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Report to the Chairman, Information, Justice, Transportation, and Agriculture Subcommittee, Committee on Government Operations, House of Representatives

September 1993

AMTRAK SAFETY

Amtrak Should Implement Minimum Safety Standards for Passenger Cars

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GAO

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General Accounting Office
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Resources, Community, and
Economic Development Division

B-254053

September 22, 1993

The Honorable Gary A. Condit
Chairman, Information,
Justice, Transportation, and
Agriculture Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

In response to your request, this report examines whether Amtrak has effective procedures for inspecting, maintaining, and repairing its passenger cars to ensure safe operation. It also examines whether the Federal Railroad Administration's oversight is adequate to ensure the safety of Amtrak's passenger cars.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to interested congressional committees; the Secretary of Transportation; the Administrator, Federal Railroad Administration; the President, Amtrak; and the Director, Office of Management and Budget. We will also make copies available to others upon request.

This work was done under the direction of Kenneth M. Mead, Director, Transportation Issues, who can be reached on (202) 512-2834. Other major contributors are listed in appendix II.

Sincerely yours,

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

The National Railroad Passenger Corporation (Amtrak) operates intercity passenger rail service in the United States, transporting over 21 million passengers annually. Commuter railroads, including Amtrak, also transport over 300 million commuter passengers each year. Because so many passengers use Amtrak, the safety of its operations is an important national concern. At a May 1991 congressional hearing, Amtrak employees alleged that Amtrak operated equipment that was not in compliance with safety standards. Concerned about these allegations, the Chairman of the Information, Justice, Transportation, and Agriculture Subcommittee, House Committee on Government Operations, asked that GAO report on whether (1) Amtrak has effective procedures for inspecting, repairing, and maintaining its passenger cars to ensure safe operation and (2) the Federal Railroad Administration (FRA) provides adequate oversight to ensure the safety of Amtrak's passenger cars.

Background

The Federal Railroad Safety Act of 1970, as amended, authorized the Secretary of Transportation to regulate and enforce the safety of rail transportation in the United States. The National Transportation Safety Board (NTSB) also plays a role in railroad safety by investigating rail accidents, determining their probable causes, and making recommendations to FRA, Amtrak, and other railroads.

Amtrak's Mechanical Department is responsible for ensuring that locomotives and passenger cars meet both FRA's and Amtrak's standards. Mechanical Department employees in six divisions inspect Amtrak's 1,798 cars and 450 locomotives, performing repairs daily as needed, periodic preventive maintenance on equipment assigned to the divisions, and major equipment overhauls at three specialized facilities.

Results in Brief

Amtrak's maintenance standards define the condition that passenger cars should meet after the performance of normal maintenance and repairs. These standards have been incorporated into a system of procedures and controls to ensure that cars are in compliance. As currently implemented, however, the controls do not provide this assurance. GAO found that Amtrak employees did not document either repairs or supervisory review of the inspection process. Also, some standards were disregarded when parts were not available or there was insufficient time for repairs before a car was placed into service.

As important, Amtrak's financial condition has seriously affected the "backbone" of its maintenance operation—equipment overhauls. Revenue shortfalls and corresponding budget cutbacks for the past 2 years have forced layoffs in overhaul personnel. As a result, about 40 percent of Amtrak's aging passenger car fleet will be past due for overhaul by the end of fiscal year 1993. When cars are not in full compliance with the maintenance standards, Amtrak officials believe that as long as the deficiencies are not safety-critical, it is more appropriate to operate the cars than cut service. Amtrak has not established a "safety-critical" threshold—a point beyond which a passenger car is not allowed to operate. While Amtrak informally regards FRA's freight car safety regulations as its minimum passenger car safety standards, these regulations are not consistently observed by all Amtrak employees.

Because FRA has established few regulations concerning passenger car safety, it provides little oversight of Amtrak's passenger rail equipment. FRA does not have minimum safety standards for mechanical components on passenger cars, as it does for freight cars and locomotives. FRA has not established standards for passenger car components because officials believe this is an "Amtrak only" issue that can better be addressed informally. GAO believes this characterization is incorrect; without such standards, commuter railroad passenger cars that transport over 300 million passengers annually are also not regulated. In 1984, FRA told the Congress it planned to study the need for standards governing the condition of safety-critical passenger car components. However, officials told GAO that FRA has not initiated the study because of limited resources.

Principal Findings

Amtrak Has Not Fully Implemented Standards for Passenger Cars

Amtrak has established its own maintenance standards to ensure that passenger cars are safe, clean, and reliable. It uses three tools to implement the standards—daily inspections, preventive maintenance, and overhauls. The standards incorporate federal standards applicable to passenger and freight cars, as well as the passenger car safety standards previously published by the Association of American Railroads. Amtrak's daily inspections include cleaning, inspecting, and repairing the cars in the hours before they are put into service. Preventive maintenance, performed every 120 to 180 days, is a more thorough cleaning, inspection, and repair operation that normally takes 3 to 5 days. Overhauls are the "backbone" of

Amtrak's maintenance program, returning cars to a like-new condition after about 4 years or 800,000 miles of service. Regular overhauls extend the life of passenger equipment and reduce service failures.

Amtrak does not consistently implement its inspection and preventive maintenance programs and does not have clear criteria for determining when a passenger car should be removed from service for safety reasons. Amtrak employees do not follow control procedures—such as documenting both repairs and supervisory review of the inspection process—designed to ensure that cars meet Amtrak's maintenance standards. Also, some standards are disregarded when parts are not available or there is insufficient time for repairs before a car is placed into service. For example, GAO observed that cars were routinely released for service without emergency equipment, such as fire extinguishers. In addition, Amtrak officials said that correcting wheel defects to meet Amtrak's standards is not necessary until the car's next preventive maintenance as long as the wheel complies with federal freight car standards.

Since 1989, Amtrak has overhauled far fewer passenger cars each year than planned because funding has not been available. In fiscal year 1992, Amtrak planned to overhaul 108 of its oldest cars, but it actually overhauled only 25. During fiscal year 1993, Amtrak indefinitely furloughed nearly a quarter of the employees from its largest overhaul facility, and its 6-month revenues fell $18 million below projections. About 40 percent of Amtrak's cars will be past due for overhaul as of the end of fiscal year 1993. The Mechanical Department is also delaying overhaul of the oldest type of car, which accounts for 740 of the 1,798 cars in Amtrak's active fleet, until the car has operated for over 1 million miles.

Federal Oversight of Passenger Car Safety Is Limited

FRA has established passenger car safety regulations for window glazing, external ladders and handholds, and power brakes. These regulations do not include standards for components such as wheels, bearings, and axles. FRA inspectors are therefore less likely to inspect passenger cars and have few criteria to assess safety when they do. In contrast, FRA's freight car and locomotive regulations require specific inspection procedures and establish minimum requirements for mechanical and structural components, whose failure can cause derailments and/or serious injuries. Without similar regulations for passenger cars, FRA inspectors cannot cite Amtrak for mechanical components suspected of being unsafe.

NTSB has often recommended that FRA expand its passenger car safety regulations. FRA officials believe that they can deal informally with these "Amtrak only" safety issues more quickly than through regulation. However, more than 20 years elapsed between the time that NTSB initially recommended the installation of seat locks and Amtrak voluntarily retrofitted its cars. NTSB investigated accidents occurring in 1969, 1970, and 1987 that caused 19 deaths and 368 injuries, recommending after each that FRA require improvements in passenger car seat locks and luggage restraints. FRA has not expanded its regulations, so NTSB now directs its recommendations to passenger railroads, including Amtrak.

In a 1984 report to the Congress, FRA emphasized that proper inspection and maintenance of rail passenger equipment are critical elements of safety. Although the report cited the excellent safety record of the passenger railroad industry, FRA noted that passenger cars were not covered under industry safety standards, necessitating close monitoring by FRA. The report also recognized that passenger rail service included all commuter railroad operators and authorities, as well as Amtrak, and said that FRA would assess the need to establish standards for the condition of various safety-critical components on passenger cars. Because of limited resources, however, FRA did not make this assessment.

Recommendations

To ensure that passenger cars are safe when operated, GAO recommends that the President of Amtrak (1) establish a safety standard that identifies a minimum threshold beyond which passenger cars may not be operated and (2) establish and implement procedures to ensure that cars are not operated unless they comply with this safety standard. GAO also recommends that the Secretary of Transportation direct the FRA Administrator to study all passenger service providers in assessing the need for establishing minimum criteria for the condition of safety-critical components on passengers cars. FRA should then establish the passenger car component regulations that the study shows to be advisable, taking into account any internal safety standards developed by Amtrak or others that pertain to passenger car components.

Agency Comments

GAO discussed this report with senior Amtrak officers, FRA's Associate Administrator for Safety, and other FRA safety officials. In general, Amtrak officials agreed with the findings after changes made to the report clarified Amtrak's standards as maintenance rather than safety standards. Although FRA officials said they believe Amtrak's cars are safe, they plan to explore

the need for passenger car regulations, for commuter railroads as well as Amtrak. As requested, GAO did not obtain written comments on this report.

Contents

Abbreviations

AAR	Association of American Railroads
FRA	Federal Railroad Administration
GAO	General Accounting Office
MAP	Maintenance Analysis Program
NTSB	National Transportation Safety Board

Introduction

By 1970, the intercity passenger rail system managed by private railroads in the United States was deteriorating badly and in danger of dissolving altogether. To preserve the system, the Congress passed the Rail Passenger Service Act in 1970.[1] The act created the National Railroad Passenger Corporation (Amtrak) to operate all intercity passenger rail service and revitalize the system. Today, Amtrak transports over 40 million passengers annually—21 million on its intercity trains and 20 million on Amtrak-operated commuter trains. Because so many passengers use Amtrak, the safety of Amtrak's operations is an important concern.

The Federal Railroad Safety Act of 1970,[2] as amended, directed the Secretary of Transportation to regulate rail safety in the United States. The Secretary delegated this authority to the Federal Railroad Administration (FRA), which establishes and enforces all rail safety regulations, including those for cars and locomotives. Amtrak is subject to these regulations as they apply to the type of equipment Amtrak operates—passenger cars, mail-handling or baggage (freight) cars, and both diesel and electric locomotives.

Federal Rail Safety Responsibilities

FRA establishes and enforces safety regulations for the U.S. railroad industry—522 freight railroads, 2 intercity railroads,[3] 13 commuter operators and authorities, and 80 tourist or excursion operations. To carry out this responsibility, FRA has issued regulations that establish safety standards for railroad track, signals, equipment, and operating practices. The regulations (title 49 of the Code of Federal Regulations) that relate specifically to equipment are Locomotive Safety Standards (part 229), Freight Car Safety Standards (part 215), Power Brake Rules (part 232), Safety Appliance Standards (part 231), and Safety Glazing Standards (part 223).

Each railroad is responsible for inspecting, repairing, and maintaining its own equipment to ensure that it complies with FRA regulations. FRA inspectors enforce compliance with these regulations by conducting routine inspections at railroads. FRA inspectors also investigate accidents and complaints and periodically participate in system assessments of a single railroad; these assessments evaluate a railroad's entire operation.

[1]Pub. L. 91-518, 84 Stat. 1327 (1970).

[2]Pub. L. 91-458, 84 Stat. 971 (1970).

[3]In addition to Amtrak, the Alaska Railroad Corporation transports 180,000 passengers annually over 482 route miles.

FRA's inspection force consists of about 360 inspectors and supervisors who specialize in one of five inspection disciplines—track, motive power and equipment, operating practices, signal and train control, and hazardous materials. When an inspection or investigation of a complaint reveals noncompliance with a federal safety regulation, the inspector lists the condition as a defect on an inspection report. When an inspector identifies a defect that poses an immediate safety hazard, or when noncompliance persists, the inspector prepares a violation report that is submitted to FRA's Office of Chief Counsel to be used to assess a civil penalty against the railroad.[4]

The National Transportation Safety Board (NTSB) also plays a role in ensuring railroad safety. Established by the Congress in 1966, NTSB investigates transportation accidents, determines their probable causes, and issues safety recommendations. NTSB also conducts broader studies of transportation safety issues and evaluates the effectiveness of government agencies involved in transportation safety. While NTSB makes recommendations to a number of organizations, including Amtrak, only Department of Transportation agencies must respond to its recommendations.

Amtrak's Mechanical Department

Among Amtrak's 12 departments, the Mechanical Department is responsible for ensuring the safety of motive power and equipment—locomotives and passenger cars. This department (1) establishes maintenance standards supplementing federal regulations for such equipment and (2) plans and conducts inspections, repairs, and maintenance on Amtrak's fleet of locomotives and passenger cars. The Mechanical Department's headquarters staff plans and monitors the maintenance of Amtrak's equipment, while personnel in the divisions and overhaul facilities are responsible for the day-to-day inspection, repair, and maintenance operations.

Amtrak's six operating divisions—in Boston, Massachusetts; Chicago, Illinois; Los Angeles, California; New York, New York; Philadelphia, Pennsylvania; and Washington, D.C.—perform routine maintenance on any Amtrak car or locomotive that is part of a train that initiates or terminates service from that terminal. Routine maintenance includes train servicing and preventive maintenance. Train servicing, performed each day just before equipment is placed in service (dispatched), includes cleaning,

[4]Both defects and violations are instances of regulatory noncompliance; violations are considered more serious. Penalties are not assessed for defects, although railroads are expected to correct the defective conditions.

inspecting, and repairing locomotives and passenger cars to ensure that the equipment is safe, clean, and reliable. As part of the daily inspection, Amtrak requires a carman to visually check the running gear, couplers, vestibules and end-car hardware, interior hardware, air brakes, air-conditioning, heat and refrigeration systems, undercar electrical and equipment compartments, interior electrical system, and on-board surveillance system. The carman repairs any defects found during the inspection or reported by the on-board crew during the previous trip.

The divisions are also responsible for preventive maintenance for specific cars and locomotives that are assigned to the division. This is a more in-depth cleaning, inspection, and repair that takes several days to complete. Tasks include removing dust and dirt from the car's interior, from air-conditioning and heat ducts, and between wall and seat frames; inspecting, measuring, and recording wheel dimensions; inspecting wheel bearing heat indicators; checking the operation of air brake slack adjusters; and inspecting and repairing (1) batteries and connections, (2) air-conditioning compressors, (3) freon moisture indicators, and (4) toilets. Amtrak has established different preventive maintenance cycles for each type of car. For example, Amtrak requires preventive maintenance every 120 days for sleepers, every 150 days for passenger coach cars, and every 180 days for baggage cars.

Amtrak's Mechanical Department is also responsible for three overhaul facilities, located in Beech Grove, Indiana; and Bear and Wilmington, Delaware. An overhaul involves the complete disassembly, reconstruction, and reassembly of a locomotive or car. The piece of equipment, including components, systems, and frame, is completely renovated and rebuilt. Some parts, such as wheel assemblies, air-conditioning units, and heating units, are automatically replaced during an overhaul. Other parts, such as flooring, are replaced as needed. This process returns the locomotive or car to a like-new condition and extends its useful life. Passenger coach cars should generally be overhauled every 4 years or 800,000 miles.

Amtrak's active fleet includes 450 locomotives and 1,798 passenger cars. The locomotives are, on average, 19.7 years old, while the average age of the passenger cars in Amtrak's fleet is 22.7 years old. The average age of the newest passenger cars, representing about 6 percent of the fleet, is 4.5 years; however, the oldest cars, representing 41 percent of the fleet, average 33.1 years (see tables 1.1 and 1.2).

Table 1.1: Amtrak's Active Car Fleet by Type and Age (as of July 1993)

Type of car[a]	Number in fleet	Year of manufacture	Average age
Heritage	740[b]	1946 - 1990	33.1
Amfleet I	491	1967 - 1977	17.6
Superliner	282	1979 - 1981	13.5
Amfleet II	148	1981 - 1983	11.5
Horizon	103	1989	4.5
Turboliner[c]	31	1966 - 1976	18.5
Viewliner[d]	3	1987 - 1988	5.8
Total	**1,798**		**22.7**

[a]Car types vary, depending on the configuration of the car's seating, the model, and the date of purchase.

[b]Heritage cars consist of 429 passenger coaches, 247 mail-handling and baggage cars, and 64 auto carriers. Sixty-nine of the mail-handling and baggage cars were built in 1990.

[c]Turboliners consist of power units and coaches that can only be operated together in a trainset. They are assigned to and operated only in the New York division.

[d]The viewliner cars in Amtrak's fleet are prototypes.

Table 1.2: Amtrak's Locomotive Fleet by Type and Age (as of July 1993)

Locomotive type	Number in fleet	Years purchased	Average age
Diesel	255	1957 - 1993	13.7
Electric	65	1968 - 1988	13.7
Switcher	78	1939 - 1959	42.0
Cab car	30	1958 - 1967	27.3
Turboliner	20	1973 - 1976	18.3
Head-end power	2	1947 - 1953	43.5
Total	**450**		**19.7**

Amtrak's Financial Operations and Federal Subsidies

The Rail Passenger Service Act directed that Amtrak be operated and managed as a for-profit corporation. From its inception until the present, however, Amtrak has received funds authorized and appropriated by the Congress. This federal subsidy has supplemented operating revenues and funded capital expenses. Table 1.3 shows Amtrak's federal appropriations for the past 3 fiscal years.

Table 1.3: Amtrak Federal Appropriations, Fiscal Years 1991-93

Dollars in millions

	1991	1992	1993 Initial	1993 Supplemental
Operating subsidy	$343	$331	$331	$20
Capital subsidy	132	175	165	25
Northeast Corridor Improvement Project[a]	179	205	204	0
Total	**$654**	**$711**	**$700**	**$45**

[a]The Amtrak-owned Northeast Corridor is located between Washington, D.C., and Boston, Massachusetts. Virtually all other track used by Amtrak throughout its route system is leased from other railroads.

These federal funds supplement Amtrak's revenues from sources such as passenger ticket sales, commuter contract services, mail and express transportation, and real estate operations. In fiscal year 1992, revenues of over $1.3 billion were applied to expenses of about $2 billion, including depreciation (a noncash expense) of approximately $206 million. For the most part, Amtrak applies its revenues to operating expenses.

Objectives, Scope, and Methodology

At a May 1991 hearing before the Government Activities and Transportation Subcommittee, House Committee on Government Operations,[5] Amtrak employees alleged that Amtrak's cars and locomotives were being operated even though they did not comply with safety standards. According to the employees, supervisors would occasionally override decisions by Amtrak inspectors and repair personnel to pull noncomplying equipment out of service when the equipment was urgently needed to maintain ridership.

Concerned about the allegations made by Amtrak employees at the May 1991 hearing, the Chairman of the Information, Justice, Transportation, and Agriculture Subcommittee, House Committee on Government Operations, asked us to examine whether (1) Amtrak has effective procedures for inspecting, repairing, and maintaining its passenger cars to ensure safe operation and (2) the Federal Railroad Administration provides adequate oversight to ensure the safety of Amtrak's passenger cars.

[5]With the formation of the 103rd Congress, the House Government Operations Committee reorganized. The Committee's responsibility for Amtrak issues was assigned to the Information, Justice, Transportation, and Agriculture Subcommittee.

To assess whether Amtrak's inspection, repair, and maintenance policies are effectively implemented, we analyzed Amtrak's policies and procedures for the inspection, repair, and maintenance of locomotives and passenger cars. At Amtrak's corporate office, we interviewed officials in the Mechanical Department about Amtrak's maintenance standards for locomotives and passenger cars. We also interviewed the General Manager of Amtrak's largest overhaul facility in Beech Grove, Indiana, about Amtrak's policies and procedures for overhauling equipment.

In addition, we interviewed mechanical superintendents and facility managers at Amtrak's six divisions about their policies and procedures for inspecting, repairing, and maintaining equipment. We also accompanied Mechanical Department employees as they inspected, repaired, and maintained equipment to observe how Amtrak's policies and procedures were carried out and reviewed documentation of the inspection, repair, and maintenance process.

To assess the adequacy of federal oversight for Amtrak's passenger car safety, we reviewed FRA's regulations that apply to passenger car safety and FRA's inspection history for Amtrak locomotives and cars. We interviewed officials in the FRA Office of Safety Enforcement in Washington, D.C., and in the FRA Boston Regional Office about their roles and responsibilities for ensuring rail transportation safety. We also interviewed NTSB officials in Washington, D.C., on their concerns about passenger safety issues. We reviewed NTSB's reports on passenger train accidents and the resulting recommendations to FRA and Amtrak.

We conducted our review between May 1992 and July 1993 in accordance with generally accepted government auditing standards. We discussed our findings, conclusions, and recommendations with senior Amtrak officials, including the Executive Vice President and Chief Operating Officer, the Vice President for Engineering and Mechanical Departments, and the Chief Mechanical Officer. We also discussed the report with FRA's Associate Administrator for Safety and other FRA safety officials. Their comments are presented in the body of this report. We did not obtain agency comments on a draft of the report.

Amtrak Lacks Assurance That Passenger Cars Meet Its Standards

Amtrak has established maintenance standards that define the condition that its passenger cars should meet after normal maintenance and repairs are made. These standards have been incorporated into a system of procedures and controls to ensure that cars are in compliance. As currently implemented, however, the controls do not ensure that Amtrak's passenger cars comply with the standards. We found that Amtrak employees did not follow such procedures as documenting either repairs or supervisory review of the inspection process. Also, some Amtrak standards are disregarded when parts are not available or there is insufficient time for repairs before a car is placed into service. In addition, Amtrak's financial condition has seriously affected the "backbone" of its maintenance operation—the equipment overhaul program. Revenue shortfalls and corresponding budget cutbacks for the past 2 years have forced layoffs in overhaul personnel. As a result, about 40 percent of Amtrak's aging passenger car fleet will be past due for overhaul by the end of fiscal year 1993.

When cars are not in full compliance with maintenance standards, Amtrak officials believe that as long as the deficiencies are not safety-critical, it is more appropriate to operate the cars than cut service. However, Amtrak has not established a threshold in its maintenance standards that represents safety-critical deficiencies—a point beyond which a car is not allowed to operate—that is consistently observed by all Amtrak employees. Although Amtrak officials informally treat FRA's freight car safety standards as such a threshold, there appears to be no hard-and-fast rule that determines when a car should be pulled from service for safety-critical repairs.

Amtrak's Maintenance Standards Incorporate Federal and Industry Standards

Amtrak's maintenance standards for passenger cars are contained in Amtrak's Standard Maintenance Procedures manuals. These standards are a combination of (1) federal standards applicable to passenger and freight cars and (2) the passenger car standards previously published by the Association of American Railroads (AAR). Used since the early 1970s, these manuals have been updated periodically by Amtrak's Mechanical Department. They provide detailed instructions for maintaining and repairing the various cars in Amtrak's fleet.

The standards focus on both passenger comfort items and mechanical components; they define tasks for daily inspections, preventive maintenance, and the overhaul of passenger cars. For example, passenger comfort items address the functioning of air-conditioning and restrooms

and the overall cleanliness of the cars. The standards require that Amtrak's cars be equipped with public address systems and emergency equipment, consisting of a fire extinguisher, first aid kit, crow bar, and hammer. The standards also provide measurable criteria, most of which are the same as specified in federal freight car regulations, for determining whether mechanical components are safe. Officials said that when Amtrak's standards exceed federal freight car regulations, Amtrak is providing an additional margin of safety for its cars.

Amtrak's Chief Mechanical Officer said that Amtrak has three primary tools for ensuring that passenger cars are safe, clean, and reliable and that the standards are met—daily inspections, preventive maintenance, and overhaul. He explained that passenger car manufacturers have no specific recommendations on the frequency of preventive maintenance or overhaul cycles; however, Amtrak experiences much less equipment failure when it can regularly maintain and overhaul its cars.

A daily inspection is required for each passenger car before it is put in service. This inspection includes cleaning, inspecting, and repairing the interior and exterior of the car during the 2 to 8 hours it is idle in a station or yard between trips. Preventive maintenance is a more thorough cleaning, inspection, and repair operation that normally takes 3 to 5 days to complete. Currently, Amtrak requires preventive maintenance every 120 days for sleepers and food service cars, every 150 days for passenger coach cars, and every 180 days for baggage cars. Amtrak also overhauls its cars, returning them to like-new condition. Taking up to 3 months, overhauls are performed by one of Amtrak's three overhaul facilities. Passenger coach cars should be overhauled every 4 years, or about every 800,000 miles; sleepers and food service cars should be overhauled more frequently—every 3 years.

Amtrak has incorporated the instructions in its standards into more than 300 Maintenance Analysis Program (MAP) forms; they are generally in the form of checklists for each type of equipment that Mechanical Department employees use in performing inspections, repairs, and maintenance. Amtrak requires its Mechanical Department personnel, by signing the appropriate MAP form, to document items inspected, tasks performed, and repairs made during daily inspections, preventive maintenance, and overhauls. The foreman-in-charge is also required to sign and date these forms. The procedures and signatures required on the MAP forms constitute Amtrak's system of controls to ensure that the cleaning, inspection, and repair work was completed and complies with Amtrak's standards.

Amtrak Does Not Consistently Implement Its Passenger Car Standards

As currently implemented, Amtrak's inspection and preventive maintenance programs do not ensure that Amtrak's passenger cars are in compliance with Amtrak's standards. Mechanical Department employees do not consistently or accurately fill out and sign MAP forms during daily inspections. Also, primarily because Amtrak is short of cars and parts, cars may be released from daily inspections with deficiencies that do not meet Amtrak's standards or without required safety equipment. In addition, preventive maintenance schedules for passenger cars may not be met because cars cannot be pulled from service as necessary.

Documentation Requirements Do Not Ensure Compliance With Amtrak's Standards for Passenger Cars

The MAP form documentation does not provide assurance that Amtrak's cars are safe. Amtrak's Mechanical Department employees do not consistently or accurately document daily inspections by completing MAP forms as required for each passenger car. For example, the Boston division does not use the MAP form required for daily inspection, nor does it otherwise document daily inspections, although officials assured us that daily inspections are performed. The New York division documents the daily inspection for the entire train rather than for individual passenger cars. The policies of the remaining divisions require documentation for the daily inspection of each car.

In the Los Angeles division, we reviewed the trip inspection MAP forms for 10 cars; these forms were completed from August 1, 1992, through November 18, 1992. Out of 191 inspections, none were completely documented. Eight inspection forms lacked any signature verifying that the inspection had been performed; the remaining forms had scattered signatures indicating that parts of the inspection had been completed. Furthermore, the majority of the forms had no supervisory signature documenting that the inspection had been completed, and 78 percent of the forms had not been signed by the foreman-in-charge. In the Washington division, we also found instances of inconsistent documentation for inspections and repairs of defects. The division's Car Manager noted that although he was sure that inspections and repairs had been completed as required, it would be difficult to establish proof of equipment safety in the event of an accident.

Amtrak's policy has not specifically identified which repairs should be documented on the worksheet included in the MAP forms. Therefore, Mechanical Department employees in the divisions are inconsistent in reporting repair work on MAP forms during the daily inspection routine. For example, the Boston division does not document any repairs made

during daily inspections of passenger cars; MAP forms were completed only when cars were taken out of service for repair. At other divisions, repairs may or may not be recorded on MAP forms, depending on whether the employee deems the repair serious enough to document. Furthermore, while a carman may identify a defect requiring a car to be taken out of service for repair, the foreman has the authority to override the carman's assessment and keep the car in service. When this happens, the defect and needed repair may not be documented at all.

In addition, Amtrak does not require that equipment nearing defective condition be tagged to notify the car's next destination that repairs are likely to be needed. Mechanical Department employees told us that when a car component is identified as being near its condemnable limit but the car could make one more trip, the inspection at the next destination should identify and perform any needed repairs. In our view, not communicating these conditions to Mechanical Department personnel at the next destination increases the likelihood that the defects will not be identified and properly repaired, especially since the inspection and repair work is often done under time constraints and car shortages. The General Mechanical Superintendent for Cars explained that if a wheel was approaching unsafe limits, the division should either telephone or fax this information to the destination so that the inspection would specifically include the possible defective condition. While we found that Amtrak personnel relay information about defective interior items, we found no evidence that divisions were communicating information about safety-critical exterior defects. For example, we were told that if an inspector identified a car's wheel thickness as being at or near condemnable limits (as defined by the freight car safety standards), the inspector could notify the next destination where the problem should be identified and repaired. However, Amtrak has no instructions and/or documentation regarding this process.

Shortages of Cars and Parts Contribute to Noncompliance With Amtrak's Standards

Amtrak officials said it is not possible to take out of service all cars that do not comply with Amtrak's standards. They said Amtrak does not have enough equipment to keep up with the demand for cars and taking any car out for repairs would affect service. For example, Amtrak may operate equipment with wheels that do not meet Amtrak's standards for flange thickness. The Chief Mechanical Officer said that if the passenger car was in use and the flange was within FRA's freight car requirement of 7/8 inch, he would not expect the car to be taken out of service solely because it failed to meet Amtrak's standard of 1 inch. However, he also stated that if

the car was taken out of service for other repairs or preventive maintenance, he would expect his employees to ensure that the flange complied with Amtrak's standard of 1 inch before the car was returned to service.[1]

In one case documented by an Amtrak employee, an inspector recommended that a car be removed from service because a side bearing was being pushed out by a truck frame.[2] However, the Facility Manager allowed the car to operate without repairs because the repair shop had closed for the weekend and the car was needed for revenue service. When later repaired, the side bearing was found to have a missing retainer pin. This is considered to be a defect under FRA's freight car safety standards. We also noted a situation in which an inspector had identified serious wheel shelling,[3] but the car was allowed to operate after review by a foreman. Shelling greater than 2-1/2 inches is also a defect under FRA's freight car standards.

In addition, we noted that required public address systems and/or emergency equipment, such as fire extinguishers and first aid kits, were routinely missing from passenger cars in all divisions. Mechanical Department employees said that these items could not be replaced because they were not in stock and that not having parts in stock was a chronic problem throughout the Amtrak system. They said that they can often replace these items only by removing them from cars that are awaiting other repairs. The Chief Mechanical Officer wants to equip all passenger cars with required public address systems and has urged employees not to take the systems from other cars because the units are damaged by being removed. An Amtrak memorandum communicating a need for emergency equipment noted that trains dispatched from New York often lacked fire extinguishers and first aid kits. The memorandum further stated that

> . . . in the event of a major derailment or similar incident, the absence of this equipment could well be a major issue with NTSB and FRA.

[1]Wheel flange thickness can be increased through a process known as "truing."

[2]Rail car "trucks" are the wheel assemblies at each end of the car that include wheels, axles, bearings, springs, and suspension equipment. This assembly is supported and mounted in a frame that permits proper functioning of all component parts.

[3]Wheel shelling is an actual loss of a piece of metal from the wheel tread.

Preventive Maintenance Schedules Are Not Met Because of Car Shortages

Amtrak has a continuous backlog of cars awaiting preventive maintenance. Amtrak officials said that it is often difficult to remove cars from service for scheduled preventive maintenance because Amtrak needs all of its passenger cars for revenue service. The Chief Mechanical Officer said that he believes that no more than 10 cars at a time should be awaiting preventive maintenance for 7 days or more. However, during February 1993, as many as 80 cars were 7 or more days overdue for preventive maintenance, according to the cycles required by Amtrak's standards. Amtrak's General Mechanical Superintendent for Cars explained that this backlog resulted because the divisions performed no preventive maintenance during Thanksgiving week so that as much equipment as possible would be available for service. In May 1993, however, Amtrak still had about 50 cars overdue by 7 days or more for preventive maintenance.

Amtrak assigns its passenger cars to one of the six divisions for preventive maintenance. Although these cars may travel throughout the country, they must be returned to their assigned divisions for this servicing. The method of assigning cars allows maintenance personnel to develop needed expertise in repairing only the types of cars the division uses and also to become familiar with specific cars. Because there is such a shortage of cars, however, it is often difficult to get the car back to its assigned division in time to meet the deadline for scheduled preventive maintenance. In one case, an Amtrak Car Coordinator and Material Expeditor stated that a car's scheduled preventive maintenance was delayed for 6 weeks before the division could "capture" the car for maintenance.

According to a May 1993 equipment status summary, Amtrak needs 1,425 cars on any given day to operate its rail service. The report identified 1,500 cars actually available for service (a reserve of 75, or 5 percent over the number needed) out of a total active fleet of about 1,800.[4] The remaining active cars are awaiting repairs, maintenance, or overhaul. Amtrak officials said that a reasonable active car reserve for a railroad of Amtrak's size would be 15 percent, or about 214 cars. The current 5-percent reserve applies to Amtrak's nationwide system and to all passenger car equipment. In fact, fewer cars are available than are needed to meet service

[4]Active cars are defined as cars "in revenue service." This designation would include cars awaiting preventive maintenance and overhaul. Inactive (or "stored") cars would include retired cars awaiting sale or disposal and cars that need repairs beyond overhaul (i.e., wrecked cars).

requirements for several types of cars.[5] For example, according to the equipment status summary, Amtrak needed 257 Amfleet I coach cars but had only 247 available for service. As a result of these shortages, Amtrak has difficulty removing cars from service for preventive maintenance.

In addition, Amtrak has based its preventive maintenance cycles on budgetary restrictions and a consent decree with the U.S. Food and Drug Administration (FDA) to eliminate rodents by increasing car cleaning and fumigation. In July 1990, to save money, Amtrak lengthened the cycle for preventive maintenance from every 120 days to every 180 days for passenger coach cars and from every 90 days to every 120 days for food service cars. Then, to comply with the June 1992 FDA consent decree, Amtrak required that all food service cars be cleaned and fumigated every 60 days. Although Amtrak conducts the full preventive maintenance on food service cars every 120 days, it requires that the food service components, such as refrigeration and ovens, be inspected every 60 days and repaired as necessary. Also, in June 1992, Amtrak shortened the cycle of preventive maintenance to every 150 days for passenger cars.

Budget Reductions Have Affected Overhaul Cycles

According to Amtrak's Chief Operating Officer, overhauls are the "backbone" of Amtrak's maintenance program. Regular overhauls extend the life of passenger equipment and reduce service failures, thus keeping more equipment available for revenue service. However, Amtrak has a significant backlog of cars overdue for overhaul. The decision by the Mechanical Department to reduce its expenses by furloughing employees at its largest overhaul facility is limiting the number of passenger cars scheduled for overhaul and, in some cases, has led to the reduction of overhaul requirements.

Amtrak's Overhaul Program Is Backlogged

Since 1989, Amtrak has fallen behind on maintaining its required 4-year overhaul schedule for passenger cars. In each fiscal year since 1989, Amtrak has overhauled far fewer passenger cars than planned because funding has not been available. Nearly 40 percent of Amtrak's cars will be past due for overhaul as of the end of fiscal year 1993. Furthermore, the Mechanical Department is currently delaying overhaul of the oldest type of car—the Heritage car, which comprises the largest group (740) of cars within Amtrak's fleet—until the car has operated for over 1 million miles. In fiscal year 1992, Amtrak planned to overhaul 108 of these older cars but

[5]The various Amtrak car types have seating configurations to satisfy different service needs. Differences in car types are also the result of Amtrak's initial takeover of passenger car equipment from several other railroads when Amtrak was established.

actually overhauled only 25. Moreover, 22 of these cars received a less extensive, "light" overhaul rather than the traditional heavy overhaul. For Heritage cars, Amtrak has decided to perform just enough overhaul work to keep them running until they can be replaced with new cars. However, Amtrak's orders for new cars are (1) staggered to arrive over the next several years and (2) dependent on available funding.

A light overhaul is different from a heavy overhaul in that not all components are automatically replaced; they are inspected and replaced or repaired as needed. The Chief Mechanical Officer said, however, that he requires all trucks to be rebuilt during a light overhaul because he believes this improves the safety of the passenger car equipment as well as the quality of the ride. For Heritage cars, a light overhaul costs between $120,000 and $135,000 per car, compared with an average of more than $440,000 for a heavy overhaul.

Revenue Shortfall Has Led to Cuts in Amtrak's Overhaul Program

Amtrak's overhaul program is backlogged primarily because of budgetary constraints. During the 1992 fiscal year, Amtrak realized that its annual revenues would fall short of projections. The Chief Mechanical Officer explained that Amtrak received congressional approval to pay for some overhauls from capital appropriations rather than from its operating budget; this action averted a planned furlough in fiscal year 1992 to recoup approximately $12 million. However, in early fiscal year 1993, Amtrak indefinitely furloughed nearly a quarter of the employees at its largest overhaul facility in Beech Grove, Indiana. Officials believed that this approach offered the greatest opportunity for achieving cost reductions within the Mechanical Department.

During fiscal year 1993, Amtrak has experienced even more budgetary difficulties; its 6-month revenues fell $18 million below projections. In May 1993, officials estimated that Amtrak would have an operating shortfall of $30 million to $60 million by the end of the fiscal year and would need an additional $21 million to maintain its overhaul program even at the reduced levels resulting from the employee furloughs. Consequently, Amtrak requested a supplemental 1993 appropriation of $58 million to maintain its operations through the end of the fiscal year. In June 1993, the Congress appropriated an additional $45 million ($20 million for Amtrak's operating subsidy and $25 million for its capital subsidy).

The Chief Mechanical Officer said the Mechanical Department strives to adhere to its preventive maintenance schedule as well as make repairs as

needed during daily inspections. Any budget cuts for the Mechanical Department have, consequently, been in overhaul. He noted, however, that if Amtrak does not properly overhaul its equipment, the equipment will break down more frequently and Amtrak will be plagued with equipment availability problems.

Conclusions

Amtrak has established standards that include inspection, repair, and maintenance procedures for ensuring the safe operation of its passenger cars, as well as a system of procedures and controls to ensure that cars are in compliance while in service. However, these standards do not constitute a minimum safety threshold that would prevent cars that are not in compliance with the standards from operating. Although Amtrak officials informally treat FRA's freight car safety standards as such a threshold, there appears to be no hard-and-fast rule that determines when a car should be pulled from service for safety-critical repairs.

As Amtrak faces continuing budget problems that limit its ability to overhaul its passenger cars and chronic shortages of cars to meet its service needs, its adherence to its standards is of the utmost importance. Amtrak officials said that revenue shortfalls and insufficient operating funds have seriously affected the "backbone" of maintenance operations—the equipment overhaul program—by forcing layoffs in overhaul personnel. These layoffs have caused Amtrak to delay repairs and maintenance in order to keep as many passenger cars in revenue service as possible. Amtrak estimates that, by the end of fiscal year 1993, about 40 percent of its aging passenger car fleet will be past due for overhaul. We therefore believe that it is essential for Amtrak to develop a minimum threshold for safety-critical mechanical components in its standards, beyond which a car may not be operated.

Recommendations

To ensure that passenger cars are safe when operated, we recommend that the President of Amtrak

- establish a safety standard that identifies a minimum threshold beyond which a passenger car may not be operated and
- establish and implement procedures to ensure that cars do not operate unless they are in compliance with this safety standard.

Agency Comments

In general, Amtrak officials agreed with our findings and suggested changes to the report clarifying Amtrak's standards as maintenance rather than safety standards. We revised the report to reflect these suggestions. Amtrak officials also said that they believe Amtrak's passenger safety record is excellent and demonstrates the effectiveness of the maintenance standards. They did, however, agree that the safety criteria followed by Amtrak employees are based informally on federal freight car safety standards because there are no specific federal passenger car safety standards for mechanical components.

Federal Oversight of Passenger Car Safety Is Limited

The Secretary of Transportation is authorized by the Federal Railroad Safety Act of 1970, as amended, to regulate all areas of railroad safety, including passenger cars operated by Amtrak and commuter railroads. The Secretary has delegated this authority to FRA. The regulations define safety from FRA's perspective; if a car or locomotive is not in compliance with applicable regulations, it is not safe. However, because FRA has established few regulations applicable to passenger cars, its inspectors provide little oversight of passenger car safety. For more than 20 years, NTSB has recommended on numerous occasions that FRA expand its regulations for passenger cars, but FRA has not done so. In 1984, FRA told the Congress that it planned to study the need for standards governing the condition of safety-critical passenger car components. However, officials told us that FRA has not initiated the study because of limited resources.

Extent of Federal Oversight of Railroad Equipment Safety Varies

Federal safety regulations for passenger cars are less comprehensive than regulations for locomotives and freight cars. In particular, FRA's locomotive and freight car regulations provide detailed criteria for the condition of safety-critical mechanical components, such as wheels, bearings, and axles. Similar regulations for passenger cars do not exist. Failures in any of these components can cause derailments and/or serious injuries. Lacking such regulations for passenger cars, FRA inspectors do not have a means of determining whether a car is safe, nor can they write defects or violations for mechanical components suspected of being unsafe.

Federal Regulations for Passenger Cars Are Limited

FRA has established only three safety regulations applicable to passenger cars: power brake testing and inspection; secure external ladders, steps, and handholds (safety appliances); and certification that windows meet glass composition (glazing) standards. FRA's power brake regulations require inspection and testing of train brakes before a train is placed in service and periodic inspection and testing of the brake equipment on individual cars. The regulations for external ladders and handholds establish requirements for the location, clearance, security, and strength of safety appliances, the devices used primarily by employees to mount railroad equipment. Safety glazing regulations prescribe minimum safety standards for the impact resistance of all glazing materials used in the windows of passenger cars and locomotives. Apart from these regulations, minimum federal safety standards that would establish a safety-critical threshold for mechanical components do not exist for passenger cars.

In contrast, FRA's regulations for locomotives and freight cars establish minimum safety standards and requirements for certain mechanical and structural components. For example, regulations define minimum safety requirements for wheels and axles in terms of stress or fatigue cracking and wear and for the brake, suspension, coupling, and electrical systems, as well as for the crashworthiness of the locomotive or freight car body. Locomotive regulations require railroads to conduct daily inspections of each locomotive in use, while freight car regulations require inspections of cars before departure. These regulations also define specific testing or documentation requirements.

Specific penalties for noncompliance are included in the regulations. Locomotive suspension system standards, for example, define requirements for areas of abnormal wear on wheels. According to the standards, if a shelled-out wheel spot is 2-1/2 inches or more in length, the wheel is defective and must be repaired before the locomotive is released for service. If the shelled area is between 2-1/2 and 3 inches in length, FRA can assess a civil penalty of $2,500; if the area is greater than 3 inches in length, the penalty is $5,000.

Limited Federal Regulations Minimize FRA's Oversight Role of Passenger Cars

Without regulations defining the safe condition of mechanical and structural components, FRA inspectors can do little to ensure this aspect of passenger car safety. According to FRA officials, inspectors may examine passenger car wheel and truck components. Inspectors should report any deficiencies, as measured by the freight car standards, to Amtrak when they find them. However, these items do not constitute defects or violations and Amtrak is under no obligation to take corrective action. Moreover, Amtrak and FRA officials agreed that FRA inspectors spend most of their time inspecting locomotives, since there are more extensive locomotive regulations and penalties for noncompliance. The inspectors identify far fewer defects or violations on passenger cars.

The number of defects per Amtrak passenger car identified by FRA inspectors on inspection reports from 1989 to 1992 was quite low compared with the number of defects identified per Amtrak locomotive. For the power brake, safety appliance, and window glazing regulations that apply to both types of equipment, FRA identified an average of 0.35 defects per passenger car compared with 1.25 defects per locomotive in Amtrak's fleet. In addition, FRA identified 5,506 defects (or about 12 per locomotive in Amtrak's active fleet) under its locomotive safety standards

for the 4-year period. Since no similar passenger car safety standards exist, no comparable defects were identified for Amtrak's passenger car fleet.

In cases of significant safety risk, FRA inspectors can also remove freight cars and locomotives from service under a "Special Notice for Repairs" action (49 CFR 216, subpart B) and prohibit movement if the equipment either does not meet freight car and locomotive regulations (parts 215 and 229) or presents a safety risk to operate. Following this action, the railroad is required to notify the FRA Regional Director of Railroad Safety in writing of the repairs made to the locomotive or freight car when the equipment is returned to service. Since 1988, FRA has removed 29 locomotives and 1 freight car from Amtrak service for regulatory noncompliance.

Agency officials told us that FRA also has the authority to remove passenger cars under this regulation. While we agree that the Federal Railroad Safety Act would permit such action, the regulation addresses only freight cars and locomotives; it does not provide the same regulatory coverage for passenger cars. Moreover, since there are no safety regulations for the mechanical components of passenger cars, the only basis for such action would be an inspector's determination that the car in question was unsafe. Such a determination would be much more subjective and difficult to sustain, leading to few if any actions being taken. In fact, FRA has not removed any Amtrak passenger cars from service over the past 6 years.

NTSB Has Recommended Further Regulation of the Passenger Rail Industry

NTSB has made numerous recommendations that FRA expand its safety regulations for passenger rail equipment. FRA has not acted on these recommendations because officials believe that they can achieve the same improvements in safety without the force of regulation and in far less time than would be required to establish and implement a regulation. They cited Amtrak's installation of seat locks and luggage restraints as examples of successful, cooperative actions initiated without the force of regulation. When we examined the history of these corrective actions, however, we found that more than 20 years had elapsed between NTSB's initial recommendations and the actual retrofitting of Amtrak's cars to implement the recommendations. Because FRA has not expanded its passenger car regulations, NTSB officials said that they now make safety recommendations directly to passenger rail operators, including Amtrak.

NTSB has long recognized the potential for unrestrained luggage and inadequately designed and secured seats to cause serious injury to

passengers. In its investigation of a 1969 derailment of a Penn Central passenger train on the corridor north of Washington, D.C., in which 144 persons were injured, NTSB concluded that most of the injuries were sustained when people were thrown from rotating seats or struck by flying luggage and loose objects. NTSB recommended that FRA initiate studies to determine the relationship between car design and passenger injury and, where practical, take action for correction in the design of future high-speed and rapid transit cars.

In 1971, NTSB went further, recommending that FRA immediately establish regulations requiring that all future (new and rebuilt) passenger cars be equipped with seat locks and luggage restraints. NTSB made this recommendation following a January 1970 train derailment near Franconia, Virginia, in which 3 of 101 passengers were killed and 50 were injured. In 1984, NTSB recommended that FRA expedite studies on the interior design of passenger cars that FRA had promised in a January 1984 report to the Congress.

Then, in 1987, an Amtrak train collided with three freight locomotives in Chase, Maryland, killing 16 and injuring 174 passengers and crew members. The accident report stated that many passengers were injured unnecessarily because not all of the seats were adequately secured against undesired rotation; many seat backs became detached, exposing their sheetmetal frames; luggage was stowed in open luggage racks above the seats; and unsecured equipment was thrown into the aisles in the food service cars.

Following the accident, NTSB again repeated its recommendation that FRA publish guidelines on the installation of seat locks and luggage restraints. In 1988, FRA responded as follows:

> We have, in the past, informed the [NTSB] Board that we do not intend to pursue regulatory action on these "Amtrak only" issues, and the reasons for that are practical ones. The Department of Transportation is Amtrak's banker and functional owner. The Secretary sits on its Board [of Directors]. With this particular carrier, we can accomplish these safety objectives more directly and efficiently by direct involvement in the company's policy making process than by instituting single carrier regulatory proceedings that could take years to complete.

Amtrak acted on NTSB's recommendations concerning seat locks and luggage restraints after the 1987 Chase accident. As of 1993, Amtrak had voluntarily installed seat locks on virtually all passenger cars and luggage

restraints on about 90 percent. These modifications responded to recommendations that NTSB had made to Amtrak in 1984 and to FRA since 1969.

In addition, NTSB recognizes that freight and passenger cars are inherently different and that the freight car safety standards Amtrak informally follows may not be appropriate for passenger cars. NTSB's Mechanical Group Factual Report for a July 1991 Amtrak accident in Lugoff, South Carolina,[1] described basic differences in construction and functionality between passenger car trucks and freight car trucks. The report stated that passenger car trucks are designed as a separate system from the car body. In addition to supporting the car body, the trucks are designed to minimize the transfer of track-generated forces to the car body. This is primarily accomplished through three devices unique to the trucks on passenger cars: the swing-hanger bolster, the equalizer beam, and the rigid passenger truck frame. These devices would not be addressed by freight car safety standards.

FRA Has Not Studied the Need for Minimum Criteria for the Safety of Passenger Car Components

Responding to a requirement in the 1983 amendment to the Federal Railroad Safety Act, FRA issued a report to the Congress on passenger equipment safety in 1984. The report stated that proper maintenance and inspection of rail passenger equipment are critical elements of safety. Even though the report cited the excellent safety record of the passenger rail industry, FRA noted that passenger cars were no longer covered under industry interchange agreements.[2] Close monitoring of passenger rail safety by FRA was therefore necessary, according to the report.

Before the formation of Amtrak, passenger cars had been owned primarily by individual railroads, and their operation over the lines of other railroads had been accomplished through standard interchange agreements. According to the report, these agreements generally reflected consensus opinions about passenger car design, inspection, testing, and maintenance. While these agreements did not have the force of regulation, they represented guidelines followed by the industry. However, AAR deleted the

[1]NTSB had not yet issued results of its accident investigation in Lugoff, South Carolina, at the time of our review. In this accident, the last 6 cars in an 18-car Amtrak train derailed, resulting in 8 fatalities and 15 people hospitalized for injuries.

[2]AAR's Rules of Interchange provide standards for the condition of rail cars that switch trains and railroads ("interchange") as they move to their destination. All freight railroads have agreed to abide by these rules. Since Amtrak uses its own locomotives to move its cars throughout the country, railroads no longer interchange passenger cars, and AAR discontinued publication of the passenger car portion of its interchange rules.

provisions concerning passenger cars from its interchange rules in 1984 and republished them as recommended industry practices.[3] In fact, Amtrak's current procedures for inspection, repair, and maintenance of equipment are based on these guidelines.

Nevertheless, the report stated that FRA would conduct a study in 1984 to assess the need to establish a uniform set of minimum criteria for the condition of various safety-critical components on passenger cars, such as wheels, axles, and bearings. The study would also explore with passenger service providers (i.e., Amtrak and the commuter railroads) the technical and operational changes occurring in the passenger rail industry that might have an adverse effect on safety. However, the study was never initiated. According to the Director, Office of Safety Enforcement, FRA had very limited resources and other work had higher priority.

In the 1984 report to the Congress, FRA recognized that passenger rail service included more than just Amtrak; it (1) comprised 20 operators and authorities (including commuter railroads and Amtrak) that provided passenger service over 138 distinct routes totaling 28,500 route miles, (2) operated more than 1.5 million trains, and (3) carried 344 million passengers. Moreover, in a 1991 study on high-speed rail issues, FRA stated that it cannot rely on attaining and maintaining the same sort of relationship with the management of each new high-speed rail system as FRA has with Amtrak.

Conclusions

Because FRA has established few regulations for passenger car safety, it has little enforcement authority over much of Amtrak's passenger rail equipment. Safety standards for safety-critical mechanical components do not exist for passenger cars as they do for freight cars and locomotives. In our view, FRA's justification for not regulating cars—that this is an "Amtrak only" issue that can better be addressed informally—ignores a major portion of the passenger rail industry and has not generated timely safety measures, even for Amtrak. Given that commuter railroads transport over 300 million passengers annually and Amtrak has taken 20 years to implement some of NTSB's recommendations for safety modifications, FRA's approach to ensuring the safety of passenger cars does not provide adequate safety coverage of the passenger rail industry. However, we believe the promised study of safety-critical passenger car components

[3]AAR's deletion of provisions concerning passenger cars, including brake systems, also caused FRA to amend its Power Brake Standards to ensure continued inspection and testing of the brake systems on passenger cars. Certain FRA brake inspection and testing requirements were keyed to the AAR's rules. Without this amendment, FRA's requirements would not have effective referents.

would provide FRA and the Congress with a factual basis for determining the best approach to overseeing passenger car safety.

Recommendations

We recommend that the Secretary of Transportation direct the FRA Administrator to conduct a study that considers all passenger service providers in assessing the need for establishing minimum criteria for the condition of safety-critical components on passenger cars. We further recommend that the Administrator establish any passenger car component regulations that the study shows to be advisable, taking into account any internal safety standards developed by Amtrak or others that pertain to passenger car components.

Agency Comments

In commenting on a draft of our report, FRA generally agreed with the thrust of the report and stated that ". . . within its limits, it fairly reflects the current [inspection and enforcement] situation." FRA's Associate Administrator for Safety said that FRA has a three-tier approach for investigating the need for passenger car regulations. The three tiers—(1) high-speed passenger service, (2) conventional passenger service, and (3) historical and excursion service—represent FRA's priorities in conducting its investigations. He said that FRA is currently involved in setting high-speed rail regulations as it qualifies equipment from Europe to be tested in the United States. However, the Associate Administrator, the Director of the Office of Safety Enforcement, and other agency officials took exception to the report in a number of areas. Overall, they said that the report lacked balance because we did not refer to Amtrak's equipment safety history. They said such information would make it clear that Amtrak's passenger cars are safe.

We analyzed Amtrak's safety record as reflected by the statistics on accidents reported to FRA and published in FRA's Accident/Injury Bulletins from 1980 to 1992. Railroads are required to report only the more serious accidents that occur each year, including any accident in which a death or injury occurred and/or damages amounted to over $6,300. We found no general downward trend in total accidents, equipment-caused accidents, or accidents per million train miles (see app. I). Since 1985, Amtrak has had 23 passenger fatalities resulting from train accidents—15 in the 1987 Chase, Maryland, accident and 8 in the 1991 Lugoff, South Carolina, accident. Furthermore, since Amtrak is the only intercity passenger rail provider in the continental United States, we were unable to compare its safety record to the records of similar providers. In our view, FRA would be

in a better position to judge the safety of Amtrak's passenger equipment if it had a standard—established by either FRA or Amtrak—by which it could measure safety.

Amtrak's Accident/Injury Data

Table I.1: History of Amtrak's Equipment Accidents Reported to FRA, 1980-92

Year	Train miles	Equipment accidents	Total accidents	Ratio of equipment to total accidents (percent)	Accidents per million train miles	Equipment accidents per million train miles
1980	29,940,609	25	124	20.2	4.142	0.835
1981	31,125,104	21	97	21.6	3.116	0.675
1982	29,917,844	17	117	14.5	3.911	0.568
1983	29,626,679	8	62	12.9	2.093	0.270
1984	29,078,103	7	64	10.9	2.201	0.241
1985	29,030,776	13	62	21.0	2.136	0.448
1986	29,040,776	14	57	24.6	1.963	0.482
1987	32,623,668	17	85	20.0	2.605	0.521
1988	34,927,173	9	98	9.2	2.806	0.258
1989	38,976,550	22	98	22.4	2.514	0.564
1990	39,257,926	15	113	13.3	2.878	0.382
1991	38,779,087	32	117	27.4	3.017	0.825
1992	41,818,549	11	90	12.2	2.152	0.263

Source: FRA Accident/Incident Bulletins, 1980-92; GAO's calculations.

Table I.2: Fatalities and Injuries Resulting From Amtrak Train Accidents, 1980-92

Year	Passenger fatalities	Employee on duty fatalities	Passenger injuries	Employee on duty injuries
1980	1	0	72	81
1981	0	0	5	48
1982	3	0	24	46
1983	4	0	48	57
1984	4	1	78	60
1985	0	0	77	57
1986	0	0	24	29
1987	15	1	190	53
1988	0	0	14	69
1989	0	3	61	65
1990	0	1	188	67
1991	8	0	32	19
1992	0	0	101	29

Source: FRA Accident/Incident Bulletins, 1980-92.

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