

January 2011

# RAIL TRANSIT

## FTA Programs Are Helping Address Transit Agencies' Safety Challenges, but Improved Performance Goals and Measures Could Better Focus Efforts



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## Why GAO Did This Study

Although transit service is generally safe, recent high-profile accidents on several large rail transit systems—notably the June 2009 collision in Washington, D.C., that resulted in nine fatalities and 52 injuries—have raised concerns. The Federal Transit Administration (FTA) oversees state agencies that directly oversee rail transit agencies' safety practices. FTA also provides assistance to transit agencies, such as funding and training, to enhance safety. GAO was asked to determine (1) the challenges the largest rail transit systems face in ensuring safety and (2) the extent to which assistance provided by FTA addresses these challenges. GAO visited eight large rail transit systems and their respective state oversight agencies, reviewed pertinent documents, and interviewed rail transit safety experts and officials from FTA and the National Transportation Safety Board (NTSB).

## What GAO Recommends

To guide and track the performance of FTA's rail transit safety efforts, DOT should direct FTA to use leading practices to set clear and specific goals and measures for these efforts. DOT and NTSB reviewed a draft of this report and provided technical comments and clarifications, which we incorporated as appropriate. DOT agreed to consider the recommendation.

## RAIL TRANSIT

### FTA Programs Are Helping Address Transit Agencies' Safety Challenges, but Improved Performance Goals and Measures Could Better Focus Efforts

## What GAO Found

The largest rail transit agencies face several challenges in trying to ensure safety on their systems. First, according to some experts we interviewed, the level of safety culture—awareness of and organizational commitment to the importance of safety—varies across the transit industry and is low in some agencies. NTSB found that the lack of a safety culture contributed to the June 2009 fatal transit accident in Washington, D.C. Second, with many employees nearing retirement age, large transit agencies have found it difficult to recruit and hire qualified staff. It is also challenging for them to ensure that employees receive needed safety training because of financial constraints and the limited availability of technical training. Training helps ensure safe operations; NTSB has identified employee errors, such as not following procedures, as a probable cause in some significant rail transit accidents. Third, more than a third of the largest agencies' assets are in poor or marginal condition. While agencies have prioritized investments to ensure safety, delays in repairing some assets, such as signal systems, can pose safety risks. The transit industry has been slow to adopt asset management practices that can help agencies set investment priorities and better ensure safety.

FTA has provided various types of assistance to transit agencies to help them address these challenges, including researching how to instill a strong safety culture at transit agencies, supporting a variety of safety-related training classes for transit agency staff, and providing funding to help agencies achieve a state of good repair. The Department of Transportation (DOT) has proposed legislation that would give FTA the authority to set and enforce rail transit safety standards, which could help improve safety culture in the industry. FTA is also planning improvements to its training program and the development of asset management guidance for transit agencies, among other things. Some legislative proposals, studies, experts, and agency officials have identified further steps that FTA could take to address transit agencies' safety challenges, such as requiring transit agencies to implement asset management practices. Some of these suggested further steps may have the potential, if implemented, to enhance rail transit safety. DOT is currently developing a legislative proposal for reauthorizing surface transportation programs and may include new rail transit safety initiatives in this proposal. In addition, clear and specific performance goals and measures could help FTA target its efforts to improve transit safety and track results. GAO has identified leading practices to establish such performance goals and measures, but FTA has not fully adopted these practices. For example, FTA has not identified specific performance goals that make clear the direct results its safety activities are trying to achieve and related measures that would enable the agency to track and demonstrate its progress in achieving those results. Without such specific goals and measures, it is not clear how FTA's safety activities contribute toward DOT's strategic goal of reducing transportation-related injuries and fatalities, including rail transit injuries and fatalities. Furthermore, problems with FTA's rail transit safety data could hamper the agency's ability to track its performance. GAO is making recommendations for improving these data in a separate report ([GAO-11-217R](#)).

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## Abbreviations

APTA	American Public Transportation Association
BART	Bay Area Rapid Transit
CTA	Chicago Transit Authority
DOT	Department of Transportation
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
LA Metro	Los Angeles County Metropolitan Transportation Authority
MBTA	Massachusetts Bay Transportation Authority
NTSB	National Transportation Safety Board
NYCT	New York City Transit
Recovery Act	American Recovery and Reinvestment Act of 2009
SF Muni	San Francisco Municipal Transportation Agency
WMATA	Washington Metropolitan Area Transit Authority

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**G A O**

Accountability \* Integrity \* Reliability

**United States Government Accountability Office**  
Washington, DC 20548

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January 31, 2011

The Honorable Tim Johnson  
Chairman  
The Honorable Richard C. Shelby  
Ranking Member  
Committee on Banking, Housing,  
and Urban Affairs  
United States Senate

Although rail transit is a relatively safe mode of transportation, recent high-profile accidents at several of the nation's largest rail transit systems have raised concerns. The most serious of these accidents was the collision of two metrorail trains in Washington, D.C., on June 22, 2009, resulting in nine fatalities and 52 injuries. Over the last several years, collisions and derailments resulting in injuries and, in some cases, fatalities, have occurred on other large transit systems, including those in Boston, Chicago, and San Francisco. Moreover, according to the Federal Transit Administration (FTA), from January 2004 through November 2010, 16 transit right-of-way workers and inspectors were struck and killed by trains or other vehicles while working along tracks on five rail transit systems.<sup>1</sup>

FTA, an agency within the U.S. Department of Transportation (DOT), is responsible for monitoring and promoting safety on rail transit systems operated by 47 rail transit agencies that receive federal funding through FTA's State Safety Oversight Program and ongoing assistance programs.<sup>2</sup> FTA requires states with one or more of these rail systems to designate a state safety oversight agency, which is responsible for establishing standards for rail safety practices and procedures to be used by rail transit agencies within its purview and for directly overseeing their compliance with these standards. While FTA does not directly oversee transit agencies, it does oversee these state safety oversight agencies. FTA also

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<sup>1</sup>A rail right-of-way is an area of land over which a train runs.

<sup>2</sup>49 C.F.R. Part 659. FTA also is responsible for monitoring and promoting security at rail transit agencies. This report focuses on safety only. We reported on FTA's State Safety Oversight Program in 2006; see GAO, *Rail Transit: Additional Federal Leadership Would Enhance FTA's State Safety Oversight Program*, [GAO-06-821](#) (Washington, D.C.: July 26, 2006).

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provides assistance to transit agencies to help them maintain and enhance safety, including funding for capital improvements, safety-related training, technical assistance, and guidance.<sup>3</sup> FTA has less authority to oversee safety than some other DOT agencies, such as the Federal Railroad Administration (FRA) that oversees freight, intercity passenger, and commuter railroads by setting and enforcing safety regulations. DOT is seeking legislative authority to directly regulate and enforce rail transit safety. There were several legislative proposals introduced during the 111th Congress to give FTA authority to establish safety regulations for rail transit agencies and, in cooperation with the states, oversee and enforce compliance by these agencies with these regulations.<sup>4</sup>

Concerned about recent high-profile accidents, the former Chairman of the Committee and Senator Shelby asked us to identify and review the challenges associated with enhancing safety on major rail transit systems. In response, this report discusses (1) the challenges the largest rail transit systems face in ensuring safety and (2) the extent to which assistance provided by FTA addresses these challenges.<sup>5</sup> Based on investigations completed by the National Transportation Safety Board (NTSB), we are also reporting on factors that have contributed to significant rail transit accidents. This topic is discussed in appendix I. We originally intended to also report on safety trends based on data collected by FTA, but we determined that these data were not sufficiently reliable for this purpose. We are reporting separately on the reliability of FTA's safety data.<sup>6</sup> For the

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<sup>3</sup>FTA does have authority to investigate unsafe conditions in any operation it finances. FTA can withhold federal funds until a plan for correcting unsafe conditions has been approved, but it does not have authority to levy fines or take legal actions against transit agencies.

<sup>4</sup>Public Transportation Safety Act of 2010, S. 3638, 111th Cong. (2010); Public Transportation Safety Program Act of 2010, S. 3015, and H.R. 4643, 111th Cong. (2010).

<sup>5</sup>The DOT Office of Inspector General currently is reviewing the challenges and risks related to increasing federal oversight of transit safety, and expects to issue a report in March 2011. To avoid overlapping reviews, we focused on DOT's efforts to provide safety-related assistance to transit agencies. We testified on this proposed strengthening of federal oversight of rail transit safety in late 2009; see GAO, *Rail Transit: Observations on FTA's State Safety Oversight Program and Potential Change in Oversight Role*, [GAO-10-293T](#) (Washington, D.C.: Dec. 8, 2009).

<sup>6</sup>See GAO, *Rail Transit: Reliability of FTA's Rail Accident Database*, [GAO-11-217R](#) (Washington, D.C.: Jan. 31, 2011).

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purpose of this study, we are focusing on heavy and light rail systems, as they represent more than 90 percent of all rail fixed guideway systems.<sup>7</sup>

To determine the challenges that the largest rail transit systems face in ensuring safety, we selected and visited five large heavy rail transit systems and three large light rail transit systems operated by seven rail transit agencies, using criteria such as annual ridership (measured by unlinked passenger trips and passenger miles), the number of rail transit vehicles in revenue service operation, and total track mileage.<sup>8</sup> The five heavy rail systems we selected were the Massachusetts Bay Transportation Authority (MBTA), the Metropolitan Transportation Authority New York City Transit (NYCT), the Washington Metropolitan Area Transit Authority (WMATA), the Chicago Transit Authority (CTA), and the Bay Area Rapid Transit (BART). The three light rail systems we selected were MBTA, the San Francisco Municipal Transportation Agency (SF Muni), and the Los Angeles County Metropolitan Transportation Authority (LA Metro). For each of these systems, we visited the transit agency, obtaining agency budget documents, accident and audit reports, corrective action plans, and staffing and training information, among other information and documentation. In addition, we interviewed representatives from these transit agencies and their respective state safety oversight agencies.

To determine the extent to which FTA's assistance addresses the safety challenges faced by the largest transit agencies, we reviewed FTA documents on funding, state of good repair initiatives, technical assistance programs, transit safety training, and guidance and outreach related to rail transit safety. We also obtained information on transit safety training from the National Transit Institute and the Transportation Safety Institute. We interviewed officials from FTA and NTSB, representatives of the American

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<sup>7</sup>FTA defines a rail fixed guideway system as any light, heavy, or rapid rail system, monorail, inclined plane, funicular, trolley, or automated guideway that: (1) is not regulated by FRA; and (2) is included in FTA's calculation of fixed guideway route miles, or receives funding under FTA's formula program for urbanized areas; or (3) has submitted documentation to FTA indicating its intent to be included in FTA's calculation of fixed guideway route miles to receive funding under FTA's formula program for urbanized areas. Heavy rail systems operate on exclusive tracks while light rail systems operate on either exclusive tracks or tracks in the street on the same level with pedestrians and vehicular traffic.

<sup>8</sup>Unlinked passenger trips are the number of passengers boarding the public transportation vehicles; passenger miles are the cumulative sum of the distances ridden by each passenger.

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Public Transportation Association (APTA), and 12 rail transit safety experts on the challenges that large rail transit agencies face in ensuring safety and the potential ways that FTA could improve its safety assistance efforts. The rail transit safety experts we interviewed were identified for us by the National Academies' Transportation Research Board and included representatives from the transit industry, academia, labor unions, and the rail consulting community. We also asked officials from the transit systems we visited and their respective state safety oversight agencies for their assessment of FTA's assistance efforts. We reviewed applicable federal regulations, laws, and legislative proposals. In addition, we consulted our prior work on performance management and rail transit issues. A more detailed description of our scope and methodology appears in appendix II, including a list of the rail transit safety experts we interviewed.

We conducted this performance audit from November 2009 to January 2011 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

Rail transit is an important component of the nation's transportation network, particularly in large metropolitan areas. Rail transit systems provide around 4.3 billion passenger trips annually. The five largest heavy rail systems carried 3.2 billion passengers in 2008, 90 percent of all heavy rail trips. The NYCT system surpassed all the other heavy rail systems by carrying almost 2.4 billion passengers—2.1 billion more than the next largest heavy rail system. Conversely, the five largest light rail systems are much smaller, collectively carrying 244 million passengers in 2008. The largest light rail system, operated by MBTA, carried 74 million passengers. Public transit is seen as an affordable mode of transportation and a means to alleviate roadway congestion and emissions. Increases in gasoline prices over the past decade also have resulted in higher ridership, which peaked in fall 2008. Although ridership declined in 2009 by about 4



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percent, following the 2008 economic recession and a decrease in gasoline prices, transit ridership is expected to grow in years to come.<sup>9</sup>

Heavy and light rail transit systems have developed throughout the nation over the past 100 years. The oldest systems in cities such as Boston, New York, and Chicago, among others, were generally built by private companies which eventually went out of business, requiring the systems' respective local governments to provide financial help to keep the systems operating. During the 1960s, Congress established a federal capital assistance program for mass transportation. With federal capital assistance, many other cities constructed rail transit systems, including heavy rail systems in Atlanta, San Francisco, and Washington, D.C. Heavy rail systems tend to be larger and carry many more passengers than light rail systems. While there are currently more than twice as many light rail systems as there are heavy rail systems, the heavy rail systems carry about seven times as many passengers and cover more than 50 percent more miles of track than light rail systems (see fig.1). The types of safety risks associated with each rail mode differ somewhat. For example, the higher volume of passengers, the higher speed of the trains, and the third rail on the track pose safety risks for heavy rail systems; the numerous interfaces between rail cars and vehicular traffic and pedestrians pose safety risks for light rail systems. Since the 1980s, newly constructed systems have been predominantly light rail systems.

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<sup>9</sup>GAO, *Public Transportation: Transit Agencies' Actions to Address Increased Ridership Demand and Options to Help Meet Future Demand*, [GAO-11-94](#) (Washington, D.C.: Nov. 30, 2010).

**Figure 1: Characteristics of Heavy and Light Rail Systems Nationwide, as of 2008**

**Heavy rail**



A heavy rail train operated by CTA.

15 systems nationwide

A rail fixed guideway system that has high-speed and rapid acceleration passenger rail cars operating singly or in multicar trains that operate on exclusive tracks and are powered by electricity (typically from a third rail). There is usually a separate right-of-way from which all other traffic is excluded. Heavy rail systems may also have sophisticated signaling, high platform loading, and a heavy passenger volume. Typically includes subways.

Annual total passenger trips: **3.5 billion**

Total track miles: **2,277**

**Light rail**



A light rail train operated by SF Muni.

33 systems nationwide<sup>a</sup>

A rail fixed guideway system that operates on either exclusive tracks or on tracks in the street on the same level with pedestrians and vehicular traffic. Light rail typically draws power from overhead wires and operates as single cars or short trains. It has a lighter passenger volume compared to heavy rail. Typically includes streetcars and trolley service.

Annual total passenger trips: **454 million**

Total track miles: **1,539**

Sources: FTA and APTA 2008 data; GAO photos.

<sup>a</sup>This does not include the Galveston Island Transit System, which is currently not in operation (but plans to resume in the future) and the Hampton Roads Transit System, which is projected to start operations in May 2011.

Rail transit systems are managed by public transit agencies accountable to their local government. However, rail transit agencies rely on a combination of local, state, and federal funds, in addition to system-

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generated revenues such as fares, to operate and maintain their systems. Some states and local governments provide a dedicated revenue source for transit, such as a percentage of the state or local sales tax, or issue bonds for public transportation. In 2008, about 57 percent of all funds for both operating expenses and capital investments were from local and state government. Other sources, such as farebox revenues, provided 26 percent. The federal government's share was about 17 percent. Even though federal funding has predominantly been for capital investments, by 2008 local government replaced the federal government as the largest source of capital investment funds.<sup>10</sup> However, in the past few years there have been decreases in the amounts of state and local funding available to transit agencies, especially for those agencies that depend on tax revenues, which have experienced decreases as a result of the general economic slowdown faced by the nation. As a result, many transit agencies have faced budget cutbacks.

FTA uses many funding programs to support transit agencies. In particular, two FTA programs—the Urbanized Area Formula Program and the Fixed Guideway Modernization Program—provide funding that can be used by existing transit agencies in urbanized areas to modernize or improve their systems.<sup>11</sup> Specifically, these funds can be used for purchasing and rehabilitating rail cars and preventive maintenance, among other things. In 2009, additional funds were made available through the American Recovery and Reinvestment Act (Recovery Act).<sup>12</sup> Recovery Act funds are used primarily for capital projects, although some funds were made available for and have been used for operating expenses.<sup>13</sup>

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<sup>10</sup>[GAO-11-94](#).

<sup>11</sup>Urbanized areas are areas encompassing a population of not less than 50,000 that have been defined and designated in the most recent decennial census as an “urbanized area” by the Secretary of Commerce. For fiscal year 2010, \$4.1 billion was apportioned for the Urbanized Area Formula Program (49 U.S.C. § 5307) and \$1.6 billion was apportioned for the Fixed Guideway Modernization Program (49 U.S.C. § 5309(b)(2)). The New Starts and Small Starts programs provide funds for the design and construction of new fixed guideway projects, but not existing projects. 49 U.S.C. § 5309(d)(e).

<sup>12</sup>Pub. L. No. 111-5, 123 Stat. 115 (Feb. 17, 2009). Approximately \$8.4 billion in Recovery Act funds were awarded through fiscal year 2010 orders from FTA’s base transit formula programs, including the Urbanized Area Formula and the Fixed Guideway Modernization programs, to support transit projects that can contribute to creating jobs.

<sup>13</sup>In June 2009, urbanized areas and states were given the authority to use up to 10 percent of certain Recovery Act transit funds for operating expenses. Supplemental Appropriations Act, 2009, Pub. L. No. 111-32, §1202, 123 Stat. 1859, 1908 (June 24, 2009).

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In comparison with other modes of transportation, rail transit is relatively safe. For example, occupants of motor vehicles are more than 70 times more likely to die in accidents while traveling as are passengers of rail transit systems.<sup>14</sup> However, several large rail transit agencies in recent years have had major accidents that resulted in fatalities, injuries, and significant property damage. NTSB has investigated a number of these accidents and has issued reports identifying the probable causes of and factors that contributed to them.<sup>15</sup> Since 2004, NTSB has reported on eight rail transit accidents that, collectively, resulted in 13 fatalities, 297 injuries, and about \$29 million in property damages. In five of these accident investigations, NTSB found the probable cause to involve employee errors, such as the failure of the train operator to comply with operating rules and of track inspectors to maintain an effective lookout for oncoming trains while working on the tracks. Of the remaining three accidents, NTSB found that problems with equipment were a probable cause of two accidents and that weaknesses in management of safety by the transit agency were a probable cause in all three accidents. In six of these investigations, NTSB reported that contributing factors involved deficiencies in safety management or oversight, such as weaknesses in transit agencies' safety rules and procedures, lack of a safety culture within the transit agency, and lack of adequate oversight by the transit agency's state safety oversight agency and FTA.<sup>16</sup> See appendix I for further information on these accident investigations.

Transit agencies are responsible for the operation, maintenance, and safety and security of their rail systems but are subject to a tiered state and federal safety oversight program. The Intermodal Surface Transportation Efficiency Act of 1991 mandated FTA to establish a State Safety Oversight Program for rail fixed guideway public transportation systems that are not subject to FRA regulation. Through this program, FTA monitors 27 state safety oversight agencies that oversee the safety of rail

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<sup>14</sup>For information on fatality rates by type of mode, see DOT Bureau of Transportation Statistics' *National Transportation Statistics 2010*.

<sup>15</sup>NTSB is an independent establishment of the U. S. government charged with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation. NTSB may elect to investigate certain accidents related to the transportation of individuals that it decides are catastrophic, involve problems of a recurring nature, or whose investigation is expected to bring about safety improvements.

<sup>16</sup>As we discuss later in this report, safety culture can be defined in different ways but is essentially an awareness of and organizational commitment to safety shared by all employees at all levels within the organization.

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transit operations in 25 states, the District of Columbia, and Puerto Rico.<sup>17</sup> While FTA has discretionary authority to investigate safety hazards at transit systems it funds, it does not have authority to directly oversee safety programs of rail transit agencies. FTA, however, does have the authority and responsibility for overseeing transit agencies' workplace drug and alcohol testing programs.<sup>18</sup> FTA also collects safety data, including data on types of accidents and causes, from the state safety oversight agencies and the transit agencies they oversee. Transit agencies provide safety data for FTA's National Transit Database while the state safety oversight agencies provide safety data through annual reports to FTA.

Under FTA regulations, state safety oversight agencies must develop a program standard that outlines transit agencies' safety responsibilities. In particular, transit agencies are required to develop and implement safety programs that include, among other things,

- standards and processes for identifying safety concerns and hazards, and ensuring that they are addressed;
- a process to develop and ensure compliance with rules and procedures that have a safety impact; and
- a safety training and certification program for employees.<sup>19</sup>

Moreover, FTA requires state safety oversight agencies to perform safety audits of their transit agencies at least once every 3 years, investigate transit accidents, and ensure that deficiencies are corrected. FTA, however, does not fund state safety oversight agencies to carry out this work. Our earlier work found that many state safety oversight agencies lacked adequate staffing, employed varying practices, and applied FTA's regulations differently.<sup>20</sup> As noted earlier, FTA's role in overseeing safety

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<sup>17</sup>This program covers all states with rail fixed guideway systems operating in their jurisdictions that: (1) are not regulated by the FRA; and (2) are included in FTA's calculations of fixed guideway route miles or receive FTA formula program funding for urbanized areas; or (3) have submitted documentation to FTA to be included in FTA's calculation of fixed guideway route miles to receive FTA formula funding.

<sup>18</sup>FTA's rule on drug and alcohol testing is found at 49 C.F.R. Part 655.

<sup>19</sup>See 49 C.F.R. Part 659, Rail Fixed Guideway Systems; State Safety Oversight.

<sup>20</sup>[GAO-06-821](#).

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on rail transit systems is relatively limited, which is reflected in the number of staff that it employs to fill that role. FTA's Office of Safety and Security has 15 to 17 staff members managing safety, security, and emergency management programs. They are supported by contractor staff.

In December 2009, DOT proposed to Congress major changes in FTA's role that would shift the balance of federal and state responsibilities for oversight of rail transit safety. DOT proposed the following:

- FTA, through legislation, would receive authority to establish and enforce minimum safety standards for rail transit systems not already regulated by FRA.
- A state may continue to have a state safety oversight program to oversee public transportation safety—by “opting in”—given that its program complies with the federal laws, regulations, and policies that FTA would implement if it receives expanded authority proposed in the legislation. DOT would provide federal assistance to states with FTA-approved state safety programs to enforce the federal minimum safety standards. Participating states could set more stringent safety standards if they chose to do so.
- In states that decided to “opt out” of participation or where FTA has found the program proposals inadequate, FTA would oversee compliance with and enforce federal safety regulations.

Subsequently, during the 111th Congress, several bills including these changes were proposed.<sup>21</sup>

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<sup>21</sup>One bill, The Public Transportation Safety Act of 2010, S. 3638, 111th Cong. (2010), proposed broadening DOT's proposed scope by requiring DOT to establish a public transportation safety certification training program for federal, state, and rail transit agency employees and others who are responsible for safety oversight and establish a national transit asset management system to measure and track the conditions of rail transit assets.

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## Transit Agencies Face Challenges in Ensuring the Safety of Their Rail Systems

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### Instilling Safety Culture Is a Challenge for the Largest Transit Agencies

Instilling a safety culture agencywide is a challenge the largest transit agencies face that can impact their ability to ensure safe operations.<sup>22</sup> The concept of safety culture can be defined in different ways and the level of safety culture in an organization can be difficult to measure. As we have previously reported, safety culture can include:

- organizational awareness of and commitment to the importance of safety,
- individual dedication and accountability for those engaged in any activity that has a bearing on safety in the workplace, and
- an environment in which employees can report safety events without fear of punishment.<sup>23</sup>

According to NTSB officials, in organizations with effective safety cultures, senior management demonstrates a commitment to safety and a concern for hazards that are shared by employees at all levels within the organization. Furthermore, such organizations have effective safety management systems that include appropriate safety rules and procedures, employee adherence to these rules and procedures, well-defined processes for identifying and addressing safety-related problems, and adequate safety training available for employees and management.

FTA officials told us that it is difficult to define safety culture but noted that attributes of a strong safety culture include open communication about safety throughout the agency, nonpunitive safety reporting by employees, and the identification of safety trends based on agency-collected data. In addition, APTA officials told us that another attribute of

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<sup>22</sup>All 12 rail transit safety experts we interviewed identified safety culture as a challenge large transit agencies face in ensuring safety. In addition, four of the seven transit agencies we visited identified safety culture as a challenge for their transit agency.

<sup>23</sup>GAO, *Biological Laboratories: Design and Implementation Considerations for Safety Reporting Systems*, [GAO-10-850](#) (Washington, D.C.: Sept. 10, 2010).

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safety culture is the accountability of individuals for how their actions and the actions of others affect safety. According to FTA, a strong safety culture can energize and motivate transit employees to improve safety performance. As we subsequently discuss, FTA currently has efforts underway that may more clearly communicate what a strong safety culture entails. All 12 of the rail transit experts we interviewed agreed that safety culture was important in helping transit agencies lower their accident rates.

The experts we consulted offered several views about safety culture at large transit agencies. Seven experts noted that the extent of safety culture varies at large transit agencies across the country. Four experts stated that the extent of safety culture was generally low throughout the rail transit industry and needed to be improved. Some experts also noted that despite system differences, a major reason why certain systems have more or fewer incidents is the extent of safety culture present at the transit agency. One expert in particular said that all the other safety challenges transit agencies faced flow from safety culture issues. Some experts we interviewed identified the importance of training to help instill a safety culture at all levels of a transit agency. We have reported that training should support an agency's goal of changing workplace culture to increase staff awareness of, commitment to, and involvement in safety.<sup>24</sup> Thus, the challenge faced by the largest transit agencies in providing sufficient training for staff—discussed below—can increase the challenge of instilling a safety culture at those same agencies.

FTA officials have identified the need to improve safety culture as a continuing problem for the transit industry as a whole, which requires changing behaviors and processes that have become engrained over decades of service. FTA has reported that, to get to the root of safety culture, transit agency management and employees need to understand the current state of their safety programs, how employees perceive management's commitment to safety, how employees actively follow established safety rules and procedures and how they are held accountable for doing so, and how management monitors employees' safety performance.<sup>25</sup> FTA officials noted that limitations in transit

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<sup>24</sup>GAO, *Architect of the Capitol: Management and Accountability Framework Needed for Organizational Transformation*, [GAO-03-231](#) (Washington, D.C.: Jan. 17, 2003).

<sup>25</sup>FTA, "Improving Safety Culture," *Rail Transit Safety Quarterly Newsletter* (Washington, D.C., 2009).



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agencies' collection and analysis of safety data impede their ability to improve their safety culture, because these limitations affect their ability to identify and address safety hazards.

Safety culture can have a significant impact on safety performance. In two of its reports on accidents since 2004, NTSB has noted that an inadequate safety culture contributed to the accidents.<sup>26</sup> Probable causes in the accidents that the NTSB investigated included employee errors, such as failure to comply with operating rules, and inadequate safety management and oversight by transit agencies. Problems such as these may reflect a poor safety culture, as employees may not be motivated to follow operating rules and management may not be properly managing safety programs to ensure that hazards are identified and addressed. In its report on the 2008 accident on MBTA's system that resulted in one fatality and eight injuries, NTSB found that the probable cause was the failure of the train operator to comply with a controlling signal resulting from an episode of micro-sleep,<sup>27</sup> and noted an MBTA report of an internal audit that stated the success of any new safety plan was largely dependent on the safety culture that MBTA fostered within each agency department and work group.<sup>28</sup> Additionally, NTSB cited this report as stating that MBTA management needed to define, understand, and integrate effective practices into day-to-day work activities to ensure that the safety of employees and passengers remained a top priority. In its report on CTA's 2006 derailment that resulted in 152 injuries, NTSB found that ineffective management and oversight of its track inspection and maintenance program was a probable cause. Specific problems included ineffective supervisory oversight of track inspections, lack of complete inspection records and follow-up to ensure defects were corrected, and insufficient training and qualification requirements for track inspectors.<sup>29</sup> NTSB found

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<sup>26</sup>See NTSB, *Derailment of Chicago Transportation Authority Train Number 220 Between Clark/Lake and Grand/Milwaukee Stations, Chicago, Illinois, July 11, 2006* (Washington, D.C., Sept. 11, 2007) and NTSB, *Collision of Two Washington Metropolitan Area Transit Authority Metrorail Trains Near Fort Totten Station, Washington, D.C., June 22, 2009* (Washington, D.C., July 27, 2010).

<sup>27</sup>A micro-sleep is an episode of sleep that may last from a fraction of a second up to 30 seconds or more. Although often associated with sleep disorders such as sleep apnea, narcolepsy, or hypersomnia, episodes of micro-sleep can occur in any individual suffering from fatigue or inadequate sleep.

<sup>28</sup>NTSB, *Collision Between Two Massachusetts Bay Transportation Authority Green Line Trains, Newton, Massachusetts, May 28, 2008* (Washington, D.C., July 14, 2009).

<sup>29</sup>NTSB, *Derailment of Chicago Transit Authority Train Number 220*.

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that these identified problems were all part of a deficient safety culture that allowed the agency's track infrastructure to deteriorate to an unsafe condition.

In its report on WMATA's June 2009 collision that resulted in nine fatalities and 52 injuries, NTSB identified the lack of an effective safety culture as a contributing factor to the accident.<sup>30</sup> According to NTSB, shortcomings in WMATA's internal communications, recognition of hazards, assessment of risk from those hazards, and implementation of corrective actions were all evidence of an ineffective safety culture and were symptomatic of a general lack of importance assigned to safety management functions across the WMATA organization. NTSB made recommendations to WMATA to improve its safety culture. In response to NTSB's recommendations to improve its safety culture, WMATA is taking a number of actions, including:

- the development of procedures to ensure clear communication and distribution of safety-related information and the monthly review of data and trend analyses,
- the establishment of a safety hotline and email for employees to report safety concerns,
- an updated whistleblower policy to encourage employee participation and upper management review of identified safety concerns,
- an amended mission statement to reflect the agency's commitment to safety, and
- a newly formed committee of WMATA's Board of Directors to make recommendations monthly on assuring safety at WMATA.

Some other transit agencies have also made efforts to increase the extent of safety culture present in their agencies. For example, officials from three transit agencies we spoke with stated that their transit agencies created and supported nonpunitive safety reporting programs such as whistleblower policies and anonymous tip hotlines to encourage employees to keep management aware of safety problems. One agency told us they have a close call reporting program. These programs can

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<sup>30</sup>NTSB, *Collision of Two Washington Metropolitan Area Transit Authority Metrorail Trains*.

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encourage employees to voluntarily and confidentially report close call incidents without fear of reprisal.<sup>31</sup> We have previously reported that it is unlikely that employees would report safety events in organizations with punishment-oriented cultures in which employees are distrustful of management and each other. Blaming individuals for accidents not only fails to prevent accidents but also limits workers' willingness to provide information about systemic problems.<sup>32</sup> To promote reporting in such environments, systems can be designed with nonpunitive features to help alleviate employee concerns and encourage participation. In addition, some transit agencies we visited are reaching outside of the organization for support to further instill safety culture at their agencies. For example, officials at three transit agencies told us they had hired or planned to hire consultants to audit the system and make recommendations for improvements to increase the safety culture at all levels of the organization. According to APTA officials, the transit industry recognizes that labor organizations must be engaged in a visible partnership at all stages of safety culture development.

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### Multiple Factors Have Made Staffing and Training a Challenge for Large Transit Agencies

In addition to instilling safety culture at transit agencies, maintaining an adequate level of skilled staff and ensuring that they receive needed safety training are also challenges the largest transit agencies face in ensuring safety.<sup>33</sup> Staffing challenges involve recruiting and hiring qualified employees to fill positions with safety responsibilities—such as safety department staff, maintenance staff, track workers, and operation managers—and adequately planning for the loss of such staff through vacancies and retirements. For example, several transit agencies told us it has been difficult to hire maintenance employees with the necessary expertise and knowledge of both aging and new technology systems. Officials from two transit agencies noted the difficulty in hiring maintenance employees who have experience working with older electronic technology—some of which dates from the 1960s—and who are also knowledgeable of current computer technology. In addition, many

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<sup>31</sup>Close call incidents are defined as situations in which an ongoing sequence of events was stopped from developing further, preventing the occurrence of potentially serious safety-related consequences.

<sup>32</sup>[GAO-10-850](#).

<sup>33</sup>All of the experts we interviewed identified staffing or training as a challenge facing large transit agencies in ensuring safety. Officials we interviewed at six of the seven transit agencies we visited identified staffing and training as a challenge.

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transit agencies face an aging workforce and the potential for large numbers of upcoming retirements. For example, one transit agency we visited identified more than 50 percent of its staff as eligible for retirement within the next 5 years. FTA officials told us that staffing is a challenge facing transit agencies nationwide due to the large number of employees nearing retirement eligibility and the difficulty in retaining and replacing qualified employees. In addition, a recent APTA report identified that the transit industry has an experienced but aging workforce, with a significant number of potential retirements expected in the next 10 years.<sup>34</sup>

The staffing challenge has been further exacerbated for transit agencies by recent budget cutbacks as a result of flat or decreased funding from state and local governments. Officials at six of the seven transit agencies we visited stated that their staffing levels have been or will be cut, including some safety staff at three of these agencies.<sup>35</sup> For example, at one transit agency we visited officials stated that, due to their current budget shortfall, staffing levels would be reduced, including in the safety department where 3 positions from the overall 93 positions were cut. In addition, at another transit agency we visited, one official cited staffing levels being stretched to the point where it is difficult to conduct the necessary rail car maintenance to keep the system running.

Training challenges for large transit agencies have included difficulties in ensuring that staff receive needed safety-related training—such as training in track safety, fire and evacuation, risk assessment, and the inspection and maintenance of track and equipment—due to financial constraints as well as the limited availability of technical training. Some experts identified ensuring adequate levels and frequency of training as key challenges for large transit agencies. Some cited training cuts as being commonplace when budget cutbacks occur despite its importance and link to safety. All the transit agencies we visited identified a challenge in having employees participate in safety training either due to the inability of their agencies to pay for training or to cover employees' positions while they attend training, or a combination of both. For example, some officials

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<sup>34</sup>APTA, *APTA Preliminary Skill Development and Training Needs Report* (Washington, D.C., July 2010).

<sup>35</sup>A recent survey by APTA of transit agencies found that 53 percent of the 151 agencies that responded eliminated positions recently and 32 percent laid off personnel. See APTA, *Impacts of the Recession on Public Transportation Agencies, Survey Results* (Washington, D.C., March 2010).

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explained that if a train operator attends safety training another train operator must work an extra shift to cover for the operator attending training. The transit agency pays for overtime hours for the extra shift worked by the train operator. Officials at some of the transit agencies we visited told us that these additional costs for training can be prohibitive. A recent APTA report identified safety training as well as supervisory and leadership training as top training needs for the industry.<sup>36</sup>

The large transit agencies we visited have different types of training programs available for their staff. For example, one transit agency has a large in-house training program that provides safety training and certification for their staff. Each department within the agency tracks employee training schedules, participation, and goals. At another transit agency, officials explained that, while they do some of their training in-house, they rely to a great extent on on-the-job training. Officials from three transit agencies noted that the availability of apprenticeship programs and external technical training, such as training in how to inspect rail and signals, is limited. One transit agency official and one state safety oversight agency official mentioned that the transit industry often relies on on-the-job training. According to APTA officials, on-the-job training is a vital part of transit agencies' training programs and can mitigate institutional knowledge loss as attrition occurs. However, they also noted that transit agencies often have not formalized their on-the-job training by documenting key elements to be covered and that this type of training is not carried out consistently among transit agencies. The transit agencies we visited also sent staff to training courses offered by DOT's Transportation Safety Institute and FTA's National Transit Institute. However, due to the high costs of traveling for training—including lodging and transportation costs—most of the transit agencies we visited cited difficulty in participating in such training opportunities. Transit agencies have attempted to find more cost effective ways of addressing this problem. For example, officials from three transit agencies told us they have offered to host DOT and FTA training at their agencies to reduce the travel costs associated with staff attending safety training courses.

Employees who have not had adequate safety-related training may be more likely to commit errors that can cause accidents. For example, in a 2009 investigation on how NYCT inspectors identified and reported defects in subway platform edges—which caused three transit riders

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<sup>36</sup> APTA, *APTA Preliminary Skill Development and Training Needs*.

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within 3 years to fall onto the tracks after defective boards broke under their weight—the transit system’s Office of the Inspector General identified the lack of training on accurately and consistently identifying safety hazards at platform edges as contributing to the accidents.<sup>37</sup> The office recommended that NYCT provide intensive and continuing training for platform inspectors. In response, NYCT developed and implemented a training program in May 2009 on identifying platform edge defects for all station managers and supervisors. In addition, in five of the eight rail transit accident investigations conducted by the NTSB since 2004, employee errors, such as not following procedures, were identified as a probable cause of the accidents. According to one expert we interviewed, training can help prevent accidents by preventing employee complacency and inattention in regards to safety rules and procedures. Some experts noted that attention to safety becomes more, not less, important as employees gain experience, as system familiarization leads some workers to drop their focus on safety. NTSB officials cited the importance of periodic refresher training for employees to ensure that staff maintain the skill set needed to identify and resolve safety issues. Another benefit of adequate training is helping to prepare the transit workforce to handle pending retirements.

Currently, no industry standards exist for what an adequate level of safety-related training should be for transit agency staff. According to APTA, the transit industry lacks a standard training curriculum for transit employees and, as a result, transit safety-related training at transit agencies lacks consistency and is not always of high quality. FTA officials have also identified a lack of consistent training throughout the transit industry. According to one expert we interviewed, because of the lack of consistent training standards, the management of individual transit agencies has to determine on its own what safety training is needed for agency employees. According to NTSB officials, without minimum training requirements, the level of training available at each transit agency will vary, which can result in differing safety outcomes for each agency.

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<sup>37</sup>Metropolitan Transportation Agency, Office of the Inspector General, *An Inquiry Into Whether MTA New York City Transit Consistently and Correctly Identifies and Reports Subway Platform-Edge Safety Defects* (New York City, N.Y., April 2009).

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## Achieving a State of Good Repair Is a Challenge for the Largest Transit Agencies

Achieving a state of good repair is a challenge the largest transit agencies face that can impact their ability to ensure the safety of their heavy and light rail systems.<sup>38</sup> In general, state of good repair is a term that transit officials use to refer to the condition of transit assets—for example, rail tracks, elevated and underground structures, rail cars, signals, ties, and cables (see fig. 2). In a study of the seven largest rail transit systems completed in 2009, FTA determined that more than a third of these agencies' assets were in poor or marginal condition, indicating that they were near or had already surpassed their expected useful life.<sup>39</sup> At six of the large transit agencies we visited, according to FTA estimates, the proportion of rail transit assets considered to be in poor or marginal condition ranged from zero percent, at LA Metro's relatively new system, to 41 percent, at the much older and larger NYCT system.<sup>40</sup>

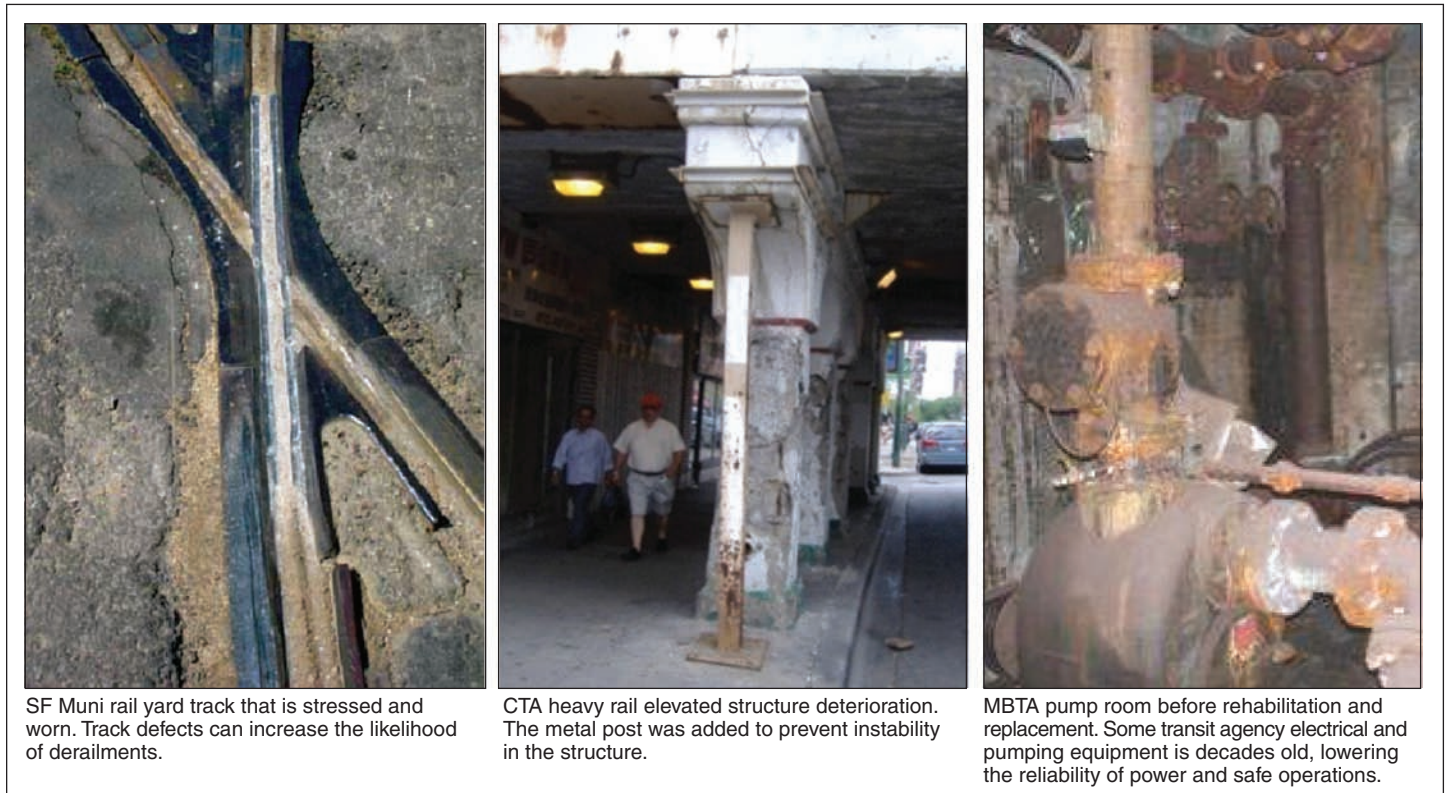
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<sup>38</sup>Eleven of the 12 rail transit safety experts we interviewed identified achieving a state of good repair as a challenge faced by the largest transit agencies in ensuring safety. In addition, all of the large transit agencies we visited cited this as a challenge facing their transit agencies.

<sup>39</sup>FTA, *Rail Modernization Study: Report to Congress* (Washington, D.C., April 2009). This study covered the heavy, light, and commuter rail systems of the following agencies: CTA, MBTA, New York Metropolitan Transportation Authority (which includes NYCT), New Jersey Transit Corporation, BART, Southeastern Pennsylvania Transportation Authority, and WMATA. FTA determined the extent to which these assets were in a state of good repair by evaluating transit asset conditions based on the asset type, age, rehabilitation history, and other factors using its Transit Economic Requirements Model and asset inventories provided by the participating agencies.

<sup>40</sup>These estimates are based on a broader follow-up study of transit agencies completed in 2010. See FTA, *National State of Good Repair Assessment* (Washington, D.C., June 2010). They do not include one transit agency we visited, SF Muni, which did not participate in FTA's studies.

**Figure 2: State of Good Repair Challenges at Transit Agencies We Visited**



Sources: GAO, CTA, and MBTA.

Efforts to achieve a state of good repair include maintaining, improving, rehabilitating, and replacing assets. The delay of some of these efforts can affect safety. Officials at one transit agency identified potential safety risks that could arise from delayed repairs, including worn tracks that could contribute to derailments, failures with the signal system that could allow for collisions, and failures with the traction power cable that could cause fires in subway tunnels. However, according to FTA and transit agency officials, transit agencies prioritize funding for state of good repair efforts to ensure that repairs important for safety are not delayed. All the transit systems we visited reported taking measures to ensure that their systems are safe in planning their state of good repair efforts. For example, one transit agency has reduced cleaning and other maintenance not critical for system safety as it continues to fund safety improvements. According to officials from this transit agency, less critical system safety items, such as escalator and elevator maintenance, have been put on a prolonged maintenance schedule. However, officials at this transit agency also stated



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that the agency had reached a point where further budget cuts would cause deterioration in system safety. In another example, one transit agency we visited has delayed the approximately \$500 million replacement of subway fans which would provide for better ventilation because the agency determined that this was not a high safety priority. Agencies have made efforts to maintain safe operation of their system despite delays in addressing identified state of good repair maintenance or replacement needs. For example, officials at one transit agency we visited told us that they have implemented “slow zones” where trains run at lower speeds to help ensure safe operating conditions on aging track.

In some cases, unaddressed poor asset conditions have contributed to accidents. For example, in its investigation of a 2006 derailment on the CTA system that injured 152 people, NTSB found that rail track problems that should have placed the tracks out of service were not identified and repaired. NTSB found that the track problems were readily observable and should have been identified and corrected.<sup>41</sup>

According to FTA officials, the transit industry has been slow to adopt asset management practices that would allow transit agencies to efficiently manage state of good repair needs. Officials noted that reasons for this slowness include the cost of development and implementation of asset management practices as well as the diversity of assets across and within transit systems. Transit asset management is a strategic approach for transit agencies to manage their transit assets and plan appropriately for rehabilitation and replacement. Asset management practices can help agencies decide how best to prioritize their investments, which can help ensure that safety needs are addressed. Such practices include tracking assets and their conditions and using this information to conduct long-term capital planning. However, no common standards for asset management practices exist and transit agencies use varying methods for determining the condition of their assets. A recent FTA study found that the use of these asset management practices at large transit agencies varied widely.

Another component of asset management is the compilation of asset inventories by transit agencies. FTA defines an asset inventory as a current and comprehensive listing of all major assets used in the delivery of transit services, compiling the attributes of asset type, location, condition, age,

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<sup>41</sup>NTSB, *Derailment of Chicago Transit Authority Train Number 220*.

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and history, among other things.<sup>42</sup> According to FTA, while some of the nation's larger transit systems, among others, have developed asset inventories specifically to assist with capital planning purposes, not all have done so and currently no industry standard or preferred method for retaining asset inventory data exists.<sup>43</sup> Furthermore, not all large transit agencies conduct comprehensive assessments of their asset conditions on a regular basis.

Investments that transit agencies have made in previous years on state of good repair efforts have not kept pace with asset deterioration. According to FTA's 2009 study, an estimated \$50 billion is needed to bring the seven largest rail transit systems into a state of good repair.<sup>44</sup> FTA found that these agencies were investing \$500 million less than the annual investment needed to prevent this state of good repair backlog from increasing.<sup>45</sup> Based on FTA's estimates, the proportion of these agencies' assets exceeding their useful life would increase from 16 percent to more than 30 percent by 2028 if funding levels remain unchanged.

The state of good repair backlog for six of the seven transit agencies that we visited varies, in part due to system characteristics such as age, size, and use of the system (see fig. 3). According to NTSB and FTA officials, having a large state of good repair backlog does not necessarily mean that a transit system is unsafe. NYCT has a considerably higher backlog in comparison with the other transit agencies we visited. For example, its

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<sup>42</sup>FTA, *Rail Modernization Study: Report to Congress*.

<sup>43</sup>In its most recent study on state of good repair, FTA found that seven large transit agencies had developed asset inventories, including CTA, MBTA, NYCT, BART, WMATA, New Jersey Transit Corporation, and Southeastern Pennsylvania Transportation Authority. FTA, *National State of Good Repair Assessment*.

<sup>44</sup>We found, in analyzing FTA data, that NYCT's backlog makes up more than half of this estimated state of good repair backlog for these seven transit agencies. See FTA, *Rail Modernization Study: Report to Congress*.

<sup>45</sup>According to FTA, the state of good repair backlog is an estimate of the costs needed to maintain, rehabilitate, and replace system assets to attain a systemwide state of good repair for the seven largest rail transit systems, including heavy, light, and commuter rail. See FTA, *Rail Modernization Study: Report to Congress*. This estimate was produced primarily by using FTA's Transit Economic Requirements Model. In addition, FTA obtained data on fixed capital assets from selected transit agencies and adjusted its estimates as appropriate to better reflect costs and asset life expectancies. The Transit Economic Requirements Model is also used to estimate transit capital investment needs for DOT's biennial *Report to Congress on the Condition and Performance of the Nation's Highways, Bridges, and Transit*.

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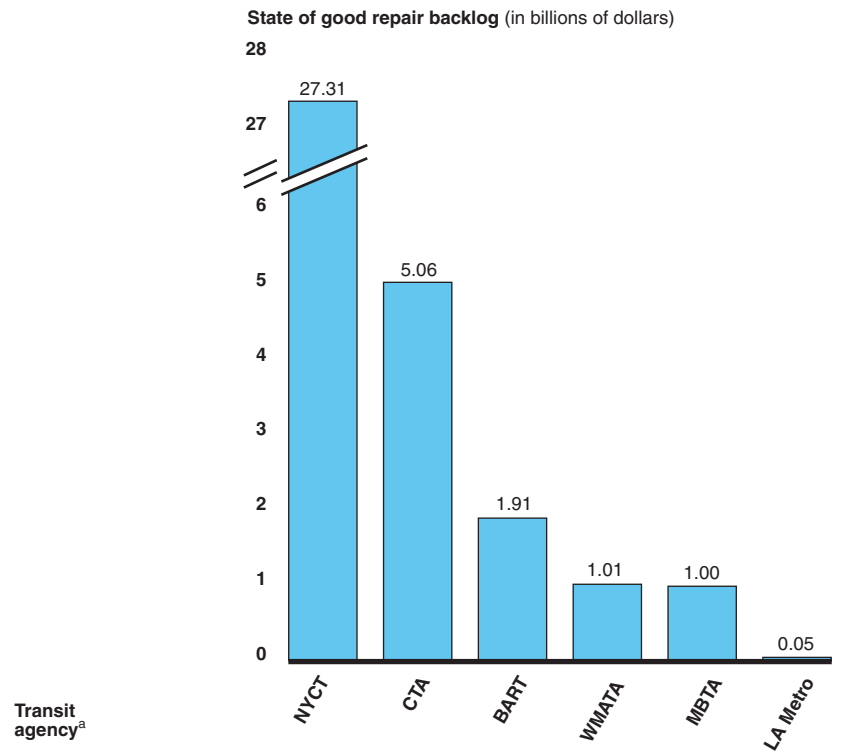
backlog is more than five times that of CTA, the next largest backlog of the agencies we visited. The backlog for the five remaining transit agencies ranges from \$5 million to about \$5 billion. LA Metro's state of good repair backlog is much smaller in comparison to the other transit agencies we visited in part due to the young age of its heavy and light rail systems. These backlogs can be much larger than these agencies' capital budgets. For example, the state of good repair backlog for NYCT is \$27.31 billion while its 5-year capital budget is \$12.32 billion. According to a 2010 FTA study of the transit industry as a whole, state of good repair investment backlogs are higher for heavy rail than light rail, reflecting the relatively young age of light rail assets in comparison to heavy rail assets.<sup>46</sup> Recent budget cutbacks and budgetary shortfalls have negatively impacted transit agencies' ability to sufficiently invest to prevent the worsening of their state of good repair backlogs and asset conditions.<sup>47</sup> All of the rail transit agencies we visited cited financial constraints as affecting their ability to achieve a state of good repair.

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<sup>46</sup>FTA, *National State of Good Repair Assessment*.

<sup>47</sup>A March 2010 survey by APTA of transit agencies found that, of the 151 agencies that responded, 69 percent projected budget shortfalls and 49 percent have transferred funds from capital to operations uses, which has aggravated efforts to keep systems in a state of good repair. The impacts were most severe among the larger transit agencies. See APTA, *Impacts of the Recession on Public Transportation Agencies*.

**Figure 3: State of Good Repair Backlog and System Information for Six of the Seven Transit Agencies We Visited, 2009**



Type of rail system	Heavy	Heavy	Heavy	Heavy	Heavy/light	Heavy/light
Average age of fleet (in years)	20.4	24.7	10.7	19.2	24.5/15.8	12.0/14.7
Total track mileage	835	288	268	270	186	150
Vehicles available for peak service	5,288	1,016	540	830	472	172
Passenger miles traveled (in millions)	9,998	1,184	1,449	1,640	737	525
Percentage of assets in poor or marginal condition	41%	27%	22%	12%	18%	0%

Source: FTA.

<sup>a</sup>We were not able to obtain comparable information for the other transit agency we visited, SF Muni, because it was not included in FTA's studies. All figures are for the year 2009 except for figures on the average age of fleet, which are for the year 2008, the most recent information available.

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## FTA Programs Have Assisted Transit Agencies in Addressing Safety Challenges, but Use of Leading Practices Could Help Target Efforts and Track Results

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### FTA Programs Have Assisted Transit Agencies in Addressing Safety Challenges, Although Some Have Suggested Changes or Additional Efforts

#### Safety Culture

FTA has various efforts underway that may help instill a more robust safety culture at transit agencies. Through the Transit Cooperative Research Program, FTA has recently begun a study on safety culture at transit agencies.<sup>48</sup> Given the difficulty of defining safety culture, this effort has the potential to more clearly communicate what a strong safety culture at transit agencies entails. The project will look at the culture of the working environment in which serious accidents occur, elements of an effective safety culture in a transit agency, and best practices for transit organizations to implement an effective safety culture. DOT's draft Strategic Plan also notes the importance of encouraging DOT, government partners, safety advocates, and industry leaders to adopt a strong and consistent safety culture that does not accept the inevitability of fatalities on the nation's transportation systems.

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<sup>48</sup>FTA funds the Transit Cooperative Research Program of the Transportation Research Board at the National Academy of Sciences, which conducts research to help transit agencies solve operational problems, adopt useful technologies from related industries, and encourage innovation.

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According to FTA officials, their safety guidance, outreach, and training provided by the National Transit Institute and Transportation Safety Institute, have helped encourage transit agencies to discuss and examine institutional safety culture. An example of these efforts cited by FTA officials is a FTA-produced video, “A Knock at Your Door.” The video re-enacts fatal rail transit accidents to underscore the importance of safety procedures. FTA officials also mentioned that they have encouraged discussions about the importance of safety culture at roundtable meetings with transit agency management and other officials, teleconferences, and training classes. In addition, FTA has also sent letters to transit agencies following incidents to, among other things, bring incidents and safety culture trends to the attention of transit agency management. FTA officials were uncertain how much transit agencies use such guidance and outreach, as well as what impact these efforts have on safety. FTA has distributed nearly 500 copies of its safety video to rail transit agencies, state safety oversight agencies, and others. More information on current and planned efforts by FTA to address safety culture challenges at transit agencies is available in appendix III.

Proposed legislation would give FTA the authority to set and enforce safety standards, which could also strengthen transit agencies’ safety culture through increased oversight, in addition to assistance.<sup>49</sup> If passed, this legislation would result in FTA receiving authority to directly regulate rail transit safety and, in cooperation with the states, to oversee and enforce rail transit systems’ compliance with these regulations. We testified in December 2009 that these changes in oversight would bring FTA’s authority more in line with that of some other modal administrations within DOT, such as FRA.<sup>50</sup> Additionally, the DOT Secretary has testified that with such authority, FTA would become more proactive in setting safety thresholds that would result in greater consistency and uniformity across transit systems in the United States. In our testimony, we noted that providing FTA and participating states with such authority could help ensure compliance with standards and improved safety practices, and might prevent some accidents as a result.<sup>51</sup> However, we also noted that Congress may need to consider a number of issues in deciding whether and how to implement such legislation. These include

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<sup>49</sup>Public Transportation Safety Act of 2010, S. 3638, 111th Cong. (2010).

<sup>50</sup>GAO, *Rail Transit: Observations on FTA’s State Safety Oversight Program and Potential Change in Its Oversight Role*, [GAO-10-314T](#) (Washington, D.C.: Dec. 10, 2009).

<sup>51</sup>[GAO-10-314T](#).

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how best to balance federal versus state responsibilities, how to ensure that FTA has adequate qualified staff to carry out such a program, and what level of resources to devote to the program.

In addition to these efforts, FTA has recently formed the Transit Rail Advisory Committee for Safety. The committee is expected to provide information, advice, and recommendations—including recommendations for instilling a safety culture at transit agencies—to the Secretary of Transportation and the FTA Administrator on all matters relating to the safety of U.S. public transportation systems and activities. Members of the committee include representatives with expertise in safety, transit operations, or maintenance; representatives of stakeholder interests that would be affected by transit safety requirements; persons with policy experience, leadership, or organizational skills; and regional representatives. The committee held its first meeting on September 9–10, 2010, and established two workgroups, one tasked with researching safety planning models for transit agencies and the other with identifying the best model for organizing a state safety oversight agency organization. Both of these workgroups were tasked to produce recommendations based on their work in May 2011. The safety planning model workgroup could help strengthen safety culture through its work to determine the best safety management system principles for transit agencies of any size to enhance rail transit safety, including policy practices, stakeholder relationships, and any desired changes to current law or regulations.

NTSB officials, transit agency officials, experts we met with, and others have proposed that FTA take additional steps to help transit agencies address safety culture challenges. These have included:

- *Develop nonpunitive safety reporting programs.* As previously discussed, nonpunitive systems can alleviate employee concerns and encourage participation in safety reporting. Nonpunitive systems can include voluntary, anonymous reports by employees that are reviewed by an independent, external entity.<sup>52</sup> NTSB has recommended that FTA facilitate the development of nonpunitive safety reporting programs at all transit agencies that would collect safety reports and operations data from employees in all divisions. Safety department representatives from their operations, maintenance, and engineering departments and representatives from labor organizations would regularly review these

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<sup>52</sup> [GAO-10-850](#).

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reports and share the results of those reviews across all divisions of their agencies.<sup>53</sup> FRA is piloting a voluntary confidential reporting program for workers in the railroad industry consistent with NTSB's recommendation and the Federal Aviation Administration has established such a program for air carrier employees, air traffic controllers, and others.<sup>54</sup> FTA officials told us that identifying operating errors in a nonpunitive way is important and that they have begun research through the Transit Cooperative Research Program to examine ways to improve compliance with safety rules at transit agencies, including the use of nonpunitive reporting models. FTA plans to report on the results of this work by late 2011.

- *Increase efforts to encourage a strong safety culture.* In addition, APTA and some transit agency officials have called on FTA to do more to develop and share information on establishing a strong safety culture at transit agencies. One expert we met with noted that establishing and enforcing regulations will not necessarily bring about an improvement in safety culture in the rail transit industry. APTA officials and officials at one large transit agency noted that FRA pilot projects aimed at addressing accidents caused by human error and identifying ways to better manage safety have helped encourage a strong safety culture in the freight railroad industry and that FTA could foster positive changes in safety culture in the

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<sup>53</sup>NTSB, *Collision of Two Washington Metropolitan Area Transit Authority Metrorail Trains near Fort Totten Station*.

<sup>54</sup>The FRA pilot program, called the Confidential Close Call Reporting System, is designed to reduce accidents in the railroad industry and strengthen safety cultures. Employees are encouraged to voluntarily and confidentially report close call incidents without fear of discipline or punishment, and data are stored and analyzed to identify trends, new sources of risk, and corrective actions. The goal is to avoid more serious incidents. We have reported that such efforts hold promise and have contributed to reductions in accidents in other transportation industries. See GAO, *Rail Safety: The Federal Railroad Administration Is Taking Steps to Better Target Its Oversight, but Assessment of Results Is Needed to Determine Impact*, [GAO-07-149](#) (Washington, D.C.: Jan. 26, 2007). The Federal Aviation Administration's program has established confidential, voluntary reporting systems to identify and report safety and operational concerns. We have reported that aviation industry personnel have some incentives to participate in voluntary programs, such as promised immunity from disciplinary action. In addition, these programs generate safety data that are not available from other sources. See GAO, *Aviation Safety: Better Management Controls are Needed to Improve FAA's Safety Enforcement and Compliance Efforts*, [GAO-04-646](#) (Washington, D.C.: July 6, 2004) and *Aviation Safety: Improved Data Quality and Analysis Capabilities Are Needed as FAA Plans a Risk-Based Approach to Safety Oversight*, [GAO-10-414](#) (Washington, D.C.: May 6, 2010).



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## Staffing and Training

rail transit industry through such methods.<sup>55</sup> While FTA has various efforts underway to instill safety culture at transit agencies, these do not include pilot projects to evaluate or test safety culture concepts and ideas.

FTA has provided some assistance to help transit agencies address staffing challenges, but its safety-related assistance has focused primarily on providing training. FTA has reported that it has a compelling interest in transit workforce development given its large investment in and oversight of transit. FTA has supported research on transit workforce challenges—including recruitment and retirement issues—through its Transit Cooperative Research Program. FTA's Southern California Regional Transit Training Consortium has worked to establish a model mentor/internship program that can be used by transit agencies of any size. These programs run in conjunction with local community colleges, where a primary objective is to introduce students to transit work, particularly maintenance and other support. Ultimately, this program allows transit agencies to hire from a greater pool of transit-trained interns. FTA's fiscal year 2011 budget request also described a proposed effort to design programs to help transit agencies build and develop a workforce with sufficient skills to fill transit jobs of the future. These efforts can help transit agencies recruit and hire qualified employees and address staffing challenges involving an aging workforce.

To help address transit agency safety training challenges, FTA has provided funding to support a variety of training classes. Through programs managed by the National Transit Institute and the Transportation Safety Institute, FTA has supported training for transit agency employees.<sup>56</sup> Both of these organizations offer safety classes attended by transit agency employees, as well as by state safety oversight

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<sup>55</sup>In addition to sponsoring the Confidential Close Call Reporting System, FRA has managed the Human Factors Research and Development Program, which has included pilot projects at freight railroad properties and other studies. The pilot projects used safety processes to change at-risk worker behavior at freight railroads by using peers to observe each other and provide safety-related, confidential feedback; compiling worker data to identify and implement corrective actions to improve safety; and training managers to effectively support the process.

<sup>56</sup>The National Transit Institute is funded by FTA and managed by Rutgers University. The Transportation Safety Institute is managed by DOT's Research and Innovative Technology Administration. The Institute's Transit Safety and Security Division is funded by FTA to develop and deliver a variety of safety and security training and education to the transit industry.

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agency staff.<sup>57</sup> To avoid duplication, the National Transit Institute focuses on training for frontline employees, such as track workers and operators, while the Transportation Safety Institute provides classes for supervisory and management personnel. Classes have included current rail system safety principles and online fatigue awareness. In fiscal year 2010, the National Transit Institute and the Transportation Safety Institute held 220 training sessions related to safety and more than 6,700 transit agency staff took part in this training.<sup>58</sup> FTA has also provided specialized training aimed at transit agencies that have experienced recent safety incidents. For example, FTA recently concluded training on rail incident investigation and system safety for WMATA staff. In all, FTA has delivered seven courses to assist WMATA staff in receiving critical safety training.<sup>59</sup> In another example, through the Transit Technology Career Ladder Partnership Program, FTA has funded partnerships in four states aimed at training transit employees to become proficient in safety practices and procedures.

Currently, FTA is drafting a 5-year safety and security strategic plan for training. The plan will cover safety technical training for staff working at FTA, state safety oversight agencies, and transit agencies. While one aim of the plan will be to prepare FTA and state staff to handle new responsibilities should legislation be enacted that would change their oversight role for rail transit safety, FTA also intends to use the plan to identify improvements needed in the training it provides to transit agencies. Potential improvements include re-evaluating the levels and types of training that FTA supports. FTA officials estimated the training plan would be completed in May 2011. Officials also told us that they are collaborating with officials at APTA, state safety oversight agencies, and FRA to obtain their views on how to better provide training to transit agencies. In its fiscal year 2011 budget request, FTA has proposed

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<sup>57</sup>We have previously recommended that FTA develop and encourage completion of a recommended training curriculum for state safety oversight staff. In response, FTA has created a recommended training curriculum and is encouraging oversight agency staff to successfully complete the curriculum and receive certification for having done so. See [GAO-06-821](#).

<sup>58</sup>In fiscal year 2010, the Transit Safety Institute trained 4,998 transit agency staff in safety-related courses compared with 36 staff from state safety oversight agencies. The National Transit Institute did not have exact numbers, but estimated that more than 95 percent of the 1,926 participants it trained in fiscal year 2010 were from transit agencies.

<sup>59</sup>FTA has planned three additional safety training classes for WMATA staff, tentatively scheduled in 2011.

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additional resources to provide training for transit agencies, state safety oversight agencies, and FTA officials. More information on current and planned efforts by FTA to address staffing and training challenges at transit agencies is available in appendix III.

A legislative proposal, as well as some APTA officials and others, identified additional efforts that, if adopted, might improve transit agencies' abilities to address their staffing and training challenges. These include:

- *Formulate a national approach to staffing and training.* In 2009, the House of Representatives Committee on Transportation and Infrastructure issued draft legislation to reauthorize surface transportation programs that would require FTA to form a national council to identify skill gaps in transit agency maintenance departments, develop programs to address the recruitment and retention of transit employees, and make recommendations to FTA and transit agencies on how to increase apprenticeship programs, among other things.<sup>60</sup> Furthermore, this proposed legislation as well as APTA and the Transportation Learning Center called for a national curriculum or certification program that would establish some level of training standardization for transit agency employees.<sup>61</sup> APTA and transit agency officials have noted that potential benefits include achieving a level of consistency in safety training across the country as well as minimum thresholds for transit agency staff. FTA has created curriculum development guidelines to help transit agencies establish their own training curricula. Due in part to differences in transit agencies' operating environments and system technologies, FTA officials reported that in developing their upcoming safety and security strategic plan for training, they may examine whether setting standards for a national training curriculum would be appropriate.
- *Increase technical training.* NTSB officials and some of the experts and transit agency officials we met with stated that FTA should increase the technical components of the training for transit agency employees that it supports. Transit agency officials reported that training provided by the

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<sup>60</sup>U.S. House of Representatives, Committee on Transportation and Infrastructure, *The Surface Transportation Authorization Act of 2009: A Blueprint for Investment and Reform* (Washington, D.C., June 18, 2009).

<sup>61</sup>Additionally, APTA officials reported that they are partnering with FTA and the Transportation Learning Center to develop guidelines for rail vehicle, rail signal, and other training. This effort is in the beginning stages, but could serve as a starting point in developing a national curriculum.

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National Transit Institute and Transportation Safety Institute includes valuable safety information, but overall the training provided is introductory and does not cover enough technical aspects of safety. According to NTSB officials, transit agency safety staff need periodic, refresher training to continue to learn and more technical training to adequately understand and perform their job. Technical aspects could include the overall mechanics and engineering involved in rail transit operations, as well as how problems with equipment can lead to unsafe conditions. Some state safety oversight and transit agency officials we met with said that available technical training is limited and that FTA could create a training curriculum that other organizations, such as local community colleges, could use to teach safety-related classes. Similarly, APTA has reported the need to develop core curricula to be used at universities and community colleges and to enhance partnerships between transit agencies and higher education in order to provide additional training and educational opportunities for current and future transit workers.<sup>62</sup>

- *Increase federal support for training.* In a past report, the Transportation Learning Center has noted that, of the billions of dollars the federal government provides to transit agencies annually, little is invested in human capital—that is, the people, knowledge, and skills necessary to provide reliable and safe service. In response, the center has recommended that federal funding provide support for transit agencies’ workforce training.<sup>63</sup> In addition, officials at APTA and transit agencies, as well as some experts we met with, favored increasing federal support to cover training and related travel costs for transit agency employees. FTA has provided funding to state safety oversight agency staff to cover such costs to attend training offered by the National Transit Institute and the Transportation Safety Institute, but this support generally has not been extended to transit agency staff. FTA officials reported that they support training offered around the country and that demand is high. Transit agencies also have the option of hosting training to reduce travel and other costs.

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<sup>62</sup>APTA, *Final Recommendations of APTA’s Blue Ribbon Panel on Workforce Development* (Washington, D.C., 2010).

<sup>63</sup>Transportation Learning Center, *International and Domestic Comparisons: Building Capacity for Transit Training* (Silver Spring, M.D., 2010). The Transportation Learning Center is a nonprofit organization whose mission is to improve public transportation through labor and management training partnerships focused on workforce and organizational performance issues. FTA provides funding and technical assistance to the center for certain transit-related projects.

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## State of Good Repair

FTA's assistance to transit agencies to help achieve a state of good repair—and therefore help ensure safe operations—has primarily consisted of providing grant funding, although FTA has also conducted studies and is taking steps to provide more guidance to agencies on asset management. The two major FTA grant programs transit agencies have used to help achieve a state of good repair are the Fixed Guideway Modernization Program and the Urbanized Area Formula Program. In fiscal year 2010, these FTA grants provided nearly \$6 billion for transit agencies' capital projects and related planning activities.<sup>64</sup> This support has helped transit agencies maintain system facilities such as stations and other equipment. Funding also has assisted transit agencies in rehabilitating or purchasing rail vehicles and modernizing track and other infrastructure to improve operations. Besides supporting achieving a state of good repair, FTA's grant funding programs can support other safety-related improvements, such as upgrading signal and communications systems. In its fiscal year 2011 budget request, FTA has proposed increasing assistance to transit agencies through a new \$2.9 billion state of good repair program for bus and rail systems.<sup>65</sup> This program would, for the first time, provide funding to transit agencies that exclusively focus on achieving a state of good repair.

Besides providing funds, another activity FTA has recently engaged in involves helping transit agencies improve their asset management practices in order to enhance their ability to achieve a state of good repair and ensure safety. As previously discussed, FTA officials reported that the transit industry has been slow to adopt asset management practices that would allow efficient management of state of good repair and some related safety needs. As a result, transit agencies may have limited knowledge of asset conditions and how to best use scarce resources to ensure an efficient and safe operation. In DOT's fiscal year 2010 appropriation, \$5 million was made available to FTA to develop standards for asset management plans, provide assistance to grant recipients

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<sup>64</sup>This amount does not include additional funding the Recovery Act provided for public transportation. The Recovery Act appropriated approximately \$8.4 billion to fund public transportation throughout the country. Besides capital projects, the Urbanized Area Formula Program can help transit agencies fund related planning activities.

<sup>65</sup>As requested in FTA's fiscal year 2011 budget request, the new formula for the state of good repair initiative would combine the existing Fixed Guideway Modernization Program (49 U.S.C § 5309) and the Bus and Bus Facility Grant Program (49 U.S.C. §§ 5309, 5318) and would provide \$2.9 billion, an 8 percent increase over the combined programs' fiscal year 2010 level of funding.

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engaged in the development or implementation of an asset management system, improve data collection, and conduct a pilot program designed to identify best practices for asset management.<sup>66</sup> FTA has begun to undertake these efforts. It has reviewed national and international asset management practices and concluded that major opportunities for improvements exist in the United States.<sup>67</sup> FTA is also currently soliciting for projects with transit agencies of various modes and sizes to demonstrate different aspects of good asset management practices. According to FTA officials, improved asset management by transit agencies will include better approaches for prioritizing rehabilitation and replacement projects and will therefore allow agencies to better ensure safety.<sup>68</sup> Other FTA technical assistance in this area includes the development of capital planning tools and asset inventory guidelines, research on integrating maintenance management with capital planning, training and guidance to educate transit agency staff on asset management, and enhanced asset data collection.

As previously discussed, while no common standards exist for asset management, it can include tracking asset condition and use, as well as planning appropriately for rehabilitation and replacement. The National Surface Transportation Policy and Revenue Study Commission has reported that, to achieve a state of good repair, local governments, states, and other entities must develop, fund, and implement an asset management system to ensure the maximum effectiveness of federal

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<sup>66</sup> Consolidated Appropriations Act, 2010, Pub. L. No. 111-117, div. A, title I, 123 Stat. 3034, 3062 (Dec. 16, 2009). FTA is to report its findings from the pilot program to the House and Senate Appropriations Committees by June 16, 2011. S. Rep. No. 111-69, at 88 (2009).

<sup>67</sup> FTA, *Transit Asset Management Practices: A National and International Review* (Washington, D.C., June 2010).

<sup>68</sup> In addition to these efforts, FTA conducted the two previously discussed studies to determine the extent to which transit agencies' assets were in a state of good repair. FTA also is working with transit industry stakeholders to better define what a state of good repair entails and how to measure and track it.

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capital support.<sup>69</sup> We have previously reported that in some surface transportation programs, including transit programs, agencies often do not employ the best tools and approaches to ensure effective investment decisions, an area where asset management can help.<sup>70</sup> See appendix III for other current and planned efforts by FTA to help transit agencies address state of good repair challenges.

Legislative proposals, one FTA study, and several organizations we met with have identified additional efforts that, if adopted, might hold transit agencies accountable for improving the management of their assets and therefore better ensure safety. These included:

- *Linking grant funding to the establishment of asset management systems.* Congress has considered legislation that would direct DOT to establish and implement a national transit asset management system.<sup>71</sup> This legislation would direct FTA to define a state of good repair and for the first time require transit agencies that receive federal funding to establish asset management systems.<sup>72</sup> This would help transit agencies to prioritize which assets to maintain, rehabilitate, and replace to help ensure safe operating conditions. Separately, a report by the Senate Committee on Appropriations directs FTA to issue a notice of proposed rulemaking by September 30, 2011, to implement asset management standards requiring

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<sup>69</sup>National Surface Transportation Policy and Revenue Commission, *Transportation for Tomorrow* (Washington, D.C., December 2007). The commission was established by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users in 2005. Among other things, it was required to conduct a comprehensive study of the current condition and future needs of the surface transportation system, evaluate possible funding alternatives, and develop a conceptual plan with alternative approaches, to ensure that the surface transportation system will continue to serve the needs of the United States. The commission listed its highest priority as bringing the nation's infrastructure, including transit assets, to a state of good repair. Pub. L. 109-59, § 1909(b), 119 Stat. 1144, 1471-1477 (2005).

<sup>70</sup>GAO, *Surface Transportation: Restructured Federal Approach Needed for More Focused, Performance-Based, and Sustainable Programs*, [GAO-08-400](#) (Washington, D.C.: Mar. 6, 2008).

<sup>71</sup>Public Transportation Safety Act of 2010, S. 3638, 111th Cong. (2010). The proposed legislation described a transit asset management system as a strategic and systematic process of operating, maintaining, and improving public transportation capital assets (track, railcars, and other system elements) effectively throughout the life cycle of those assets.

<sup>72</sup>According to FTA officials, the agency does not currently have the authority to require transit agencies to establish asset management systems as a condition of receiving FTA funds.

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transit agencies that receive FTA funds to develop capital asset inventories and condition assessments.<sup>73</sup> FTA officials told us that they have no plans to develop such a rulemaking at this time, but would do so if required by statute. FTA is to report to Congress in June 2011 on its investigations into asset management. We have previously identified principles that could help drive re-examination of federal surface transportation programs, including ensuring accountability for results by entities receiving federal funds and using the best tools and approaches, such as grant eligibility requirements, to emphasize return on targeted federal investment.<sup>74</sup>

- *Increasing available transit agency asset data.* Another option that FTA has reported on for it and Congress to consider involves establishing a system that ensures regular reporting of transit agencies' capital assets and a consistent structure and level for this reporting. FTA officials noted that they already collect transit vehicle data from agencies, but that they need more information to effectively report on transit agency assets. FTA is considering expanding transit agency reporting requirements to include data on local agency asset inventory, holdings, and conditions.<sup>75</sup> FTA has reported that these data would support better national needs assessments and transit asset condition monitoring than is currently possible. Also, this would encourage transit agencies to develop and maintain their own asset inventory and condition monitoring systems.

Besides the additional efforts outlined above, there are other proposals that would make more grant funding available to large transit agencies. FTA and transit agency officials reported that transit agencies maintaining older systems have received a smaller percentage of available federal funding as the number of transit systems competing for the same amount of funding has increased. For example, in its 2009 study on the state of good repair in the transit industry, FTA reported that the seven largest rail transit systems, which carry 80 percent of the nation's rail transit riders and maintain 50 to 75 percent of the nation's rail transit infrastructure, have received 23 percent of the total federal funding eligible for rail state of good repair investment.<sup>76</sup> These agencies' percentage share of total

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<sup>73</sup>This report accompanies the Senate fiscal year 2011 appropriations bill for the Departments of Transportation and Housing and Urban Development. See S. Rep. No. 111-230, at 99 (2010).

<sup>74</sup>[GAO-08-400](#).

<sup>75</sup>FTA, *National State of Good Repair Assessment*.

<sup>76</sup>FTA, *Rail Modernization Study*.



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federal funding for achieving a state of good repair has declined.<sup>77</sup> In short, while total federal support for transit infrastructure has increased, the share allocated to the nation's oldest and largest systems has shrunk. To address this, FTA included an option in its 2009 study for it and Congress to consider modifying existing funding formulas to factor in system age, among other things. Congress is also considering new ways to potentially fund transit and other surface transportation projects, including the formation of a National Infrastructure Bank.<sup>78</sup>

The various proposals suggesting additional steps that FTA could take to provide safety-related assistance to transit agencies or strengthen their accountability for effectively managing their assets have the potential, if implemented, to enhance rail transit safety. Past reauthorizations of surface transportation programs have provided an avenue for Congress to identify programs to address problems, including those involving transportation safety. DOT is currently developing a surface transportation reauthorization proposal. As part of its effort to develop a surface transportation reauthorization proposal, DOT officials have conducted outreach events to collect input from experts on possible surface transportation initiatives to include in the proposal and have held internal discussions to develop the proposal. Additionally, DOT is considering options for improving transportation safety, including rail transit safety. Therefore, the proposal that DOT eventually puts forward may address some or all of the safety challenges that we cite. Furthermore, FTA's 5-year safety and security training plan, when it is completed, may include improvements that help address the training challenges that transit agencies face.

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<sup>77</sup>FTA calculated 23 percent from the amount of federal funding available through the Fixed Guideway Modernization, Urbanized Area Formula, and bus capital programs and how much the seven largest transit agencies received from these sources.

<sup>78</sup>The House of Representatives Committee on Transportation and Infrastructure has proposed that legislation to reauthorize surface transportation programs include the creation of a National Infrastructure Bank. The bank would be a government corporation that would sell bonds and provide direct subsidies to infrastructure projects. The bank's board of directors would be responsible for monitoring and overseeing energy, environmental, telecommunications, and transportation infrastructure projects.

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## Leading Practices Could Help FTA Target and Track the Results of Its Safety Efforts

As FTA undertakes efforts to help transit agencies address their safety culture, staffing and training, and state of good repair challenges, setting performance goals and measures can help it target these efforts and track results. Performance goals can help organizations clearly identify the results they expect to achieve, prioritize their efforts, and make the best use of available resources. Performance measures can help organizations track the extent to which they are achieving intended results. In the case of FTA, such prioritization is essential, given the relatively small number of staff it has devoted to safety and state of good repair efforts. For example, while FTA has requested 30 additional staff in fiscal year 2011 in anticipation of receiving authority to strengthen its safety oversight role, it currently has 15 to 17 full-time employees working in its Office of Safety and Security, as well as staff from other FTA offices working on state of good repair efforts.<sup>79</sup> The ability to prioritize efforts and track progress will become even more important in the event that Congress enacts legislation that would give FTA greater oversight authority of transit agencies and expand its transit safety responsibilities. Furthermore, as FTA is faced with proposals to assume even more responsibility for transit safety in the future—through, for example, setting asset management or training curriculum standards for transit agencies—it is even more essential that it clearly identify the specific results it is trying to achieve, target its efforts, and track progress toward achieving those results.

We have identified a number of leading practices agencies can implement to help set or enhance performance goals and measures. While FTA has created plans and other tools to help guide and manage its safety efforts, it has not fully adopted these practices. The next sections discuss these leading practices and the extent to which FTA has followed them.<sup>80</sup>

## Focusing on Results

We have found that successful organizations try to link performance goals and measures to strategic goals and that, in developing these goals and measures, such organizations generally focus on the results that they

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<sup>79</sup>These numbers do not include contractor staff.

<sup>80</sup>For additional information on developing performance goals and measures through certain practices, see GAO, *Agency Performance Plans: Examples of Practices That Can Improve Usefulness to Decisionmakers*, [GAO/GGD/AIMD-99-69](#) (Washington, D.C.: February 1999); GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act*, [GAO/GGD-96-118](#) (Washington, D.C.: June 1996); and GAO, *Tax Administration: IRS Needs to Further Refine Its Tax Filing Season Performance Measures*, [GAO-03-143](#) (Washington, D.C.: Nov. 22 2002).

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expect their programs to achieve.<sup>81</sup> DOT has identified an overall strategic safety goal of reducing transportation-related injuries and fatalities, including rail transit injuries and fatalities, and FTA has identified measures in its fiscal year 2011 budget request related to that goal.<sup>82</sup> In its Annual Performance Plan for fiscal year 2011, FTA identified a general safety goal of further defining its leadership role in the area of surface transportation safety as well as some desired outcomes of its safety efforts, such as increased public confidence in the safety of public transportation and improved safety culture at transit agencies nationwide. It also identified some strategies for achieving this goal and these outcomes, such as establishing the Transit Rail Advisory Committee for Safety and assessing safety and security training. However, FTA has not identified specific performance goals that make clear the direct results its safety activities are trying to achieve and related measures that would enable the agency to track and demonstrate its progress in achieving those results. Without such specific goals and measures, it is not clear how FTA's safety activities contribute toward DOT's overall strategic goal of reducing transportation-related injuries and fatalities, including rail transit injuries and fatalities.

In addition, in its fiscal year 2011 budget request FTA included the goal of improving the rail transit industry's focus on safety vulnerabilities. FTA also identified some activities associated with this safety goal, such as submitting legislation to Congress. However, FTA did not clearly articulate the expected results associated with this goal and activities. Nor did FTA explain how such results would be measured and how they relate to DOT's strategic goals.

Linking FTA's performance goals to departmental goals can provide a clear, direct understanding of how the achievement of annual goals will lead to the achievement of the agency's strategic goals.<sup>83</sup> We have previously reported that a clear relationship should exist between an

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<sup>81</sup> [GAO/GGD/AIMD-99-69](#).

<sup>82</sup> These measures are transit injuries and fatalities per 100 million passenger miles traveled.

<sup>83</sup> In past work, we have identified ways to make federal transit grant programs more performance based, such as the use of data to measure performance. For example, we have reported that FTA has set targets for some broad goals and has some initiatives aimed at increasing performance. However, FTA does not, in general, use the performance data it collects to evaluate the effectiveness of its grant programs. GAO, *Federal Transit Programs: Federal Transit Administration Has Opportunities to Improve Performance Accountability*, [GAO-11-54](#) (Washington, D.C.: Nov. 17, 2010).

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Addressing Important  
Dimensions of Program  
Performance

agency's annual performance goals and long-term strategic goals and mission. FTA officials told us that it can be difficult to set performance goals and measures for the agency's safety efforts due to its limited authority over safety in the transit industry. In past work, we have reported that developing goals and measures for outcomes that are the result of phenomena outside of federal government control is a common challenge faced by many federal agencies.<sup>84</sup> However, despite this challenge, measuring program results and reinforcing their connection to achieving long-term strategic goals can create a greater focus on results, help hold agencies and their staff accountable for the performance of their programs, and assist Congress in its oversight of agencies and their budgets.<sup>85</sup>

Performance goals and measures that successfully address important and varied aspects of program performance are key aspects of a results orientation. While FTA has identified various activities aimed at improving rail transit safety, it has not established clear results-oriented goals and measures that address key dimensions of the performance of its various efforts related to safety, such as its training and state of good repair programs. FTA could address important dimensions of program performance in different ways. For example, the agency could set goals and measures to address identified safety challenges, such as those identified in this report, or to capture results of its various safety-related efforts, such as its training programs or asset management initiatives. Alternatively, performance goals and measures could relate to the causes behind certain types of transit accidents, such as setting a goal of reducing the number of accidents where human error is a probable cause in a given year.

Without goals related to various dimensions of program performance, FTA has not identified the intended results of its various safety-related efforts. Limited use of performance measures by FTA makes it difficult to determine the impact of these efforts on safety. While FTA has identified

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<sup>84</sup>We have reported on ways that agencies have overcome challenges in developing measures of program results. See GAO, *Managing for Results: Measuring Program Results That Are Under Limited Federal Control*, [GAO/GGD-99-16](#) (Washington, D.C.: Dec. 11, 1998) and GAO, *Pipeline Safety: Management of the Office of Pipeline Safety's Enforcement Program Needs Further Strengthening*, [GAO-04-801](#) (Washington, D.C.: July 23, 2004).

<sup>85</sup>GAO, *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making*, [GAO-05-927](#) (Washington, D.C.: Sept. 9, 2005).

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overall measures of transit safety—the number of transit injuries and fatalities per 100 million passenger-miles traveled—its annual performance plan lacks quantifiable, numerical targets related to specific goals, against which to measure the performance of its efforts.<sup>86</sup> FTA’s fiscal year 2011 budget request did include a performance measure to track the percentage of federal formula funding that transit agencies used for replacement versus new capital purchases by the end of fiscal year 2011 and related this measure to its goal of improving the rail industry’s focus on safety vulnerabilities. However, this measure captures only one of the types of results FTA might expect to achieve from its various safety efforts.<sup>87</sup>

In the past, FTA safety planning documents have linked specific FTA performance goals and measures with DOT’s overall strategic safety goals; however, FTA is no longer using these documents.<sup>88</sup> For example, FTA’s 2006 Rail Transit Safety Action Plan included safety goals and measures, such as reducing total derailments per 100 million passenger miles, major collisions per 100 million passenger trips, and total safety incidents per 10 million passenger trips. These goals and measures are clearly linked to DOT’s overall strategic goal of working toward the elimination of transportation-related injuries and fatalities, including rail transit injuries and fatalities. The plan also included a number of supporting priorities, such as reducing the impact of fatigue on transit workers, and how the agency planned to achieve them. The plan also included performance measures and target goals for FTA’s state safety oversight program, such as the number of dedicated state personnel and necessary levels of training and certification.<sup>89</sup> FTA officials reported that the goals and measures captured in this and other past planning documents were no

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<sup>86</sup>We have reported that FTA has set targets for some broad goals and has some initiatives aimed at increasing grantee performance, but does not, in general, use the performance data it collects to evaluate the effectiveness of its grant programs. We also identified ways to make federal transit programs more performance based. See [GAO-11-54](#).

<sup>87</sup>In regards to public transit workforce development, APTA has recommended developing, implementing, and maintaining an ongoing tracking and monitoring system to measure performance and continuous improvement.

<sup>88</sup>To improve FTA’s management of its oversight of state safety oversight agencies, we previously recommended that FTA set performance goals, along with measures to make sure the program is making progress toward meeting those goals and to evaluate the impact of its management on safety and security. FTA later met this recommendation; however, as described above, FTA later discontinued using these set goals and measures. See [GAO-06-821](#).

<sup>89</sup>FTA, *Rail Transit Safety Action Plan* (Washington, D.C., September 2006).

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longer in use because of changes in safety environments. At present, FTA has no active strategic plan, and FTA officials estimated the new strategic plan would be completed in late 2011.

Other agencies are presently making use of practices to enhance performance goals and measures for safety activities. For example, FRA has created a set of performance goals and measures that address important dimensions of program performance. In its proposed fiscal year 2011 budget, FRA included specific safety goals to reduce the rate of train accidents caused by various factors, including human errors and track defects. These goals are numeric, with a targeted accident rate per every million train miles. Collecting such accident data equips FRA with a clear way to measure whether or not those safety goals are met. FRA's budget request has also linked FRA's performance goals and measures with DOT's strategic goals. Another DOT agency, the Federal Motor Carrier Safety Administration, has a broad range of goals and related performance measures that it uses to provide direction to—and track the progress of—its enforcement programs, including measures of the impact of its enforcement programs on the level of compliance with safety regulations and on the frequency of crashes, injuries, and fatalities.<sup>90</sup> The agency's end goal—to reduce crashes, injuries, and fatalities through its reviews—aligns with and contributes to DOT's overall strategic safety goals.

While these leading practices are useful, problems with FTA's rail transit safety data could hamper the agency's ability to measure its safety performance.<sup>91</sup> We have found that data contained in FTA's State Safety Oversight Rail Accident Database—which is compiled from data provided by state safety oversight agencies and transit agencies—are unreliable. Specifically, we found unverified entries, duplicative entries, data

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<sup>90</sup>The Federal Motor Carrier Safety Administration's primary mission is to reduce crashes, injuries, and fatalities involving large trucks and buses by issuing, administering, and enforcing federal motor carrier safety regulations and hazardous materials regulations, among other things.

<sup>91</sup>FTA may also need to collect additional data elements in support of new performance measures. FTA collects data from state safety oversight agencies and transit agencies. State safety oversight agencies report transit agency data to FTA as part of FTA's oversight program. Recipients or beneficiaries of grants from FTA under the Urbanized Area Formula Program (49 U.S.C. § 5307) or Other than Urbanized Area (Rural) Formula Program (49 U.S.C. § 5311) are required to submit data to the National Transit Database in order to be eligible for a grant award. 49 U.S.C. § 5335 (b).

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discrepancies, and insufficient internal controls.<sup>92</sup> Without reliable data, it is difficult for FTA to measure performance based on goals to be captured in annual performance plans or agency strategic plans. Baseline and trend data also provide context for drawing conclusions about whether performance goals are reasonable and appropriate. Establishing procedures that ensure reliable data is an important internal control necessary to validly measure performance based on numerical targets.<sup>93</sup> Additionally, decision makers can use such data to gauge how a program's anticipated performance level compares with past performance. FTA officials have acknowledged the important role that data play in making decisions regarding how to address challenges to rail transit safety. FTA has implemented changes to the data collection process to address some of the data problems we identified and plans to take additional actions to validate and correct discrepancies contained in its State Safety Oversight Rail Accident Database, but these plans do not identify specific efforts to establish procedures that would improve data reporting in the future. To ensure the accuracy and reliability of the State Safety Oversight Rail Accident Database, we have recommended that FTA develop and implement appropriate internal controls to ensure that data entered are accurate and incorporate an appropriate method for reviewing and reconciling data from state safety oversight agencies and other sources.<sup>94</sup>

Without clear, specific, and varied performance goals and related measures linked to DOT's strategic goal of reducing transportation-related injuries and fatalities, including rail transit injuries and fatalities, the intended results of FTA's safety efforts are unclear. Furthermore, the absence of clear goals and measures to guide and track progress limits FTA's ability to make informed decisions about its safety strategy and its accountability for its safety performance. Finally, without reliable data, FTA cannot establish useful performance measures, making it difficult to determine whether safety programs are accomplishing their intended purpose and whether the resources dedicated to program efforts should be increased, used in other ways, or applied elsewhere.

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<sup>92</sup>These data were used by FTA to prepare its *2009 Rail Safety Statistics Report*. See [GAO-11-217R](#).

<sup>93</sup>We have reported on various internal control standards to help agencies better achieve missions and program results. See GAO, *Standards for Internal Control in the Federal Government*, [GAO/AIMD-00-21.3.1](#) (Washington, D.C.: November 1999).

<sup>94</sup>[GAO-11-217R](#).

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## Conclusions

Rail transit systems will remain vital components of the nation's transportation infrastructure and will need to continue to provide safe service for the millions of commuters that rely on them daily. Through its assistance efforts, FTA has worked with transit agencies to foster a safer operating environment for these passengers. Planned, new assistance efforts by FTA, as well as legislative proposals to enhance FTA's regulatory authority over transit safety, have the potential to further enhance safety on rail transit systems. Some additional proposals concerning new steps FTA could take to address safety challenges facing transit agencies also have the potential to improve rail transit safety. For example, while FTA is already working to instill safety culture at transit agencies, creating pilot projects to examine new approaches for instilling a strong safety culture at these transit agencies may have merit. Setting standards for a national training curriculum for transit employees may also ensure that a minimum threshold of training is achieved across the transit industry, if such standards could account for differences in transit agencies' environments and technologies. Asset management shows promise in both helping transit agencies and protecting federal investment. Similarly, holding agencies that receive federal funds accountable for using asset management practices could help ensure that federal funds aimed at addressing this problem are effectively used. DOT is uniquely positioned to examine various proposals to discern any worthwhile options for implementation going forward, given available resources and other competing priorities, and to propose in its draft surface transportation reauthorization legislation any options deemed worthwhile. We are not recommending at this time that DOT take actions on proposals for improving rail transit safety, as the department is considering various options for improving transportation safety, including rail transit safety, in developing its reauthorization proposal.

As FTA helps transit agencies ensure safety, setting clear performance goals and related measures for its safety efforts, based on leading practices, will be vital to improve FTA's ability to set priorities and determine progress—both in overseeing transit agencies and in helping them maintain safety on their systems. Setting clear performance goals will help FTA to communicate a direction for its safety efforts and establish benchmarks for performance. Tracking progress through performance measures will help FTA in planning its future efforts and will help hold the agency accountable for achieving results. However, FTA must take further actions to improve the reliability of its safety data before it can track its safety performance based on new measures and goals.



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## Recommendation for Executive Action

To ensure that FTA targets its resources effectively as it increases its safety efforts and is able to track the results of these efforts, we recommend that the Secretary of Transportation direct the FTA Administrator to use leading practices as FTA develops its plans for fiscal year 2011 and in the future. In particular, the Administrator should create a set of clear and specific performance goals and measures that (1) are aligned with the department's strategic safety goals and identify the intended results of FTA's various safety efforts and (2) address important dimensions of program performance.

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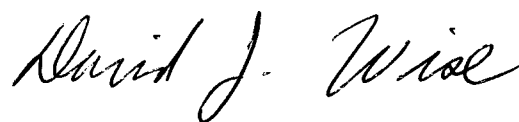
## Agency Comments and Our Evaluation

We provided a draft of this report to DOT and NTSB for their review and comment. Both provided technical comments and clarifications, which we incorporated into the report as appropriate. DOT agreed to consider our recommendation.

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We are sending copies of this report to interested congressional committees, the Secretary of Transportation, and the Chair of the National Transportation Safety Board. In addition, this report is available at no charge on GAO's Web site at <http://www.gao.gov>.

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



David J. Wise  
Director, Physical Infrastructure Issues

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# Appendix I: Results of NTSB's Investigations of Rail Transit Accidents

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Of the 48 rail accident investigations that the National Transportation Safety Board (NTSB) has reported on since 2004, 7 were on heavy rail transit systems operated by the Chicago Transit Authority (CTA) and the Washington Metropolitan Area Transit Authority (WMATA), and one was on the light rail transit system operated by the Massachusetts Bay Transportation Authority (MBTA).<sup>1</sup> As shown in table 2, these accidents collectively resulted in 13 fatalities, hundreds of injuries, and millions of dollars in property damage.

In its reports, NTSB identified the probable causes of accidents as well as factors that contributed to these accidents.<sup>2</sup> In five of these eight accident investigations, NTSB found the probable cause to involve employee errors, such as the failure of the train operator to comply with operating rules and of track inspectors to maintain an effective lookout for trains. Of the remaining three accidents, NTSB found that problems with equipment were a probable cause of two accidents and that weaknesses in management of safety by the transit agency, such as its management of maintenance and of equipment quality controls, were a probable cause of all three accidents. For six of these eight accidents, contributing factors identified involved deficiencies in safety management or oversight, including weaknesses in transit agencies' safety rules and procedures and in their processes for ensuring employees' adherence to these rules and procedures, lack of a safety culture within the transit agency, and lack of adequate oversight by the transit agency's state safety oversight agency and the Federal Transit Authority (FTA). In one accident report, NTSB found as a contributing factor the lack of safety equipment or technologies, such as a positive train control system that can prevent trains from colliding.

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<sup>1</sup>NTSB may elect to investigate certain accidents related to the transportation of individuals that it decides are catastrophic, involve problems of a recurring nature, or whose investigation is expected to bring about safety improvements.

<sup>2</sup>NTSB issues reports and recommendations pursuant to its duties to determine the probable cause or causes of transportation accidents and to report the facts, conditions and circumstances relating to such accidents. See 49 C.F.R. § 800.3(c). In addition to reporting on probable causes, NTSB often reports on factors that it found to have contributed to the accidents.

**Appendix I: Results of NTSB's Investigations  
of Rail Transit Accidents**

**Table 1: Causes of and Factors Contributing to Significant Rail Transit Accidents, 2004–2010, Based on Completed NTSB Investigations**

<b>Accident</b>	<b>Date</b>	<b>Impact</b>	<b>Probable causes</b>	<b>Contributing factors</b>
Collision of 2 CTA trains	2/3/04	42 minor injuries and \$62,000 in property damage	Failure of the operator of the striking train to comply with operating rules	Inadequate operational safety oversight by CTA.
NTSB, <i>Railroad Accident Brief: Collision of Two Chicago Transit Authority Trains, Chicago, Illinois, February 3, 2004</i> (Washington, D.C., July 7, 2004).				
Collision of 2 WMATA trains.	11/3/04	About 20 injuries <sup>a</sup> and about \$3.5 million in property damage	Failure of operator of the striking train to stop, due to reduced alertness	Lack of rollback protection feature to stop the train while in manual operation mode.
NTSB, <i>Railroad Accident Report: Collision Between Two Washington Metropolitan Area Transit Authority Trains at the Woodley Park-Zoo/Adams Morgan Station in Washington, D.C., November 3, 2004</i> (Washington, D.C., Mar. 23, 2006).				
WMATA train struck and killed an employee working on a track	5/14/06	1 fatality	Failure of train mechanic working on the track to stay clear of the approaching train either because he was not aware of it or because he lacked a physical reference by which to identify a safe area outside the train's dynamic envelope. <sup>c</sup>	WMATA's right of way rules and procedures did not (1) provide adequate safeguards to protect the wayside personnel <sup>b</sup> from approaching trains, (2) ensure that that train operators were aware of wayside work being performed, and (3) adequately provide for reduced train speeds through work areas. Also, WMATA's lack of an aggressive program of rule compliance testing and enforcement on its rail system.
NTSB, <i>Railroad Accident Brief: Washington Metropolitan Area Transit Authority Train Strikes Wayside Worker Near Dupont Circle Station, Washington, D.C., May 14, 2006</i> (Washington, D.C., Jan. 23, 2008).				
Derailment of a CTA train	7/11/06	152 injuries and more than \$1 million in property damage	CTA's ineffective management and oversight of its track inspection, maintenance program, and system safety program	CTA's state safety oversight agency's failure to require that action be taken by CTA to correct unsafe track conditions. Also, FTA's ineffective oversight of CTA's state safety oversight agency.
NTSB, <i>Railroad Accident Report: Derailment of Chicago Transit Authority Train Number 220 Between Clark/Lake and Grand/Milwaukee Stations, Chicago, Illinois, July 11, 2006</i> (Washington, D.C., Sept. 11, 2007).				

**Appendix I: Results of NTSB's Investigations  
of Rail Transit Accidents**

<b>Accident</b>	<b>Date</b>	<b>Impact</b>	<b>Probable causes</b>	<b>Contributing factors</b>
WMATA train struck and killed 2 employees conducting a track inspection	11/30/06	2 fatalities	Failure of track inspectors to maintain an effective lookout for trains and failure of the train operator to slow or stop the train to ensure that the workers ahead were aware of its approach and had moved to a safe area.	WMATA's right-of-way rules and procedures did not (1) provide adequate safeguards to protect personnel working along the tracks from approaching trains, (2) ensure that that train operators were aware of wayside work being performed, and (3) adequately provide for reduced train speeds through work areas. Also, WMATA's lack of an aggressive program of rule compliance testing and enforcement on its rail system.
<i>NTSB, Railroad Accident Brief: Washington Metropolitan Area Transit Authority Train Strikes Wayside Workers Near Eisenhower Avenue Station, Alexandria, Virginia, November 30, 2006 (Washington, D.C., Jan. 23, 2008).</i>				
Derailment of WMATA train	1/7/07	23 injuries and \$3.8 million in property damage	(1) Improper milling of a train wheel resulting in a rough wheel surface caused the wheel to climb on the train car and derail, (2) lack of quality control measures to ensure that wheel surfaces were smoothed after being milled, (3) lack of a guard rail at the location of the derailment, and (4) WMATA's failure to have an effective process to implement safety improvements identified following similar accidents and related research projects	n/a
<i>NTSB, Railroad Accident Report: Derailment of Washington Metropolitan Area Transit Authority Train Near the Mt. Vernon Station, Washington, D.C., January 7, 2007 (Washington, D.C., Oct. 16, 2007).</i>				
Collision between 2 MBTA trains	5/28/08	1 fatality, 8 injuries, and \$8.6 million in property damage	Failure of train operator to comply with controlling signal indication, resulting from an episode of micro-sleep.	Lack of a positive control system that would have intervened to stop the train and prevent the accident.
<i>NTSB, Railroad Accident Report: Collision Between Two Massachusetts Bay Transportation Authority Green Line Trains, Newton, Massachusetts, May 28, 2008 (Washington, D.C., July 14, 2009).</i>				

**Appendix I: Results of NTSB's Investigations  
of Rail Transit Accidents**

<b>Accident</b>	<b>Date</b>	<b>Impact</b>	<b>Probable causes</b>	<b>Contributing factors</b>
Collision between 2 WMATA trains	6/22/09	9 fatalities, 52 injuries, \$12 million in property damage	(1) Failure of the track circuit modules <sup>d</sup> , built by GRS/Alstom Signaling Inc., causing the automatic train control system to (a) not detect and transmit speed information to the striking train of another train on the track and (b) transmit speed commands to the striking train up to the point of impact; (2) WMATA's failure to ensure that the enhanced track circuit verification test (developed after a near-collision in 2005) was institutionalized and used systemwide, which would have identified the faulty track circuit before the accident.	(1) WMATA's lack of a safety culture, (2) WMATA's failure to effectively maintain and monitor its automatic train control system, (3) GRS/Alstom Signaling Inc.'s failure to provide a maintenance plan to detect spurious signals that could cause track circuit modules to malfunction, (4) ineffective safety oversight by board of directors, (5) ineffective oversight and lack of safety oversight authority by WMATA's state safety oversight agency, and (6) FTA's lack of statutory authority to provide federal safety oversight.

NTSB, *Railroad Accident Report Collision of Two Washington Metropolitan Area Transit Authority Metrorail Trains Near Fort Totten Station, Washington, D.C., June 22, 2009* (Washington, D.C., July 27, 2010).

Source: GAO analysis of NTSB accident reports and briefs.

<sup>a</sup>These represent those who were taken to the hospitals for treatment of their injuries.

<sup>b</sup>Wayside personnel work along the rail tracks.

<sup>c</sup>A dynamic envelope refers to the total area occupied by a moving train. It not only incorporates the physical dimensions of the equipment but also accounts for suspension travel, overhang on curves, or lateral motion along the track.

<sup>d</sup>Track circuit modules are electrical devices interconnected with tracks to help detect a train's location and communicate the location to other trains nearby.

In addition, as shown in table 2, NTSB has ongoing investigations on six accidents that occurred on heavy and light rail transit systems.

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**Appendix I: Results of NTSB's Investigations  
of Rail Transit Accidents**

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**Table 2: NTSB's Ongoing Investigations of Heavy and Light Rail Transit Accidents,  
as of November 2010**

<b>Accident</b>	<b>Date</b>	<b>Impact</b>
Derailment of CTA passenger cars on an elevated track	5/28/08	14 injuries
Collision of two MBTA light rail passenger trains	5/8/09	About 46 injuries
Collision of two San Francisco Municipal Transportation Agency light rail vehicles	7/18/09	48 injuries
Collision of two WMATA trains in Falls Church, VA	11/29/09	3 injuries
The fatal striking of two wayside workers by a WMATA hi-rail vehicle	1/26/10	2 fatalities
Derailment of a WMATA train	2/12/10	No injuries

Source: GAO presentation of NTSB information.

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# Appendix II: Objectives, Scope, and Methodology

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To determine the challenges that the largest rail transit systems face in ensuring safety, we conducted site visits, examined documents, conducted interviews, and consulted relevant literature. We obtained documents from and interviewed officials at five large heavy rail transit systems and three large light rail transit systems operated by seven transit agencies. The five heavy rail systems are those operated by the Metropolitan Transportation Authority New York City Transit (NYCT), WMATA, CTA, MBTA, and the Bay Area Rapid Transit (BART). The three light rail systems are operated by MBTA, the San Francisco Municipal Transportation Agency (SF Muni), and the Los Angeles County Metropolitan Transportation Authority (LA Metro). We obtained budget documents, accident and audit reports, corrective action plans, and staffing and training information, among other information and documentation, from each system. Also, we interviewed representatives from these transit agencies and their respective state safety oversight agencies about the transit agencies' challenges. We also analyzed published NTSB investigations of accidents on heavy and light rail transit systems since 2004 to help us determine the causes of and factors contributing to rail transit accidents in recent years.

We used data from Federal Transit Administration's (FTA) National Transit Database (NTD) to select these eight transit systems.<sup>1</sup> The NTD data we used for our selection criteria were (1) annual ridership, as measured by unlinked passenger trips and passenger miles, (2) the number of rail transit vehicles in revenue service operations, and (3) total track mileage.<sup>2</sup> To determine whether these NTD data were reliable for our purposes, we interviewed FTA officials who are knowledgeable about the database and assessed the accuracy of these data elements. We determined that these specific data elements were sufficiently reliable to be used as selection criteria.

To determine the extent to which FTA's assistance addresses the safety challenges faced by the largest transit agencies, we reviewed FTA

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<sup>1</sup>Established by Congress, the NTD is the primary source for information and statistics on the nation's transit systems. Recipients or beneficiaries of grants from the FTA under the Urbanized Area Formula Program (§5307) or Other Than Urbanized Area (Rural) Formula Program (§5311) are required by statute to submit data to the NTD in order to be eligible for a grant award.

<sup>2</sup>Unlinked passenger trips are the number of passengers boarding the public transportation vehicles, and passenger miles are the cumulative sum of the distances ridden by each passenger.

documents on funding, state of good repair initiatives, technical assistance programs, and guidance and outreach related to rail transit safety. We also obtained information on transit safety training from the National Transit Institute and the Transportation Safety Institute.<sup>3</sup> We interviewed officials from FTA and NTSB and representatives of the American Public Transportation Association (APTA). We asked officials from the transit systems we visited and their respective state safety oversight agencies for their assessment of FTA's assistance efforts. We reviewed applicable federal regulations, laws, and legislative proposals. In addition, we consulted our prior work on performance management and rail transit issues.

We further contracted with the National Academies' Transportation Research Board to identify rail transit safety experts from the transit industry, academia, labor unions, and the rail consulting community. We interviewed 12 experts on the challenges that large rail transit agencies face in ensuring safety, the factors that contribute to rail transit safety accidents, and potential ways that FTA could improve its safety assistance efforts (see table 3). We also interviewed officials from NTSB and representatives of the APTA on these topics.

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<sup>3</sup>The National Transit Institute is part of Rutgers University Transportation Center, but is funded by FTA. The Transportation Safety Institute is part of DOT's Research and Innovative Technology Administration, but its transit safety training is funded by FTA.



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**Table 3: Rail Transit Safety Experts Interviewed**

<b>Name of expert</b>	<b>Affiliation</b>
Edward Beimborn, Ph.D.	University of Wisconsin-Milwaukee
Joe Calabrese	Greater Cleveland Regional Transit Authority
James Fox	Southeastern Pennsylvania Transportation Authority
Jackie Jeter	Amalgamated Transit Union
Karla Karash, retired	TranSystems, Inc.
Richard Krisak	Metropolitan Atlanta Transportation Rapid Transit Authority
Clarence Marsella, retired	Denver Regional Transportation District
Robert Paaswell, Ph.D.	City College of New York
Robert Peskin	AECOM Transportation, Inc.
Conrad Santana	Parsons Brinckerhoff
James Stem	United Transportation Union
Ed Watt	Transport Workers Union of America

Source: GAO.

In addition, as part of this review, we assessed FTA’s safety data to determine whether they were sufficiently reliable for us to use to report on trends in rail transit accidents as well as causes of those accidents. During that assessment, we identified inaccuracies, discrepancies, and duplicative entries, and determined that these data were not sufficiently reliable for these purposes and decided to conduct a separate review of the data’s reliability. We are issuing a report on our findings and recommendations based on this review.<sup>4</sup>

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<sup>4</sup>[GAO-11-217R](#).

# Appendix III: DOT Safety-Related Assistance Efforts That Address Transit Agencies' Safety Culture, Staffing, and Training Challenges

**Table 4: Efforts that Address Safety Culture, Staffing, and Training Challenges**

Name	Description	Time frame
<i>Current efforts</i>		
Training–National Transit Institute	Program funded by FTA and managed through Rutgers University. Fiscal year 2011 proposed budget estimates that the National Transit Institute will deliver approximately 50 courses at locations through the country. Class topics include avoiding operator fatigue and asset management. The primary transit agency audience is frontline employees at transit agencies, such as mechanics and drivers. There are a few specialized classes for supervisors, and a course for midlevel managers on asset management is being piloted in 2010 for a general offering in 2011.	Ongoing
Training–Transportation Safety Institute	Program funded through the Department of Transportation’s Research and Innovation Technology Administration. Various training sessions are held each year, including classes on rail incident investigations and rail transit system safety. The primary transit agency audience is supervisory personnel. The state safety oversight community receives a three-tier training curriculum funded by FTA. The state safety oversight community also receives individual educational plans to guide members toward obtaining a transit safety and security certificate. Transit agencies can also help receive certification for their staff, but this requires a firm commitment from the transit agency, requesting to host classes and obtain a 3–5 year training plan to train its employees.	Ongoing
Transit Technology Career Ladder Partnership Program	Under this program, funded by FTA and managed by the Transportation Learning Center, the center develops and supports standards and models for training and career programs in public transit. Since 2002, this program has provided training for more than 9,000 transit mechanics. Partnerships have been carried out in Pennsylvania, Utah, New York, and California.	Ongoing
Southern California Regional Transit Training Consortium	This program provides a training resource network comprising public and private organizations (community colleges and transit agencies in Southern California) focused on the development and employment of the transit industry’s workforce. Training is provided largely for maintenance workers. Classes focus on upkeep and maintenance of mechanical and electrical systems on transit vehicles, as well as expanding into the arena of information and technology services.	Ongoing
Guidance	FTA provides various types of guidance to transit agencies on ensuring safety. Examples include a compilation of best practices on transit safety, hazard analysis guidelines, guidance on drug and alcohol testing, a video on protecting track workers, safety Webinars and teleconferences, curriculum development guidelines, and periodic letters to FTA grantees on safety issues in the industry and recommended practices to address them.	Ongoing
Transit Cooperative Research Program	Funded by FTA and administered by the Transportation Research Board, provides funds for national transit research and development projects, including projects related to safety. This results in products that are available to the transit industry. Recent reports have addressed safety in transportation tunnels and other operations. A 3-year study began earlier in 2010 that will report on best practices for maintaining safety culture at transit agencies.	Ongoing

**Appendix III: DOT Safety-Related Assistance  
Efforts That Address Transit Agencies' Safety  
Culture, Staffing, and Training Challenges**

<b>Name</b>	<b>Description</b>	<b>Time frame</b>
Annual transit agency executive officers safety summit and annual drug and alcohol conference	In the past, the safety summit has included executive officers from 36 rail transit agencies and representatives from state safety oversight agencies and others. The summit has facilitated discussion of safety concerns. Next summit scheduled for late 2010 or early 2011. The drug and alcohol conference has included FTA and other expert speakers and information on running a successful drug and alcohol programs, solving common problems, and other topics.	Ongoing
Support for industry safety standards	FTA funds APTA's ongoing development of safety and other standards and recommended practices for the rail industry.	Ongoing
<i>Planned efforts</i>		
Technical Assistance and Workforce Development Program	Reformatting and restructuring technical assistance programs to emphasize transportation safety, among other things. FTA funding will include safety technical assistance, such as training and capacity building programs to develop a workforce with sufficient skills to fill transit jobs of the future.	Proposed fiscal year 2011

Source: GAO analysis of FTA information.

**Table 5: Efforts that Address State of Good Repair Challenges**

<b>Name</b>	<b>Description</b>	<b>Time frame</b>
<i>Current efforts</i>		
Fixed Guideway Modernization Program (49 U.S.C. § 5309(b)(2))	Capital assistance to modernize or improve existing fixed guideway systems. Eligible uses include the purchase and rehabilitation of rolling stock, maintenance facilities and equipment, and preventive maintenance. Funds are apportioned based on a multitiered formula. The program's fiscal year 2010 funding level was \$1.6 billion. <sup>a</sup>	Ongoing, funds apportioned annually
Urbanized Area Formula Program (49 U.S.C. § 5307)	Through this program, FTA provides assistance for capital and planning projects in urbanized areas (and operating assistance in areas with a population of less than 200,000). <sup>b</sup> Eligible uses include the purchase and rehabilitation of rolling stock, preventive maintenance, and the overhaul and rebuilding of vehicles, track, and signals. The program's fiscal year 2010 funding level was \$4.1 billion.	Ongoing, funds apportioned annually
Grants to WMATA	Congress authorized \$1.5 billion for WMATA over 10 years. These federal grants for capital and preventive maintenance projects leverage equal financial contributions from the District of Columbia, Maryland, and Virginia to the transit agency. Funds are intended for WMATA to use to address maintenance and upkeep. For fiscal year 2010, \$150 million was appropriated.	Fiscal years 2010 to 2020
Rail modernization studies	FTA's original April 2009 study outlined the financial challenges facing transit systems in addressing state of good repair issues. <sup>c</sup> FTA released a new study in June 2010 that concluded that \$78 billion is needed to address the backlog of capital investment faced by all transit agencies nationwide. <sup>d</sup>	April 2009 and June 2010
State of good repair roundtables and advisory groups	These meetings include industry, engineering, and capital planning experts who share approaches and solutions to common state of good repair problems, as well as help ensure that FTA state of good repair efforts reflect real word realities.	Fiscal years 2009 and 2010, with more planned

**Appendix III: DOT Safety-Related Assistance Efforts That Address Transit Agencies' Safety Culture, Staffing, and Training Challenges**

<b>Name</b>	<b>Description</b>	<b>Time frame</b>
Transit Asset Management Practices Scan	The objective of this report is to build on efforts to date to create a resource of information about existing practices in Transit Asset Management. The report details the published literature in this area, and includes additional information on existing practices in 11 organizations prepared through a set of case studies.	June 2010
<i>Planned efforts</i>		
Bus and Rail State of Good Repair Program	This new program would provide increased capital assistance for the modernization of fixed guideway systems, focusing on bus and rail transit assets that are in marginal or poor condition. FTA's fiscal year 2011 budget request proposed merging existing grant programs into this new \$2.84 billion effort.	Proposed for fiscal year 2011
Transit asset management	In DOT's fiscal year 2010 appropriations, \$5 million was made available to FTA to develop standards for asset management plans, provide assistance to grant recipients engaged in the development or implementation of asset management plans, improve data collection, and conduct a pilot program to identify best practices for asset management. FTA is to submit a report on its activities to Congress in June 2011.	June 2011
Definition and measurement of state of good repair	FTA aims to reach consensus with the industry on how to define and measure "state of good repair." The goal is to find a common language to facilitate discussion and an agreed upon method to measure various aspects of state of good repair.	End of fiscal year 2011
Transit Economic Requirements Model (TERM) Lite	TERM is a model that can be used to forecast long-term transit investment needs. TERM Lite will be a modification of this model to enable distribution to grantees for use as an asset management tool.	During fiscal year 2011

Source: GAO analysis of FTA information.

<sup>a</sup>The American Recovery and Reinvestment Act of 2009 appropriated approximately \$8.4 billion to fund public transportation throughout the country. Recovery Act funds have primarily supported grants in capital projects at transit agencies, although some funds have been used for operating expenses. As of August 25, 2010, approximately \$190 million had been obligated for use as operating expenses.

<sup>b</sup>Urbanized areas are areas encompassing a population of not less than 50,000 that have been defined and designated in the most recent decennial census as an "urbanized area" by the Secretary of Commerce.

<sup>c</sup>FTA, *Rail Modernization Study* (Washington, D.C., April 2009).

<sup>d</sup>FTA, *National State of Good Repair Assessment* (Washington, D.C., June 2010).

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# Appendix IV: GAO Contact and Staff Acknowledgment

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## GAO Contact

David J. Wise, (202) 512-2834 or [wised@gao.gov](mailto:wised@gao.gov)

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## Staff Acknowledgments

In addition to the contact named above, Judy Guilliams-Tapia, Assistant Director; Catherine Bombico; Matthew Cail; Martha Chow; Antoine Clark; Colin Fallon; Kathleen Gilhooly; Brandon Haller; Hannah Laufe; Grant Mallie; Anna Maria Ortiz; and Kelly Rubin made significant contributions to this report.

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