



FRA Uses Automated Track Inspections To Aid Oversight but Could Improve Related Program Utilization Goals and Track Inspection Reporting

Self-initiated

Federal Railroad Administration | ST2022028 | April 27, 2022

What We Looked At

While track-caused rail accident numbers and rates have declined over the past 2 decades, defective track conditions are still among the most frequent causes of train derailments. The Federal Railroad Administration's (FRA) Track Division deploys track inspectors and its Automated Track Inspection Program (ATIP) to determine whether railroads are complying with minimum safety requirements for railroad track. Given the impact of track conditions on railroad safety, we initiated this audit to evaluate FRA's use of automated inspections to aid track safety oversight.

What We Found

FRA deploys eight ATIP inspection vehicles to monitor track conditions nationally and recently took actions to improve the program's operation and oversight. However, the Agency's formal program metric for ATIP vehicle utilization is outdated. Specifically, FRA contracts out operation of these vehicles to two contractors but only established a single utilization goal to run the ATIP vehicles 150 survey days a year. While some ATIP vehicles came close to the goal individually, collectively the ATIP fleet fell short, with an average 80-percent utilization between fiscal years 2016 and 2021. FRA officials offered several reasons, including weather events, to explain the missed goal. In addition, over half of the 539 ATIP-related inspection reports we reviewed contain inaccurate data—in part because FRA does not have sufficient guidance on recording ATIP-related inspection activities. FRA also relies on inspectors to respond promptly to changing conditions and use their territory knowledge in planning their work but does not have any national or formal district-level track inspection planning processes in place. However, FRA does use ATIP vehicles and survey data to perform data-driven evaluations of railroad track testing programs and improve its data inventories. Until FRA improves ATIP utilization goals and ATIP-related track inspection reporting, it cannot ensure its resources are optimally targeted to support the Agency's track oversight.

Our Recommendations

FRA concurred with all six of our recommendations to improve its use of automated inspections to aid track safety oversight and provided appropriate actions and completion dates. We consider these recommendations resolved but open, pending completion of planned actions.

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Memorandum

Date: April 27, 2022

Subject: ACTION: FRA Uses Automated Track Inspections To Aid Oversight but Could Improve Related Program Utilization Goals and Track Inspection Reporting | Report No. ST2022028

From: David Pouliott 
Assistant Inspector General for Surface Transportation Audits

To: Federal Railroad Administrator

According to data from the Federal Railroad Administration (FRA), track-caused rail accident numbers and rates have declined over the past 2 decades. Defective track conditions still account for 30 percent of all reportable rail accidents and are among the most frequent causes of train derailments. In 2020, for example, a problem with track conditions caused a BNSF Railway train to derail near Temple, TX. Twenty-six cars derailed, causing over \$3 million in estimated damages.

FRA's Track Division is tasked with providing technical expertise and guidance in the execution of rail safety programs to ensure maximum safety in railroad track operations. These operations cover approximately 220,000 miles of track in the United States and 140,000 route miles.¹ The Division deploys track inspectors to evaluate the track and determine whether railroads are complying with Federal Track Safety Standards (TSS), which prescribe minimum safety requirements for railroad track. Track inspectors report conditions that fail to meet these minimum standards. Since 1974, FRA has also used a critical tool to supplement these physical track inspections—the Automated Track Inspection Program (ATIP), which uses technology to identify specific types of track defects. According to FRA, ATIP data inform the Agency's risk-based planning to ensure inspection resources are used effectively. ATIP also generates comprehensive infrastructure diagnostics to notify railroads about major safety risks and supports research to improve track safety.

Given the impact of track conditions on railroad safety, we initiated this audit to evaluate FRA's use of automated inspections to aid track safety oversight. Specifically, we reviewed FRA's ATIP activities and supporting documentation

¹ According to an FRA official, route miles reference the length of a route and are unaffected by the number of parallel tracks on that route. Track miles count the length of all of the tracks.

from fiscal years 2011 through 2021 related to ATIP utilization and prioritization, Track Division inspection planning and ATIP-related reporting, and FRA's use of ATIP to perform evaluations and improve railway information.

We conducted this audit in accordance with generally accepted Government auditing standards. Exhibit A details our scope and methodology, exhibit B lists the organizations we visited or contacted, exhibit C lists the acronyms used in this report, and exhibit D provides details about FRA's ATIP Fleet, as of October 2021

We appreciate the courtesies and cooperation of Department of Transportation representatives during this audit. If you have any questions concerning this report, please call me at (202) 366-1844 or Wendy Harris, Program Director, at (202) 366-2794.

cc: The Secretary
DOT Audit Liaison, M-1
FRA Audit Liaison, RFCO-1

Results in Brief

FRA uses ATIP data to aid track safety oversight but could improve program utilization goals and track inspection reporting.

FRA deploys eight ATIP vehicles to monitor track conditions nationally and recently took actions to improve the operation and oversight of the program. However, the Agency's formal program metric for ATIP vehicle utilization is outdated. Specifically, FRA contracts out operation of these vehicles to two contractors, but the statements of work only established a single utilization goal to run the ATIP vehicles 150 survey days a year. Our assessment found that while some ATIP vehicles came close to the goal individually, collectively the ATIP fleet fell short, with an average 80-percent utilization between fiscal years 2016 and 2021. FRA officials offered several reasons to explain the missed goal, such as impacts due to weather events. In addition, over half of the 539 ATIP-related inspection reports completed by track inspectors from October 2011 to May 2021 contain inaccurate data. One reason is that FRA does not have sufficient guidance on how to properly record ATIP-related inspection activities on inspection reports, and we often found it difficult to tell what types of inspection activities occurred. For example, 61 percent of the 539 ATIP survey inspection reports had an activity code inconsistent with an in-progress ATIP survey. Of these, all but one listed defects that should be recorded in a different type of inspection report to accurately reflect how the inspection was conducted. FRA also relies on inspectors to respond promptly to changing conditions and utilize their territory knowledge in planning their work. According to FRA, the Agency is transitioning from its National Inspection Plan (NIP) to oversight models and tools it is developing to inform track inspection planning, including Focused Inspection Plans (FIP). Currently, inspectors in FRA's Track Division manage their own inspection activities. As a result, the Division does not have any national or formal district-level track inspection planning processes in place at this time. However, FRA does use ATIP vehicles and survey data to perform data-driven evaluations of railroad track testing programs and improve Agency data inventories. Until FRA improves ATIP utilization goals and ATIP-related track inspection reporting, it cannot ensure its resources are optimally targeted to support the Agency's track oversight.

We are making recommendations to update the ATIP fleet utilization performance metric, document the survey prioritization process, improve accuracy of ATIP-related inspection reporting, and provide detailed inspection planning guidance to track inspectors. However, within the scope of our audit, we did not identify any areas for correction in FRA's use of ATIP vehicles to evaluate test programs or use survey data to evaluate potential regulation changes and improve data inventories. Thus, we did not make any recommendations in those areas.

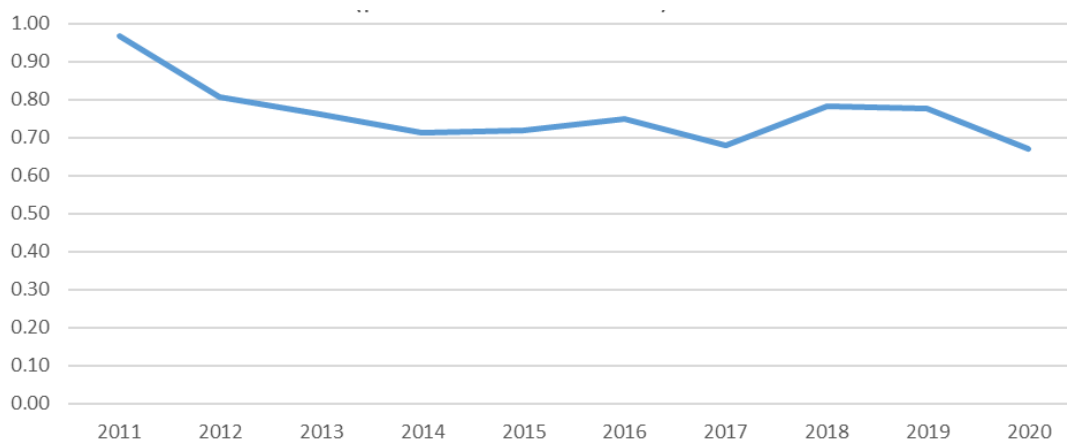
Background

Freight rail line safety is first and foremost the responsibility of individual railroads, which must comply with the TSS. These standards prescribe minimum safety standards for railroad track and require railroads to have track inspectors to monitor conditions for compliance.

FRA's Track Division is a part of the Office of Railroad Infrastructure and Mechanical within the Office of Railroad Safety. Like the railroads, the Division has track inspectors whose primary duty is to determine whether railroads comply with the TSS. FRA employs and trains nearly 400 Federal safety inspectors and specialists and trains more than 150 State safety inspectors. FRA's inspectors specialize in six safety disciplines,² including track, and are located in eight districts throughout the country. Each of FRA's 8 districts has a Supervisory Track Safety Specialist who cumulatively oversees about 90 track inspectors nationwide. One of these Track Safety Specialist positions was vacant when we conducted this audit.

FRA's safety data show defective track as the second-leading cause of non-grade crossing train accidents, but accident rates are declining (see figure 1). The rate of track-caused accidents per million train miles fell from 0.97 in 2011 to 0.67 in 2020.

Figure 1. Track Accident Rates, 2011–2020 (Per Million Train Miles)



Source: OIG analysis of FRA safety data

ATIP uses different types of technology to identify exceptions—track geometry conditions that do not meet TSS standards. For example, class 3 track, which limits

² FRA's safety disciplines are: Grade Crossings, Hazardous Materials, Motive Power and Equipment, Operating Practices, Signal and Train Control, and Track.

freight train speed to 40 miles per hour, must have a gage³ of at least 4 feet 8 inches but not more than 4 feet 9¾ inches.⁴ Since the program's start in 1974, ATIP's primary focus has been to identify the most important noncompliant track geometry conditions early so railroads can make repairs. Over 2 years, specifically fiscal years 2017 and 2018, ATIP vehicles surveyed more than 194,000 track miles and found 8,624 exceptions to the TSS. According to an FRA official, these survey miles are not unique. In 2020, ATIP vehicles surveyed 130,439 track miles and identified 8,873 exceptions to the TSS, such as track alignment or gage measurements deviating from mandated parameters. When exceptions identified by ATIP vehicles are physically verified by Agency inspectors, FRA may initiate enforcement actions.⁵ For example, certain track structure or geometry conditions, such as track gage in excess of 58½ inches, may warrant a violation citation.

FRA's ATIP Fleet

Between fiscal years 2011 and 2021, ATIP's budget grew from approximately \$14.3 million to \$16.5 million, and its fleet grew from six to eight inspection vehicles. The current fleet includes seven track geometry cars and one hi-rail vehicle (see exhibit D). FRA has indefinite delivery, indefinite quantity contracts with two contractors for the operation of all these vehicles. As of 2021, three geometry cars and the hi-rail vehicle are staffed by ATIP contractor crews that operate the vehicles and analyze the data in real-time. FRA inspectors and railroad personnel may also ride on these staffed ATIP vehicles. Two are unstaffed geometry railcars that are pulled by freight trains in general revenue service and collect track data remotely. ATIP contractor personnel review the track data collected by these unstaffed ATIP vehicles and issue reports to FRA and the railroad the next day. The last two geometry cars can operate in either staffed or unstaffed modes. According to FRA, when unstaffed, the cars operate in Amtrak trains along regularly scheduled passenger train routes. FRA plans to put a second staffed hi-rail vehicle with new technology into service in 2022.

The ATIP vehicles are equipped in different configurations. There are approximately 15 different inspection and data collection technologies deployed across the fleet; however, not all technologies are installed on all vehicles. These include new technologies that FRA's Track Research Division is developing, such as machine-learning-based track component vision-based systems and LiDAR, which uses pulsed lasers to collect data that help to identify grade crossing

³ "Gage" is an alternate spelling of "gauge" that is used in the TSS and FRA's *Track and Rail and Infrastructure Integrity Compliance Manual* to refer to the distance between track rails.

⁴ 49 Code of Federal Regulations (CFR) § 213.53.

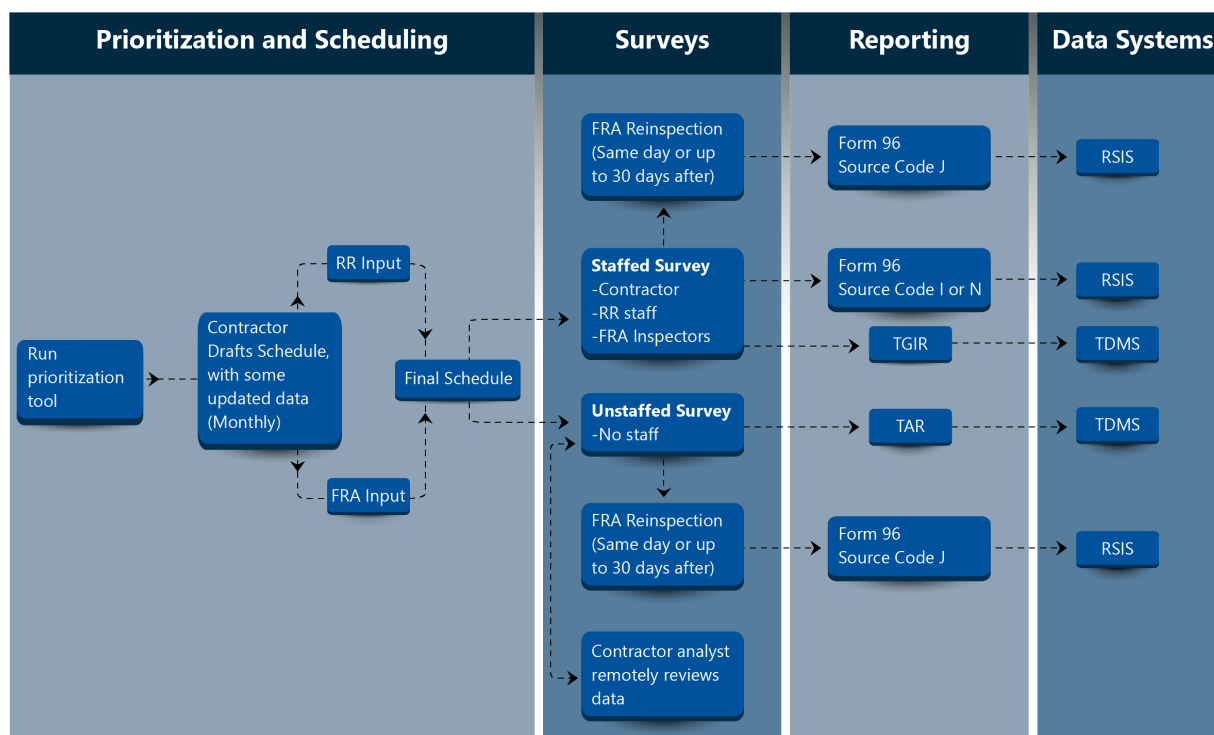
⁵ An inspector can initiate various enforcement actions. In order of increasing severity, they are: defect report, violation report recommending a civil penalty, special notice for repairs (slow order), compliance order recommendation, and notice of track conditions (emergency order).

features. All ATIP vehicles have a track geometry measurement system (TGMS) that measures parameters such as track gage, alignment, and track surface.

FRA Officials Use ATIP Data but Could Improve Program Utilization Goals and Track Inspection Reporting

FRA uses ATIP to monitor track conditions but relies on an outdated utilization metric and does not always accurately report related inspection activities. The Agency recently developed models and tools to aid its oversight, but district track specialists and inspectors do not yet use them to inform track inspection planning. Still, FRA does use ATIP vehicles and survey data to improve data inventories and perform data-driven evaluations. Figure 2 shows an overview of the key data collection processes related to ATIP that OIG identified.

Figure 2. FRA’s ATIP-Related Data Collection Processes



Note: "Form 96" is shorthand for FRA Form F 6180.96. This form is completed when an inspection occurs. The source code denotes the inspection purpose. Source codes are described in table 1, on page 15. The other acronyms used in this figure are described in exhibit C.

Source: OIG generated from FRA documents and interviews

FRA Monitors Track Conditions With ATIP but Relies on an Outdated Utilization Metric and Inaccurately Reports on Some Inspection Activities

Our review found that FRA's utilization of the ATIP fleet varies from vehicle to vehicle, and the Agency did not meet its utilization metric goal, which FRA officials said is outdated. Management of ATIP has changed over time, and several initiatives related to schedule prioritization, utilization metrics, database systems, and data quality may affect future fleet utilization. While FRA does use ATIP surveys to monitor track conditions, we found several different types of inaccurate reporting in our review of related inspection reports.

FRA's Utilization of Its ATIP Fleet Varies, and Its Utilization Metric Is Outdated

FRA works with two ATIP contractors to identify, prioritize, and schedule surveys of high-risk⁶ sections of track across the country. When a staffed ATIP vehicle identifies a track condition outside the TSS measurement parameters, the vehicle records the condition as an exception. Railroad and FRA representatives may be present on the staffed surveys and are informed of the exceptions during the survey. If an FRA inspector is on board, they can choose to leave the ATIP vehicle to manually verify the exception during the survey. At the end of the survey day, ATIP contractors send FRA and railroad officials a Track Geometry Inspection Report (TGIR) that lists the exceptions identified by the vehicle. According to FRA, some railroads use TGIRs to direct their maintenance and inspection resources.

FRA's statements of work for its ATIP vehicle contractors establish a utilization goal of 150 survey days a year. In its *Standards for Internal Control in the Federal Government*⁷ (Internal Control Standards), the Government Accountability Office (GAO) directs Federal managers to define objectives in measurable terms so that they can assess performance toward achieving those objectives; clearly document internal controls; and process relevant, reliable, and timely data into quality information. FRA officials told us they roughly track how many days ATIP vehicles survey in a year but have not held contractors to the 150-day utilization goal contained in the statement of work, which they called a legacy performance metric. Further, they were unclear about whether the survey goal in the

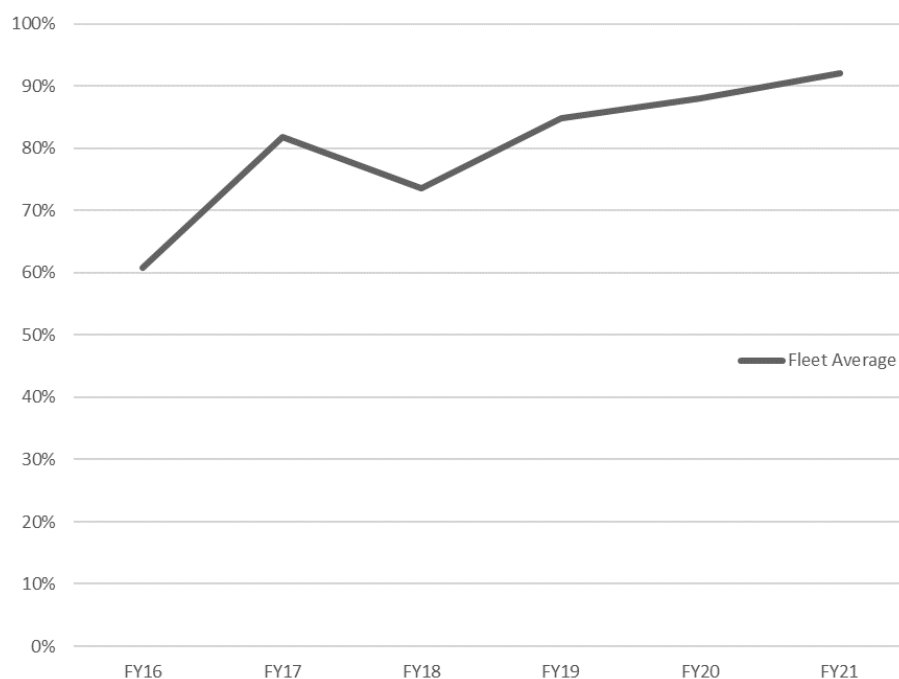
⁶ Track may be considered high-risk and prioritized for ATIP surveys based on FRA inspection data or other factors such as whether it carries passenger or hazardous materials traffic.

⁷ GAO, *Standards for Internal Control in the Federal Government* (GAO-14-704G), 2014.

statements of work applied to the contractor as a whole or to each ATIP vehicle managed by the contractors.

We assessed FRA’s utilization of its ATIP fleet by reviewing ATIP survey schedules and records from fiscal year 2016 to fiscal year 2021. We found that the fleet fell short of the 150-day utilization goal, with an average 80 percent of the utilization goal during the 6-year period (see figure 3).

Figure 3. Average ATIP Fleet Utilization Rate as a Percentage of the 150-Day Utilization Goal, FY 2016–FY 2021

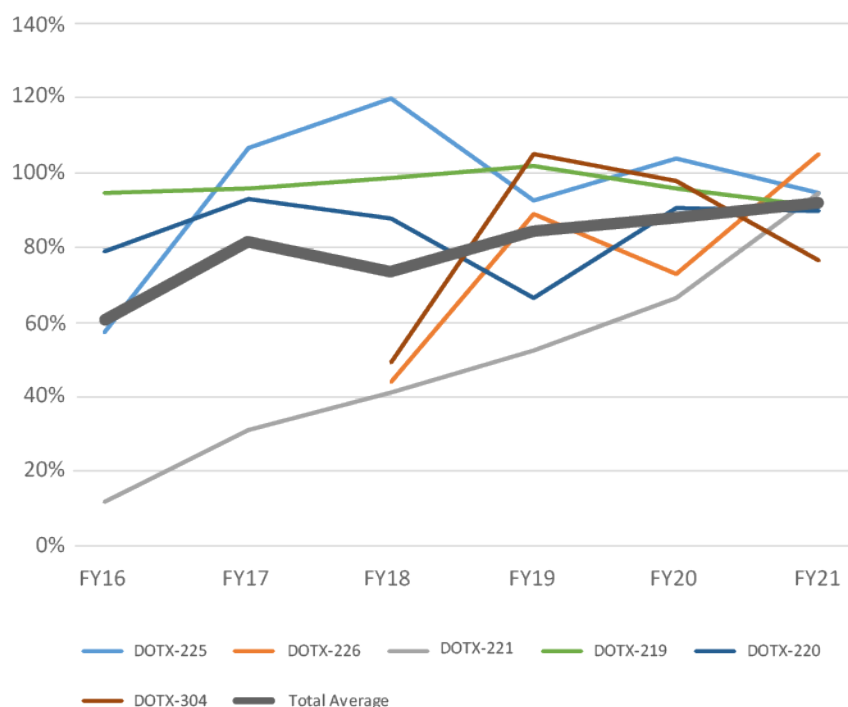


Note: DOTX-216 is not included in the average shown in this chart because it was not used for ATIP surveys during the time period covered by our review.

Source: OIG analysis of FRA data

Fleet utilization varied by type of ATIP vehicle. On average, the two unstaffed ATIP vehicles achieved 96 percent and 78 percent of the 150-day utilization goal. However, the ATIP vehicle that can operate in staffed or unstaffed modes met 50 percent of the utilization goal. Still, the fleet’s overall average utilization has increased over time (see figure 3), despite the variance in individual ATIP vehicle utilization (see figure 4).

Figure 4. ATIP Vehicle Utilization as a Percentage of the 150-Day Utilization Goal, FY 2016–FY 2021



Note: The “DOTX-” labels identify each ATIP vehicle by number. See exhibit D for details. DOTX-216 is not included in this chart because it was not used for ATIP surveys during the time period. DOTX-218 is not shown separately in this chart because it is coupled with DOTX-220.

Source: OIG analysis of FRA data

FRA officials offered several reasons to explain why the ATIP fleet missed the 150-day utilization goal:

- *Program goals:* FRA officials have other survey routing priorities beyond the 150-day goal, such as ensuring geographic coverage, targeting high-risk track, and tracking the number of miles inspected and exceptions identified.
- *Differential ATIP vehicle uses:* Some ATIP vehicles are used for specific purposes that impact utilization. For example, FRA officials said that crews can drive DOTX-304, the hi-rail vehicle shown in figure 5, to specific survey locations rather than rely on railroads for movement. Consequently, DOTX-304 usually has high rates of utilization.

Figure 5. DOTX-219, a Staffed ATIP Track Geometry Car, and DOTX-304, a Staffed ATIP Hi-Rail Vehicle



Source: FRA

- *External factors:* Scheduled ATIP surveys may be canceled or limited because of weather events, accidents, and changes in railroad staffing. For instance, according to FRA officials, DOTX-304 was down for nearly 4 months in 2021 after a highway collision. Additionally, winter weather generally limits surveys in northern latitudes.
- *Railroad prioritization:* FRA relies on the railroads to provide locomotives and train crews to support survey operations for staffed ATIP vehicles. Additionally, the movements of unstaffed ATIP vehicles depend on how railroads prioritize freight traffic. Delays, shifts in priorities, and failure to provide resources on the part of railroads may limit ATIP surveys.
- *Survey routing:* All the ATIP vehicles operated by one contractor must return to Pennsylvania for annual maintenance. Returning to the East Coast at least once a year limits FRA's ability to route surveys across the country.
- *Maintenance:* The current practice of 3 weeks of survey, 1 week of routine maintenance in the field, and 1 to 2 months of annual inspection and maintenance at the contractor's facility limits the number of days ATIP vehicles can survey.

In addition, management and operation of FRA's ATIP changed recently and has had an impact on ATIP utilization. Historically, the ATIP program had a small fleet managed by one contractor (ENSCO), and FRA program oversight included a project manager and a contract manager. Since 2017, FRA has expanded the fleet with new vehicles and awarded contracts to two ATIP vehicle contractors, ENSCO and Mermec. According to FRA, the ATIP program moved to FRA's new Engineering, Technology and Automation Division as part of the Agency's Office

of Railroad Safety reorganization. From June 2019 through March 2021, the project management position was on rotational duty while FRA recruited a new project manager. In March 2021, FRA hired a permanent ATIP project manager, who has been working to formalize, revise, and document ATIP processes. The resulting program changes, such as documenting prioritization and scheduling processes, updating the utilization metric, replacing the data system, and overseeing data quality controls, will have an impact on ATIP utilization. However, the current lack of a documented prioritization process—one that uses the most recent data and performance metrics aligned with ATIP goals—means that FRA cannot be sure it is targeting the highest risk track and maximizing use of its ATIP fleet.

Documenting prioritization and scheduling processes. FRA and contractor staff prioritize the scheduling of the ATIP fleet based on several factors, such as passenger traffic, hazardous materials routing, and FRA inspection data. The ATIP section of FRA’s track compliance manual describes the scheduling process broadly; however, FRA currently executes this process differently and the process is not documented in writing. Currently, according to FRA, roughly every 6 months, the ATIP contractor builds a map that incorporates several data elements⁸ and uses it to develop the ATIP schedule during monthly consultations with the Agency’s ATIP staff, FRA district officials, and railroad officials. FRA did provide documentation showing survey planning results, including ATIP survey schedules for fiscal years 2011 through 2021, examples of the contractor’s prioritization maps, and the draft schedules it sends to its districts for consultation.

Furthermore, a 2014 document prepared by FRA’s contractor describes the tool it used to prioritize track segments for ATIP surveys. FRA and contractor staff told us this tool was last run in 2014 with 2013 data, and those results are used as the basis of ATIP prioritization today. The contractor stopped running the prioritization tool because it had been developed under a separate research contract. As a result, contractor staff lacked the knowledge to use the tool effectively, a situation that was compounded by staff turnover. Contractor staff told us they plan to update the prioritization tool with current data in the coming months.

Updating an outdated utilization metric. According to FRA officials, they are considering adding a reporting requirement related to utilization in future contracts and are assessing alternative performance metrics to replace the 150-day goal and account for geographic coverage and mitigation of track safety

⁸ Data elements include a geographic information system (GIS) map overlay from the 2014 results of the risk prioritization tool, up-to-date data on hazardous materials flows, Strategic Rail Corridor Network routes, and maps of prior ATIP surveys.

risks. They expressed concerns that holding to mileage or survey day-based performance metrics may result in less effective survey routes. For example, to meet required survey days, a contractor could schedule its ATIP vehicles along simple-to-schedule routes, regardless of track safety risks.

FRA is working to replace the database system. All of the TGIRs generated by ATIP vehicles are stored in the Track Data Management System (TDMS), FRA's contractor-managed database. TDMS allows users to download TGIRs and view ATIP data on a map and technical details from past ATIP surveys. FRA officials said TDMS makes it difficult to track utilization and document reasons why a contractor may deviate from the ATIP schedule, such as for weather events. FRA and its database contractor, Strongbridge, are developing a new cloud-based database called the Track Data System (TDS), which they plan to release in 2022. TDS will allow contractors to document ATIP vehicle utilization and include reasons for schedule deviations. This new system will also incorporate standardized core data elements that meet National Information Exchange Model standards,⁹ which are necessary now that there are two contractors submitting complex ATIP survey data.

Overseeing data quality controls. ATIP has a range of controls on the quality of data it produces. For example, contractor data specialists can edit ATIP survey data in real time to remove data anomalies. Data specialists are required to have 5 years of experience, undergo contractor training, and operate under a contractor supervisor. ATIP vehicle utilization can be impacted by some of these controls, such as the reproducibility testing that takes place annually, when ATIP contractors test the reliability of survey equipment. FRA has defined reproducibility thresholds that contractors must meet for some ATIP technologies, including the track geometry measurement systems all vehicles have. FRA also reviews the results of the ATIP contractors' reproducibility tests. Furthermore, FRA is considering testing every vehicle in the ATIP fleet at least every 2 years at its own test track at the Transportation Technology Center as an additional validation of ATIP equipment. Finally, ATIP contractors are required to maintain ISO-17025 certification¹⁰ for testing and calibration laboratories and work with third parties to do so. However, while the statements of work allow FRA to audit its contractors, the Agency has not conducted an audit of reproducibility tests or data quality processes.

⁹ The National Information Exchange Model is a Governmentwide standards-based approach to exchanging information.

¹⁰ ISO-17025 refers to the International Organization for Standardization's general requirements for the competence of testing and calibration laboratories.

ATIP-Related Inspection Activities Are Not Always Accurately Reported

FRA inspectors may conduct followup inspections during the ATIP survey to verify exceptions or later to determine whether or not the railroad has remediated the exceptions listed on the TGIR. According to the Track and Rail and Infrastructure Integrity Compliance Manual (track compliance manual), followup inspections that are not conducted during the survey should be completed in 30 days and documented in FRA Form 96 inspection reports.¹¹

GAO’s Internal Control Standards directs Federal managers to clearly document internal controls in management directives, administrative policies, or operating manuals. FRA produces compliance manuals, such as its track compliance manual to direct the work of inspectors, including conducting track inspections and documenting inspection activities and findings in reports. According to FRA’s track compliance manual, inspectors should verify geometry measurements following an ATIP survey to ensure the measurements are accurate so they can be used to support enforcement actions. An FRA district track specialist explained that an inspector has to be physically on the ground to perform these kinds of measurements. If the inspector verifies that conditions do not meet the TSS, they document the defects or violations in a FRA Form 96 inspection report.

The Railroad Inspection System for Personal Computers (RISPC) provides inspectors with the capability to enter inspection report data into a FRA Form 96 via computer. They must complete the report on the day of the inspection and give it to the appropriate railroad representative. Inspectors are directed to enter only one source code on their reports to indicate the purpose of the inspection. According to FRA’s track compliance manual, there are three source codes for ATIP-related inspections (see table 1). Source codes I and N refer solely to staffed ATIP vehicles. Source code J indicates a followup inspection was conducted in response to a TGIR report generated by either a staffed or an unstaffed ATIP vehicle.

Table 1. Report Source Codes Designated for ATIP-related Inspections

| Source Code | Description |
|-------------|---|
| I | ATIP Active and Inactive Surveys |
| N | ATIP Inspection of the Strategic Rail Corridor Network (STRACNET) |
| J | ATIP Follow-up Re-inspection |

Source: Track and Rail and Infrastructure Integrity Compliance Manual (2018)

¹¹ Track Inspection Report Form (F 6180.96).

In addition to the source code that designates why the inspection is taking place, inspectors also use activity codes to document their field activities; they are allowed to enter up to 11 activity codes in a report (see table 2 for examples).

Table 2. Examples of Activity Codes Inspectors Used in Source Code I Reports

| Activity Code | Purpose |
|---------------|--|
| ATIP | To document an inspection onboard a FRA geometry car* |
| CWRP | To document one continuous welded rail (CWR) plan unit when an inspector conducts a track inspection where any CWR is observed |
| MTH | To document a main track inspection while on board a hi-rail or other on-track vehicle |
| MTW | To document a main track inspection while walking |
| MSB | To document an inspection of track located on a railroad bridge |
| RMM | To document an inspection concerning Part 214 Subpart D, On-Track Roadway Maintenance Machines and Hi-Rail Vehicles |
| RWP | To determine compliance with Part 214 Subpart C, Roadway Worker Protection |
| TGMS | To document an inspector's observations while on an other than government owned vehicle |
| YTH | To document an inspection of other than main track while onboard a hi-rail or other vehicle |
| YTW | To document an inspection of other than main track while walking |

*This occurs when an inspector is riding on an ATIP survey vehicle.

Source: OIG generated based on information provided by FRA

However, we found several different types of inaccurate reporting over the 10-year period of data we reviewed; it was often difficult to tell what types of inspection activities took place. Inaccurate inspection data limit FRA's ability to evaluate the effectiveness of the inspection program. Furthermore, inspection reports are used as the basis for enforcement actions, such as recommending violations of the TSS. Inaccuracies may hamper the Agency's ability to take this type of action.

Inspectors documented ATIP survey inspections incorrectly more than half the time. FRA's track compliance manual says inspectors should use source code I when inspecting track in conjunction with ATIP active surveys. If the inspector stops an ATIP car during an active survey and observes noncompliant conditions,

the inspector must initiate a source code J inspection report, separate from the ATIP survey source code I report. We confirmed this in interviews with FRA officials. A different type of inspection report is necessary because an on-the-ground inspection has a different purpose and activities than an inspection recorded while riding on the ATIP vehicle. However, 330 of 539 (61 percent) of the source code I reports submitted from October 2011 to May 2021 contained the activity code MTW. According to FRA guidance, the MTW code documents inspection of a main railroad track while walking, and this type of activity should only be documented in a source code J inspection report. Of the 330 reports with the MTW activity code, 329 listed defects. Because the reports use this activity code incorrectly, they do not clearly document the actions the inspector took to verify the potential defects detected by the ATIP vehicle.

Similarly, inspection reports did not always clearly show that inspectors had exited the ATIP vehicle to verify track geometry defects. Twenty-nine percent (157 of 539) source code I reports we reviewed incorrectly contained the activity code MTH or YTH, and all of those reports listed defects. MTH and YTH are used to document an inspection from a hi-rail or other on-track vehicle, and, according to an FRA official, should not be reported in a source code I inspection report. Defects associated with activity code MTH ranged from excess vegetation on tracks to track geometry defects. Based on some inspection reports we reviewed, it is unclear whether some FRA inspectors exited the ATIP vehicle to verify geometry defects by direct track measurements, as required. Track specialists indicated it is not physically possible for an inspector to verify a geometry defect while still onboard an on-track vehicle. Thus, reports using MTH or YTH to cite track geometry defects do not accurately document the inspector's actions.

These source code I inspection reports were coded incorrectly because track inspectors have access to several types of guidance on completing inspection reports (see table 3). None of them clearly specify which activity codes are appropriate for ATIP-related reports, including source code I reports.

Table 3. FRA Guidance for Track Inspectors: Using Activity Codes in Source Code I Reports

| FRA Resource | Should an inspector list activity codes in addition to ATIP on a source code I report? |
|---|--|
| Track and Rail and Infrastructure Integrity Compliance Manual | Does not specify |
| Railroad Inspection System for the PC (RISPC) Help – Inspection Form Field Descriptions | Yes (implied): Lists MTH, MTW, YTH, YTW |
| Track Logic – Programming Specifications for Track | Does not specify |
| On the Job Training (OJT) task list | Does not specify |
| FRA District Track Specialists | 3 of 7 said no—ATIP only 4 of 7 said yes |

Source: OIG generated based on FRA documentation

FRA’s track compliance manual says that when an inspector records a defect, the code should match the activity occurring at that time. However, it does not address how defects that can be visually observed should be recorded while inspectors are riding on an ATIP vehicle. For instance, the manual does not explain how to cite defects seen visually while the ATIP car is still moving, such as excess vegetation on the tracks—specifically, whether those kinds of defects belong on a source code I or a source code J report. The manual also does not discuss whether it is appropriate for inspectors to use one of the hi-rail codes to cite defects when they are in an ATIP hi-rail vehicle.

RISPC also allows an inspector to enter multiple activity codes on a source code I report, including MTH, MTW, YTH and YTW. In the absence of clear written guidance or RISPC controls on activity codes, we interviewed track specialists from seven of the eight FRA districts on how they expect inspectors to record ATIP-related activities. Three of the seven FRA district track specialists said they expect a track inspector to list defects or recommend violations on a source code I report, rather than initiate a source code J report to cite noncompliance. Two of the three district track specialists specifically described inspectors using activity codes MTW or YTW to indicate that they exited the ATIP vehicle and walked the track during the survey to verify exceptions in a source code I, rather than a separate source code J, report. Five of the seven district track specialists we interviewed said activity codes MTH and YTH could not be used along with activity code ATIP in a source code I report. However, one of these five said that MTH or YTH could be used with activity code ATIP on a source code I report if the inspector rode the ATIP hi-rail vehicle to the location of the defect. While the

district track specialists differ on how to record ATIP-related inspections, none of them regularly review more than a few ATIP inspection reports. Without routine review of ATIP-related inspection reports, the Agency has no assurance that the activity codes accurately describe how the inspections are conducted.

Counter to RISPC programming logic, inspectors were able to enter defects on ATIP survey reports and use ATIP-related codes incorrectly. Eighty-three percent of the source code I reports in the inspection data (447 of 539) listed a total of 2,102 defects. According to RISPC programming logic, defects should not be listed on a source code I report. Ninety-five of the 539 source code I reports recommended violations for civil penalties, but these may have improperly listed defects. RISPC also allowed inspectors to enter the activity code ATIP in 45 reports in the inspection data with source codes other than I, J, and N. These 45 reports documented under incorrect source codes cited 116 defects and recommended 3 violations. While track inspectors have access to several types of guidance, none of them clearly state whether defects should be recorded in source code I reports (see table 4).

Table 4. FRA Guidance for Track Inspectors: Citing Defects in Source Code I Reports

| FRA Resource | Should an inspector list defects on a source code I report? |
|---|---|
| Track and Rail and Infrastructure Integrity Compliance Manual | Does not specify |
| Railroad Inspection System for the PC (RISPC) Help – Inspection Form Field Descriptions | Does not specify |
| Track Logic – Programming Specifications for Track | No |
| On the Job Training (OJT) task list | Does not specify |
| FRA District Track Specialists | 3 of 7 said yes 4 of 7 said no |

Source: OIG generated based on FRA documentation

More important, the RISPC system does not perform as outlined in FRA’s *Track Logic—Programming Specifications for Track*, which details valid activity code and source code combinations and states that if the activity code is ATIP, the source code must be I, J, or N. Additionally, if the source code is I, defect line items are not permitted. If the activity code and the source code are not a valid combination, inspectors should see the following error message from RISPC: “ACTIVITY CODE AND SOURCE CODE ARE NOT COMPATIBLE.”

In its Internal Control Standards, GAO directs Federal managers to use quality information to achieve the organization's objectives, identify data sources that accurately represent the information they are seeking to collect, and evaluate these data sources for reliability. FRA uses RISPC to collect this type of information. Moreover, GAO also directs Federal managers to process data into accurate and accessible information for use by decision makers in an iterative process. Each Federal agency should design policies, procedures, techniques, and mechanisms to achieve its objectives and address risks.

However, despite the RISPC specifications, FRA's track compliance manual does not explicitly state that source code I reports must not list defect line items. Furthermore, RISPC allows inspectors to enter defects on source code I reports and the activity code ATIP on reports with source codes other than I, J, or N. FRA officials verified that nothing on the RISPC form prevents inspectors from adding the wrong data under source code I and, as noted above, some of FRA's district track specialists expect inspectors to list defects and recommend violations on source code I reports.

Overall, FRA lacks the detailed instructions track inspectors need to accurately record ATIP-related activities. Additionally, the inspectors' reports do not always accurately document the actions they took to verify exceptions as defects. As FRA explains in its track compliance manual, the data in inspection reports help to determine the effectiveness of the overall inspection program, the degree of compliance, and the effect of the TSS on reducing track-related accidents. Management reports may lack quality information if inspection reports are inaccurate. An FRA official said if ATIP-related inspection reports are not completed correctly, the inaccurate data skews the numbers FRA uses as a data-driven organization.

In addition, FRA's track compliance manual explains that, since every defect may become a violation without corrective action, it is imperative that inspection reports are accurate and complete. The manual states that when inspectors prepare a package recommending a violation against a track owner, they should include all other inspection reports containing related defects as well. However, we found inaccurate ATIP-related inspection reports in the inspection data we reviewed. As a result, FRA has no assurance that ATIP-related inspection data are of sufficient quality to support recommended violations.

FRA Is Developing Oversight Models and Tools but Has Not Deployed Them To Inform Track Inspection Planning

FRA is developing models and tools that use several sources of data, including ATIP, to aid track safety oversight but has limited documentation on their use. Individual inspectors do not always use these models and tools to develop their track inspection plans or consistently use ATIP survey data to plan track division inspections.

FRA Recently Developed Models and Tools To Aid Oversight, but Documentation Is Limited

FRA is developing and starting to use risk-based approaches, such as FIPs, to allocate safety inspectors nationwide and assess rail safety conditions. Operational research analysts at FRA Headquarters are developing risk-assessment models that use Agency data and are also developing staff allocation and planning tools. Two models specifically use ATIP data. The rail integrity risk model seeks to identify the risk of track-caused derailments on continuous welded rail and jointed rail across the rail network. It uses historical ATIP data to identify areas where conditions are similar to those on track that experienced derailments and produces an estimate of derailment risk that can be mapped and analyzed. The rail trespasser model uses ATIP to calculate trespasser risk.

FRA's operational research analysts also use ATIP data along with inspection point data from the Asset Inventory of Railroads and Shippers (AIRS) in the Territory Optimization Planning System (TOPS). This tool is designed to help Agency officials understand the distribution of inspectors across the country. Individual inspectors should also be able to use TOPS to inform their inspection planning and identify potential risks in their territories.

However, contrary to GAO's Internal Control Standards, we found limited documentation describing these models and tools or explaining how enforcement staff, such as track inspectors planning their work schedules, should use them. All seven district track specialists we interviewed and other Track Division officials told us they do not use the models. An FRA official told us there is little information available to users because these models and tools are new, and the Agency is still documenting them. For example, according to FRA, a TOPS specific to the Track Division will be documented and evaluated by Agency leadership in mid-2022.

Individual Inspectors Do Not Consistently Use Models, Tools, or ATIP Survey Data When Planning Track Inspections

In its Internal Control Standards, GAO directs management to identify and develop responses to risks. However, while FRA's track compliance manual states that the NIP is a critical tool that provides for the efficient allocation of FRA's resources, the Track Division stopped using the NIP to guide its inspection activities 2 to 3 years ago. Instead, inspection planning in FRA's Track Division is in transition and currently consists of individual inspectors developing their own work schedules, which are then approved by their district track specialist supervisors. As a result, currently, FRA does not have any national or formal district-level track inspection planning processes in place. Some FRA districts, however, use coordination calls or "mini-focuses" to target inspection activities around a certain topic, such as a track safety at a specific railroad subdivision or on track gage issues across the district.

FRA is developing a planning tool for the districts in each safety discipline. According to FRA, these FIPs are informed by risk models and are intended to help inspectors and other discipline staff plan their oversight activities. Each FRA safety discipline will manage its own FIPs, and an Agency official told us the Operating Practices Division was the first safety discipline to implement its FIP.

FRA officials also told us the Track Division is moving toward using district-driven FIPs. According to one official, FIPs assess risks at a lower level. One district track specialist described the NIP as a "trailing edge indicator" because it showed inspection priorities after accidents had already happened. The Track Division has yet to implement FIPs, and none of the seven district track specialists we interviewed knew when they would receive them from FRA Headquarters. One Track Division official explained that the data used in FIPs and other models are historical, and the results do not provide insight on how to prevent future derailments. The official added that individual inspectors, who have detailed knowledge of their territories, are expected to manage their own inspection activities.

Four of the seven district track specialists we interviewed said the inspectors they supervise incorporate ATIP data when designing their work schedules or inspection plans. While many inspectors conduct followup inspections related to ATIP surveys currently traversing their territories, one of the district track specialists said their inspectors also use historical ATIP survey data to guide their plans. According to a few district track specialists, FRA inspectors are highly qualified and generally have years of prior rail safety experience. FRA officials told us that, in general, track inspectors use their professional judgement, in addition to data, to make risk-based decisions about where to conduct inspections in their own territories based on changing conditions. Inspectors differ in the sources of

information they use to plan their inspections because they rely on their own knowledge of their territories to assess risk. Moreover, FRA lacks detailed, written planning guidance for track inspectors. Without a comprehensive and documented planning process that identifies key sources of data, including ATIP data, FRA has no assurance that track inspections are targeted to the highest-risk areas.

FRA Uses ATIP Vehicles and Survey Data To Perform Data-Driven Evaluations and Improve Rail Network Information

FRA monitors the condition of test program track by comparing ATIP survey data with railroad test program data. FRA also uses ATIP data to evaluate regulations and improve railway information.

FRA Monitors Track Conditions Under Railroad Automated Track Inspection Test Programs By Comparing ATIP Survey Data with Railroad Test Program Data

Starting in 2018 with the BNSF railroad, FRA has overseen six Class I freight railroad automated track inspection test programs. According to FRA's approval notices for the test programs,¹² the purpose of these programs is to test whether using track geometry cars for track inspection is a viable alternative to the manual visual inspections¹³ required by the TSS. During these tests, FRA monitors whether railroads are meeting their performance goals¹⁴ while the railroads evaluate the effectiveness of different combinations and frequencies of visual and automated inspections in test territories. BNSF completed its test program and was granted a waiver in early 2021 to continue its use of automated track inspections.

One way the FRA official overseeing railroad test programs monitors the test programs' effectiveness is to roughly compare the number of exceptions identified by FRA's ATIP surveys of track in territories where the pilot programs are running to the exceptions railroads submit in their test program reports every month. This official manually records ATIP surveys of test program track in a spreadsheet. FRA's ATIP TGIRs do not specify when the vehicle is surveying test program territory, and FRA does not use its ATIP vehicles to verify the accuracy of

¹² For example, FRA Notice of Approval, Approval of BNSF Railway Company Test Program To Evaluate Automated Track Inspection Technologies (FR Doc. 2018-24111), November 2, 2018.

¹³ Manual visual inspections are the same as field inspections, which is the term we use throughout this report.

¹⁴ Each railroad establishes a value for its test program performance metric, which is based on the number of defects per 100 miles tested. Fewer defects per 100 miles indicates better track quality.

railroads' automated inspection equipment. According to the FRA official, the Agency tried to use ATIP to verify the accuracy of railroads' automated inspection equipment side by side, in real-time. But there were too many factors affecting the measurements—such as differences in the weight of FRA's ATIP vehicles and the railroad's track geometry cars—to allow for detailed comparison of the automated inspection data.

FRA Uses ATIP Data To Evaluate Regulations and Improve Rail Network Information

FRA also uses ATIP to generate large, detailed datasets for track-related research and evaluation activities. FRA's approach is consistent with GAO's Internal Control Standards, which directs managers to process data into quality information. Specifically, FRA has used ATIP data to perform data-driven evaluations of regulation changes and to improve the accuracy of rail system information. For example, from 2019 to 2021, a working group in the Railroad Safety Advisory Committee used ATIP data to evaluate potential changes to the TSS. This group modeled data from 50,000 miles of ATIP surveys to see whether combinations of marginally compliant track conditions would result in exceptions. Additionally, Agency officials used ATIP data to improve the accuracy of the North American Rail Network (NARN), a geospatial dataset that maps out the rail system. NARN is used by FRA, the rail industry, and researchers.

Conclusion

The Nation relies on the integrity of the 220,000 miles of track in the United States to get people and goods to their destinations safely. Over the past 20 years, defective track remains the second-leading cause of non-grade crossing train accidents and is one of the most frequent causes of derailments. Through ATIP, FRA is focused on identifying track problems on the highest risk routes. Without improved utilization goals and track inspection reporting, however, the Agency cannot ensure ATIP resources are optimally targeted to support risk-based, data-driven track oversight.

Recommendations

To improve FRA's use of automated inspections to aid track safety oversight, we recommend that the Federal Railroad Administrator:

1. Update and implement Automated Track Inspection Program (ATIP) fleet utilization performance metric(s) and establish a process to monitor ATIP contractor performance.
2. Document the current ATIP survey prioritization process and establish a schedule for running the prioritization tool with updated data.
3. Revise the Track and Rail and Infrastructure Integrity Compliance Manual to include specific guidance for inspectors completing ATIP-related inspection reports.
4. Modify the programming logic of the Railroad Inspection System for Personal Computers so that the system will accept only correct ATIP-related inspection report entries.
5. Develop and implement training for Track Division specialists and inspectors on how to correctly prepare ATIP-related inspection reports.
6. Document and implement the track safety inspection planning processes, including guidance to district track specialists and inspectors on data sources that can be used to inform planning (e.g., risk assessment models, planning tools, and ATIP data).

Agency Comments and OIG Response

We provided FRA with our draft report on March 8, 2022, and received its response, dated April 6, 2022, which is included as an appendix to this report. FRA concurred with our six recommendations and provided appropriate actions and completion dates. Accordingly, we consider all recommendations resolved but open pending completion of the planned actions.

Actions Required

We consider recommendations 1 through 6 resolved but open pending completions of planned actions.

Exhibit A. Scope and Methodology

This performance audit was conducted between May 2021 and March 2022. We conducted this audit 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. Our review focused ATIP activities and supporting documentation from fiscal years 2011 to 2021.

We identified criteria related to FRA's use of ATIP data to aid track safety oversight. We reviewed the track safety standards at Title 49, Code of Federal Regulations (CFR), Part 213; FRA's *Track and Rail & Infrastructure Integrity Compliance Manual* (2018), including Volume I, Chapter 3: ATIP Geometry Car Operation; an earlier version of the compliance manual, the *Track Safety Standards Compliance Manual* (2002); FRA's *General Manual*; FRA's *Operating Practices Compliance Manual*¹⁵ (2012); the *Safety Manual for FRA Survey Cars: Automated Track Inspection Program*; and ENSCO and Mermec's ATIP statements of work (2017). We also reviewed GAO's *Standards for Internal Control in the Federal Government* and FRA's Track Division On-The-Job Training checklist.

To assess FRA's ATIP fleet utilization, we obtained ATIP survey schedules from fiscal years 2011 to 2021. FRA later provided fiscal year 2021 schedules for vehicles that operated in unstaffed modes because the schedules are updated with actual routes at the end of the year. Because FRA expanded the ATIP fleet and changed ATIP management during this time, we limited our fleet utilization analysis to the six ATIP vehicles operating from 2016 to 2021. Four of the six vehicles operated between fiscal years 2016 to 2021, and two operated between fiscal year 2018 and 2021. We used details in the schedules to identify days where an ATIP vehicle logged a survey, which we then categorized as a survey day. In calculating survey days, we did not count holidays, weekends, or whole days spent in maintenance or traveling as survey days, unless an ATIP vehicle both traveled and operated in survey mode on a given day. We then compared the total number of survey days logged by each vehicle, every fiscal year, against FRA's utilization goal of 150 survey days per fiscal year in the contractor statements of work for ENSCO and Mermec. In total, we reviewed 32 survey schedules over this 6-year period, and we validated our methodology and initial results with FRA ATIP officials. We also reviewed *Implementation of a Risk-Based Approach to ATIP Inspection Prioritization*, which describes a tool ENSCO

¹⁵ The team used FRA's *Operating Practices Compliance Manual* to identify activity codes found on ATIP-related inspection reports.

prepared for FRA to prioritize track segments for ATIP surveys as well as a list of data sources used to prioritize ATIP surveys. We reviewed documentation of FRA's survey planning results, including contractors' prioritization maps and draft schedules sent to FRA's districts for consultation. Finally, we interviewed FRA program officials and ATIP contractors on ATIP utilization rates and program goals.

To assess FRA's management of ATIP survey operations, we reviewed Volume I, Chapter 3: ATIP Geometry Car Operation of the *Track and Rail & Infrastructure Integrity Compliance Manual*; the ENSCO and Mermec statements of work; examples of monthly reports to FRA prepared by Mermec, ENSCO, and Strongbridge; and a monthly ATIP trends report. We also interviewed contractor personnel from ENSCO, Mermec, and Allinfotech, as well as FRA officials who manage ATIP and those managing the contractors, about the history and current oversight of these contractors.

To assess the quality of data collected by ATIP vehicles, we reviewed ENSCO standard operating procedures on reproducibility testing processes and reporting. We reviewed the ENSCO and Mermec statements of work for FRA requirements related to reproducibility testing, ISO-17025 certification for testing and calibration laboratories, and data specialists. We also reviewed an example of a reproducibility report ENSCO sent to FRA. Finally, we interviewed FRA program officials and ATIP contractors about data quality processes and controls.

We conducted limited data reliability testing of ATIP data in TDMS and did not observe any errors. We gained access to the system and observed a demonstration on how the TDMS website worked. We also traced two records from an ATIP survey schedule to TDMS. Finally, we interviewed staff at the ATIP database system contractors, Strongbridge and Allinfotech, and FRA officials about data entry procedures and controls for TDMS, as well as development of TDS.

To assess whether inspectors accurately reported ATIP inspection activities, we obtained nearly 10 years of ATIP-related inspection data, from October 2011 to May 2021, from FRA's Railroad Safety Information System (RSIS). We then identified the total number of inspection reports by source code in the ATIP-related inspection data we were given and which activity codes inspectors used in the reports. For the period from October 2011 to May 2021, we received data for all of the ATIP-related inspection reports recorded including: 539 source code I reports, 726 source code J reports, 47 source code N reports, and 45 reports with other source codes that contained the activity code ATIP. To assess track inspectors' compliance with FRA's procedures for preparing ATIP-related inspection reports, we counted defects and violations recommended in the data for each source code as a whole in addition to defects associated with particular activity and source codes. In addition to the data analysis, we also judgmentally

selected and reviewed 30 examples of inspectors' ATIP inspection reports (FRA Form F 6180.96) from the 1,265 reports listed in the source code I and J data to identify how they reported their activities and used various source and activity codes.

We conducted data reliability testing of these RSIS data and found the errors we detailed in the report findings. Testing included observing a demonstration of how an FRA official obtained ATIP inspection data from the Office of Safety Analysis' Secure Site. We traced the data entered in 21 judgmentally selected inspection reports to the inspection data FRA provided. FRA considers the inspection report to be the most accurate source of inspection data because that is the original report.

FRA would not give the audit team read-only access to RSIS because the Agency did not want to provide direct access to its systems if the data could be provided another way. Instead, FRA gave the audit team the full ATIP-related inspection data for the requested time period. At our request, FRA also provided us with specific inspection reports (Form FRA F 6180.96). However, the initial RSIS data FRA provided were missing defect data and activity codes due to the code FRA used to pull the data. After OIG notified FRA about the inconsistencies we found, FRA gave us corrected ATIP-related inspection data for October 2011 to May 2021.

We reviewed FRA guidance for inspectors on entering data in ATIP-related inspection reports, specifically: FRA's *General Manual*, FRA's *Track and Rail and Infrastructure Integrity Compliance Manual*, a Track Division On-the-Job Training Task List, *RISPC Help-Inspection Form Field Descriptions*, and a RISPC programming document. We interviewed FRA's Track Division Staff Director and Deputy Staff Director. Since the audit was scoped and planned while the Federal employee travel ban was still in effect, we remotely interviewed all seven current track safety specialists in FRA's eight districts (one district had a vacancy at the time of our audit) using a standard set of questions pertaining to ATIP inspection reporting. We also interviewed FRA's Rail Safety Data and Information Management Division's Acting Staff Director.

To assess FRA's development of models and tools using ATIP data, we interviewed the Agency's operational research analysts and Global Information System (GIS) Specialist, who are developing or maintaining models and tools related to ATIP. We reviewed an FRA presentation that described how FRA uses GIS. We also reviewed limited documentation provided by FRA that explained the development of rail risk models.

To assess whether and how inspectors used ATIP survey data or models and tools incorporating ATIP data, we requested examples of inspectors' work plans. However, an FRA official told us that inspectors do not submit formal work

planning documents. We also interviewed FRA's Track Division Staff Director and Deputy Staff Director, and all seven current track safety specialists, with standardized questions about planning. We reviewed FRA's *General Manual* and *Track and Rail and Infrastructure Integrity Compliance Manual* to identify guidance available to inspectors when planning their work.

To identify the role of ATIP or ATIP data in FRA's oversight of railroad test programs, we reviewed and analyzed notices for six railroad petitions to temporarily suspend 49 CFR § 213.233(b) and (c) to allow for the testing of Automated Track Inspection Systems. The notices detailed planning, timelines, testing frequencies, defect identification, and reporting to FRA. To identify whether FRA uses ATIP surveys to evaluate test program track, we interviewed the FRA Track Specialist overseeing this area about the collection and storage of test program data. To validate that surveys of test track had occurred, we traced six ATIP surveys of test programs listed by the Track Specialist to the ATIP schedules maintained separately by the ATIP Program Manager and to TDMS.

To understand FRA's use of ATIP data to evaluate the impact of potential changes to the TSS, we reviewed a Railroad Safety Advisory Committee (RSAC) Track Safety Standards Working Group document and the RSAC website.

To understand FRA's use of ATIP data to improve railway information, we interviewed FRA's GIS Specialist. We collected and reviewed a FRA presentation about its GIS application and how the application includes the NARN.

Exhibit B. Organizations Visited or Contacted

Federal Railroad Administration

FRA Headquarters

IT Governance and Risk Compliance Branch, Office of Information Technology,
Office of Administration

Office of Data Analysis and Program Support, Office of Railroad Safety

Program and Policy Development Division, Office of Railroad Policy and
Development

Rail Safety Data and Information Management Division, Office of Data Analysis
and Program Support, Office of Railroad Safety

Engineering, Technology and Automation Division, Office of Railroad Systems,
Technology, and Innovation, Office of Railroad Safety

Track Division, Office of Railroad Infrastructure and Mechanics, Office of Railroad
Safety

Track Research Division, Office of Research, Development, and Technology, Office
of Railroad Policy and Development

FRA Districts

FRA District 1

FRA District 2

FRA District 3

FRA District 4

FRA District 5

FRA District 6

FRA District 7

Other Organizations

Allinfotech

ENSCO

Mermec

Strongbridge

Exhibit C. List of Acronyms

| | |
|-------|---|
| AIRS | Asset Inventory of Railroads and Shippers |
| ATIP | Automated Track Inspection Program |
| CFR | Code of Federal Regulations |
| DOT | Department of Transportation |
| FIP | Focused Inspection Plan |
| FRA | Federal Railroad Administration |
| GAO | Government Accountability Office |
| GIS | Geographic Information System |
| ISO | International Organization for Standardization |
| NARN | North American Rail Network |
| NIP | National Inspection Plan |
| OIG | Office of Inspector General |
| OJT | On-the-Job Training |
| RR | Railroad |
| RSAC | Railroad Safety Advisory Committee |
| RISPC | Railroad Inspection System for Personal Computers |
| RSIS | Railroad Safety Information System |
| TAR | Track Assessment Report |
| TDMS | Track Data Management System |
| TDS | Track Data System |
| TGIR | Track Geometry Inspection Report |
| TGMS | Track Geometry Measurement System |
| TOPS | Territory Optimization Planning System |
| TSS | Track Safety Standards |

Exhibit D. FRA’s ATIP Fleet, as of October 2021

| ATIP Vehicle | Staffing | Type | Notes |
|--------------|----------------------|-----------------|--------------------------------------|
| DOTX-216 | Staffed or Unstaffed | Railcar | Re-entered service in September 2021 |
| DOTX-218 | Staffed | Railcar | Operates with DOTX-220 |
| DOTX-219 | Staffed | Railcar | |
| DOTX-220 | Staffed | Railcar | Operates with DOTX-218 |
| DOTX-221 | Staffed or Unstaffed | Railcar | |
| DOTX-225 | Unstaffed | Railcar | |
| DOTX-226 | Unstaffed | Railcar | |
| DOTX-304 | Staffed | Hi-Rail Vehicle | |
| DOTX-305 | Staffed | Hi-Rail Vehicle | Expected to enter service in 2022. |

Note: DOTX-223 is an unstaffed buffer car with no onboard measurement systems.

Source: OIG generated based on information provided by FRA

Exhibit E. Major Contributors to This Report

| | |
|-------------------|----------------------|
| WENDY HARRIS | PROGRAM DIRECTOR |
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| SEETHA SRINIVASAN | SENIOR COUNSEL |

Appendix. Agency Comments



**U.S. Department
of Transportation**

Federal Railroad Administration

MEMORANDUM

Subject: INFORMATION: Management Response to Office of
Inspector General (OIG) Draft Report on FRA's Use of
Automated Track Inspection Programs

Date: April 6, 2022

From: 
Amitabha Bose
Administrator, Federal Railroad Administration

To: David Pouliott
Assistant Inspector General for
Surface Transportation Audits

Reply to the Attn: RCFO-1
of:

The Federal Railroad Administration's (FRA) Automated Track Inspection Program (ATIP) has provided accurate track geometry data to assess compliance with the Federal Track Safety Standards for over 30 years. Over the last five years, track geometry-caused accidents have decreased by 29 percent. The ATIP program has contributed to this improvement by finding and reporting exception information to the railroads. In CY 2021, ATIP inspection vehicles collected track measurement data for 152,670 miles of track (a 15 percent increase over the previous calendar year), finding 7,951 exceptions to FRA's Track Safety Standards with 1,898 (24 percent) deemed safety-critical.

FRA has the following initiatives underway to support continued improvements to the program:

- FRA is formalizing ATIP fleet utilization metrics and contractor performance monitoring approaches for inclusion in future ATIP procurement actions and contracts.
- FRA is updating the survey prioritization process to reflect the current state of the rail network.
- FRA is updating key data systems and tools, including revising the Track and Rail and Infrastructure Integrity Compliance Manual and finalizing risk models to inform new Focused Inspection Plans.

Based on our review of the draft report, we concur with OIG's six recommendations as written. We plan to complete actions to address recommendation 1 by June 30, 2022; recommendation 2 by September 30, 2022; recommendations 3, 4, and 5 by December 31, 2022; and recommendation 6 by March 31, 2023.

We appreciate the opportunity to comment on the OIG draft report. Please contact Will Dyer, Chief Financial Officer, at 202-744-6125, with any questions.

U.S. Department of Transportation
Office of Inspector General

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