

January 2007

# RAIL SAFETY

## The Federal Railroad Administration Is Taking Steps to Better Target Its Oversight, but Assessment of Results Is Needed to Determine Impact



GAO  
Accountability · Integrity · Reliability

# Highlights

Highlights of [GAO-07-149](#), a report to congressional committees

## Why GAO Did This Study

Since 1980, the train accident rate has improved significantly, but progress has leveled off over the past 10 years. Recent serious accidents—such as one in Graniteville, South Carolina, that led to 9 deaths and 292 injuries—elevated concerns. The Federal Railroad Administration (FRA) develops safety standards and inspects and enforces railroads' compliance with these standards.

This report addresses how FRA (1) focuses its efforts on the highest priority risks related to train accidents in planning its oversight, (2) identifies safety problems on railroad systems in carrying out its oversight, and (3) assesses the impact of its oversight efforts on safety. To complete this work, GAO reviewed FRA regulations, planning and policy documents, and safety data. GAO also contacted FRA officials in headquarters and three regional offices and others.

## What GAO Recommends

GAO is recommending that FRA develop measures of the direct results of its oversight and evaluate the effectiveness of its enforcement program. The Department of Transportation did not provide overall comments on these recommendations but did provide several technical comments, which were incorporated as appropriate.

[www.gao.gov/cgi-bin/getrpt?GAO-07-149](http://www.gao.gov/cgi-bin/getrpt?GAO-07-149).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Katherine Siggerud at (202) 512-2834 or [siggerudk@gao.gov](mailto:siggerudk@gao.gov).

## RAIL SAFETY

# The Federal Railroad Administration Is Taking Steps to Better Target Its Oversight, but Assessment of Results Is Needed to Determine Impact

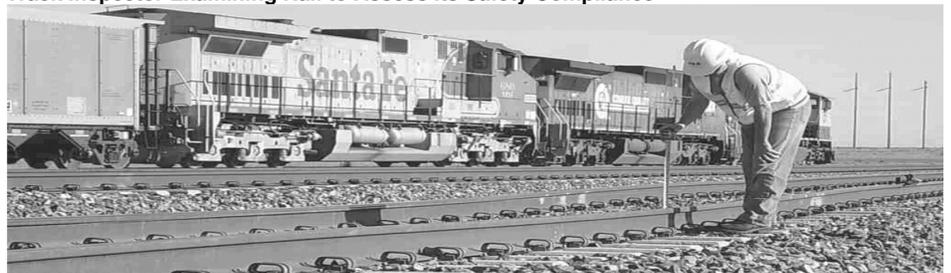
## What GAO Found

In planning its safety oversight, FRA is focusing its efforts on the highest priority risks related to train accidents through initiatives aimed at addressing their main causes—human behaviors and defective track—as well as through improvements in its inspection planning approach. In its May 2005 National Rail Safety Action Plan, the overall strategy for targeting its oversight at the greatest risks, FRA provides a reasonable framework for guiding these efforts. Its initiatives to address the most common causes of accidents are promising, although the success of many of them will depend on voluntary actions by the railroads. In addition, the action plan outlined the agency's development of a new inspection planning approach. Under this approach, inspectors focus their efforts on locations that data-driven models indicate are most likely to have safety problems.

In carrying out its safety oversight, FRA identifies a range of specific and broad-scale safety problems on railroad systems mainly by determining whether operating practices, track, and equipment are in compliance with minimum safety standards. However, FRA is able to inspect only about 0.2 percent of railroads' operations each year and its inspections do not examine how railroads are managing safety risks throughout their systems that could lead to accidents. Such an approach, as a supplement to traditional compliance inspections, is used in the oversight of U.S. commuter railroads and pipelines and of Canadian railroads. While this type of approach can provide additional assurance of safety, GAO is not recommending that FRA adopt it because its various initiatives to reduce the train accident rate have not yet had time to demonstrate their effects on safety.

FRA uses a broad range of goals and measures to assess the impact of its oversight. For example, it has developed (1) new goals to target its inspection and enforcement programs at reducing various types of railroad accidents and (2) related measures to monitor its progress. These measures include the rate of train accidents caused by human behaviors, track defects, and equipment defects. However, FRA's ability to make informed decisions about these programs is limited because it lacks measures of their direct results, such as the correction of identified safety problems. Furthermore, FRA has not evaluated the effectiveness of its enforcement program.

Track Inspector Examining Rail to Assess Its Safety Compliance



Source: FRA.

---

# Contents

---

<b>Letter</b>		<b>1</b>
	Results in Brief	3
	Background	6
	FRA Has Made Progress in Targeting Its Oversight Efforts on the Basis of Risk	15
	FRA Relies Primarily on Direct Inspections to Identify Safety Problems and Does Not Oversee Railroads' Management of Safety Risks	27
	FRA Measures Its Progress in Achieving a Variety of Safety Goals, but Has Limited Information on the Direct Results of Its Oversight	39
	Conclusions	50
	Recommendations for Executive Action	50
	Agency Comments	51
<b>Appendix I</b>	<b>Scope and Methodology</b>	<b>52</b>
	Other Aspects of Our Work	53
<b>Appendix II</b>	<b>FRA Addresses Safety Problems through Cooperation and Enforcement</b>	<b>56</b>
<b>Appendix III</b>	<b>Oversight of Risk Management in the U.S. Commuter Railroad, U.S. Pipeline, and Canadian Railroad Industries</b>	<b>62</b>
<b>Appendix IV</b>	<b>GAO Contact and Staff Acknowledgments</b>	<b>65</b>
<b>Tables</b>		
	Table 1: FRA's Inspection Disciplines	13
	Table 2: Key FRA Initiatives Aimed at Addressing Main Causes of Train Accidents	17
	Table 3: FRA's Safety Performance Measures	43
	Table 4: Description of FRA Enforcement Actions and Frequency of Use, January 2005 through July 2006	57
	Table 5: Risk Management Framework	62

---

---

## Figures

Figure 1: Train Accident Rates, 1980 through 2005	2
Figure 2: Train Miles Traveled, 1996 through 2005	7
Figure 3: Train Injuries and Deaths, 1980 through 2005	8
Figure 4: Primary Causes of Train Accidents, 2005	10
Figure 5: Human Factor and Track Accident Rates, 1980 through 2005	11
Figure 6: FRA Inspector Measuring Track Gauge	29
Figure 7: FRA Inspector Inspecting Train Cars	30
Figure 8: Inspections Conducted and Defects and Violations Cited, by Inspection Discipline, in 2005	32
Figure 9: How FRA's Inspection and Enforcement Programs Contribute to Rail Safety	41
Figure 10: FRA's Civil Penalties, 1996 through 2005, in 2005 Dollars	59

---

## Abbreviations

APTA	American Public Transportation Association
FRA	Federal Railroad Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration

This is a work of the U.S. government and is not subject to copyright protection in the United States. It may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.



United States Government Accountability Office  
Washington, DC 20548

---

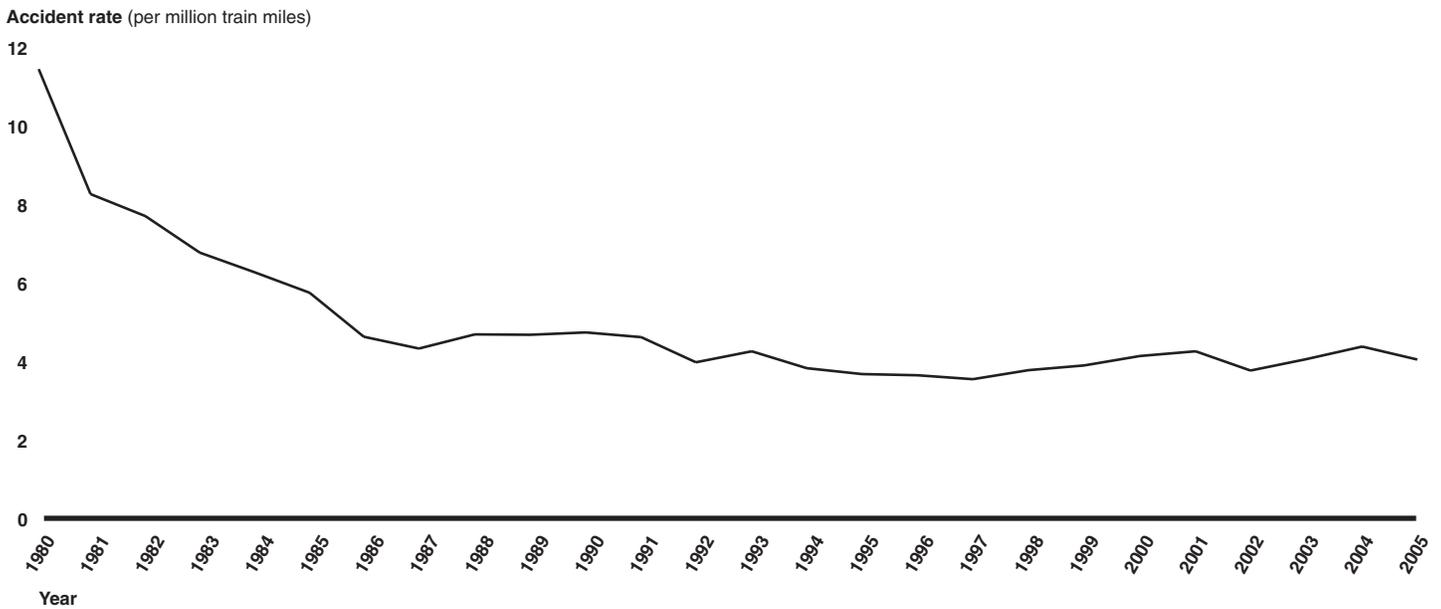
January 26, 2007

The Honorable Patty Murray  
Chairman  
The Honorable Christopher Bond  
Ranking Minority Member  
Subcommittee on Transportation,  
Housing and Urban Development,  
and Related Agencies  
Committee on Appropriations  
United States Senate

The Honorable John Olver  
Chairman  
The Honorable Joe Knollenberg  
Ranking Minority Member  
Subcommittee on Transportation,  
Housing and Urban Development,  
and Related Agencies  
Committee on Appropriations  
House of Representatives

Since 1980, the overall safety record in the railroad industry, as measured by the rate of train accidents, has improved markedly. (See fig. 1.) However, during the past decade, the rate of improvement has leveled off, and a number of serious accidents in 2004 and 2005 elevated concerns about railroad safety. For example, in January 2005, a train carrying hazardous materials collided with a standing train in Graniteville, South Carolina, resulting in 9 deaths and 292 injuries and requiring the evacuation of 5,400 people. In response to the leveling off of the train accident rate, this accident, and other serious train accidents, in May 2005, the federal railroad safety regulator, the Federal Railroad Administration (FRA), announced a National Rail Safety Action Plan to improve its safety oversight. The plan outlines strategies for FRA to target the most frequent, highest-risk causes of accidents, focus federal oversight and inspection resources, and research the use of technologies in order to improve rail safety.

**Figure 1: Train Accident Rates, 1980 through 2005**



Source: FRA.

Citing concerns over several serious accidents that occurred in 2005, the Senate Appropriations Committee directed that we assess FRA’s oversight approach. Accordingly, this report concentrates on how FRA (1) focuses its efforts on the highest priority risks related to train accidents in planning its safety oversight, (2) identifies safety problems on railroad systems in carrying out its oversight, and (3) assesses the impact of its oversight efforts on safety.

To determine how FRA focuses its efforts on the highest priority risks related to train accidents in planning its safety oversight, we reviewed the agency’s National Rail Safety Action Plan, plans for developing new regulations, inspection planning documents, and other key planning documents related to targeting its oversight at these risks. We also discussed oversight planning efforts with FRA officials. To assess how FRA identifies safety problems on railroad systems in carrying out its oversight, we reviewed FRA’s statutory authority; regulations; and policies, procedures, and guidance for conducting inspections and identifying safety issues. We reviewed data from FRA on its inspection activities for the period from 1996 through 2005. We also examined risk management principles and safety oversight approaches used by other modal administrations within the Department of Transportation and

---

elsewhere that have similar safety missions in order to determine their possible application to FRA. To determine how FRA assesses the impact of its oversight efforts on safety, we examined FRA safety performance measures and evaluations of its oversight activities, determined how FRA uses this information in making decisions about its oversight, and reviewed our products on performance measurement and evaluation.

As part of our work in each of these areas, we interviewed program and enforcement officials at FRA headquarters, as well as at three regional offices covering states with the highest train accident rates. We also discussed FRA's approach to safety oversight with representatives of railroads, unions, and state railroad safety organizations. Our work focused on FRA oversight efforts to reduce the rate of train accidents rather than those to reduce highway-rail crossing and trespassing accidents because (1) the Department of Transportation's Inspector General has recently assessed efforts to reduce highway-rail crossing accidents<sup>1</sup> and (2) trespassing accidents primarily involve issues not related to railroad safety performance. We also focused on FRA's oversight of railroads rather than its oversight of nonrailroad companies (such as shippers of hazardous materials by rail) because the agency's oversight efforts focus primarily on railroads. In addition, according to FRA, most recent serious train accidents involving the release of hazardous materials have resulted from problems with railroad operations. As part of our review, we assessed internal controls and the reliability of FRA's data on its inspection activities and enforcement actions that were pertinent to these efforts. We determined that the data elements were sufficiently reliable for our purposes. We conducted our work from November 2005 through January 2007 in accordance with generally accepted government auditing standards. (See app. I for additional information on our scope and methodology.)

---

## Results in Brief

In planning its safety oversight, FRA is focusing its efforts on the highest priority risks related to train accidents through various initiatives aimed at addressing the main causes of these accidents as well as through improvements in its inspection planning approach. The agency's overall

---

<sup>1</sup>See U.S. Department of Transportation, Office of the Inspector General, *Audit of Oversight of Highway-Rail Grade Crossing Accident Reporting, Investigations and Safety Regulations*, MH-2006-016 (Washington, D.C., Nov. 28, 2005); and *Report on the Audit of the Highway-Rail Grade Crossing Safety Program*, MH-2004-065 (Washington, D.C., June 16, 2004).

---

strategy for targeting its oversight at the greatest risks is the National Rail Safety Action Plan. This plan provides a reasonable framework for guiding the agency's efforts to improve its oversight. It includes initiatives to address the two main causes of train accidents—human factors and defective track—and FRA has pursued some additional initiatives to address these causes since issuing the plan.<sup>2</sup> These initiatives—which include new regulations, research on new technologies and approaches for improving safety, and new vehicles for inspecting track—have the potential to reduce the risks associated with these causes and thereby reduce the rate of train accidents. For example, FRA has recently issued proposed regulations that, if finalized, will enable the agency to take enforcement actions when railroad employees do not follow key railroad operating procedures for ensuring safety and, therefore, may help to reduce some common types of accidents caused by human factors. However, most of these initiatives have not yet been fully implemented, and, while some may start showing results in the next year or two, their overall impact on safety will probably not be apparent for a number of years. Furthermore, the ability of many of these efforts to improve safety will depend on voluntary actions by railroads, such as the adoption of a model FRA has developed to improve train crew scheduling practices in order to prevent worker fatigue. In addition, the National Rail Safety Action Plan announced a new approach for planning inspections that relies on greater use of accident and inspection data and other data. Under this approach, which FRA has been using for over a year, inspectors focus their efforts on locations that, according to data-driven models, are likely to have safety problems. This new planning approach allows FRA to use its inspectors more effectively and better target the greatest safety risks.

In carrying out its safety oversight, FRA identifies safety problems on railroad systems mainly through routine inspections that determine whether operating practices, track, and equipment, such as signals and locomotives, are in compliance with safety standards. Through this approach, FRA inspectors identify a range of safety problems at various sites on railroads' systems. FRA also identifies some broad-scale problems that affect multiple sites, primarily through analyses of accident and inspection data, internal discussions, and some nonroutine inspections. However, the number of FRA and state inspectors is small relative to the

---

<sup>2</sup>Generally, human factors are behaviors that affect job performance, such as incorrectly setting switches. According to FRA, the term human factors refers broadly to the role of human participation in any system and to the ways in which human beings positively or negatively contribute towards system performance.

---

size of the industry and FRA inspections are able to cover only about 0.2 percent of railroads' operations each year.<sup>3</sup> Also, these inspections focus on compliance with minimum standards and are not designed to determine how well railroads are managing safety risks throughout their systems that could lead to accidents. The American Public Transportation Association (APTA), the Pipeline and Hazardous Materials Safety Administration (PHMSA), and Transport Canada have implemented approaches to oversee the management of safety risks by U.S. commuter railroads, U.S. pipelines, and Canadian railroads, respectively. Risk management can be described as a continuous process of managing—through the systematic identification, analysis, and control of risks associated with safety hazards (such as train collisions)—the likelihood of hazards' occurrence and their negative impact.<sup>4</sup> These oversight approaches complement, rather than replace, traditional compliance inspections and, therefore, provide additional assurance of safety. However, because we believe that FRA's initiatives to reduce train accident rates need time to mature and demonstrate their effects on safety, we are not recommending that FRA adopt an approach for overseeing railroads' management of safety risks.

FRA uses a broad range of goals and measures to assess the impact of its oversight efforts on safety. For example, it has developed new goals to target its inspection and enforcement efforts at reducing various types of railroad accidents and related measures to track its progress. These measures include the level of train accidents caused by human factors, track defects, and equipment defects, both nationwide and within each of its eight regions. These safety performance measures provide FRA with much information that it uses to make decisions about its oversight approach. However, its ability to make informed decisions is limited because it lacks measures of the direct results of its inspection and enforcement programs, such as measures of the extent to which these programs have resulted in the correction of identified safety problems or improvements in compliance. We have found that it is a useful practice for agencies to establish measures of programs' direct results to help show their contributions to the ultimate results the agencies seek to achieve. Furthermore, while FRA has made some changes in its oversight approach

---

<sup>3</sup>This figure is an FRA estimate, based on an estimation of the amount of activity, such as train movements, on each railroad in the United States.

<sup>4</sup>Risk is the combination of the likelihood and the consequence of a specified hazard being realized.

---

in response to external and internal evaluations, the agency has not evaluated the effectiveness of its enforcement program in achieving desired results. Evaluations can provide a broader range of information on program performance and how to improve it than performance measures alone. Both performance measures and evaluations can provide valuable information on program results that helps hold agencies accountable for the performance of their programs.

To improve FRA's ability to determine the extent to which its inspection and enforcement programs are contributing to rail safety and whether changes in these programs are needed, we are recommending that FRA develop and implement measures of the direct results of its inspection and enforcement programs and evaluate its enforcement program. We provided a draft of this report to the Department of Transportation for its review and comment. The department did not offer overall comments on the draft report or its recommendations. It did offer several technical comments, which we incorporated where appropriate.

---

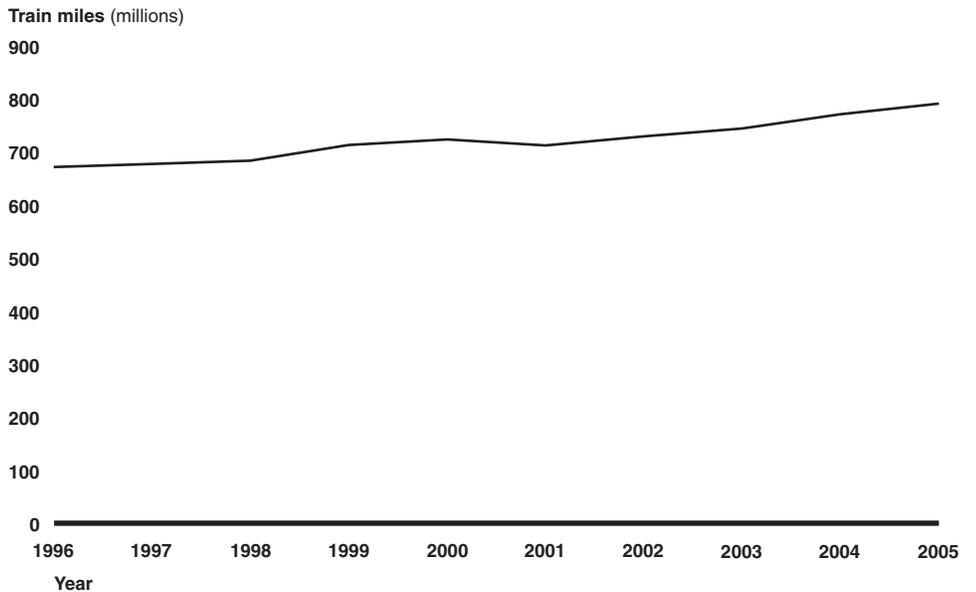
## Background

Railroads are an important component of the transportation system, transporting about 42 percent of the nation's freight (as measured by weight). For passenger movement, railroads play a much smaller role than do highway and air travel; however, communities are looking to different forms of public transit for relief, particularly as highways become increasingly congested. Demand continues to grow for both freight and passenger transportation on railroads. In 2005, railroads traversed 790 million train miles,<sup>5</sup> an increase of 18 percent since 1996. (See fig. 2.) Moreover, the Department of Transportation estimates that between 1998 and 2020, the amount of freight transported by rail (as measured by weight) will increase by about 50 percent. Commuter and intercity passenger railroads have also grown—providing over 522 million passenger trips in 2005, compared with 385 million in 1995. According to the Federal Transit Administration, as of 2006, seven more commuter rail systems throughout the country were being planned or designed.

---

<sup>5</sup>A train mile is the movement of a train a distance of 1 mile.

**Figure 2: Train Miles Traveled, 1996 through 2005**



Source: FRA.

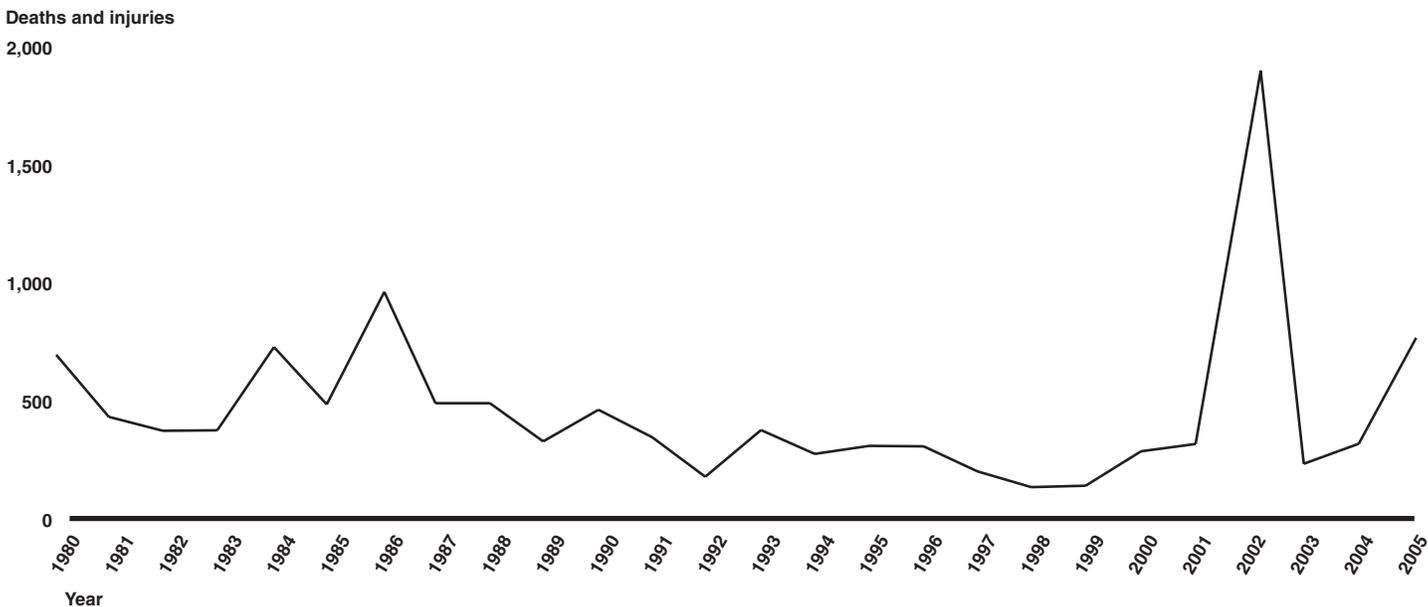
The railroad industry is primarily composed of 7 large freight railroads (called Class I railroads); about 560 smaller freight railroads (called Class II and III railroads); and 118 passenger, commuter, tourist, excursion, and other railroads.<sup>6</sup> Within the industry, Class I freight railroads predominate, representing about 93 percent of railroad freight revenue and 69 percent of the total U.S. rail mileage. Class II and Class III railroads include a number of regional and short line railroads that provide freight transportation. Class II regional railroads typically operate 400 to 650 miles of track in a region spanning two to four states, whereas Class III short lines typically perform point-to-point service over short distances.

On average, about 446 people have been injured and 14 people have been killed each year over the past decade, from 1996 through 2005, exclusive of highway-railroad grade crossing and trespassing accidents. Despite overall improvements since 1980, gains have tapered off. Since 1992, the accident rate has remained at about or sometimes more than four

<sup>6</sup>For 2005, the Surface Transportation Board has defined Class I railroads as railroads earning adjusted annual operating revenues of \$319.3 million or more. Class II railroads are those earning between \$25.5 million and \$319.3 million, and Class III railroads are those earning less than \$25.5 million.

accidents per million train miles. (See fig. 1.) In recent years, a number of serious accidents raised concerns about the level of safety in the railroad industry. Train accidents resulted in 1,884 injuries and 15 deaths in 2002, and 733 injuries and 33 deaths in 2005. (See fig. 3.) FRA officials attributed the large rise in number of injuries and deaths in 2002, and subsequently in 2005, to one or two major accidents, as opposed to a series of accidents. For example, in 2002, a derailment in Minot, North Dakota, led to the release of approximately 200,000 gallons of anhydrous ammonia, 1,442 injuries and 1 death. In 2005, a train collision in Graniteville, South Carolina, resulted in the evacuation of 5,400 people, 292 injuries and 9 deaths.

**Figure 3: Train Injuries and Deaths, 1980 through 2005**



Source: FRA.

Note: Injuries were far more common than deaths during the period of 1980 through 2005; deaths ranged from 4 to 67 per year. Figures do not include highway-railroad crossing and trespassing incidents.

Although Class I railroads have a lower rate of accidents than Class II and III railroads, because of their size, they account for most train accidents; in

---

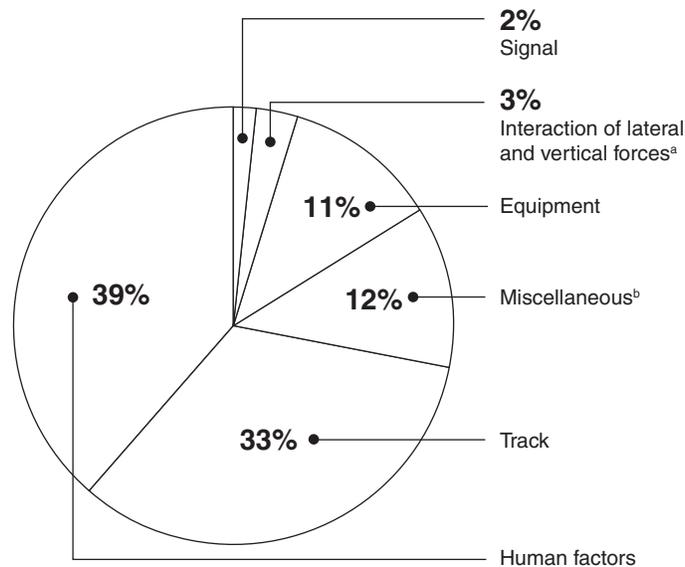
2005, Class I railroads were involved in 76 percent of train accidents.<sup>7</sup> Moreover, Class I railroads were involved in 53 percent of injuries and 58 percent of deaths during that year.

According to FRA data, the majority of train accidents are attributable to either human factors or track defects. (See fig. 4.) For 2005, FRA data show that human factors and track defects were the primary causes of 72 percent of all train accidents. Those accidents caused by human factors often result from actions such as improperly positioning switches, shoving cars without properly checking for safe conditions, leaving cars in a position that obstructs track, and failing to secure a sufficient number of handbrakes. Those accidents caused by defective track often result from defective or ineffective crossties; broken or worn switch points; and broken, fissured or fractured rail components.

---

<sup>7</sup>FRA defines a train accident as any collision, derailment, fire, explosion, act of God, or other event involving operation of railroad on-track equipment (standing or moving) that results in reportable damages greater than the current reporting threshold to railroad on-track equipment, signals, track, track structures, and roadbed. The threshold for 2006 was \$7,700.

**Figure 4: Primary Causes of Train Accidents, 2005**



Source: GAO analysis of FRA data.

<sup>a</sup>Interaction of lateral and vertical forces refers to a specific type of accident that occurs when a lateral, or sideways, force exceeds a vertical force, or gravity, by 50 percent or more. Lateral force may be caused by travel through curves and alignment imperfections in the track.

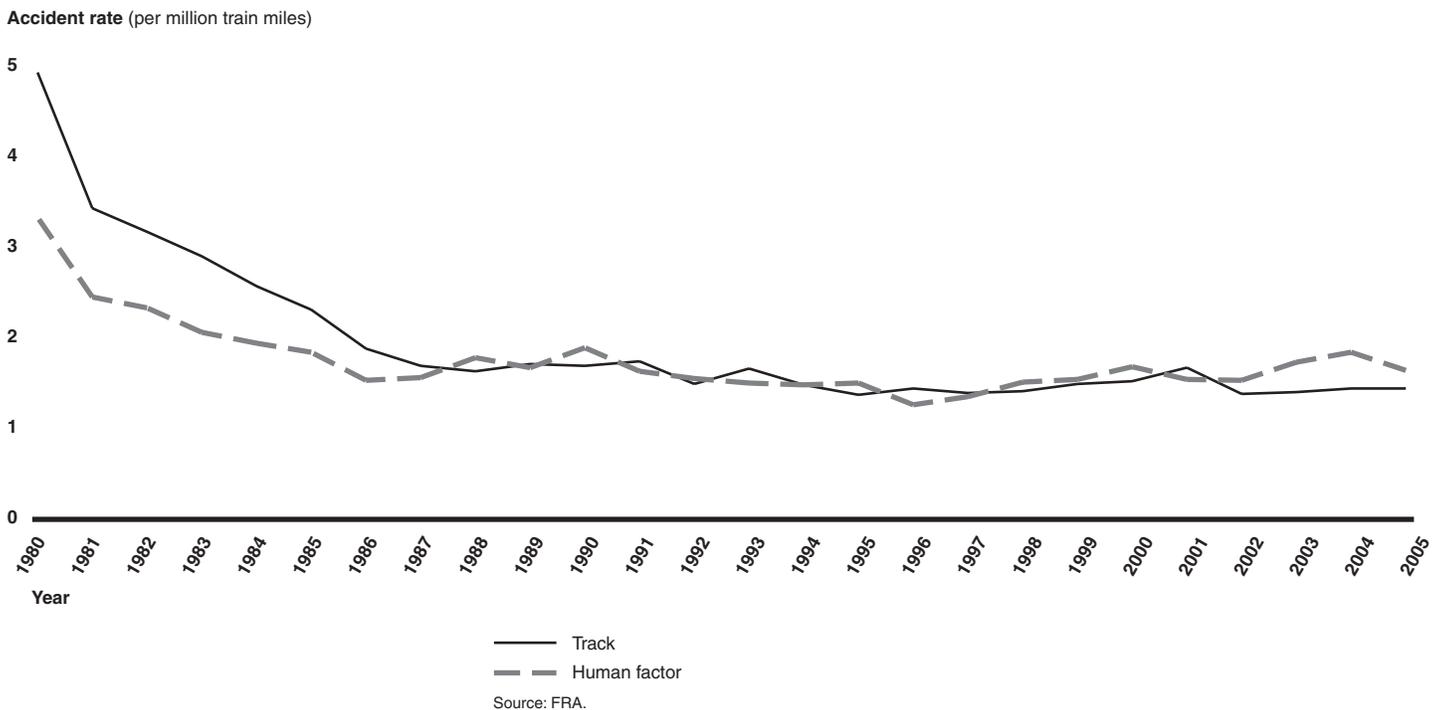
<sup>b</sup>The miscellaneous category of accident causes contains a number of subcategories, none of which exceeds 1.5 percent.

As have overall accident rates, improvements in human factor and track accident rates have leveled off over the past decade, achieving their lowest rates in 1996 and 1995, respectively. (See fig. 5.) According to FRA, the increase in the human factor accident rate in 2004 can be attributed to increases in accidents caused by employees not following railroad operating rules. (These rules specify various operating procedures, such as the proper positioning of track switches, to ensure safe operations.) However, according to FRA, these types of human factor accidents decreased by 21 percent from the first half of 2005 to the first half of 2006. Officials attribute this decrease largely to actions the agency has taken to focus railroads' attention on this problem,<sup>8</sup> including issuing a safety

<sup>8</sup>In addition, according to FRA, train accident rates for 2006 will probably appear slightly more favorable than those for 2005 because of a single, large increase in the dollar level reporting threshold for the year 2006. Specifically, starting in 2006, railroads are required to report accidents resulting in railroad property damage exceeding \$7,700, up from the previous threshold of \$6,700.

advisory and an emergency order in 2005 to address the problem of employees leaving hand-operated main track switches in nonsignaled territory in the wrong position, the cause of an increasing number of accidents, including the Graniteville accident.<sup>9</sup>

**Figure 5: Human Factor and Track Accident Rates, 1980 through 2005**



While the individual railroads have primary responsibility for their safe operation, FRA conducts various activities to oversee safety. FRA develops and enforces regulations for the industry that include requirements related to safety. For example, these regulations include requirements governing track, signal and train control systems, grade crossing warning device systems, mechanical equipment—such as locomotives and tank cars—and railroad operating practices. FRA also enforces hazardous materials regulations issued by PHMSA as they relate to the safe transportation of such materials by rail. Many of FRA’s regulations have detailed, prescriptive minimum requirements for track

<sup>9</sup>Nonsignaled territory refers to sections of track where no signal or other system is in service that indicates that a main track switch may be in other than its normal position.

---

and equipment, such as wheel safety requirements and formulas that determine maximum allowable speeds on curved track. However, some regulations are not prescriptive and allow railroads greater flexibility in determining how to comply. For example, if a railroad chooses to implement a processor-based train control system or product,<sup>10</sup> it must develop and receive FRA's approval for a railroad safety program plan. The plan should include a description of risk assessment procedures and the safety assessment process, and railroads have flexibility to adjust their programs to accommodate the specific system or product change. In addition, some regulations require railroads to develop and implement safety programs, such as accident and incident reporting programs and roadway worker protection programs.

In 1996, FRA adopted a more participatory approach to rulemaking through the creation of the Railroad Safety Advisory Committee. This committee is designed to include all segments of the rail community in developing solutions to safety regulatory issues. Currently, the committee consists of 39 member organizations, including representatives from railroads, railroad associations, labor, states, and agencies with railroad regulatory responsibility in Canada and Mexico.

FRA conducts inspections to determine railroads' compliance with its regulations. Typically, inspectors conduct inspections at specific sites of railroad operations. For example, inspectors examine track, equipment, devices, employee actions, or procedures and may review records maintained by the railroad in order to determine the railroad's compliance with FRA regulations. Inspectors generally specialize in one of five areas, called inspection disciplines: (1) operating practices, (2) track, (3) hazardous materials, (4) signal and train control, and (5) motive power and equipment. (See table 1.) FRA's policy is to cite defects for most instances of noncompliance and to encourage the railroad to comply voluntarily.

---

<sup>10</sup>A processor-based train control system or product is one that is dependent for its proper functioning on a digital processor, such as an onboard signal or switch control.

**Table 1: FRA’s Inspection Disciplines**

<b>Inspection Discipline</b>	<b>Examples of what inspections cover (not all inclusive)</b>
Operating practices	Railroad operations related to human factors, including employee compliance with railroad operating rules, railroads’ monitoring of this compliance, drug and alcohol testing of employees, employees’ hours of service, radio communications, locomotive engineer qualification, and accident and incident reporting.
Track and structures <sup>a</sup>	Condition of track and structures, including track components and geometry, railroad track inspections, and programs to maintain continuous welded rail track and protect roadway workers.
Hazardous materials	Rail transportation of hazardous materials, including the integrity, markings, maintenance, and placement of tank cars; the training of train crews; security; and emergency preparedness.
Signal and train control	Signal switching systems, locomotive signal devices, locks and brake application, including related recordkeeping, testing, modifications, and repairs.
Motive power and equipment	Design and operation of railroad rolling equipment, including railroad freight and passenger car safety, locomotive safety and maintenance, safety devices, brake system safety, and emergency preparedness procedures.

Source: GAO analysis of FRA information.

Notes: FRA has recently established a new inspection discipline, industrial hygiene, which covers the protection of railroad employees on the job, including enforcement of FRA standards for occupational safety and health. The discipline is also responsible for the operation of FRA’s internal occupational safety and health program for ensuring FRA employee safety and health. The resources devoted to this inspection discipline are relatively small—FRA plans to have a total of 5 industrial hygienist inspectors. In comparison, the other inspection disciplines each have between 50 and 90 inspectors, approximately.

<sup>a</sup>In addition to its manual inspections, FRA has an automated track inspection program that uses data produced by vehicles that precisely measure track geometry.

When railroads do not comply voluntarily or identified defects are serious, FRA may cite violations and assess civil penalties—either against railroads or individuals—or take other enforcement actions to promote compliance with its regulations. FRA developed the concept of focused enforcement in the mid-1990s to ensure that inspectors know which violations pose the greatest hazards and make enforcement decisions accordingly. The purpose of this approach is to concentrate FRA’s enforcement efforts on the areas with the greatest potential safety benefits. FRA’s enforcement policy, as stated in its regulations, specifies that before recommending penalties, inspectors should consider the seriousness of the condition or act, the potential safety hazards, and the current level of compliance of the individual or railroad, among other things. FRA is authorized to negotiate civil penalties with railroads and exercises this authority. For example, it settles claims annually with each Class I railroad. FRA uses civil penalties as its primary enforcement tool. However, it also has other available enforcement tools. These include compliance agreements and compliance orders, special notices for repair, emergency orders, criminal penalties, disqualification orders and injunctions. (See app. II for further discussion.)

---

FRA conducts additional oversight of Class I railroads through the Railroad System Oversight program, established in October 2005, which addresses safety issues not subject to regulation, such as aspects of worker fatigue, as well as safety compliance issues. Under this program, the agency assigns an FRA manager for each Class I railroad to cooperate with it on identifying and resolving safety issues. These managers act as liaisons with the railroads and labor officials, analyze accident and inspection data for their assigned railroad, and support FRA's inspection and enforcement efforts. Finally, under this program, FRA has begun annual meetings with the leadership of each Class I railroad to discuss its safety performance.

The Railroad System Oversight program replaced FRA's Safety Assurance and Compliance Program, which had emphasized using teams—consisting of FRA inspectors and other FRA officials, railroad officials, and union representatives—to identify and resolve safety issues, as a complement to FRA's regular inspection activity. The agency envisioned this program as a comprehensive approach to safety through which these representatives would work together to identify and correct the root causes of problems across an entire railroad. According to FRA, the program had a number of accomplishments, such as improving collaboration among management, labor and FRA, and encouraging railroads' voluntary cooperation in taking corrective action on safety issues not covered under FRA's safety regulations. However, FRA ended this program in response to concerns that it had lost its effectiveness, inhibited enforcement actions, and shifted regional resources away from conducting site-specific inspections, the mainstay of FRA's safety program.

In addition to these activities, FRA conducts other types of safety oversight aimed at reducing train accidents, such as monitoring of railroad safety data, accident investigations and reviews and investigations of complaints, and education efforts aimed at small railroads.<sup>11</sup> Furthermore, FRA funds research and development that supports its safety oversight, by, for example, assisting in the development of new regulations and the revision of existing regulations.

FRA is a small agency, especially in relation to the industry it regulates. As of July 2006, FRA had 657 full-time and part-time safety staff, including

---

<sup>11</sup>For example, FRA conducts twice yearly training seminars for short line railroads on how to comply with its regulations and operate safely.

---

about 400 inspectors in the field (in its regional, district, and local offices). In addition, 30 state oversight agencies participate in a partnership program with FRA to conduct safety oversight activities at railroads' operating sites. Currently, about 160 state inspectors work with FRA to conduct inspections and other investigative and surveillance activities as needed. In contrast, the railroad industry has about 235,000 employees,<sup>12</sup> 219,000 miles of track in operation, 158,000 signals and switches, and over 1.6 million locomotives and cars.

---

## FRA Has Made Progress in Targeting Its Oversight Efforts on the Basis of Risk

In planning its safety oversight, FRA focuses its efforts on the highest priority risks related to train accidents through a number of initiatives aimed at addressing the main causes of these accidents as well as through improvements in its inspection planning approach. The agency's overall strategy for targeting its oversight at the greatest risks—the National Rail Safety Action Plan—provides a reasonable framework for guiding the agency's efforts. FRA's various initiatives to address the two main causes of train accidents—human factors and defective track—are promising. However, most of these initiatives are not yet fully implemented and their overall impact on safety will probably not be apparent for a number of years. FRA has also recently implemented new approaches for planning its inspection activity—based on analyses of accident, inspection, and other data—that allow it to better target the greatest safety risks and more effectively use its inspectors.

---

## National Rail Safety Action Plan Provides Strategy for Addressing Highest Priority Risks, but Impact of Safety Initiatives Is Not Yet Clear

FRA's May 2005 National Rail Safety Action Plan provides an overarching framework for the agency's efforts to target its oversight at the highest priority risks. The agency developed the plan in response to a leveling off of the train accident rate in recent years and the occurrence of serious train accidents in 2004 and early 2005. The plan outlines a number of initiatives aimed at reducing the main types of train accidents, those caused by human factors and track defects.<sup>13</sup> These efforts include some innovative approaches for the railroad industry, such as a pilot project for reporting close calls, that are designed to prevent accidents by addressing

---

<sup>12</sup>This number does not include contractor employees hired by the railroads.

<sup>13</sup>The National Rail Safety Action Plan also includes initiatives to improve hazardous materials safety and emergency response capability. Most of the serious accidents involving the release of hazardous material that have occurred in the last several years have been caused by human factors or track defects.

---

safety problems that may cause them.<sup>14</sup> Other efforts include new regulations, several research endeavors, and new track inspection vehicles. We have not reviewed these individual initiatives in depth, but believe that the plan provides a reasonable strategy for guiding and prioritizing FRA's efforts to reduce the rates of accidents attributable to human factors and track defects.

Some of the efforts outlined in the action plan are underway, and some are planned for the near future. FRA issued a progress report to the Secretary of Transportation on the action plan in June 2006 and intends to continue to report on the plan's implementation. Since issuing the plan, the agency has pursued additional initiatives to target risks posed by human factors and track defects, including issuing new track regulations in response to a congressional mandate and encouraging a new braking technology. (See table 2.) The combined initiatives hold promise for reducing the risks associated with human factors and track defects. However, these efforts are in varying stages of development or implementation and their overall impact on safety will probably not be apparent for a number of years. Some individual initiatives, such as the close call reporting project, may start showing results in the next year or two.

---

<sup>14</sup>According to FRA, a close call is an opportunity to improve safety practices in a situation or incident that has a potential for more serious consequences. It represents a situation in which an ongoing sequence of events was stopped from developing further, preventing the occurrence of potentially serious safety-related consequences.

**Table 2: Key FRA Initiatives Aimed at Addressing Main Causes of Train Accidents**

Cause of train accidents	Initiative	FRA action and time frame
Human factors	<b>Rail Safety Action Plan initiatives</b>	
	Regulations on employee compliance with railroad operating rules	Issued proposed regulation in October 2006. Plans to issue final regulation by the end of 2007.
	Pilot project to establish voluntary reporting system to learn from close call incidents	Plans to initiate this 5-year project in January 2007 at one Class I railroad site. FRA is seeking the participation of other railroads.
	Research on worker fatigue to develop a model that could be used to improve crew scheduling	Discussed results of the research with key stakeholders and released a report on the results in November 2006.
	<b>Other initiatives</b>	
	Pilot project to establish voluntary risk management programs at railroad worksites	Is considering establishing a pilot project in fiscal year 2008.
Encouraging new braking technology that can prevent or reduce human error	Released a study on new brake system technology in August 2006 and plans to issue proposed regulations in May 2007 to facilitate its use.	
Track defects	<b>Rail Safety Action Plan initiatives</b>	
	New track inspection vehicles	Plans to deploy two new vehicles in early 2007.
	Research and development on new inspection technologies	Demonstrated a prototype system in October 2005. Enhanced the system in 2006 and is planning further enhancements in 2007.
	<b>Other initiatives</b>	
Additional regulations on continuous welded rail track	Issued a final rule on rail joint inspection in October 2006. Plans to develop additional regulations for improving management of this type of track, but has not yet developed time frames for this effort.	

Source: GAO analysis of FRA data.

The National Rail Safety Action Plan also outlines the agency's development of a new approach for planning its inspections, based on greater use of its accident and inspection data. Since issuing the plan, FRA has made other efforts to improve its approach for planning its inspections.<sup>15</sup> Starting in fiscal year 2006, FRA's new inspection planning approach has allowed the agency to better target its inspections on the

<sup>15</sup>Other key agency plans that focus efforts on the highest priority risks related to train accidents include the department's rulemaking agenda, strategic plan and annual performance plan, and FRA's performance budget. The rail safety goals and measures contained in the performance plan and performance budget are discussed later in this report.

---

basis of risk and to better coordinate inspection planning among its headquarters and regional offices.

---

## FRA Is Making a Number of Efforts to Reduce Accidents Caused by Human Factors

Human factor accidents result from unsafe acts of individuals, such as employee errors, and can occur for a number of reasons, such as employee fatigue or inadequate supervision, training, or staffing.<sup>16</sup> FRA has recently issued proposed regulations aimed at reducing the most common causes of such human factor train accidents: improper positioning of track switches or derails,<sup>17</sup> shoving rail cars without properly monitoring for safe conditions or controlling the movement, and leaving rail cars in a position that obstructs adjacent track. Procedures for employees to follow to avoid these types of accidents are contained in railroads' operating rules.<sup>18</sup> Currently, FRA regulations contain general requirements that railroads train employees on their operating rules and periodically test their compliance with these rules, but do not specifically require that employees follow the rules that can prevent these types of accidents.<sup>19</sup> As a result, according to FRA officials, the agency has had a limited ability to cite noncompliance and take enforcement actions in this area. The proposed regulations mirror established railroad operating rules that require employees to follow procedures, such as procedures related to the positioning of track switches, that if followed, could prevent these types of accidents. In addition, they include further requirements for railroads to train employees on these rules and monitor their compliance with these rules. According to FRA, these new requirements and its ability to enforce them will make railroad employees more accountable for following

---

<sup>16</sup>Management decisions at the organizational level, such as decisions regarding the allocation of resources or crew scheduling, can have consequences in the workplace that can contribute to human factor accidents.

<sup>17</sup>Derails are devices used to prevent the obstruction of track by unauthorized movements of trains or unattended rolling stock.

<sup>18</sup>Most Class I railroads use one of two sets of standard rules: the Northeast Operating Rules Advisory Committee rulebook and the General Code of Operating Rules. Railroads must file their operating rules with FRA.

<sup>19</sup>In a few cases, FRA's regulations do require some practices, such as securing a sufficient number of handbrakes, that are in railroad operating rules. Also, the Switching Operations Fatality Analysis working group—made up of representatives of FRA, unions, railroads, and the Department of Transportation's Volpe National Transportation Systems Center—studies fatalities that occur to workers engaged in switching operations and recommends ways that such events can be prevented.

---

operating rules and railroad management more accountable for ensuring that employees do so.

FRA is also sponsoring a 5-year Confidential Close Call Reporting System pilot project, through which employees of participating railroads can provide confidential information on close calls. A neutral party, the Bureau of Transportation Statistics, will maintain the close call data and a team of representatives from the participating railroad, labor organizations, FRA, and the bureau will review these data to identify safety problems. Railroads will be expected to correct identified problems in order to prevent accidents. The purpose of this project is to determine the effectiveness of such a voluntary reporting system for the railroad industry. FRA has developed plans to monitor and evaluate the performance of the project over time; these plans include short-term and long-term performance measures. The agency anticipates that it will have early indications of how the program is affecting safety in the next year or two. To date, one Class I railroad has committed to participate in this project, at one yard on its system, and, according to FRA, two others have expressed strong interest. Such systems have contributed to significant reductions in accidents in some other industries, such as aviation.

FRA and the National Transportation Safety Board (NTSB) have identified employee fatigue as a significant factor in many train accidents. Railroad employees often work long hours and have unpredictable and fluctuating work schedules. Under current law, these employees could potentially work a maximum of 11 hours and 59 minutes, followed by 8 hours off duty, and then another 11 hours and 59 minutes on duty, continually.<sup>20</sup> In addition, time spent waiting for transportation at the end of a tour of duty and being transported to a release point, called limbo time, does not count as either duty or off-duty time and can be significant. FRA has sponsored a study to develop a fatigue model that could be used to improve train crew scheduling practices, has discussed the draft results with railroads and labor organizations, and released the final report on the study in November 2006. The agency is also taking some other actions to encourage railroads to improve their management of employee fatigue, such as providing funding for a new program, in use at a Class I railroad, that tracks and analyzes crew scheduling to remedy practices that could contribute to fatigue.

---

<sup>20</sup>The law also specifies that train employees are required to have 10 consecutive hours off duty following 12 continuous hours on duty.

---

Through a recent investigation of a 2004 train accident in which three people died, NTSB found that the engineer and conductor were likely asleep at the controls and recommended that FRA require railroads to use scientifically based principles when assigning work schedules for train crew members and to limit crew member limbo time.<sup>21</sup> In recent testimony, the FRA Administrator noted that, several times in the 1990s, the Department of Transportation proposed legislation to repeal or reform the hours-of-service law or to require railroads to develop fatigue management plans, but that these bills encountered opposition and were not passed. However, since that time, FRA has not submitted such legislation. The agency has not yet responded to NTSB's recommendations, but has told us that it intends to tell the board, as it has in the past, that the agency lacks jurisdiction to issue regulations addressing hours of service.<sup>22</sup>

While we were conducting our work, FRA was considering establishing a pilot project that would use risk management to help reduce human factor accidents at selected railroad worksites. Risk management can be described as a systematic approach for identifying, analyzing, and controlling risks.<sup>23</sup> The agency envisioned that, under such a project, each worksite would collect and analyze data on precursors to human factor accidents—such as close call incidents, employee errors, or organizational characteristics—to better identify and correct individual and organizational factors that contribute to such accidents and therefore reduce the risks of such accidents occurring. The agency proposed that funding for this project be included in its fiscal year 2008 budget request and this proposal was approved by the department. In January 2007, as we were finalizing our report, FRA told us that it had decided to expand the scope of this project to include efforts to use risk management to reduce all types of accidents, not only human factor accidents.

---

<sup>21</sup>NTSB, *Collision of Union Pacific Railroad Train MHOTU-23 With BNSF Railway Company Train MEAP-TUL-126-D With Subsequent Derailment and Hazardous Materials Release, Macdona, Texas, June 28, 2004*, Railroad Accident Report NTSB/RAR-06/03 (Washington, D.C., 2006).

<sup>22</sup>According to FRA, it is the only safety regulatory agency in the Department of Transportation that lacks regulatory authority over worker duty hours.

<sup>23</sup>Risk is the combination of the likelihood and the consequence of a specified hazard (or threat) being realized. We have developed a framework for risk management based on industry best practices. See app. III for a discussion of this framework as well as comprehensive risk management approaches in use by several other transportation agencies for overseeing the U.S. commuter railroad, U.S. pipeline, and Canadian railroad industries.

---

FRA has examined possible approaches to use for this project. According to agency officials, one possible approach is represented by a new program that a Class I railroad has implemented at two locations on its system. In this program—which has received funding from FRA—a committee of employees documents employee behaviors that could lead to unsafe conditions, without recording names, and provides feedback to the responsible employees to help them eliminate these behaviors. FRA has also considered the approach used by the Occupational Safety and Health Administration’s Voluntary Protection Program. This program recognizes individual worksites with exemplary safety records and practices, including the identification, analysis, prevention, and control of workplace hazards that could lead to employee injuries and illnesses.<sup>24</sup>

As envisioned by FRA officials, this project will focus on establishing risk management programs at three separate railroad worksites and will include close monitoring and evaluation of these programs to determine their impact in reducing accidents over a 5-year period. If the pilot is successful, FRA anticipates establishing a voluntary risk management program for the railroad industry, which would encourage railroads to implement this type of approach on a systemwide basis in order to reduce human factor accidents, as well as other types of accidents.

Finally, FRA has recently issued a study on a new braking technology, electronically controlled pneumatic brakes, which improves train-handling and decreases stopping distances by 40 to 60 percent. These brakes use an electronic line to uniformly command brake applications and releases throughout the train. FRA has decided that it will develop new regulations to facilitate the use of this technology over the next decade. According to FRA officials, improving railroads’ braking systems can have a significant safety benefit by improving the ability of locomotive engineers to control

---

<sup>24</sup>In reviewing the Voluntary Protection Program of the Occupational Safety and Health Administration, along with several other voluntary compliance programs, we found that benefits reported by participating worksites included reduced injury and illness rates, an improved safety culture, and improved employee-management relations. See GAO, *Workplace Safety and Health: OSHA’s Voluntary Compliance Strategies Show Promising Results, but Should Be Fully Evaluated before They Are Expanded*, [GAO-04-378](#) (Washington, D.C.: Mar. 19, 2004).

---

their trains and, therefore, avoid or reduce the severity of some types of human factor-caused accidents.<sup>25</sup>

The above initiatives use a variety of approaches, some quite innovative, for addressing the causes of human factor accidents. These initiatives, which are in varying stages of development or implementation, have the potential to eventually reduce these types of accidents. However, while some may start showing results in the next year or two, their overall impact will likely not be apparent for a number of years. Furthermore, all of these initiatives, except for the proposed regulations on operating rules, depend on voluntary actions by railroads, and, in some cases, labor as well, for their success. For example, the impact of FRA's effort to develop a model to address the problem of worker fatigue depends on the extent to which railroads eventually use this model to improve train crew scheduling practices. FRA has worked with railroads and labor on some of these initiatives, but it is too early to predict their outcomes.

---

### FRA Is Pursuing Several Initiatives to Improve the Detection and Management of Track Defects

Railroads operate trains on about 219,000 miles of track across the United States. This track consists of traditional jointed rail as well as newer rails that are smooth bands of welded steel, called continuous welded rail. Derailments can occur when rails are uneven or too wide apart or when rails or joint bars are cracked or broken. FRA inspects track conditions through manual inspections conducted on-foot or in on-track equipment, and with automated track inspection vehicles that precisely measure track and can identify problems that are difficult to detect through other types of inspections. The agency operates one automated track inspection vehicle that it uses in inspecting track and plans to add two more for this purpose in early 2007.<sup>26</sup> According to FRA, these additional vehicles will allow the agency to triple the miles of track that it is able to inspect per year, to nearly 100,000 miles.<sup>27</sup>

---

<sup>25</sup>FRA has also recently issued standards for processor-based positive train control systems. These systems are an advanced train control technology that can prevent train collisions through automatic brake applications. They also can provide enhanced protection for maintenance-of-way workers.

<sup>26</sup>FRA also has two additional automated track inspection vehicles that are primarily used for research activities but occasionally are used for inspections.

<sup>27</sup>However, FRA may inspect some sections of track more than once a year.

---

FRA is also developing an automated inspection system for improving the detection of cracks in joint bars. Such cracks can lead to a derailment-causing break but can be difficult to detect through simple visual inspections. Specifically, FRA has designed and is refining a high-resolution video inspection system that can be used in on-track inspection equipment and will improve detection of these defects.<sup>28</sup> According to FRA, the technology is ready for use, was demonstrated and refined in the field in 2006, and will undergo further enhancements in 2007. The agency expects that railroads will make use of the technology and is reviewing how to use it in its own inspections. According to FRA, one Class I railroad is starting to make use of this technology and others have shown strong interest in it.

Finally, in response to a congressional mandate and NTSB recommendations, FRA has recently finalized regulations that require track owners to conduct detailed and periodic inspections of rail joints in continuous welded rail track. Although FRA issued regulations in 1998 requiring railroads to develop and implement procedures for the inspection and maintenance of continuous welded rail track, a number of train accidents occurred since that time in which the failure of a rail joint on this type of track was a factor.<sup>29</sup> FRA officials told us that the railroads' overall management of the condition of continuous welded rail track is a major concern for the agency because about 20 accidents involving problems with this type of track occur per year and these accidents are usually serious. FRA has estimated that continuous welded rail track represents between 99,000 and 120,000 miles of the 219,000 miles of track in operation in the United States. The agency is working with the Railroad Safety Advisory Committee to develop additional regulations to improve railroads' management of this type of track.

These initiatives have the potential to reduce accidents caused by track defects. FRA's deployment of two new track inspection vehicles in early

---

<sup>28</sup>FRA also has a number of other ongoing efforts to improve track inspection capabilities. For example, since 2002 it has sponsored a Rail Integrity Task Force—composed of experts in the railroad industry, FRA, and the Department of Transportation's Volpe National Transportation Systems Center—to identify best practices for rail inspection, maintenance, and replacement.

<sup>29</sup>In continuous welded rail track, rails are welded together to form one continuous rail that may be several miles long. There may be joints in this rail for several reasons, including the need for insulated joints that electrically separate track segments for signaling purposes and the need to replace a section of defective rail.

---

2007 will enable the agency to significantly expand its ability to monitor the condition of the nation's track. The agency's development of an automated inspection system has the potential to help prevent derailments, provided that railroads make use of this technology. Finally, FRA's issuance of new regulations related to continuous welded rail track and development of further regulations in this area should eventually improve railroads' management of this type of track, although time frames for the development of new regulations are not yet clear.

---

### FRA Has Made Progress in Targeting Its Inspections on the Basis of Risk

Like other modal safety administrations within the Department of Transportation, FRA has few resources for overseeing railroads compared with the scope of its responsibility. According to agency officials, it inspects 0.2 percent of railroad operations per year. FRA has developed a new approach—the National Inspection Plan—for using available data to target its inspections at the greatest safety risks. The agency began using the new approach for three of its inspection disciplines (operating practices, track, and motive power and equipment) in October 2005 and expanded it to the remaining two disciplines (hazardous materials and signal and train control) by March 2006. The purpose of the plan is to optimize FRA's ability to reduce the rates of various types of train accidents as well as releases of hazardous materials. The plan provides guidance to each regional office on how its inspectors, who each specialize in one of the five inspection disciplines, should divide up their work by railroad.

Developing the plan involves two steps. In the first step, FRA headquarters produces an initial plan for each of the agency's eight regions. This plan specifies, by inspection discipline, numeric goals for the level of inspection activity to allocate to each railroad, by state. These numeric goals are derived from models—based on trend analyses of accident, inspection, and other data—that predict, by inspection discipline, locations where train accidents and incidents are likely to occur within each region and provide the optimal allocation of inspection resources to prevent accidents.<sup>30</sup> FRA has developed separate models for each inspection discipline based on how well individual data elements, such as historical information on inspection results, tend to predict accidents.

---

<sup>30</sup>We did not evaluate these models or the data on which they are based. FRA defines train incidents as events involving the movement of railroad equipment that results in a casualty but does not cause damage above the reporting threshold established for train accidents, which was \$7,700 in 2006.

---

According to FRA officials, they expect to refine this new planning process to reflect lessons learned during the first year of its implementation.

In the second step, the regional administrators are allowed to adjust the goals for their region on the basis of local knowledge and emerging issues, such as recent accidents. However, according to FRA officials, there were only a few such adjustments for fiscal year 2006. Throughout the year, FRA monitors how the regions are meeting their goals. Starting in fiscal year 2007, regional administrators will have a second opportunity to adjust their inspection plans at midyear to respond to safety issues that emerged during the first 6 months of the year.

Previously, FRA had a less structured, less consistent, and less data-driven approach for planning inspections. According to agency officials, each region prepared its own inspection plan, based on judgments about appropriate priorities and analysis of available data. However, the use of data was not consistent from region to region. Inspectors had greater discretion about where to inspect and based decisions about priorities on their knowledge of their inspection territories.

The National Inspection Plan covers federal inspectors, but not state inspectors. Other than funding training and computer equipment, FRA does not provide funding for state inspection activities.<sup>31</sup> Therefore, each state makes its own decisions about how to use its inspectors. FRA officials told us that the agency has not included states in the National Inspection Plan because it does not have authority to tell the states what inspections to conduct. The 30 states that participate in FRA's state program have varying numbers of inspectors and most conduct inspections in some, but not all, of FRA's five inspection disciplines. According to FRA, its regional offices coordinate with the states in their region to avoid duplication of effort. The regional administrators may make adjustments to their National Inspection Plan goals based on the work of state inspectors within their region.

The National Inspection Plan also does not establish priorities across regions and inspection disciplines, but rather, for given staffing levels for each discipline within each region, assigns inspection levels to railroads

---

<sup>31</sup>FRA provides training for state inspectors and certifies them as qualified to perform inspections and cite violations.

---

and states. However, FRA eventually plans to use its results to help decide how to optimally allocate additional inspectors, as vacancies occur or new positions are funded. According to headquarters officials, the National Inspection Plan model played a role in a decision to allocate additional inspection staff to the operating practices discipline in the regions.<sup>32</sup> However, officials told us that they will need more time to determine how well the plan is working before using it to reallocate resources among the regional offices.

The fiscal year 2006 plan resulted in various reallocations of inspection activity within FRA's regional offices. These reallocations have allowed FRA to better target its inspections on the basis of risk. For example, in the track area, in some cases regions are focusing more attention on certain railroads that have higher accident rates and worse track conditions than others. Conversely, in the area of operating practices, some regional offices have decreased their focus on certain railroads that have shown good or improving performance in this area compared with other railroads.

In fiscal year 2006, in addition to implementing the National Inspection Plan, the agency implemented a new coordinated approach for planning nonroutine inspection activity, by inspection discipline. Examples of these types of inspections include in-depth inspections by a regional office of a railroad's compliance with track standards; interregional inspections of compliance with certain regulations, such as those related to bridge safety, of a Class I railroad that operates in multiple regions; and headquarters-led inspections of Class I railroads' drug and alcohol testing programs. Some of these planned inspections are based on analyses of data on accidents by railroad, accident causes, and inspection results in order to define, beyond the National Inspection Plan goals, what railroad locations and specific regulatory requirements warrant increased attention by inspectors. Others, such as inspections of some required railroad safety programs, are performed periodically. According to FRA officials, the regional offices and headquarters previously planned such inspections separately and made less use of data in their planning. Under this new planning approach,

---

<sup>32</sup>Overall, the motive power and equipment discipline currently has the highest number of inspectors (86), followed by the operating practices discipline (76), the track and structures discipline (73), the signal and train control discipline (61), and the hazardous materials discipline (55). However, to help reduce human factor accidents, which account for the highest percentage of train accidents, inspectors in the motive power and equipment discipline conduct some inspections of operating practices.

---

FRA headquarters and regional offices coordinate in developing plans for inspections they will conduct, by inspection discipline. These plans are compiled into an agencywide plan, and then FRA tracks the completion of these inspections.

FRA's new approaches for planning its inspection activity allow it to better target the greatest safety risks and coordinate inspection planning among its eight regional offices and headquarters offices. Therefore, they allow FRA to make more effective use of its inspectors. However, it is not yet clear whether these new planning approaches will lead to a prioritization of inspection levels across regions and inspection disciplines or improved safety.

---

## **FRA Relies Primarily on Direct Inspections to Identify Safety Problems and Does Not Oversee Railroads' Management of Safety Risks**

In carrying out its safety oversight, FRA identifies safety problems on railroad systems mainly through routine inspections to determine whether operations, track, and equipment, such as signals and locomotives, are in compliance with safety standards. Through this approach, FRA inspectors identify a range of safety problems at various sites on railroads' systems, through citing defects and violations. FRA also identifies some broad-scale compliance problems that affect multiple sites, mainly through analyses of accident and inspection data, internal discussions, and some nonroutine inspections.

FRA's inspections focus on compliance with minimum standards within five separate inspection disciplines and do not attempt to determine how well railroads are managing safety risks on their systems. APTA, PHMSA, and Transport Canada have implemented approaches to oversee the management of safety risks by U.S. commuter railroads, U.S. pipelines, and Canadian railroads, respectively. These oversight approaches complement, rather than replace, traditional compliance inspections and therefore provide additional assurance of safety. However, we are not recommending that FRA adopt such an oversight approach, since the agency is currently pursuing various initiatives to reduce train accident rates. In our view, these initiatives need time to mature to demonstrate their effects and, subsequently, an informed assessment would need to be made about whether additional actions are warranted.

---

## FRA's Oversight Identifies a Range of Site-Specific and Broad-Scale Problems on Railroad Systems

Overseeing the safety of the railroad industry is a huge task. FRA's 400 inspectors, along with about 160 state inspectors, oversee 686 railroads, with about 235,000 employees, 219,000 miles of track, 24,000 locomotives, 1.6 million cars, 158,000 signals and switches, and 240,000 highway-rail grade crossings.<sup>33</sup> As noted previously, according to FRA officials, the agency's inspectors are able to directly observe only about 0.2 percent of the railroad industry's operations per year. FRA carries out this oversight responsibility primarily through inspections of railroads' compliance with its safety standards at various locations on railroads' systems and through cooperation and enforcement aimed at resolving identified problems. During inspections, which are generally conducted separately within the five inspection disciplines, inspectors examine railroads' compliance with a broad range of federal standards. Inspectors discuss identified compliance problems (called defects) with railroads to achieve voluntary compliance, and cite violations—recommending that the agency take enforcement action against a railroad—when they determine that the problems are serious or when a railroad does not voluntarily comply. (See app. II for a description of FRA's use of cooperation and enforcement to resolve safety problems and improve safety.) In addition, FRA's Railroad System Oversight managers work with Class I railroads and labor to identify and resolve some safety problems that are not directly related to compliance with the agency's regulations. For example, one manager worked with a railroad and labor organization to improve the railroad's program for communicating with roadway workers to ensure that they are aware of and implement key safety procedures.

FRA primarily monitors railroads' compliance through routine inspections by individual inspectors at specific sites on railroads' systems.<sup>34</sup> As discussed previously, FRA inspects locations likely to have safety problems, which it identifies using accident and previous inspection data as well as other information. Inspectors typically cover a range of standards within their discipline during these inspections. This inspection approach focuses on direct observations of specific components of the train, related equipment, and railroad property—including the track and signal systems—as well as operating practices to determine whether they meet FRA's standards. (See figs. 6 and 7.) Inspectors also examine

---

<sup>33</sup>These figures do not include railroad contractor employees or track that is not in use.

<sup>34</sup>Inspectors also sometimes travel along part of a railroad's system in conducting inspections. According to FRA, from 2002 to 2005, inspectors traveled between two locations in 17 percent of the routine inspections of railroads.

---

railroads' inspection and maintenance records. The railroads have their own inspectors who are responsible for ensuring that railroad equipment, track, and operations meet federal rail safety standards. For example, FRA requires that railroads inspect brake systems, signal systems, passenger equipment, track conditions, and train crews' adherence to operating rules, among other things. According to FRA officials, the agency's inspectors often review the railroads' records of inspection to determine whether the records accurately represent the types of problems FRA inspectors are finding during their own inspection activities.

**Figure 6: FRA Inspector Measuring Track Gauge**



Source: FRA.

---

**Figure 7: FRA Inspector Inspecting Train Cars**



Source: FRA.

FRA also conducts more in-depth inspection efforts that generally focus on railroads' compliance in a particular area, such as their inspections of employees' adherence to operating rules. These efforts often involve a team conducting separate inspections at multiple sites, generally within one of FRA's eight regions.<sup>35</sup> FRA focuses these in-depth inspection efforts on emerging issues, identified through previous routine inspections or analyses of accident data. FRA also periodically conducts in-depth inspections of some systemwide programs that the railroad is required to implement, such as employee drug and alcohol testing programs and accident and incident reporting programs. In some cases, FRA may conduct a systemwide in-depth set of inspections on a railroad to

---

<sup>35</sup>However, in some cases, FRA conducts nationwide inspections of railroads' compliance with specific requirements. For example, in mid-2006, it began a set of nationwide inspections of various railroads' compliance with requirements for notifying train crews of the types of hazardous materials being transported on their trains, after identifying noncompliance in this area as a problem.

---

determine its overall compliance within a single inspection discipline or in several disciplines. For example, in early 2006, in response to a Class I railroad's high accident rates, FRA conducted an in-depth set of inspections of the railroad's compliance with operating practices, track, signal and train control, motive power and equipment, and hazardous materials regulations across its system. However, according to an FRA headquarters official, the agency does not frequently perform systemwide or multidisciplinary inspections.

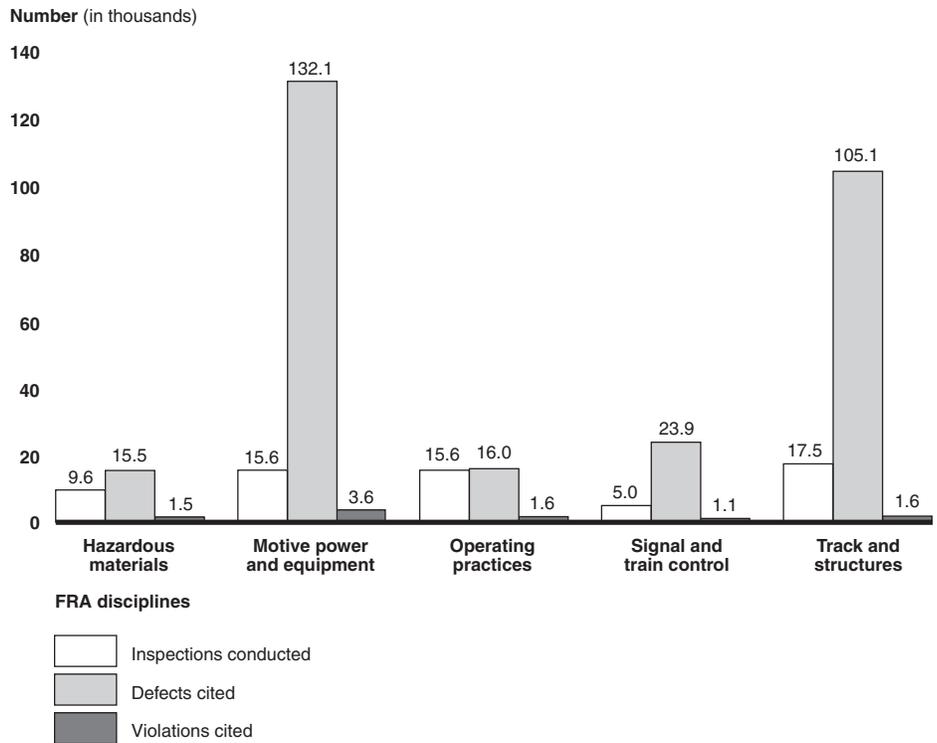
In 2005, federal and state inspectors conducted a total of about 63,000 inspections.<sup>36</sup> According to FRA, routine inspections constituted about 75 percent of the inspections of railroads and in-depth inspections accounted for about 11 percent. The remainder of these inspections (14 percent) consisted of other types of activities, such as investigations of accidents and complaints. Inspectors in the track discipline performed the most inspections, followed by those in the motive power and equipment, operating practices, hazardous materials, and signal and train control disciplines.<sup>37</sup> This approach to oversight enables FRA inspectors and managers to identify a wide range of safety problems. Inspectors identify specific compliance problems—conditions that do not meet FRA's standards—at sites they visit by citing defects. Inspectors cite violations for those defects that they believe warrant enforcement action. They consider a number of factors in making this decision, including the railroad's history of compliance at that location and the seriousness of the noncompliance (such as whether it is likely to cause accidents, injuries, or releases of hazardous materials). Inspectors in some disciplines cite more defects and violations than others. (See fig. 8.) Overall, FRA and state inspectors cited about 293,000 defects and about 9,500 violations during the 63,000 inspections conducted in 2005.

---

<sup>36</sup>This number includes inspections of railroads as well as of nonrailroads (companies that ship hazardous materials by rail, tank car manufacturers, and tank car repairers). In 2005, inspections of nonrailroads represented 7 percent of all inspections.

<sup>37</sup>To help reduce accidents caused by human factors, which are the leading cause of train accidents, FRA's motive power and equipment inspectors conduct some inspections to look for operating practices problems that can lead to these types of accidents.

**Figure 8: Inspections Conducted and Defects and Violations Cited, by Inspection Discipline, in 2005**



Source: GAO analysis of FRA data.

Note: These figures include inspections carried out by both federal and state inspectors. Inspectors are instructed to cite defects for most instances of noncompliance found, but have discretion in determining which instances to cite as violations warranting enforcement action.

The motive power and equipment discipline cites almost half of all defects and over a third of all violations. FRA officials told us that the standards in this inspection discipline are the most prescriptive, making defects and violations easier to find. However, these types of defects cause a much smaller proportion of accidents than human factors and track defects.<sup>38</sup>

<sup>38</sup>FRA officials have explained that operating practices inspectors have had a limited ability to cite defects and violations because of the way regulations in this area are written. For example, as noted previously, the regulations contain general requirements about railroads' programs for inspecting employees' adherence to operating rules and do not specifically require that employees follow these rules. The agency expects that its proposed regulations on operating rules will improve its ability to enforce in this area, because the requirements will be more stringent than existing regulations.

---

(See fig. 4.) The most frequently cited violations include those for noncompliance with standards regarding locomotives and freight cars, track conditions, recordkeeping on the inspection and repair of equipment and track, and the condition of hazardous materials tank cars.

While individual defects and violations are generally for compliance problems identified at specific locations on railroads' systems, FRA also identifies broad-scale compliance problems, by inspection discipline, that affect multiple locations on a railroads' system. It does so mainly through analyses of accident data and data on defects and violations found during inspections, communications among managers at headquarters and in its eight regional offices on the results of analyses and inspections, and further inspections to obtain more information about identified problems. Agency officials told us that they hold frequent internal discussions about emerging issues to determine where problems are occurring and plan actions that the agency should take to address them. The agency's Railroad System Oversight managers support this effort by analyzing systemwide accident and inspection data, by inspection discipline, for the Class I railroads to identify trends and emerging issues. FRA may plan and conduct in-depth inspections to determine the scope of such issues. For example, if the rate of human factor accidents has increased at various locations on a railroad's system, FRA may conduct inspections of operating practices at these locations.

Examples of broad-scale problems FRA has identified at railroads include weak implementation within a particular state of a program for monitoring employees' adherence to operating rules, poor inspections by a railroad of its track in a particular region, systemic problems in reporting accidents and incidents, and defective equipment across a railroad's system. In some cases, FRA inspectors identify some higher-level management issues, such as a lack of supervision or inadequate training of railroad personnel, which could have led to the compliance problems. According to FRA officials, they discuss broad-scale compliance problems with railroad officials to try to get these problems resolved. For example, after an in-depth inspection, inspectors meet with railroad managers to discuss overall problems found and, according to headquarters officials, usually provide a written summary of those problems. Efforts to cooperate with the railroad to resolve broad-scale problems may be combined with enforcement actions, usually civil penalties, for specific violations identified at individual sites.

---

According to FRA officials, the agency always conducts follow-up on serious problems it has identified to ensure that they are resolved.<sup>39</sup>

While FRA does track and maintain data on various types of train accidents and incidents as well as defects and violations cited by inspectors and enforcement actions taken, the agency does not centrally track the broad-scale compliance problems it has identified.<sup>40</sup> These problems are described in some agency documents, such as inspectors' summary reports on findings of in-depth inspection efforts; various reports prepared by the Railroad System Oversight managers on the Class I railroads;<sup>41</sup> and the agency's overall plan, by region and inspection discipline, for its nonroutine inspection activity. As explained in the next section, this lack of centralized tracking can impede the ability of the agency to measure the effectiveness of its efforts to resolve identified broad-scale problems.

FRA's five Railroad System Oversight managers also identify some broad safety problems at Class I railroads that are not related to compliance. They identify these problems mainly through contacts with labor and railroad officials and FRA regional officials and try to address them through cooperation with the railroad. For example, these managers have worked with railroads in addressing labor's concerns about practices for transporting train crews at the end of their shifts that may worsen fatigue and programs for training employees on the railroads' operating rules. In some cases, these problems were first identified under the Safety Assurance and Compliance Program.

---

<sup>39</sup>App. II contains a description of FRA's efforts to resolve such problems through discussions with railroad officials as well as enforcement actions. According to FRA officials, the agency uses compliance agreements, which require railroads to take significant actions to improve their ability to comply, when broad-scale compliance problems are egregious and have not been resolved through other methods. FRA has issued eight such agreements since 2000. These agreements have mainly focused on compliance problems in the operating practices and track disciplines.

<sup>40</sup>According to FRA officials, its ability to track broad-scale compliance problems is limited because its existing databases related to safety are not integrated. The agency has an effort underway to better integrate its existing data. The next section contains a description of this effort.

<sup>41</sup>The Railroad System Oversight managers track the status of nonregulatory problems, as well as some regulatory problems, that they are working on and, in response to our request, created papers for us describing systemwide and regional issues for each of the Class I railroads. In addition, these managers produce quarterly and annual reports showing safety trends—based mainly on accident data—for each of the Class I railroads.

---

Several Other Organizations Have Implemented Comprehensive Approaches for Overseeing the Management of Safety Risks in Transportation Industries

FRA officials have noted that their approach of directly inspecting safety conditions and targeting locations that are most likely to have compliance problems provides a safety net and holds railroad management accountable. However, because the number of FRA and state inspectors is small relative to the size of railroad operations, FRA inspections can cover only a very small proportion of railroad operations (0.2 percent). Also, FRA targets inspections at locations on railroads' systems where accidents have occurred, among other factors, rather than overseeing whether railroads systematically identify and address safety risks that could lead to accidents.

Rail transportation poses a variety of potential safety hazards, including collision or derailment; injury to workers, passengers, or nearby residents; and damage to property or the environment. Risk management is a systematic approach for dealing with the risks posed by such safety hazards and has been used in the private and public sectors for decades. It can be described as a continuous process of managing—through the systematic identification, analysis, and control of risks associated with hazards (or threats)—the likelihood of their occurrence and their negative impact.<sup>42</sup> A framework for risk management based on industry best practices and other criteria that we have developed divides risk management into five major phases: (1) setting strategic goals and objectives, and determining constraints; (2) assessing risks; (3) evaluating alternatives for addressing these risks; (4) selecting the appropriate alternatives; and (5) implementing the alternatives and monitoring the progress made and results achieved.<sup>43</sup> Risk management can help to improve systemwide safety by systematically identifying and assessing risks associated with various safety hazards and prioritizing them so that resources may be allocated to address the highest risks first. It also can help in ensuring that the most appropriate alternatives to prevent or mitigate the effects of hazards are designed and implemented.

---

<sup>42</sup>Risk is the combination of the likelihood and the consequence of a specified hazard being realized. In risk management, the term “threat” is sometimes used in place of hazard.

<sup>43</sup>GAO, *Risk Management: Further Refinements Needed to Assess Risks and Prioritize Protective Measures at Ports and Other Critical Infrastructure*, [GAO-06-91](#) (Washington, D.C.: Dec. 15, 2005); *Homeland Security: Summary of Challenges Faced in Targeting Oceangoing Cargo Containers for Inspection*, [GAO-04-557T](#) (Washington, D.C.: Mar. 31, 2004); and *Rail Security: Some Actions Taken to Enhance Passenger and Freight Rail Security, but Significant Challenges Remain*, [GAO-04-598T](#) (Washington, D.C.: Mar. 23, 2004).

---

Other transportation oversight organizations have developed and implemented approaches for overseeing industries' overall management of safety risks. In particular, during the last 10 years, APTA, PHMSA, and Transport Canada have developed and implemented such oversight approaches for U.S. commuter railroads, U.S. pipelines, and Canadian railroads, respectively. These approaches complement, rather than replace, traditional compliance inspections. APTA established a U.S. commuter railroad oversight program in 1996, in partnership with FRA and the commuter rail industry, that supplements FRA's inspections of these railroads.<sup>44</sup> Under this program, APTA provides guidelines to these railroads on managing the safety of their systems—including safety risks—and audits their plans for and implementation of this management approach. Beginning in 2000, PHMSA issued a series of requirements for pipeline operators to develop "integrity management" programs to manage risk in areas—such as those that are densely populated—where leaks or ruptures could have the greatest impact on public safety.<sup>45</sup> The agency's integrity management regulations supplement its minimum safety regulations, and it inspects operators' compliance with both types of standards. In Canada, the department responsible for overseeing railroad safety, Transport Canada, in 2001 began requiring that railroads establish safety management systems that include risk management.<sup>46</sup> Transport Canada assesses these systems as well as railroads' compliance with its

---

<sup>44</sup>APTA is a nonprofit organization representing the transit industry, including U.S. commuter rail systems. APTA offered to develop this program after FRA directed passenger railroads to develop system safety plans for addressing hazards associated with passengers occupying the lead units of a train. The APTA program is more extensive and is intended to cover all aspects of system safety. FRA issued this directive in 1996, in an emergency order, after two passenger train accidents caused 14 deaths.

<sup>45</sup>PHMSA administers the national regulatory program to ensure the safe transportation of hazardous liquids and natural gas by pipeline. PHMSA and FRA are similar in several respects. For example, both oversee large industries with relatively few inspectors. Both also oversee industries that have relatively few deaths, injuries, and accidents (as compared to transportation as a whole), making additional safety gains more difficult.

<sup>46</sup>Transport Canada oversees the safety and security of Canada's rail, marine, highway, and aviation operations.

---

traditional safety standards.<sup>47</sup> (For further information on GAO's risk management framework and these oversight approaches, see app. III.)

These oversight approaches are intended to provide additional assurance of safety beyond that provided by inspections of compliance with minimum safety standards. They supplement uniform, minimum standards by encouraging or requiring companies to identify and address their unique safety risks. APTA, PHMSA, and Transport Canada have emphasized that risk management provides a higher standard of performance than traditional safety regulation based on compliance alone. According to APTA officials, their approach helps companies to prioritize their actions for addressing risk and therefore optimize safety within constraints of their resources. According to PHMSA officials, pipeline companies' compliance with the agency's traditional regulations ensures minimum safety performance, but its integrity management approach has improved the ability of these companies to systematically address the full range of safety threats to their pipelines. According to Transport Canada officials, by encouraging systemwide improvements in companies' safety performance in order to address systemic causes of specific problems, its new approach helps the agency to leverage its resources. Transport Canada has emphasized that risk management ensures that risks are being adequately addressed and should point railroads to areas where they could undertake initiatives beyond their current practices that could improve their overall safety performance. Transport Canada officials also told us that a primary objective of their new approach is for railroads to assume more responsibility for the safety of their operations. Similarly, APTA officials told us that their oversight approach is proactive because it encourages companies to identify and address potential hazards before accidents occur.

We have reviewed PHMSA's gas transmission pipeline integrity management oversight approach and have recently concluded that it

---

<sup>47</sup>In addition, the European Commission has funded an effort to develop proposed guidelines for a safety management system for rail companies of its member nations. These proposed guidelines recommend that European railways incorporate some basic risk management elements—including safety performance targets, risk assessment and control, and an internal audit process—in their safety management systems. See E.M. El Koursi, L. Tordai and J. Rodriguez. *European Commission Fifth Framework Programme, SAMNET Thematic Network, SAMNET Synthesis Report, Safety Management and Interoperability* (SAMNET, February 2006).

---

enhances public safety.<sup>48</sup> We also found that representatives from the pipeline industry, safety advocacy groups, and state agencies generally agree that this approach improves public safety. Operators told us that the primary benefit of the program is the comprehensive knowledge they acquire about the condition of their pipelines. APTA and Transport Canada officials have told us that their oversight approaches have not been formally evaluated to determine their effectiveness. However, according to FRA officials, APTA's system safety oversight approach has strengthened safety program management in the commuter rail sector. Finally, Transport Canada is expanding its safety management system approach to its oversight of civil aviation.

While FRA does not oversee railroads' overall approach for managing safety risks on their systems, it has taken some steps in a limited number of areas to oversee and encourage risk management in the railroad industry. For example, the agency has several regulations in place that require railroads to use a risk-based approach for managing safety in specific areas: the operation of high-speed passenger trains, the fire safety of new passenger cars and locomotives, and the adoption of new processor-based signal and train control technologies. In addition, PHMSA, in consultation with FRA and the Transportation Security Administration, has recently proposed a regulation that could lead to greater FRA oversight of railroads' management of hazardous materials risks.<sup>49</sup> FRA has also issued guidance for passenger railroads on assessing collision hazards and risks and developing strategies for addressing them.<sup>50</sup> In addition, FRA is currently working with APTA and some commuter railroads to improve these railroads' abilities to conduct collision hazard analyses. Finally, as discussed earlier, FRA is considering establishing a pilot project to examine how a risk management approach could be used

---

<sup>48</sup>GAO, *Natural Gas Pipeline Safety: Integrity Management Benefits Public Safety, but Consistency of Performance Measures Should Be Improved*, [GAO-06-946](#) (Washington, D.C.: Sept. 8, 2006).

<sup>49</sup>As noted previously, FRA enforces PHMSA's hazardous material regulations as they relate to the transportation of such materials by rail. Specifically, under this proposed regulation, which was issued in December 2006, railroads would be required to compile annual data on certain shipments of hazardous materials that are particularly hazardous, use the data to analyze safety and security risks along the rail transportation routes where those materials are transported, assess alternative routing options, and base routing decisions on those assessments.

<sup>50</sup>FRA has also worked with Amtrak, which does not participate in APTA's program, to assist it in developing a system safety plan that is consistent with APTA's guidelines.

---

in the railroad industry, on a voluntary basis, to reduce human factor accidents as well as other types of accidents.

Although FRA is taking some steps to encourage increased use of risk management in the railroad industry, oversight of railroads' overall approach for managing safety risks on their systems, in addition to FRA's existing discipline-specific compliance-based oversight, has the potential to provide additional assurance of safety. Such an approach could help to ensure that railroads systematically identify and address the full range of risks on their systems and could also encourage railroads to take on more responsibility for safety. According to agency officials, FRA is concerned that railroads too often wait for inspectors to show up before addressing problem areas, while FRA would prefer that they find and fix problems on their own. However, developing and implementing such a new oversight approach would be a major undertaking for the agency and would also require the support and participation of the railroad industry.

While we believe that adopting a comprehensive approach for overseeing railroads' management of safety risks, similar to the approaches discussed in this section, can lead to improved safety, we are not making a recommendation aimed at encouraging FRA to adopt such an oversight approach. As discussed in the previous section, FRA is pursuing several initiatives aimed at reducing train accident rates. In our view, these initiatives need time to mature to demonstrate their effects and, at the appropriate time, the department may wish to conduct an informed assessment to determine whether additional actions are warranted.

---

## **FRA Measures Its Progress in Achieving a Variety of Safety Goals, but Has Limited Information on the Direct Results of Its Oversight**

FRA has a broad range of goals and measures that it uses to provide direction to and track the performance of its safety oversight activities. However, its ability to make informed decisions about its inspection and enforcement programs is limited because it lacks measures of the intermediate outcomes, or direct results, of these programs that would show how they are contributing toward the end outcomes, or ultimate safety improvements, that the agency seeks to achieve. Furthermore, while FRA has made some changes in its oversight approach in response to external and internal evaluations, it has not evaluated the effectiveness of its enforcement approach. Evaluations can provide a broader range of information on program performance and how to improve it than performance measures alone. Both performance measures and evaluations can provide valuable information on program results that helps hold agencies accountable for their programs' performance.

---

## FRA Has Established a Range of Safety Goals and Uses Cooperation and Enforcement to Achieve These Goals

To its credit, FRA has adopted a range of useful safety performance goals.<sup>51</sup> These safety goals are useful because they help the agency target its oversight efforts to help achieve the department's goals of reducing (1) the rate of rail-related accidents and incidents and (2) the number of serious hazardous materials releases. For fiscal year 2007, FRA established six new agencywide safety goals that are aligned with its five inspection disciplines and its grade crossing efforts. These goals are to reduce the rates of (1) accidents caused by human factors; (2) accidents caused by track defects; (3) accidents caused by equipment failure; (4) accidents attributable to other causes, including signal defects; (5) hazardous materials releases; and (6) grade-crossing incidents. These departmental and agency goals represent the key end outcomes, or ultimate results, FRA seeks to achieve through its oversight efforts. The agency has also recently established regional office goals that are generally aligned with the new agencywide goals. These regional office goals help FRA to link the oversight activities of its eight regional offices with its overall goals.

FRA officials told us that their inspection and enforcement programs contribute to meeting these safety goals, or end outcomes, by resulting in the correction of safety problems and compliance.<sup>52</sup> These desired direct results can be called the intermediate outcomes of the inspection and enforcement programs, although FRA has not identified them as such. FRA officials told us that they use a combination of cooperation with railroads and enforcement actions to achieve the correction of safety problems and compliance. The linkages between such program outputs and desired intermediate and end outcomes can be demonstrated in a

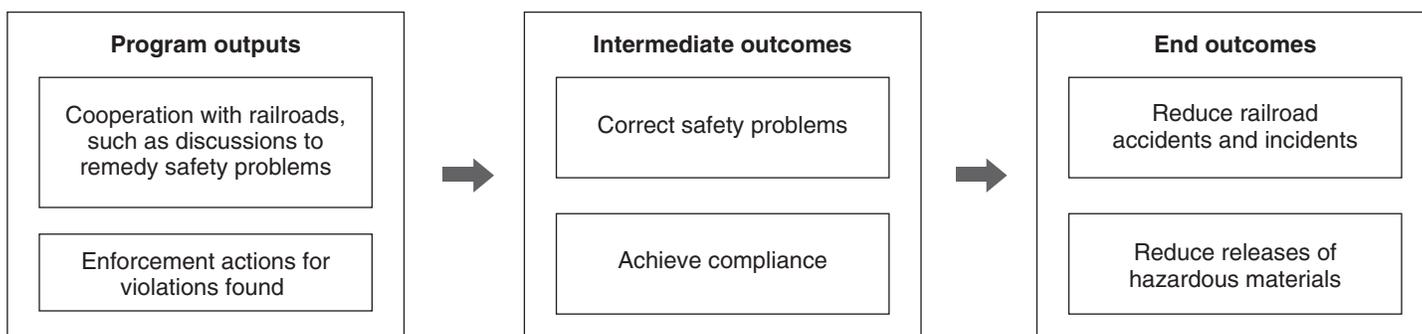
---

<sup>51</sup>We have reported that agencies should create a set of performance goals that address important and various aspects of program performance. See, for example, GAO, *Results-Oriented Government: GPRA Has Established a Solid Foundation for Achieving Greater Results*, [GAO-04-38](#) (Washington, D.C.: Mar. 10, 2004); *Managing for Results: Strengthening Regulatory Agencies' Performance Management Practices*, [GAO/GGD-00-10](#) (Washington, D.C.: Oct. 28, 1999); and *Agency Performance Plans: Examples of Practices That Can Improve Usefulness to Decisionmakers*, [GAO/GGD/AIMD-99-69](#) (Washington, D.C.: Feb. 26, 1999).

<sup>52</sup>A number of other agency efforts—including the Railroad Safety Oversight program, the development of new safety standards, rail-related research and development, and initiatives to improve highway-rail grade crossing safety—also contribute toward these end outcomes.

“logic model” that helps to show how program activities contribute to the ultimate results the agency seeks to achieve.<sup>53</sup> (See fig. 9.)

**Figure 9: How FRA’s Inspection and Enforcement Programs Contribute to Rail Safety**



Source: GAO analysis of FRA information.

Note: The program outputs and intermediate outcomes identified in this figure are examples of the outputs and intended direct results of FRA’s inspection and enforcement and resulted from discussions with FRA officials. FRA has not identified these as outputs or intermediate outcomes. In addition to the agency’s inspection and enforcement efforts, its Railroad System Oversight managers work cooperatively with the Class I railroads to achieve safety improvements not related to compliance.

FRA uses cooperation with railroads and enforcement actions in various ways to resolve safety problems and achieve compliance. As explained previously, problems identified in inspections can be site-specific compliance problems or broader problems affecting multiple sites. Inspectors try to resolve site-specific compliance problems found during routine inspections by discussing defects with railroad officials in order to achieve voluntary compliance. The agency’s policy of focused enforcement requires that inspectors cite violations and recommend enforcement actions, most frequently civil penalties, for those compliance problems that pose the greatest safety hazards. Enforcement actions can require railroads to correct identified compliance problems as well as deter future noncompliance. After in-depth inspection efforts at multiple sites, inspectors meet with railroad managers to discuss overall findings of safety problems that need to be corrected to achieve compliance. FRA sometimes encourages or requires railroads to make broad-scale improvements, such as in the training of railroads’ track inspectors, which

<sup>53</sup>We have suggested that regulatory programs develop logic models to develop a better understanding of how their programs deliver results, in order to select appropriate performance goals and measures. See [GAO-04-38](#) and [GAO/GGD-00-10](#).

---

could help a railroad to comply with the agency's standards. (See app. II for more information on how FRA uses cooperation and enforcement to improve safety.)

---

### Performance Measures Support FRA's Oversight, but Information on Direct Results Is Limited

Consistent with the Government Performance and Results Act of 1993, which calls on federal agencies to develop performance measures to help determine the extent to which intended outcomes are achieved, FRA has developed a range of performance measures that it uses to track the progress of—and provide direction to—its safety oversight programs.<sup>54</sup> (See table 3.) A number of these measures provide useful information about the extent to which various desired end outcomes, or ultimate results, are being achieved. In particular, FRA has developed a number of measures, based on agency and regional goals, that capture important components of its progress in achieving the department's overall safety goals. Since these new measures are linked to inspection and enforcement activities of its inspection disciplines and regional offices, they can provide some useful information on progress in achieving the desired end outcomes. For example, the agency expects that inspection and enforcement efforts in the operating practices discipline will reduce accidents caused by human factors, and it tracks the extent to which these accidents are reduced, both at the national and the regional level.

---

<sup>54</sup>This act is the centerpiece of a statutory framework that Congress put in place during the 1990s to help resolve the long-standing management problems that have undermined the federal government's efficiency and effectiveness and to provide greater accountability for results. See [GAO-04-38](#).

**Table 3: FRA’s Safety Performance Measures**

Type of measure	Description
<b>End outcomes</b>	
Departmental safety goals	Rate of rail-related accidents and incidents <sup>a</sup> and number of serious hazardous materials releases
Agency safety goals	Rates of train accidents caused by human factors, track defects, equipment defects, or other (signal and miscellaneous) causes; rate of nonaccident rail-related hazardous materials releases; and rate of highway-rail grade crossing incidents
Regional office safety goals	By region, numbers of train accidents caused by human factors, track, equipment, and other causes and numbers of highway-rail grade crossing incidents
Class I railroad safety performance trends	Trends in rates of accidents of various types for each Class I railroad
<b>Program outputs and management</b>	
Agency efficiency goal	Ratio of safety budget expenditures on safety-related activities, such as inspections, versus administrative activities
Management of inspection and enforcement activities	<ul style="list-style-type: none"> <li>• Various measures used in targeting inspections and determining enforcement actions, including trends in various types of accidents and employee injuries and cited defects and violations, by inspection discipline, region, state, and railroad</li> <li>• Inspections conducted and costs by region and inspection discipline</li> <li>• Extent to which regions are meeting planned targets for inspections</li> <li>• Timeliness of reports received from railroads on actions taken to remedy violations<sup>b</sup></li> <li>• Measures related to enforcement, including civil penalties assessed and collected and processing times</li> </ul>

Source: GAO analysis of FRA information.

<sup>a</sup>Includes train accidents as well as grade-crossing, trespassing, and other accidents.

<sup>b</sup>For those violations requiring corrective action, railroads are required, within 30 days after the end of the month in which the violation occurred, to notify FRA of the actions they have taken.

The agency has adjusted its oversight approach in response to trends in end outcome measures. For example, it developed the National Rail Safety Action Plan in response to a flat trend in the overall train accident rate and an increasing rate of accidents caused by human factors. In addition, FRA has developed measures to track the performance of Class I railroads, and it reviews these measures quarterly to assist in making decisions about oversight of these railroads.

FRA also uses various measures of program outputs, such as numbers of inspections and enforcement actions, as well as some other types of measures to manage its oversight efforts. While the agency does not track its cooperative efforts to achieve compliance, it does track inspection and enforcement activities. In fiscal year 2007, the agency will start using an efficiency measure to track its progress in using its resources on safety-related activities, such as inspections, rather than on administrative activities. FRA headquarters and inspection staff use data on defects and

---

violations cited in inspections, together with data on accidents and incidents, in planning inspection activities and making enforcement decisions. Finally, FRA tracks whether railroads report on actions taken to correct violations within the required time.

While FRA has developed a range of measures of end outcomes and program outputs, it lacks measures of the desired intermediate outcomes, or direct results, of its inspection and enforcement efforts—that is, the correction of identified safety problems and compliance. We have found that it is a useful practice for agencies to establish measures of intermediate outcomes to help show programs' contributions to desired end outcomes.<sup>55</sup> According to FRA officials, inspectors review reports on corrective actions provided by railroads and may ask a railroad to resubmit a report if they believe that it does not adequately address the violation.<sup>56</sup> FRA officials also told us that inspectors always follow up on serious problems identified—both site-specific and broader scale problems—to ensure that they are corrected, and may cite additional violations if they find continuing problems.<sup>57</sup> However, the agency does not measure the extent to which identified safety problems have been corrected. Without such a measure, FRA cannot determine the extent to which its inspection and enforcement efforts are achieving the desired direct results.

Measuring whether safety problems have been corrected is particularly important when serious compliance problems are broad-scale, affecting multiple sites, whether the problems are local, regional, or systemwide. These problems are sometimes identified in reports of in-depth inspections. For example, one set of track inspections of a Class I railroad at various sites within a region in early 2006 led to overall findings that

---

<sup>55</sup>See [GAO/GGD/AIMD-99-69](#) and [GAO/GGD-00-10](#).

<sup>56</sup>For violations determined by the inspector to require corrective action, railroads are required to provide FRA with a report within 30 days of the end of that month on the corrective actions they have taken. These reports also include the type of action taken, such as repair or replacement of equipment and disciplinary action or training of employees. FRA tracks whether these reports are received on time as well as the types of actions taken.

<sup>57</sup>FRA's inspection reports contain a field for recording the receipt of railroads' reports on corrective actions but do not contain a field for recording whether inspectors have determined, in following up on violations, that the corrective actions are adequate. Furthermore, some regional staff told us that inspectors do not consistently record follow-up inspections as such.

---

these locations had deteriorating track conditions, that no repair work was scheduled, and that the railroad's track inspections were not adequate.<sup>58</sup> According to FRA officials, headquarters managers and managers of the agency's eight regional offices frequently discuss serious safety problems, indicated by the results of field inspections and data analyses, to determine the scope of the problems and decide on actions the agency should take to ensure that railroads resolve them. However, while FRA tracks a variety of safety related data, it does not centrally track these broad-scale compliance problems or their status and therefore lacks overall information on the effectiveness of its efforts to ensure that they are resolved.<sup>59</sup>

FRA also lacks overall measures of railroads' compliance. FRA officials told us that, while defect rates (the ratio of defects found per units inspected) measure noncompliance found by inspectors, they cannot be used to produce statistically valid measures of railroads' overall level of compliance because inspections are focused on problem areas and FRA is not able to conduct enough inspections of railroads to ensure that it is getting a good measure of compliance.<sup>60</sup> Officials have emphasized that the agency relies on inspectors' day-to-day oversight of and interaction with railroads to track compliance. Also, as noted previously, FRA officials, both at the headquarters and regional levels, analyze defect data in each inspection discipline to identify emerging issues and plan inspection activity. Finally, officials noted that the agency is planning to use its automated track inspection vehicles to survey most of the national track system and to monitor improvements in the condition of track over time.

---

<sup>58</sup>In contrast, defects and violations tend to be much more specific. In this case, inspectors also found numerous defects concerning specific instances of track not meeting federal standards and two violations concerning defects that had gone for more than 30 days without corrective action.

<sup>59</sup>In fiscal year 2006, FRA compiled information for the first time on all in-depth inspection activity by its headquarters and regional offices into one report and began producing quarterly updates on the status of these inspections. These updates contain some information on findings of broad-scale problems, in narrative form, but do not provide overall assessments of progress being made by each railroad as a whole in addressing these problems.

<sup>60</sup>However, FRA does include in its quarterly review of Class I railroads' performance trends certain operating practices and track defect rates that it has found to be related to accident rates.

---

We recognize that developing measures of intermediate outcomes would be difficult and that it is challenging for regulatory agencies to develop such measures.<sup>61</sup> Nevertheless, some other regulatory agencies in the Department of Transportation have developed such measures. For example, the Federal Motor Carrier Safety Administration measures the percentage of truck companies that improve their performance in a follow-up inspection and PHMSA measures the extent of improvement in pipeline operators' integrity management programs, as indicated by successive inspections of operators' programs. FRA officials have told us that the fact that the agency has not integrated its existing safety-related databases has impeded its ability to develop measures of intermediate outcomes. The agency has an initiative underway to better integrate these databases, including its database on accidents and incidents and its inspection and enforcement databases, in order to better manage its information resources.<sup>62</sup>

Performance measures should provide agency managers with information that helps them make decisions that improve program performance, including decisions to adjust policies and priorities. As noted, FRA has used its existing performance measures to make decisions about its oversight approach in a variety of ways. However, not having measures of the intermediate outcomes of its inspection and enforcement approaches limits FRA's ability to make informed decisions about these approaches and adjust them to improve performance. Intermediate outcome measures can provide more timely information on program performance than end outcome measures, because it may take longer for program efforts to affect end outcomes.

Measures of program results can also help hold agencies accountable for the performance of their programs. Congress needs information on program results to support its oversight of agencies and their budgets. FRA's new discipline-specific and region-specific outcome measures do

---

<sup>61</sup>We have reported on such challenges and how agencies have overcome them. See, in particular, [GAO-04-38](#); [GAO/GGD-00-10](#); *Managing for Results: Measuring Program Results That Are Under Limited Federal Control*, [GAO/GGD-99-16](#) (Washington, D.C.: Dec. 11, 1998); and *Managing for Results: Regulatory Agencies Identified Significant Barriers to Focusing on Results*, [GAO/GGD-97-83](#) (Washington, D.C.: June 24, 1997).

<sup>62</sup>FRA has tasked a contractor with developing a plan for a data warehousing strategy for the agency that will integrate its data from various sources. According to agency officials, this initiative will allow FRA to better monitor its performance, through, for example, providing scorecards and graphical tools to depict performance.

---

help ensure accountability for results. However, without measures of intermediate outcomes, the extent to which FRA's inspection and enforcement programs are achieving direct results and contributing to desired end outcomes is not clear. FRA officials have noted that they cannot attribute any drops in accident rates solely to FRA's efforts because other factors, such as railroads' investments in their systems, also play an important role.

FRA can also use measures of intermediate outcomes to increase railroads' accountability for correcting safety problems. In spring 2006, the agency instituted annual meetings with the heads of the Class I railroads to discuss their overall safety performance, using trends in various accident rates. These meetings are a good step forward for the agency because they represent an opportunity for FRA to put pressure on top railroad executives to adequately address major problems the agency has identified. However, without measures of the extent to which individual railroads have addressed such problems, FRA cannot take full advantage of this opportunity. In addition, without central tracking of these problems and their status, FRA's ability to identify continuing or recurring problems as well as interrelated problems and make appropriate enforcement decisions may be impaired, especially since much of this work is performed in eight separate FRA regional offices and in five separate inspection disciplines.<sup>63</sup> According to FRA, annual meetings with the major railroads to negotiate civil penalties focus on individual violations but also address systemic issues that have been identified through analysis of individual violations. However, regional officials told us that these meetings do not generally deal with systemic issues. Readily available information on the status of broader problems would help put a railroad's individual violations into perspective and could help ensure that FRA negotiates appropriate final amounts with railroads.

---

### FRA Has Made Changes in Response to Evaluations but Has Not Evaluated Its Enforcement Approach

Besides requiring performance measurement, the Government Performance and Results Act of 1993 calls for agencies to evaluate the effectiveness of their programs in achieving intended outcomes. We have found that, since it can be challenging for regulatory agencies to measure the direct results of their programs, program evaluations are particularly

---

<sup>63</sup> A major concern with the previous Safety Assurance and Compliance Program, which ended in 2005, was that systemwide safety problems handled under this program took too long to resolve.

---

helpful in determining these results.<sup>64</sup> Program evaluations are objective, systematic studies that answer questions about program performance and results. By examining a broader range of information than is feasible to monitor on an ongoing basis through performance measures, evaluation studies can explore the benefits of a program as well as ways to improve program performance. They can also be used to develop or improve agencies' measures of program performance and help ensure agencies' accountability for program results.<sup>65</sup>

FRA's safety oversight activities have recently undergone several external evaluations by the department's Inspector General, as well as an internal review, and FRA has made some changes as a result. For example, on the basis of several reviews since 1998, the department's Inspector General in 2004 recommended that FRA develop a plan to make meaningful use of available data to focus its inspection and enforcement activity.<sup>66</sup> FRA developed its National Inspection Plan in response. Also, in 2004, FRA established a committee to conduct an internal review of its Safety Assurance and Compliance Program. This committee solicited the views of various FRA managers on the strengths and weaknesses of the program. Based on its findings, FRA terminated this program and replaced it with its Railroad System Oversight program.

In addition, the Office of Management and Budget assessed FRA's overall safety program in 2003.<sup>67</sup> Although the office found this overall program to be moderately effective, it also found that FRA had not arranged for independent evaluations of its design and effectiveness. In response, FRA

---

<sup>64</sup>Such evaluations can also help determine the extent to which a program is having an impact on these outcomes versus other variables that affect outcomes. See [GAO-04-38](#).

<sup>65</sup>See GAO, *Program Evaluation: An Evaluation Culture and Collaborative Partnerships Help Build Agency Capacity*, [GAO-03-454](#) (Washington, D.C.: May 2, 2003); and *Program Evaluation: Studies Helped Agencies Measure or Explain Program Performance*, [GAO/GGD-00-204](#) (Washington, D.C.: Sept. 29, 2000).

<sup>66</sup>U.S. Department of Transportation–Office of the Inspector General, *Review of Allegations that FRA Deputy Administrator Attempted to Relax Safety Enforcement Against Union Pacific* (Washington, D.C., Dec. 10, 2004); and *Audit of Oversight of Highway-Rail Grade Crossing Accident Reporting, Investigations, and Safety Regulations*, MH-2006-016 (Washington, D.C., Nov. 28, 2005).

<sup>67</sup>The Office of Management and Budget performed this assessment using its Program Assessment Rating Tool. This tool examines factors that affect and reflect program performance, including program purpose and design, performance measurement and evaluations, and aspects of program management.

---

arranged for a review of its Railroad Safety Board process and has stated that it will continue to have regular independent reviews of various aspects of its safety program.<sup>68</sup> The agency is planning to have an independent evaluation of its Railroad System Oversight program conducted in the third quarter of fiscal year 2007. FRA also made some other improvements in response to recommendations of the Office of Management and Budget assessment, including developing its new efficiency measure and procuring new vehicles for conducting track inspections.

Although FRA has modified various aspects of its safety oversight in response to evaluations, it has not evaluated the extent to which its enforcement is achieving desired results. In addition to providing information on program performance and how it could be improved, an evaluation of FRA's enforcement approach could help to identify data needed to develop useful performance measures. For example, the Federal Motor Carrier Safety Administration examined the rate of violations by trucking companies before and after implementing a policy of assessing maximum penalties for such violations and, based on initial analyses, has improved its data system to be better able to analyze this trend.

Under FRA's focused enforcement policy, developed in the mid-1990s, inspectors cite a small percentage of identified defects (about 3 percent in 2005) as violations that they recommend for enforcement action, generally civil penalties. While this policy relies, to a great extent, on cooperation with railroads to achieve compliance and is intended to focus FRA's enforcement efforts on those instances of noncompliance that pose the greatest safety hazards, it is not clear whether the number of civil penalties issued, or their amounts, are having the desired effect of improving compliance. FRA officials have told us that they have not evaluated the effectiveness of civil penalties in ensuring compliance, noting that this would be difficult because penalty payments usually occur after the agency's yearly settlement process. However, without an evaluation of its enforcement program, FRA is missing an opportunity to obtain valuable information on the performance of this program and on any need for adjustments to improve this performance.

---

<sup>68</sup>The Railroad Safety Board approves or denies requests for waivers or special approval submitted by railroads and other parties subject to FRA regulations.

---

## Conclusions

The various initiatives that FRA has begun in the past year and a half to better target its oversight—by addressing the main causes of train accidents and better focusing inspections on problem areas—hold promise for bringing down the train accident rate, reducing injuries, and saving lives. Some initiatives, such as reporting of close call incidents, encourage the railroad industry to address safety problems before they result in accidents. However, the success of many of these initiatives will depend on voluntary actions by the railroads and their overall safety impact will likely not be apparent for a number of years. While FRA is pursuing these initiatives, it has not changed its approach for conducting inspections, which relies primarily on direct observations of operations, equipment, and track. An additional approach that has provided additional assurance of safety in the U.S. commuter railroad, U.S. pipeline, and Canadian railroad industries is oversight of companies' overall management of safety risks. Although we believe that a similar approach could help improve rail safety, we are not recommending that FRA adopt such an approach because its current initiatives to bring down the train accident rate need time to demonstrate their effects.

Without measures of the direct results of its inspection and enforcement programs, FRA cannot demonstrate how these programs are contributing to rail safety and lacks key information that could help it improve performance. This information could also help FRA hold railroads accountable for addressing safety problems it identifies. While these measures are not always easy to develop, at least one other modal administration within the department has done so at our recommendation. Coupled with better measures of FRA's direct results is the need to assess the effectiveness of its enforcement program, especially its use of civil penalties, to understand the degree to which they contribute to improved safety outcomes and to determine whether it should adjust its approach to improve performance.

---

## Recommendations for Executive Action

To enhance FRA's ability to determine the extent to which its inspection and enforcement programs are contributing to rail safety and whether changes in these programs are needed, we recommend that the Secretary of Transportation direct the Administrator of FRA to take the following two actions:

- develop and implement measures of the direct results of its inspection and enforcement programs; and

- 
- evaluate the agency's enforcement program to provide further information on its results, the need for additional data to measure and assess these results, and the need for any changes in this program to improve performance.

---

## Agency Comments

We provided a draft of this report to the Department of Transportation for its review and comment. The department did not offer overall comments on the draft report or its recommendations. It did offer several technical comments, which we incorporated where appropriate.

---

We are sending copies of this report to congressional committees and subcommittees with responsibility for transportation safety issues; the Secretary of Transportation; the Administrator, Federal Railroad Administration; and the Director, Office of Management and Budget. We will also make copies available to others upon request. This report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you have any questions about this report, please contact me at (202) 512-2834 or [siggerudk@gao.gov](mailto:siggerudk@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Staff who made key contributions to this report are listed in appendix IV.



Katherine A. Siggerud  
Director, Physical Infrastructure Issues

---

# Appendix I: Scope and Methodology

---

To determine how the Federal Railroad Administration (FRA) focuses its efforts on the highest priority risks related to train accidents in planning its safety oversight, we reviewed FRA's National Rail Safety Action Plan, plans for developing new regulations, documents related to its initiatives for reducing human factor and track-caused accidents, and inspection planning documents. We also discussed the agency's inspection planning approach and key initiatives with headquarters and regional officials responsible for these areas. In addition, we obtained information on FRA's initiatives through attending congressional hearings on FRA's oversight and meetings of the Railroad Safety Advisory Committee.

To determine how FRA identifies safety problems on railroad systems in carrying out its oversight, we determined how FRA uses its inspections, the Railroad System Oversight program, and other oversight activities to oversee safety and identify problems. In order to do this, we reviewed FRA's regulations, policies, procedures, and guidance for conducting inspections and identifying safety problems as well as reports on inspection results. We also reviewed the agency's statutory authority under the Federal Railroad Safety Act and reviewed Railroad Safety Oversight program documents. We discussed FRA's oversight activities with FRA headquarters managers and inspection discipline specialists and Railroad Safety Oversight managers to gain a greater understanding of how FRA identifies safety problems on railroad systems. We also contacted three (Chicago, Fort Worth, and Atlanta) of the eight FRA regional offices reporting the highest numbers of accidents in their jurisdictions during 2005. We discussed this topic with administrators and track and human factor discipline specialists from each of these regional offices. We conducted these interviews on-site at the offices located in Fort Worth, Texas, and Chicago, Illinois. We also discussed this topic with officials from the three state regulatory associations employing the greatest number of railroad safety inspectors in order to discuss how state inspectors coordinate their activities with FRA inspectors. (See the end of this appendix for a list of organizations that we contacted.) We also examined our published work on risk management and safety oversight approaches used by other modal administrations within the Department of Transportation as well as some other organizations responsible for overseeing rail safety.

We reviewed FRA data on its inspection activities for the period from 1996 through 2005. To assess the reliability of the inspection data, we (1) performed electronic testing of required data elements, (2) reviewed existing information about the data and the system that produced them, and (3) interviewed agency officials knowledgeable about the data. We

discussed our preliminary results with FRA to ensure that we were capturing the correct information and consulted with these officials to resolve questions on the data collection process. We determined that the data were sufficiently reliable for the purposes of this report.

To determine how FRA assesses the impact of its oversight efforts in improving safety, we examined the methods FRA uses to assess the results of its oversight programs and FRA's use of this information to make decisions about its oversight strategy. As part of this effort, we reviewed FRA documents on its safety performance measures and evaluations of its oversight and enforcement activities. We also discussed this issue with managers at headquarters and in the regional offices responsible for developing and using performance information. In addition, we reviewed our recommendations on performance measurement, the use of performance information, and program evaluation and determined the extent to which FRA's practices are consistent with these recommendations.

We focused our work on FRA's oversight activities aimed at reducing train accidents—such as train collisions and derailments—rather than those aimed at reducing highway-rail crossing and trespassing accidents. FRA's oversight of highway-rail grade crossing safety has been the subject of two recent Department of Transportation Inspector General audits. In addition, both these types of accidents and trespassing accidents involve issues not related to railroad safety performance, such as driver awareness of grade crossing safety and individuals' willingness to abide by railroads' warning signs on their property. We also focused on FRA's oversight of railroads rather than its oversight of non-railroad companies (such as shippers of hazardous materials by rail) because the agency's oversight efforts focus primarily on railroads. In addition, according to FRA, most recent serious train accidents involving the release of hazardous materials have resulted from problems with railroad operations.

---

## Other Aspects of Our Work

We also examined how FRA uses enforcement and other methods for ensuring that safety problems on railroad systems are resolved. In order to do this, we reviewed FRA's policies, procedures, and guidance for conducting enforcement; major enforcement actions such as compliance agreements; Railroad Safety Oversight program documents; and other agency documents. We also discussed FRA's approaches to resolving safety problems, through enforcement and other means, with officials from FRA headquarters, Railroad System Oversight managers, and administrators and inspection discipline specialists in three regional

offices. Regarding FRA's enforcement approach, we reviewed how FRA employs enforcement to improve safety on railroads' systems. However, we could not determine the extent to which railroads address systemic safety problems as a result of enforcement because FRA does not track the broad-scale safety problems it identifies or the extent to which these problems are resolved. We focused on FRA's use of enforcement as part of its overall oversight strategy and did not examine the agency's individual enforcement actions.

We also obtained FRA data on civil penalties from FRA's enforcement database, which includes data on assessed and collected amounts from 1996 through 2005. We assessed the reliability of the enforcement data by the same means that we employed to assess the reliability of FRA's inspection data. We determined that the enforcement data used in this report were sufficiently reliable for the purposes of this report.

Finally, we met with or contacted the following organizations or persons in order to obtain a fuller understanding of railroad safety issues and obtain their perspectives on FRA's oversight approach.

*Other federal agencies:*

National Transportation Safety Board

*Freight railroads (Class I):*

BNSF Railway Company  
CSX Transportation, Inc.  
Norfolk Southern Railway Company  
Union Pacific Railroad Company

*Passenger railroads:*

National Railroad Passenger Corporation, or Amtrak  
Northeast Illinois Regional Commuter Rail Corporation, or Metra  
New Jersey Transit Rail Operations

*Regional and short line railroad management companies:*

Cedar American Rail Holdings, Inc.  
RailAmerica

*Industry associations:*

American Chemistry Council  
Association of American Railroads  
American Public Transportation Association  
American Short Line and Regional Railroad Association

*Labor unions:*

AFL-CIO  
Brotherhood of Maintenance of Way Employees  
Brotherhood of Locomotive Engineers and Trainmen  
United Transportation Union

*State oversight organizations:*

Association of State Rail Safety Managers  
California Public Utilities Commission  
Ohio Public Utilities Commission  
Texas Department of Transportation

*Canadian oversight organization:*

Transport Canada

*Academic expert:*

Dr. Ian Savage, Department of Economics, Northwestern University

---

# Appendix II: FRA Addresses Safety Problems through Cooperation and Enforcement

---

FRA uses cooperation with railroads and enforcement actions in various ways to resolve identified safety problems and achieve compliance. When inspectors find problems during inspections, FRA's policy is to cite defects for most instances of noncompliance and to encourage the railroad to comply voluntarily. For example, issues may be addressed on site with railroad officials during inspections. According to FRA officials, railroads often correct identified problems immediately and if so, these problems would not require additional action. When railroads do not comply voluntarily or the identified defects are serious, FRA may cite violations and recommend civil penalties or take other enforcement actions—either against railroads or individuals—to promote compliance with safety regulations.<sup>1</sup> According to FRA officials, inspectors follow up on violations or high numbers of defects within 60 days to ensure that they are corrected.<sup>2</sup>

FRA most commonly uses civil penalties against companies as its enforcement tool for site-specific violations.<sup>3</sup> From January 2005 through July 2006, FRA assessed about 8,600 violations for civil penalties. FRA has other enforcement tools. These include compliance agreements and compliance orders, civil penalties against individuals, special notices for repair, emergency orders, criminal penalties, disqualification orders, and injunctions. (See table 4.) FRA uses these tools much less frequently than it does civil penalties. For example, FRA issued 288 special notices for repair, 118 warning letters and fewer than a dozen of all other enforcement actions during this period.<sup>4</sup>

---

<sup>1</sup>While we reviewed how FRA employs enforcement to improve safety on railroads' systems, we could not determine the extent to which railroads address systemic safety problems as a result of enforcement. This is because FRA does not track the broad-scale safety problems it identifies or the extent to which these problems are resolved. We focused on FRA's use of enforcement as part of its overall oversight strategy and did not examine the agency's individual enforcement actions.

<sup>2</sup>Often, an inspector will conduct follow-up re-inspections during other routine inspections. However, an inspector may make a special visit to conduct follow-up if warranted.

<sup>3</sup>FRA's Statement of Enforcement Policy specifies that before citing violations and recommending penalties, inspectors consider the seriousness of the condition or act, the potential safety hazard posed by the condition or act, and the current level of compliance of the offending person (e.g., a railroad or individual), among other things.

<sup>4</sup>FRA could not supply data covering a longer period on the frequency of use of all of its enforcement actions without substantial effort.

**Appendix II: FRA Addresses Safety Problems  
through Cooperation and Enforcement**

**Table 4: Description of FRA Enforcement Actions and Frequency of Use, January 2005 through July 2006**

<b>Enforcement action</b>	<b>Number of times used</b>	<b>Description</b>
Civil penalty against a railroad or other entity except for an individual	8,606	Imposes a monetary penalty on a railroad or other entity, such as a company that ships hazardous materials by rail, that violates a rail safety or hazardous materials statute, regulation, or order. Each day that the violation continues is a separate violation.
Special notice for repair	288	Orders a locomotive, freight car, or passenger car out of service and may require a reduction of the maximum operating speed over defective track segments.
Warning letter to an individual	118	Informs an individual that FRA believes that the individual has committed a rail safety or hazardous materials violation and that any future violation by the individual will result in enforcement action.
Civil penalty against an individual	6	Imposes a monetary penalty on any individual who willfully violates or willfully causes the violation of a rail safety statute, regulation, or order.
Compliance agreement	2	States a railroad's agreement to take a specified action to promote compliance. The railroad agrees that if, in FRA's judgment, the required action is not performed, the railroad will not contest FRA's sanction—typically a compliance order. See below.
Criminal penalty	1	Imposes (1) either a monetary penalty or imprisonment for up to 2 years, or both, on an individual for knowingly and willfully violating certain reporting, recordkeeping, or other regulations or (2) a monetary penalty or imprisonment for up to 5 years, or both, for knowingly violating the hazardous materials statute or an implementing regulation or order.
Disqualification order	1	Prohibits an individual from performing safety-sensitive functions in the rail industry for a specified period if the individual's violation of a rail safety statute or regulation demonstrates unfitness to perform such functions.
Emergency order	1	Orders corrective action where an unsafe condition or practice causes an emergency situation involving a hazard of death or personal injury.
Compliance order	0	Directs compliance following repeated failure to comply with rail safety or hazardous material statute or regulation.
Injunction	0	Restrains a violation of, or enforces, a rail safety or hazardous materials regulation or order.

Source: FRA.

FRA inspectors cite many defects, but cite comparatively few of these defects as violations warranting enforcement action. Since 1996, FRA inspectors have cited an average of about 4 violations for every 100 defects cited annually. According to FRA officials, inspectors cite relatively few defects as violations warranting enforcement action because FRA's focused enforcement policy guides inspectors to cite violations only for problems that pose safety risks. In addition, inspectors have discretion in citing a defect or a violation for a given instance of noncompliance—FRA directs inspectors to first seek and obtain the railroads' voluntary compliance with the rail safety regulations.

According to FRA officials, inspectors usually choose to provide the railroad with information about defects they found during their inspection, discuss these instances of noncompliance, and attempt to obtain the railroad's commitment to improve compliance. If the railroad's response is inadequate or the inspector finds that the problem warranting the defect is serious, the inspector may exercise the agency's enforcement discretion by citing a violation, recommending that FRA take enforcement action, generally a civil penalty. The agency makes an initial penalty assessment against the railroad based on the type of violation that occurred.<sup>5</sup> FRA meets with the major railroads in an annual settlement meeting to negotiate a final amount for all civil penalties cited in the past year. This amount is based on the railroad's compliance history and efforts to correct the problem, among other factors.<sup>6</sup> The total value of civil penalties assessed and collected each year was higher from 2001 through 2005 than from 1996 to 2000. (See fig. 10.) According to FRA officials, the higher civil penalty assessments after 2000 reflect the agency's efforts to focus its inspection activity on areas that present the greatest risk. FRA officials also told us that when the agency initiated the Safety Assurance and Compliance Program—which emphasized a partnership approach with railroads to improve safety—in 1995, inspectors initially cited fewer violations. They noted that in 2001 FRA's management pushed for inspectors to be more aggressive in citing violations. Since 2001, the amounts collected have been about 63 percent of the amounts initially assessed. Consistent with the purpose of the federal railroad safety laws and with federal court decisions interpreting the purpose of such laws, the agency's goals are to promote safety and to gain compliance rather than to maximize amounts collected. For example, FRA may agree to a reduced penalty amount if the railroad immediately remedies the safety problem or

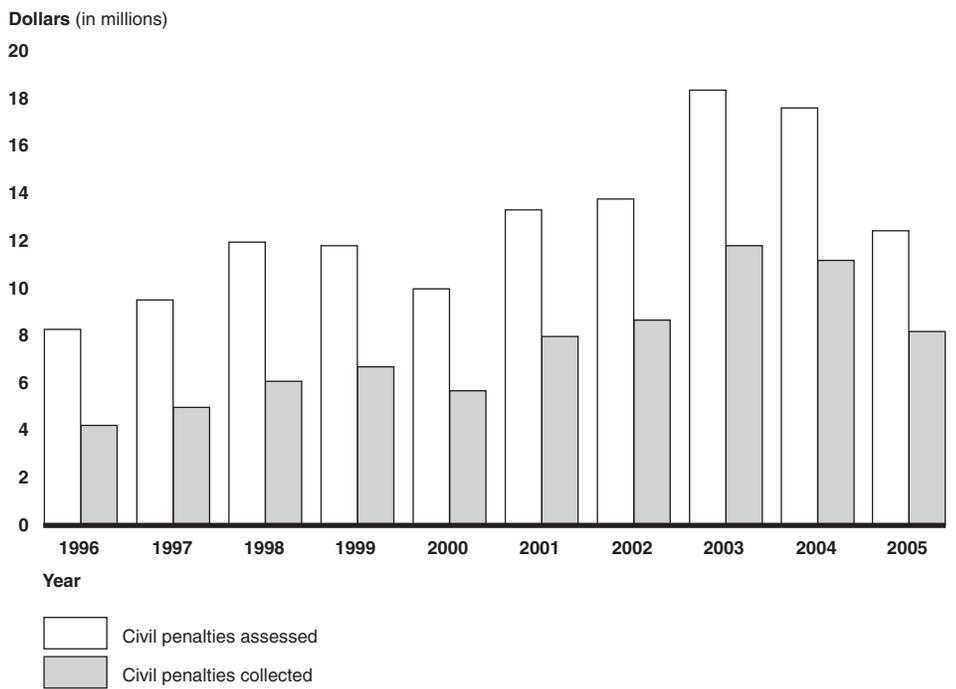
---

<sup>5</sup>In December 2006, FRA published in the *Federal Register* proposed amendments to its schedules of civil penalties for each type of violation to ensure that penalty amounts more fully reflect the risk associated with a railroad's violation of the rail safety regulations.

<sup>6</sup>Given the volume of civil penalty cases, FRA usually negotiates civil penalties with smaller railroads and shippers through the mail and telephone conferences. FRA is authorized to negotiate civil penalties with railroads and exercises this authority by annually settling civil penalty amounts with each railroad. The criteria for compromising with railroads on civil penalty amounts are set in statute. In determining the amount of a compromise, the Secretary shall consider (1) the nature, circumstances, extent, and gravity of the violation; (2) with respect to the violator, the degree of culpability, any history of violations, the ability to pay, and any effect on the ability to continue to do business; and (3) other matters that justice requires.

implements a new program to prevent a problem from recurring.<sup>7</sup> This is consistent with federal law. In other cases, FRA will agree to a reduced penalty amount if its documentation on the violation is not substantial enough.

**Figure 10: FRA's Civil Penalties, 1996 through 2005, in 2005 Dollars**



Source: GAO analysis of FRA data.

Notes: Individual penalties resulting from violations are consolidated into one or more case(s) for each railroad and are negotiated annually with FRA and the railroad during settlement conferences.

Each year's amounts are for cases initiated in that year. Some penalties may be initially assessed in one year, with the final assessment in another year. FRA, in commenting on a draft of our report, provided 2006 civil penalty figures. However, we did not use this information because there was not enough time to assess its reliability before the report was issued.

Penalties against individuals are not included. From 1996 through 2005, FRA issued an average of 1 civil penalty per year against individuals.

<sup>7</sup>The Federal Motor Carrier Safety Administration follows a similar policy. See GAO, *Large Truck Safety: Federal Enforcement Efforts Have Been Stronger Since 2000, but Oversight of State Grants Needs Improvement*, [GAO-06-156](#) (Washington, D.C.: Dec. 15, 2005).

FRA seeks to resolve broad-scale compliance problems it has identified by first discussing them with railroad officials and elevating them, as necessary, to obtain an appropriate response. After in-depth inspection efforts at multiple sites, inspectors meet with railroad managers responsible for those sites to discuss overall findings or problems. For very serious or systemic problems, FRA may ask railroads to submit corrective action plans and may review these plans for adequacy. FRA sometimes discusses broad problems with railroad headquarters officials to try to obtain corrective actions. For example, one regional administrator told us that his region arranged a multiregion meeting with the senior management of a Class I railroad to discuss systemic problems with the railroad's equipment. FRA asked the railroad to submit a corrective action plan to address the equipment problems. According to FRA officials, the railroad has been meeting the milestones in the corrective action plan and has been making progress in addressing its equipment problems. Also, FRA's Railroad System Oversight managers, who act as liaisons with the Class I railroads, help to maintain frequent communication with these railroads about major problems that have been identified and associated corrective actions. These efforts to cooperate with railroads to resolve problems may be combined with civil penalties for violations found at specific locations. According to FRA officials, when in-depth inspections result in findings of serious problems, inspectors always follow up to determine whether these problems are adequately resolved. However, FRA has no central repository for data on the status of these broader problems its inspectors have identified at railroads.

FRA officials told us that they hold frequent internal discussions among headquarters and regional management about these broad-scale compliance problems that have been identified—whether local, regional, or systemwide—and actions that the agency should take to attempt to resolve them. According to FRA officials, the agency sometimes uses compliance agreements, which require railroads to take significant actions beyond those specifically required by regulations to improve their ability to comply, when broad-scale compliance problems are egregious and have not been resolved through other methods. Compliance agreements allow FRA to apply more leverage in trying to obtain compliance because FRA uses the agreements as an alternative to the railroad involved undergoing an FRA proceeding for a compliance order. For example, under recent compliance agreements, railroads have agreed to reinstruct managers on how to test employees' adherence to operating rules and to develop and implement track maintenance plans to eliminate systemic track defects. FRA monitors railroads' performance under these agreements. In some instances, FRA has also used compliance orders to address significant

railroad compliance problems. However, these enforcement tools are seldom used. FRA has entered into 13 compliance agreements altogether and one compliance order since 1996, or an average of about 1 per year. In comparison, since 1996, FRA has assessed in the neighborhood of almost 40,000 violations for civil penalties.

This approach to resolving broad-scale safety problems has had some success. For example, the three railroads that have entered into compliance agreements in the past 2 years have generally made progress in improving compliance, according to the results of FRA's follow-up.<sup>8</sup> In addition, FRA officials have cited a number of other successes, including improved compliance by several railroads with signal inspection and testing requirements,<sup>9</sup> and another railroad's implementation of an electronic system to record locomotive defects and repairs following FRA's finding that inadequate recordkeeping had resulted in the operation of locomotives with multiple defects. FRA's Railroad System Oversight managers have also worked with railroads to make some systemic safety improvements not related to compliance. For example, these managers have encouraged railroads to make improvements related to roadway worker communication, signal maintenance, and mentoring of new employees.

---

<sup>8</sup>FRA's compliance agreements with three different divisions of one Class I railroad have resulted in improved compliance. FRA had to extend the compliance agreement with the third division because noncompliance continued but has since terminated the compliance agreement because of improved safety performance. While FRA does not have overall measures of compliance, it sometimes, in summary reports on follow-up inspections at a railroad, records trends in certain types of defects found.

<sup>9</sup>FRA has noted instances of significant noncompliance with signal inspection and testing requirements on the part of two major commuter railroads and at least one Class I railroad.

---

# Appendix III: Oversight of Risk Management in the U.S. Commuter Railroad, U.S. Pipeline, and Canadian Railroad Industries

---

Risk management is a systematic process for assessing risks and taking appropriate steps to deal with them. It is founded on several inspection disciplines, including financial economics, decision science, organizational theory, and strategic management. The National Academy of Sciences, a presidential commission, private organizations, and others have addressed the subject and have recognized its applicability in both the private and the public sectors. We have developed a framework for risk management based on industry best practices.<sup>1</sup> This framework divides risk management into five major phases. (See table 5.)

---

**Table 5: Risk Management Framework**

Phase	Description
Strategic goals, objectives, and constraints	Establish an organization's strategic goals and the steps needed to attain those results, including performance measures to assess progress. Constraints that affect outcomes can also be identified during this phase.
Risk assessment	Assess the threats to and vulnerabilities of assets so that countermeasures may be instituted to prevent or mitigate risks. Risks can be assessed by various methods, depending on the specific application and knowledge available.
Alternatives evaluation	Evaluate risk reduction methods by considering the countermeasures and the costs and benefits associated with each. Countermeasures can be considered and prioritized according to a number of factors, such as the degree of risk reduction they afford and the cost and difficulty to implement them.
Management selection	Choose among alternative actions. Management's active participation is important at this phase because risk assessment tools contain various assumptions about preferences that may require value judgments and review at the management level.
Implementation and monitoring	Move from planning to implementing the selected countermeasures. Following implementation, monitoring is essential to help ensure that the entire risk management process remains current and relevant.

---

Source: GAO.

During the last 10 years, the American Public Transportation Association (APTA), Pipeline and Hazardous Materials Safety Administration (PHMSA), and Transport Canada have developed and implemented new approaches for overseeing safety in the U.S. commuter railroad, U.S. pipeline, and Canadian railroad industries, respectively. These approaches promote the use of risk management and incorporate various elements of

---

<sup>1</sup>To develop the framework, we reviewed risk management literature, our reports and testimonies on this topic, and other government guidance. In addition, we consulted with experts on risk management, risk modeling, and terrorism. We reviewed numerous frameworks from industry, government and academic sources. We field-tested the framework, and it was reviewed by academic experts in risk management. See [GAO-06-91](#).

risk management noted above. They also complement traditional compliance inspections.

In 1996, following two serious commuter rail accidents, APTA, with FRA support, started a program to help its 16-member commuter railroad properties develop and implement plans for managing the safety of their systems. APTA had previously developed a similar program for the rapid transit industry. Risk management is a key aspect of these plans, which must include, among other things, goals and objectives, the identification of hazards, an assessment of their associated risks, the analysis and implementation of actions to reduce these risks, and internal assessments of the effectiveness of safety management. Commuter railroads are given the latitude to develop individual plans that conform to APTA's guidelines but that are based on their unique circumstances. APTA audits its member railroads' system safety management plans on a 3-year cycle. During the first year, APTA conducts an initial assessment of the plan; during the second year, APTA evaluates how well the railroad implements its plan; and during the third year, APTA follows up with the railroad to see what actions it has taken in response to APTA's audit findings.

In 2000, to better focus on safety risks that are unique to individual pipelines, PHMSA, then operating as the Office of Pipeline Safety, issued the first in a series of integrity management regulations that now apply to more than 1,000 hazardous liquid and gas transmission pipelines operating in densely populated and environmentally sensitive areas. Under this approach, operators are required to develop programs to systematically assess and mitigate safety threats, such as corrosion, to pipelines located in such high-risk areas. For example, these programs must integrate all available information about pipeline integrity and the consequences of a leak or rupture, repair identified defects within defined time limits based on their severity, and evaluate the need for additional preventive and mitigating actions. In addition, operators are required to report program performance measures to PHMSA semi-annually. PHMSA inspects these written programs as well as their implementation in periodic comprehensive inspections.

During the 1990s, a series of derailments raised concerns over the level of safety in the Canadian rail industry. In 2001, following a review of its oversight approach, Transport Canada determined that a more comprehensive safety management assessment was necessary to minimize safety risks, and adopted new safety management regulations under Canada's Railway Safety Act. The new regulations require that Canadian railway companies develop their own safety management systems, subject

to Transport Canada's review. These systems must include, among other things, annual safety performance targets; the identification of safety issues through a variety of methods (such as analyses of safety data and input from employees); an assessment of the risks associated with these issues to determine their significance; the development, approval, and implementation of strategies for controlling these risks; and systems for monitoring these strategies and other management-approved corrective actions. Transport Canada audits the railroads' documentation and implementation of their safety management systems. The level of such monitoring varies depending on the safety performance of the railroad.

---

# Appendix IV: GAO Contact and Staff Acknowledgments

---

## GAO Contact

Katherine Siggerud (202) 512-2834 or [siggerudk@gao.gov](mailto:siggerudk@gao.gov)

---

## Staff Acknowledgments

In addition to the contact named above, James Ratzenberger, Assistant Director; Ashley Alley; Marianne Anderson; Timothy Bober; Elizabeth Eisenstadt; Judy Guilliams-Tapia; Brandon Haller; Bonnie Pignatiello Leer; Masha P. Pastuhov-Purdie; and Minette Richardson made key contributions to this report.

---

## GAO's Mission

The Government Accountability Office, the audit, evaluation and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

---

## Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's Web site ([www.gao.gov](http://www.gao.gov)). Each weekday, GAO posts newly released reports, testimony, and correspondence on its Web site. To have GAO e-mail you a list of newly posted products every afternoon, go to [www.gao.gov](http://www.gao.gov) and select "Subscribe to Updates."

---

## Order by Mail or Phone

The first copy of each printed report is free. Additional copies are \$2 each. A check or money order should be made out to the Superintendent of Documents. GAO also accepts VISA and Mastercard. Orders for 100 or more copies mailed to a single address are discounted 25 percent. Orders should be sent to:

U.S. Government Accountability Office  
441 G Street NW, Room LM  
Washington, D.C. 20548

To order by Phone: Voice: (202) 512-6000  
TDD: (202) 512-2537  
Fax: (202) 512-6061

---

## To Report Fraud, Waste, and Abuse in Federal Programs

Contact:

Web site: [www.gao.gov/fraudnet/fraudnet.htm](http://www.gao.gov/fraudnet/fraudnet.htm)

E-mail: [fraudnet@gao.gov](mailto:fraudnet@gao.gov)

Automated answering system: (800) 424-5454 or (202) 512-7470

---

## Congressional Relations

Gloria Jarmon, Managing Director, [JarmonG@gao.gov](mailto:JarmonG@gao.gov) (202) 512-4400  
U.S. Government Accountability Office, 441 G Street NW, Room 7125  
Washington, D.C. 20548

---

## Public Affairs

Paul Anderson, Managing Director, [AndersonP1@gao.gov](mailto:AndersonP1@gao.gov) (202) 512-4800  
U.S. Government Accountability Office, 441 G Street NW, Room 7149  
Washington, D.C. 20548