs are installed at all public and private crossings.

A sample of a blue Emergency Notification Sign, with the white legend "REPORT CROSSING EMERGENCY OR PROBLEMS TO 1-877-635-2929. IDENTIFY AS CROSSING No. 123-456X."

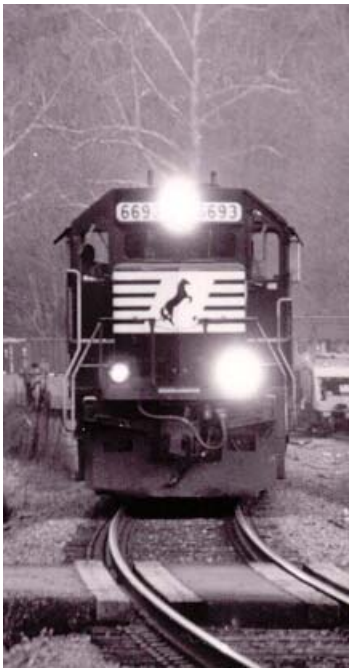
The FRA's Emergency Notification System (ENS) depends on having an accurate National Highway-Rail Grade Crossing Inventory. All railroads need to continue to update the Crossing Inventory as railroads are merged and sold, and railroad crossings are added and closed. There is a mapping component of the ENS that allows a specific railroad crossing to be identified based on its physical location. Not all crossings in the inventory have accurate latitude and longitude data. Efforts will be made to obtain accurate latitude and longitude information and put it into the inventory.

Currently, the short line railroads have not implemented the ENS due to cost and limited manpower available to install the system and staff the toll-free call centers. Regional centers where the costs of implementing and operating the ENS program can be shared among all the participating railroads may be a means to overcome these obstacles. FRA is demonstrating this concept for Susquehanna Economic Development Agency in Lewisburg, Pennsylvania.

Before the end of 2004, the FRA will publish a report documenting the benefits realized from the software developed to manage the ENS system. This report will be supported by two years of field experience and data collected during the operation of the ENS system.

The FRA will work to facilitate the implementation of ENS systems and posting of MUTCD compliant signs on all railroads.

8. Issue Safety Standards



A close-up front view of a freight locomotive approaching a grade crossing. The locomotive's brightly illuminated headlight and lower auxiliary lights stand out in this view.

Current Federal regulations govern Inspection, Testing and Maintenance of Automated Warning devices and requirements for Auxiliary Alerting Lights on locomotives.

The Federal Railroad Administration published a report in April 1995 on the impact of whistle bans nationwide. An Interim Final Rule on the use of locomotive horns at highway-rail grade crossings was published in the Federal Register on December 18, 2003. Within this framework, which facilitates the establishment of quiet zones, there is a potential for many of the safety efforts anticipated by this Action Plan to be able to compete for resources on the basis of quality of life issues as well.

The FRA has sponsored several studies regarding the reflectorization of rail cars. In 1982, the Volpe Center conducted a study to determine if retroreflective materials were a feasible option to enhance freight car visibility, and thereby reduce the number of highway-rail grade crossing accidents. The study concluded that although the use of reflectors enhanced conspicuity (i.e. visibility), the reflective material was not durable enough to withstand the harsh railroad environment. Since 1982, technical advancements were achieved in the brightness, durability, and adhesive properties of reflective material. Because of these advances, the FRA funded renewed research through Volpe to reexamine this issue. In July 1999, the FRA announced the results of its renewed research efforts with the release of a report on freight car reflectorization. The results of this research suggest that microprismatic-retro-reflective material can help in the recognition of freight cars.

The FRA will complete the rulemaking that would require retro-reflective material on the sides of freight rolling stock (freight cars and locomotives) to enhance the visibility of trains in order to reduce the number of accidents at highway-rail grade crossings by the end of 2005.

9. Evaluate Current Safety Efforts for Effectiveness

The Department will undertake a comprehensive evaluation effort to determine the effectiveness of the principal grade crossing collision mitigations to ensure that "best practices" are identified, and that emphasis and support for these programs and projects is maintained. The Department will complete this analysis and issue a report on its findings by the end of 2006.

A two-lane road leads to a highway-rail grade crossing in the distance. This crossing is equipped with flashing lights and gates, which are fully activated by the presence of an intermodal freight train in the crossing. A line of cars is stopped at the crossing. In the foreground is a round, yellow, grade crossing sign, along with the "RXR" white-pavement markings in the lane approaching the crossing.

Conclusion

Freight rail transportation is critical to the Nation's economy, and passenger rail service provides important options for mobility in major metropolitan areas and on heavily traveled corridors. As other modes of transportation experience growing congestion, the Nation may rely even more heavily on transportation by rail.

Intermodal conflict at highway-rail crossings comes at a high price, measured in lost lives and serious injuries to highway users; and the safety of train crews, bystanders, and rail passengers are also threatened. Experience under the 1994 action plan has affirmed that substantial reductions in highway-rail crossing casualties can be achieved through intermodal, intergovernmental, and public-private partnerships. This Action Plan is designed to carry forward those partnerships and further reduce loss of life and injuries at highway-rail crossings.

In addition, this Action Plan identifies possibilities for reducing the persistent and trenchant complex of problems that result in trespassing on railroad property. Since trespassing on railroad property accounts for the largest single category of fatalities associated with railroad operations, it is clearly important that DOT be involved in fostering useful strategies. Although efforts to date have not been successful in effecting major reductions in the fatalities and injuries

A freight locomotive moves onto a highway-rail grade crossing. The blurred background emphasizes the speed, motion, and size of the locomotive in relation to its surroundings.

associated with trespassing on railroad property, this Action Plan underscores the idea that--with a better understanding of antecedent factors--useful countermeasures can be crafted, and specific goals can be determined.

Department of Transportation operating administrations will work with States, local governments, transportation companies and private associations to implement this Action Plan.