

SAFETY MANAGEMENT INSPECTION

Massachusetts Bay Transportation Authority
Massachusetts Department of Public Utilities



U.S. Department of Transportation
Federal Transit Administration

Final Report

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Acronyms List

AC	Alternating Current
AFL-CIO	American Federation of Labor and Congress of Industrial Organizations
CAP	Corrective Action Plan
CFR	Code of Federal Regulations
DAG	Data Analysis Group
DC	Direct Current
E&M	Engineering and Maintenance
ESC	Executive Safety Committee
ESRP	Employee Safety Reporting Program
FTA	Federal Transit Administration
GEC	General Engineering Consultant
GM	General Manager
MBTA	Massachusetts Bay Transportation Authority
DPU	Massachusetts Department of Public Utilities
NTD	National Transit Database
OCC	Operations Control Center
OEM	Original Equipment Manufacturer
PMI	Preventive Maintenance Inspection
QA/QC	Quality Assurance / Quality Control
ROW	Right-of-Way
RWP	Roadway Worker Protection
SDAR	Safety Data Analysis Report
SMCWG	Safety Management Certification Working Group
SMWG	Safety Management Working Group
SMI	Safety Management Inspection
SMRC	Safety Management Review Committee
SMS	Safety Management Systems
SOP	Standard Operating Procedure
SRA	Safety Risk Assessment
SRM	Safety Risk Management
SRP	Safety Review Panel
SSO	State Safety Oversight
SSOA	State Safety Oversight Agency

Executive Summary

This report documents the results of the Safety Management Inspection (SMI) performed by the Federal Transit Administration (FTA) of the Massachusetts Bay Transportation Authority (MBTA) rail transit system operations and maintenance programs and MBTA's State Safety Oversight (SSO) agency, the Massachusetts Department of Public Utilities (DPU), between April 14 and June 30, 2022. The SMI reviewed the MBTA's rail transit system, which comprises the Red, Orange, Blue, and Green Lines and the Mattapan Trolley. FTA's SMI did not review the MBTA's bus transit or commuter rail system.

FTA conducted this SMI in response to the pattern of safety incidents at the MBTA, including safety issues such as derailments, train collisions, grade crossing fatalities, and other incidents involving both MBTA employees and passengers. In addition, FTA launched the SMI after considering MBTA's safety performance as monitored through data reported to the National Transit Database (NTD) and assessing DPU's implementation of its SSO program.

- **MBTA Safety Performance:** Safety data show that, from January 1, 2019, through April 2022, MBTA experienced a higher overall rate of reportable safety events¹, particularly on its heavy rail mode, and a higher rate of derailments on both heavy and light rail modes, than its peers and the total rail transit industry average. MBTA's recent safety events also indicate an increase in severity, from minor property damage, brief service disruptions, and minor injuries in 2019 and 2020, to more significant property damage, extended service disruptions, and more serious passenger injuries requiring hospitalization in 2021. In April 2022, a railcar door entrapment resulted in a passenger fatality.
- **DPU Oversight Program:** In October 2019, FTA conducted a triennial audit of DPU's SSO program, issuing 16 findings of non-compliance. At the time of the SMI, seven findings from this 2019 triennial audit remained open.² FTA continues to monitor the technical capacity of DPU's staff to perform safety oversight and the organizational resources and support that DPU commits to its SSO program.

To address concerns with MBTA's safety performance and ensure comprehensive safety oversight for the MBTA rail transit system, FTA notified the MBTA and DPU on April 14, 2022, that it would conduct an SMI utilizing its safety authority established at 49 U.S.C. 5329(f).

¹ As defined in the [NTD](#).

² These findings addressed the need for procedures to oversee specific roadway worker protection and track maintenance issues; for increased capabilities and capacity to oversee the identification and analysis of MBTA safety concerns and hazards; for needed improvements in the investigation and root-cause analysis of accidents; and for requiring and overseeing MBTA's development of corrective action plans to address safety deficiencies and concerns.

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Major SMI Activities

FTA's SMI activities focused on:

- MBTA data, information, and initiatives beginning in January 2020,
- MBTA's compliance with its internal safety rules and procedures,
- MBTA's compliance with Federal safety rules, including the Public Transportation Safety Certification Training Program regulation, [49 CFR part 672](#), the Public Transportation Agency Safety Plan regulation, [49 CFR part 673](#), and with DPU's SSO program, as required in FTA's SSO regulation at [49 CFR part 674](#),
- MBTA's compliance with DPU's program standard at [220 CMR 151.00](#),
- how MBTA's established processes, procedures, tools, and resources function to support safety decision-making and the evaluation of safety risk, and
- the role of the DPU in overseeing MBTA's safety performance.

FTA's SMI covered all rail transit and safety disciplines, and included a review of rail transit operations, training, vehicle maintenance, signals and train control, track and track access, capital project delivery, traction power, facilities, and safety management. Between April 14 and June 30, 2022, FTA requested and reviewed documents, managed a series of virtual interviews, conducted three weeks of on-site inspections at MBTA rail transit facilities, and engaged in extensive follow-up to identify areas where MBTA must make improvements to ensure the continued safety of its passengers, workers, and system infrastructure.

SMI Observations

Throughout the SMI, FTA assessed MBTA's safety management capabilities and capacity as well as the effectiveness of DPU's oversight of MBTA. FTA observations provide context for findings discussed in the report. The following discussion highlights these observations.

FTA observed that MBTA's executive leadership team supported FTA's activities throughout the SMI. In interviews and field observations, MBTA's leadership team and other staff engaged in candid discussions with FTA regarding safety performance challenges and needed improvements. At all levels of the organization, from the frontline through supervision and middle management to senior technical leadership, FTA found support for executive leadership and appreciation for the stability of having a consistent MBTA leadership team in place since January 1, 2019.³

³ Numerous interviewees described challenges experienced from January 1, 2010, to December 31, 2018, when MBTA had nine different general managers in nine years.

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FTA also observed that, since the 2019 Safety Review Panel⁴ (SRP), MBTA's executive leadership team has taken action to address select findings from the SRP report, such as new management initiatives and programs focused on the performance and tracking of preventive maintenance inspections, hiring for key technical positions, enhancement of the agency's Safety Rules Compliance Program (SRCP) to support safety assurance, enhancement of the MBTA's Employee Safety Reporting Program (ESRP), and new safety event investigation capabilities. Also, since fiscal year 2019, MBTA has increased the Safety Department's budget by 74 percent.⁵

Organizational Deficiencies Requiring Immediate Action

FTA's SMI identified interim findings of organizational deficiencies and operational concerns that needed immediate action in advance of this report. As a result, FTA issued four special directives to MBTA on June 15, 2022, addressing key safety concerns that had not yet received urgent attention from MBTA or DPU:

- [Needed repairs to MBTA's track infrastructure and enhancements in the management of maintenance information \(Special Directive 22-4\).](#)
- [Lack of policies, procedures and training for the securement and movement of disabled trains in rail transit yards \(Special Directive 22-5\).](#)
- [Fatigue management and lapsed certifications for dispatchers in the Operations Control Center \(Special Directive 22-6\).](#)
- [Hours of work violations and lapsed certification for rail transit operations personnel \(Special Directive 22-7\).](#)

FTA took this action in part because during the SMI it found that MBTA does not have sufficient capabilities for identifying priorities to address safety concerns from the agency's operations, maintenance, and capital project delivery programs. Throughout the SMI, FTA found that while MBTA leadership was aware of many of the issues raised in the special directives they had not evaluated the information as is necessary to effectively assess systemwide safety and prioritize action.

FTA also issued a special directive (Special Directive 22-8) to DPU requiring additional oversight activities in these areas because FTA found DPU has not used its authority to ensure the identification and resolution of safety issues at MBTA. Despite MBTA's recent safety performance, FTA determined that DPU has not been actively engaged in overseeing the MBTA's Safety Management System (SMS), including safety risk management and safety assurance activities. While DPU has the authority to require MBTA to take expedited action to

⁴ In 2019, MBTA's Fiscal Management and Control Board (FMCB) convened a safety review panel (SRP) to take a comprehensive review of the MBTA's safety performance, safety leadership, and culture.

⁵ The FY 2022 budgeted headcount for safety related positions is 50 positions with 9 vacancies. This represents a 95 percent increase in active headcount since January 2018.

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implement its SMS and address other safety concerns, the agency rarely invokes its authority to compel such action.

FTA also issued the special directives because MBTA and DPU have been slow to complete corrective actions to address safety concerns, averaging almost two years to close a CAP (Corrective Action Plan). Persons interviewed in the SMI process articulated concerns about MBTA leadership's lack of urgency to address safety deficiencies in a timely manner. MBTA's frontline workers expressed a lack of confidence that safety issues, once reported, would be addressed. In addition, senior technical leadership expressed similar concerns, providing numerous examples where operational or maintenance issues with potential safety impacts had been raised but were not addressed, as agency resources were unavailable or focused on other areas.

Balancing Safety-Critical Operations and Maintenance with Effort to Deliver Capital Projects

FTA observed that MBTA is not effectively balancing safety-critical operations and maintenance activities with its efforts to deliver capital projects. This lack of balance is at the center of many of MBTA's safety challenges. Over the last four years, the MBTA's capital budget has grown four-fold⁶, yet MBTA is still recovering from the impact of funding cuts from 2015 to 2019 to the MBTA's operations and maintenance budget which resulted in a reduction in hundreds of millions of dollars and hundreds of positions. MBTA has taken steps to hire new personnel and expanded its Capital Program Office. Nevertheless, many of the requirements associated with capital projects, including initial engineering, schedule management, track access requirements, flagging, testing, and acceptance, are managed with existing operations and maintenance staff which has stressed staff and required the excessive use of overtime.

FTA found that budgeted positions do not reflect the true measure of required staff levels because they do not consider the additional responsibilities associated with capital project delivery and often are calculated to rely on overtime to cover staff vacations and training.

MBTA leadership reported that they have not taken corrective action to address concerns regarding the impact of capital projects on the day-to-day safe operations of the MBTA due to the challenges and uncertainties of the COVID-19 public health emergency. During this same period MBTA aggressively moved forward with its \$2 billion per year capital program supported largely by existing and overtime resources from the agency's operations and maintenance departments and contractors.

In January 2022, MBTA's leadership team and board of directors took the unprecedented step of transferring an additional \$500 million from the MBTA's operating budget to the capital budget. In interviews, MBTA's leadership explained their objective for the agency to build its

⁶ Over the last four years, the MBTA's capital budget has more than doubled, from approximately \$875 million in fiscal year 2018 to over \$2 billion in fiscal year 2022.

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way into enhanced capacity, safer, and more reliable passenger service and a better state of repair through an aggressive program of capital projects. While the agency is focused on this priority, its aging assets and infrastructure continue to deteriorate and fail. For example, the July 21, 2022, train fire on the transit bridge over the Mystic River was caused when a rusted sill panel fell off a rail transit train and contacted the third rail.

The combination of overworked staff and aging assets has resulted in the organization being overwhelmed, chronic fatigue for key positions in the agency, lack of resources for training and supervision, and leadership priorities that emphasize meeting capital project demands above passenger operations, preventive maintenance, and even safety.

Challenges with SMS Implementation

FTA observed that MBTA's approach to implementing SMS lacks sufficient detail and explicit direction from MBTA's leadership. MBTA has not developed the necessary tools and capabilities to support the management of safety risk. As a result, MBTA has been unable to prioritize safety risk and, subsequently, resources to mitigate safety risk. MBTA's lack of effective safety risk management has been compounded by the DPU's at times inadequate safety oversight. The DPU has responsibility to enforce the MBTA's Public Transportation Safety Plan (PTASP), which implements SMS. The DPU has not consistently required or enforced timely assessment and mitigation of safety risk for passenger operations to prevent organizational blindness to emerging safety concerns.

FTA also observed that MBTA lacks effective safety reporting and formal mechanisms to support and assure the communication of safety issues from the frontline to senior leadership. For example, MBTA established local safety committees as a primary venue through which it receives safety information from frontline personnel. During interviews and records review, however, FTA learned that local safety committee meetings often do not have frontline representation due to staffing shortages and that there is no documented requirement for the Safety Department representative to report, synthesize, or address the items and information discussed during the meetings. While the Safety Department has undertaken several new initiatives to facilitate cross-department discussion regarding safety issues, MBTA leadership has not created a structured communication process to address safety issues.

During the on-site portion of the SMI, all levels of the organization, from leadership to frontline workers, expressed surprise and occasional alarm at the MBTA's declining safety performance but tended to view incidents as "one of a kind" or "freak accidents" rather than the result of systemic failures in operating procedures, training, staffing, and supervision. Pressure points identified in interviews and on-site inspections, such as lack of staffing and supervision, lack of enforcement of safety rules, lack of track access for critical repairs, and excessive overtime, were generally dismissed as inevitable and normal work conditions. There was little awareness that key mitigations previously put in place to reduce safety risk, including safety procedures,

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staffing resources, and supervision, may no longer be as effective as they once were because resources have been strained so significantly over the last few years.

SMI Finding Categories for MBTA Requiring Action

FTA's SMI report focuses on four categories of actions necessary to strengthen MBTA's safety posture and improve its safety management capabilities:

- **Category 1 – Managing the impact of operations, maintenance, and capital project requirements on the existing workforce:** FTA found that an organizational focus on capital projects has diverted management attention and resources from the agency's operations and maintenance, allowing the agency to operate a level of service that is not adequately staffed, trained, supervised, or maintained. In addition, existing staffing levels and capabilities do not provide adequate safety oversight for the design, construction, and testing of new capital projects and do not support widespread safety certification of these projects, which is an industry standard practice. MBTA also has experienced a series of construction safety events due to the lack of oversight of worksites. To ensure that the system remains safe for both passengers and workers, and to support the safety of MBTA's projects and worksites, FTA issues four findings requiring additional assessment and resource prioritization for operations and maintenance activities.
- **Category 2 – Prioritization of safety management information:** FTA found limited evidence that MBTA has adopted SMS practices in the field to support the identification, analysis, and prioritization of safety information. To ensure this critical capability, FTA issues six findings requiring enhanced and expedited implementation of the agency's SMS, including the development of procedures, safety management training, safety risk assessment, and safety assurance activities to enhance the organization's capability to identify safety concerns and to prioritize action to mitigate safety risk.
- **Category 3 – Effectiveness of safety communication:** FTA found that there is a lack of routine, consistent, and meaningful communication regarding safety issues across departments and with frontline workers. To address this concern, FTA issues three findings requiring improvements in the MBTA's management of its safety committee process, employee safety reporting program, and safety promotion activities.
- **Category 4 – Operating conditions and policies, procedures, and training:** FTA found several areas where MBTA is not meeting its own written requirements; does not have adequate procedures, processes, or requirements; does not have adequate training, coordination, and supervision; and does not have independent quality assurance and quality control (QA/QC) capabilities. FTA also found instances where procedures are well-documented and available but are not followed or enforced, and where workers were required to perform specific activities but were not given the resources or guidance necessary to complete the work. Conversely, FTA found outdated procedures

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and a lack of operational assessments to ensure revisions accurately capture changes in the system and required work practices. To address these concerns, FTA issues seven findings requiring additional monitoring of rail transit operations, new Quality Assurance/Quality Control capabilities, and new training and procedures.

SMI Findings for DPU Requiring Action

FTA also established a category of findings for DPU necessary to strengthen its oversight program:

- **Category 5 – Safety oversight of MBTA rail transit system:** FTA found that DPU has not been actively engaged in overseeing MBTA's SMS implementation. To ensure that DPU fulfills its statutory oversight requirements and maintains its Federal SSO program certification, FTA issues four findings requiring DPU to re-assess its staffing, technical capacities, capabilities, and authorities to conduct engaged and independent safety oversight. FTA also requires DPU to adopt and oversee implementation of Corrective Action Plans developed by the MBTA and approved by FTA to address the findings and required actions identified in this SMI.

Introduction

The Federal Transit Administration (FTA) administers a national program to advance safe, reliable, and equitable transit service throughout the United States. The FTA works to make transit safer through policy development, safety data collection and analysis, safety risk assessment, safety regulatory and oversight programs, information sharing, promotion of effective practices, and funding that supports safety.

This report documents the results of the Safety Management Inspection (SMI) that FTA performed of the Massachusetts Bay Transportation Authority (MBTA) rail transit system, and its State Safety Oversight (SSO) agency, the Massachusetts Department of Public Utilities (DPU), from April 14 to June 30, 2022. MBTA's rail transit system includes the Red, Orange, Blue, and Green Lines and the Mattapan Trolley. FTA's SMI did not include the commuter rail system, which is under the jurisdiction of the Federal Railroad Administration, or MBTA's bus transit system.

FTA conducted this SMI to address:

- an escalating pattern of safety incidents and concerns on the MBTA's rail transit system, including rates and numbers of derailments, collisions, and passenger and employee injury/fatality events significantly exceeding industry average and peer-based assessments, and
- deficiencies FTA identified in the SSO program administered by the DPU, which limit its ability to provide effective safety oversight for the MBTA.

Over the last year, the MBTA has experienced several serious rail transit safety events including a July 30, 2021, Green Line collision on the B Branch that injured 27; a September 28, 2021, derailment at Broadway Station that resulted in significant damage to track and a railcar; a December 17, 2021, rollaway train at Cabot Yard that injured three workers; and an April 10, 2022, door dragging incident that resulted in the death of a passenger. Analysis of safety data reported by the MBTA to the National Transit Database (NTD), for the period January 1, 2020, through April 30, 2022, shows numbers and rates of derailments and collisions on the MBTA rail transit system that far exceed industry average and the safety performance of MBTA's peer transit systems.

Over the last two-and-a-half years, the DPU has been unable to close findings from FTA's 2019 triennial SSO audit, which was conducted to ensure the capacity and capability of the SSO agency to carry out its program in compliance with FTA's SSO regulation at [49 CFR part 674](#) and

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DPU's program standard at [220 CMR 151.00](#). In April 2022, seven of 16 findings remained open.⁷

To address concerns with MBTA's safety performance and to ensure comprehensive oversight for the MBTA rail transit system, FTA notified the MBTA and DPU on April 14, 2022, that it would conduct an SMI. FTA began the SMI with a kick-off meeting with MBTA and DPU on April 21, 2022, and an extensive document request, which was completed by MBTA on April 29, 2022.

Focus of FTA's SMI

FTA's SMI focused on assessing MBTA's compliance with its internal safety rules and procedures as well as compliance with key Federal safety rules, including the Public Transportation Agency Safety Plan regulation, [49 CFR part 673](#), the Public Transportation Safety Certification Training Program regulation, [49 CFR part 672](#), and with DPU's SSO program, as required in FTA's SSO regulation at [49 CFR part 674](#) and DPU's program standard at [220 CMR 151.00](#).

FTA also reviewed how established processes, procedures, tools, and resources at the MBTA function to support safety decision-making and the evaluation of safety risk. As part of this larger assessment, FTA also evaluated MBTA's implementation of its Safety Management System (SMS). Finally, FTA assessed the role of the DPU in overseeing MBTA's safety performance through the implementation of its SSO program.

In 2019, MBTA's Fiscal Management and Control Board (FMCB) convened a safety review panel (SRP) to take a comprehensive review of the MBTA's safety performance, safety leadership, and culture. The SRP issued its [Safety Review Panel \(SRP\) Final Report](#) in December 2019. As a result of this past report, FTA's SMI activities focused on MBTA data, information, and initiatives beginning in January 2020. FTA also evaluated MBTA's activities to address the 34 recommendations and 61 individual corrective actions resulting from the SRP's assessment. Many of the corrective actions developed to address SRP findings included actions related to MBTA's SMS, required by FTA's 49 CFR part 673 and DPU's program standard.

In conducting the SMI, FTA focused on operations, training, vehicle maintenance, signals and train control, track, track access and capital project delivery, traction power, facilities, capital projects, and safety management. FTA requested and reviewed over 1,500 documents; conducted over 200 interviews with MBTA staff, including executive leadership, technical leadership, mid-level management, supervision, frontline employees, union leadership and

⁷ These findings addressed the need for procedures to oversee specific roadway worker protection and track maintenance issues; for increased capabilities and capacity to oversee the identification and analysis of MBTA safety concerns and hazards; for needed improvements in the investigation and root-cause analysis of accidents; and for requiring and overseeing MBTA's development of corrective action plans to address safety deficiencies and concerns.

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representatives from DPU's SSO program; and conducted dozens of field inspections of MBTA's Operations Control Center, stations and maintenance facilities, track, signal and train control systems, traction power infrastructure, and vehicles.

FTA rode the entire MBTA rail transit system and conducted head-car ride observations on portions of the Green Line. FTA also inspected track on the Green and Orange Lines and visited the locations of recent safety events as well as major capital projects, including the Green Line Extension project and the Green Line Train Protection System project.

FTA inspected each major rail transit yard and vehicle maintenance facility, including Cabot Yard, Caddigan Yard, Green Line Extension Vehicle Maintenance Facility, Reservoir Yard, Riverside Yard, Wellington Yard, and Orient Heights Yard. FTA also reviewed numerous data pulls and reports from MBTA's information management systems, including its Enterprise Asset Management (EAM) system, its maintenance information management system (Trapeze), and systems in the Operations Control Center (ISIS) and Safety Department.

FTA Urgent Special Directives

As a result of observations made while still on-site, FTA identified safety concerns and unsafe conditions at MBTA that required immediate action. On June 15, 2022, FTA issued four [Special Directives](#) to MBTA:

- Special Directive [22-4](#): Track Access and Maintenance
- Special Directive [22-5](#): Securement of Disabled Trains
- Special Directive [22-6](#): Operations Control Center (OCC)
- Special Directive [22-7](#): Lapsed Certifications

FTA also issued Special Directive [22-8](#): State Safety Oversight to DPU to compel its oversight of MBTA's corrective actions to address the pattern of safety incidents and interim safety findings identified in the Special Directives.

While developing this SMI report, FTA has continued to work with the MBTA and DPU to oversee the actions required to address these Special Directives through daily submittals, bi-weekly meetings, and an on-site follow-up inspection during the week July 18-22, 2022. FTA also has established a routine schedule of meetings and on-site activities to continue to assess MBTA's and DPU's implementation of corrective actions required by these directives throughout the rest of the year.

MBTA Safety Performance During SMI

FTA also monitored MBTA's safety performance during the SMI, when the agency experienced a number of incidents, including:

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- Derailment at Kendall Station (April 23),
- Three derailments of construction equipment in a diversion work zone near Airport Station (May 7-9, 2022)
- Red Line train rollaway at Cabot Yard (May 28)
- Red Line train rollaway from Braintree Station onto the mainline for about 1/3 of a mile (May 30)
- Collision between two trains on the Green Line that sent four MBTA transit workers to the hospital (June 1)
- A low-speed collision on at a Green Line platform that inadvertently coupled the two trains together and caused a passenger evacuation toward Park station (June 14)
- A partial suspension of service on the Orange and Green Lines due to a structural issue at the Government Center Garage⁸ on (June 23)

In addition, during the time of FTA's on-site SMI, the new China Railway Rolling Stock Corporation (CRRC) Orange and Red Line railcars were removed from service twice due to sheared bolts on a train brake unit (on May 19) and a battery failure that resulted in an explosion (June 21).

FTA reviewed MBTA's activities to investigate and manage these events and to develop and implement corrective actions to prevent their recurrence. FTA also observed DPU's role in overseeing and approving these event investigation activities and reports.

FTA Immediate Action Letter

Following the completion of the SMI, MBTA continued to experience safety incidents:

- A serious burn injury to a contractor at a diversion work site (July 19)
- A train fire and passenger evacuation over the Mystic River on the Orange Line (July 21)
- A Red Line train rollaway from Braintree Station onto the mainline (July 25)

In response to the July 25 unintended train movement on the Red Line, in which a two-car train with diminished braking capacity rolled out of a rail yard and onto the Red Line for approximately 800 feet, FTA issued an Immediate Action Letter requiring the MBTA to conduct a safety standdown to review procedures for the safe coupling/uncoupling of railcars and to develop and implement checklists for rail vehicle safety inspections and circle checks. MBTA implemented the safety standdown required by the Immediate Action Letter on July 30, 2022.

⁸ Government Center Garage is not an MBTA asset or project and is being managed by a third party.

FTA’s Authority and Need for SMI

FTA’s Role in Public Transportation Safety Oversight

FTA manages a National Public Transportation Safety Program to improve the safety of public transportation systems that receive Federal financial assistance under Chapter 53 of title 49, United States Code, through administration of the Public Transportation Safety Program at 49 U.S.C. § 5329. FTA’s safety program includes safety regulations, technical assistance, training, and safety data collection and analysis. For rail transit agencies, FTA also certifies and monitors SSO agencies charged with overseeing and enforcing compliance with agency safety plans required in [49 CFR part 673](#) and SSO program standards required in 49 CFR part 674.

FTA’s Authority to Conduct an SMI and Issue Special Directives

The framework for Federal transit safety oversight and enforcement is specified in FTA’s Public Transportation Safety Program and FTA’s implementing regulation at [49 CFR part 670](#). The FTA’s authority to conduct inspections, such as an SMI, and any supporting inspections, audits, examinations, or testing, is specified at 49 U.S.C. § 5329(f) and 49 CFR [§ 670.11](#). The FTA has authority to issue Special Directives in certain situations, including when FTA identifies unsafe conditions and practices exists such that there is a substantial risk of death or personal injury, or damage to property or equipment, as specified in 49 CFR [§ 670.27](#).

Need for SMI at MBTA

FTA monitors the safety performance of the rail transit industry through data reported to the National Transit Database (NTD) and the State Safety Oversight Reporting (SSOR) tool.

Recent data shows that, from January 1, 2020, through April 30, 2022, MBTA experienced a decline in safety performance. Over this period, MBTA experienced a higher overall rate of reportable safety events, particularly on its heavy rail mode, and a higher rate of derailments on both heavy and light rail modes than its peers and the total rail transit industry average. As noted in Figure 1, since the beginning of calendar year 2020, MBTA also experienced a higher rate of collision on its heavy rail transit mode than the industry average.

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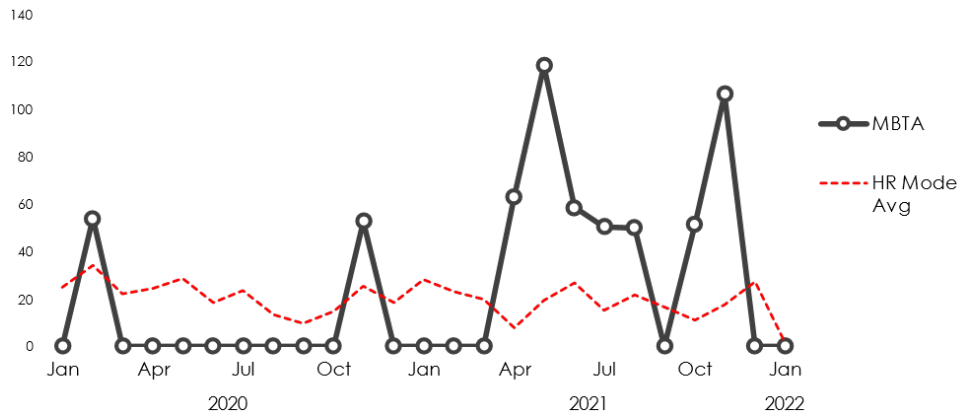


Figure 1: Heavy Rail Mainline Collision Rate (per 100 million vehicle revenue miles (VRM)), Calendar Year (CY) 2020 to CY 2021

Figure 1 includes collisions between a rail transit vehicle (revenue service or non-revenue service) and any person, vehicle, or other object, where a threshold for accident investigation was met, as specified in 49 CFR Part 674. Suicides and non-transit collisions (e.g., collisions between privately owned vehicles in a transit parking lot) are excluded.⁹ All data is sourced from the NTD and reported according to the reporting requirements established in the [NTD Safety and Security reporting manual](#).

Specifically for light rail collisions, the entire U.S. light rail industry reported 13 revenue service rail-to-rail collisions between 2017 and 2021, resulting in 48 injuries. MBTA was responsible for 5 (38%) of these collisions and 45 (94%) of the associated injuries.

For mainline derailments, which have been a long-standing concern for the MBTA, the data depicted in Figures 2 and 3 also show how MBTA's safety performance compared to industry average during the 7-year period between 2015 and 2021.¹⁰ During this time, MBTA has consistently experienced a higher rate of light rail derailment than industry average and a higher rate of heavy rail derailment than industry average since 2016, with a sharp increase in 2020.

⁹ Figure 1 compares collisions per 100 million (M) vehicle revenue miles (VRM) reported by MBTA's heavy rail mode to the aggregate number of collisions per 100M VRM at all heavy rail modes under FTA safety jurisdiction

¹⁰ Note: Data for Calendar Year 2021 is incomplete due to a lag in reporting data.

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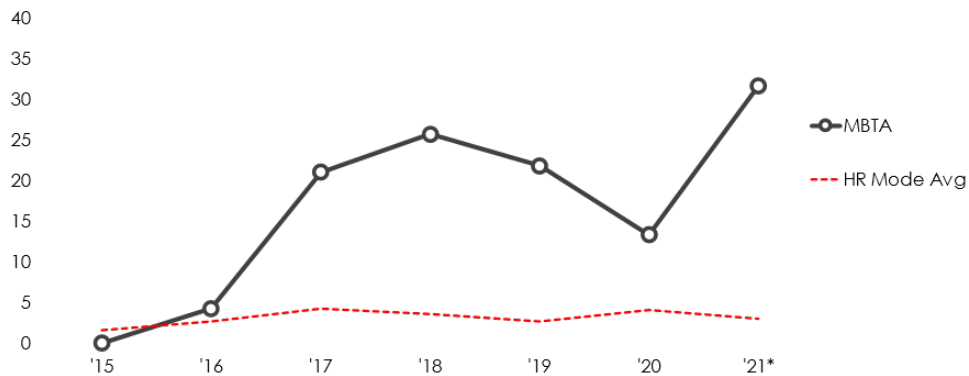


Figure 2: Heavy Rail Mainline Derailment Rate (per 100 million VRM), CY 2015 to CY 2021

Figures 2 and 3 include all events reported to NTD as a mainline derailment, including both rail revenue and non-revenue vehicles, such as hi-rail vehicles. Yard derailments and derailments reported as collisions or other event types per NTD reporting policy are excluded.¹¹

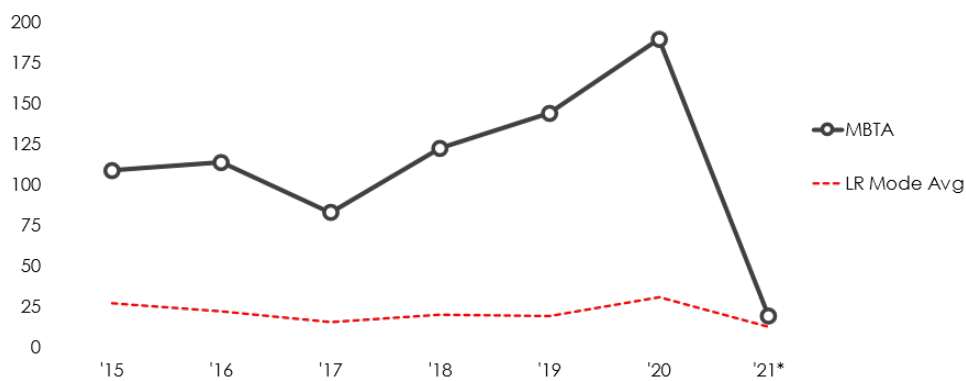


Figure 3: Light Rail Mainline Derailment Rate (per 100 million VRM), CY 2015 to CY 2021¹²

MBTA's recent safety events also indicate an escalation in the severity of safety events, from minor property damage, brief service disruptions, and minor injuries in 2019 and 2020, to more significant property damage, extended service disruptions, and more serious passenger injuries requiring hospitalization in 2021. In April 2022, this escalation continued with an April 10, 2022, railcar door entrapment incident that resulted in a passenger fatality.

¹¹ Figure 2 compares mainline derailments per 100M VRM reported by MBTA's heavy rail mode to the aggregate number of mainline derailments per 100M VRM at all heavy rail modes under FTA safety jurisdiction.

¹² Figure 3 compares mainline derailments per 100M VRM reported by MBTA's light rail mode to the aggregate number of mainline derailments per 100M VRM at all light rail modes under FTA safety jurisdiction.

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Concerns with Performance of SSO Program Administered by DPU

The DPU is the SSO designated by the Commonwealth of Massachusetts as the agency responsible for overseeing rail fixed guideway safety in the Commonwealth of Massachusetts, pursuant to 49 CFR § 674.11. As set forth in Section 12(a) of Title XXII, Chapter 159 of the Massachusetts General Laws, DPU has the power to supervise and regulate the transportation or carriage of persons or property, or both, by railroads, street railways, electric railroads, and trackless trolleys between points within the Commonwealth of Massachusetts.

In exercise of its oversight authority, DPU can take actions including review and oversight of Corrective Action Plans (CAPs) submitted by MBTA. In October 2019, FTA conducted an audit of DPU's SSO program, issuing 16 findings of non-compliance, nine of which have been closed. The DPU submitted CAPs to FTA to address the seven findings that remain open. However, FTA has not closed these remaining findings because DPU has not yet demonstrated positive safety outcomes at MBTA with their proposed and implemented CAPs. FTA continues to monitor the technical capacity of DPU's staff to perform safety oversight and the organizational resources and support that DPU commits to its SSO program.

MBTA Rail Transit System and DPU Organization

Overview

The MBTA is one of the oldest public transit systems and the fourth largest in the United States. A division of the Massachusetts Department of Transportation (MassDOT), the MBTA provides heavy and light rail, bus, commuter rail, ferry, and paratransit service to eastern Massachusetts and parts of Rhode Island.

The MBTA was integrated into MassDOT in 2009. Previously, the MBTA was an individual department within the Commonwealth of Massachusetts.

MBTA Organization

Under the MBTA's enabling act, Chapter 161A of the Massachusetts Laws, as amended in July 2021, the MBTA is governed, and its corporate powers exercised, by a seven-member board of directors. The MBTA Board consists of:

- the Secretary of Transportation for the Commonwealth, who serves *ex officio*,
- one person appointed by the MBTA Advisory board who shall have municipal government experience in the service area constituting the MBTA and experience in transportation operations, transportation planning, housing policy, urban planning or public or private finance, and
- five persons appointed by the Governor, one of whom shall have experience in safety, one of whom shall have experience in transportation operations, one of whom shall have experience in public or private finance, one of whom shall be a rider as defined in the Enabling Act and a resident of an environmental justice population, and one selected from a list of three persons recommended by the president of the Massachusetts State Labor Council, American Federation of Labor and Congress of Industrial Organizations (AFL–CIO).

The statute also requires the MBTA Board to establish subcommittees, including, at a minimum, a subcommittee on: (i) safety, health, and environment; (ii) planning and workforce development; and (iii) audit and finance.

Additionally, not less than two of the appointed members must also serve as members of the Board of Directors of MassDOT. The Secretary of Transportation chairs the MassDOT Board and reports to the Governor.

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MBTA top-level administrative leadership includes the General Manager, Deputy General Manager and Executive Management Team. The General Manager oversees MBTA's operations and leads the Executive Management Team.

DPU Organization

The DPU's Transportation Oversight Division is an adjudicatory agency under the Massachusetts' Executive Office of Energy and Environmental Affairs and serves as the SSO agency designated by the Commonwealth of Massachusetts to oversee rail fixed guideway safety in the Commonwealth, including the MBTA.

The DPU is overseen by the three-member Commonwealth Utilities Commission appointed by the Secretary of the Executive Office of Energy and Environmental Affairs with approval by the Governor. The Secretary designates one of the Commissioners as Chairman.

Figure 4 shows the relative positions of the MBTA and DPU's Transportation Oversight Division within the Office of the Governor.

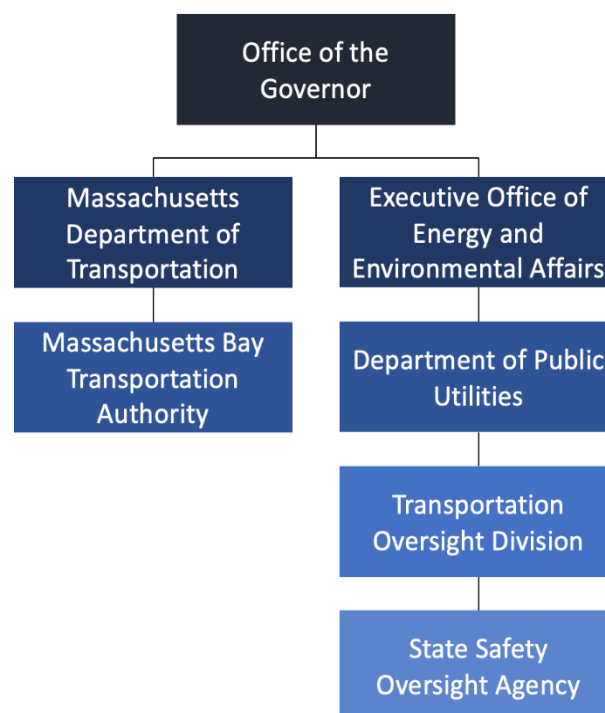


Figure 4: Location of the MBTA and the DPU within the Office of the Governor

MBTA Rail Transit System Characteristics

The MBTA rail transit system includes three heavy rail lines (Red, Orange, and Blue Lines) and two light rail lines (Green Line and the Mattapan High Speed Trolley Line).

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Rail Transit Line	Power	Number of Stations and Mileage	Average Weekday Trips ¹³	
			2019	2021
Red Line Heavy Rail service from Alewife to Ashmont and Braintree	Third rail	22 Stations 22.5 mi	273,003	125,000
Light Rail (heritage trolley) service from Ashmont to Mattapan (considered part of the Red Line) ¹⁴	Overhead catenary system (OCS)	8 Stations 2.5 mi		
Orange Line Heavy Rail service from Oak Grove to Forest Hills	Third rail	20 Stations 11 mi	218,000	104,000
Blue Line Heavy rail from Wonderland to Bowdoin	OCS (Wonderland to Airport Station) Third rail (Airport Station to Bowdoin)	12 Stations 6 mi	74,000	41,000
Green Line ¹⁵ Light rail service with four active branches from Union and Lechmere Stations: <ul style="list-style-type: none"> • B Branch – Boston College • C Branch – Cleveland Circle • D Branch – Riverside • E Branch – Heath Street 	OCS	65 Stations 5 Stations under construction 23.7 mi active track 3 mi under construction	185,000	94,000

Table 1: MBTA Rail Transit Line Characteristics

¹³ Service information reported to the FTA [National Transit Database](#).

¹⁴ While considered part of the Red Line, within MBTA, the Mattapan line is managed by Light Rail Operations and maintained by Light Rail Maintenance.

¹⁵ The Green Line Extension (GLX) project is underway and has already extended the northern end of the Green Line from Lechmere to Union Square in Somerville and will further expand the Green Line to College Avenue in Medford. The Union Square Branch of the GLX opened for service on March 21, 2022.

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Prior to the Coronavirus Disease 2019 (COVID-19) public health emergency, MBTA provided approximately 750,000 passenger trips each weekday on its rail transit system. In March 2022, the rail transit system averaged approximately 350,000 daily passengers, or almost 49 percent of its pre-COVID-19 ridership.

Rail Transit Lines

The MBTA's rail transit operates over four lines called the Red, Orange, Blue, and Green Lines.



Figure 5: MBTA Rail Transit System Map

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Each of the four MBTA rail lines has its own rail cars, maintenance facilities, and rail maintenance vehicles.

Red Line

The MBTA maintains its Red Line vehicle fleet at Cabot and Codman Yards, which are both undergoing upgrades and expansion. The 68 Number 1 vehicles manufactured in 1968 are the second oldest vehicles currently operating in the system. The overall oldest vehicles are the 6 active 1944 Pullman-Standard PCC vehicles used for trolley service. When taking mid-life overhauls into account, the No. 1 vehicles are the second oldest from mid-life overhaul or manufacture, for vehicles that have not yet been overhauled.¹⁶

Red Line Vehicles

- 68** No. 1 Pullman-Standard vehicles (manufactured 1968, mid-life overhaul 1985)
- 58** No. 2 Urban Transportation Development Corporation (UTDC) vehicles (1987)
- 82** No. 3 Bombardier vehicles (1994)
- 8** No. 4 CRRC vehicles – delivery ongoing

Trolley Service

- 10 (6 in use)** Pullman-Standard PCC vehicles (1944, mid-life 1999)

The MBTA is replacing the Red Line fleet with 252 new vehicles, which will increase the total fleet by 34 railcars. While the new fleet manufacturer, China Railway Rolling Stock (CRRC), is accelerating production for final delivery scheduled in 2024, so far, only one six-car Red Line train and two additional single cars have been delivered. Most of the Red Line's older fleet will remain in service during the delivery period.

Orange Line

The MBTA maintains its Orange Line fleet at Wellington Yard, which is also undergoing expansion and upgrade. The MBTA is wholly replacing the Orange Line fleet with CRRC vehicles assembled in the CRRC's Springfield, Massachusetts factory. The CRRC and MBTA are working to retrofit the new No. 14 vehicles due to undercarriage issues identified after a March 2021 derailment of one of these vehicles and other issues that require a software upgrade.¹⁷ As a result, much of the older Orange Line fleet, the oldest fleet when considering mid-life overhauls, remains in service.

Orange Line Vehicles

- 114** No. 12 Hawker Siddley Canada vehicles (1980)
- 60** No. 14 CRRC vehicles – delivery ongoing

¹⁶ The oldest vehicles considering mid-life overhauls are the Orange Line No. 12 Hawker Siddley Canada vehicles, manufactured in 1980, that have not received a mid-life overhaul.

¹⁷ MBTA and DPU continue to resolve and monitor this issue. DPU closed the corrective action plan requiring replacement of all Side Bearer Pads on April 6, 2022 after MBTA provided evidence of completion. On August 15, 2022, MBTA Safety received notification that the software upgrades were complete.

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Blue Line

The Blue Line fleet is maintained at Orient Heights Yard. The Blue Line is undergoing a series of tunnel and track improvements.

Blue Line Vehicles

94 No. 5 Siemens vehicles (2008)

Green Line

The MBTA maintains its Green Line fleet at Riverside and Reservoir Yards and the Green Line Maintenance Facility. The Green Line is undergoing significant upgrades, including track and signal replacements, track and intersection upgrades, and installation of the Green Line Train Protection System (GLTPS).

The GLTPS uses vehicle-borne and wayside equipment to monitor and actively intervene in vehicle operations when the system detects certain conditions. This system is intended to prevent train-to-train collisions, red light overruns, and overspeed. The system can also send alerts to the operator of certain conditions. The \$212 million contract is slated for completion in late 2023.

Green Line Vehicles

101 Type 7 Kinki Sharyo vehicles (**91** manufactured 1986, mid-life 2016 and **20** manufactured 1997, mid-life 2018)

84 Type 8 Ansaldo Breda vehicles (manufactured 1996, mid-life 2016)

24 Type 9 Construcciones y Auxillar de Ferrocarriles (CAF) (2018)

Rail Operations Control Center (OCC)

The MBTA rail OCC is part of the agency's OCC and Training Department, overseen by the Chief of Operations, Strategy, Policy, and Oversight, who reports to the Deputy General Manager of Operations. The MBTA has two rail OCCs, one of which serves as a backup and was used during the COVID-19 public health emergency to allow for social distancing.

The OCC has consoles for dispatchers, supervisors, a police liaison, a Public Information Officer, and the Power System Maintenance Department (PSM). Together, these positions direct and monitor rail operations, including revenue service, maintenance and inspection activities, and emergency response.

Rail Transit Fleet Maintenance

The MBTA Chief Mechanical Officer, who leads MBTA's maintenance activities, reports to the Chief of Transit Services, who reports to the Deputy General Manager. Preventive and other maintenance activities for MBTA's rail transit fleet are largely carried out by vehicle type.

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Rail Transit Line	Lifecycle Management Strategy/Activity¹⁸	Frequency
Red Line	Preventive Maintenance (PM) Inspections No. 1 and 2 cars	8,500 mi or 90 days
	PM Inspections No. 3 cars	15,000 mi
	PM Inspections No. 4 cars	12,000 mi or 90 days ¹⁹
	PM Inspections Heritage Trolley cars	30 days
	Heating, Ventilation, and Air Conditioning (HVAC) System Inspection	Varies
Orange Line	PM Inspections No. 12 cars	12,000 mi or 90 days
	PM Inspections No. 14 cars	12,000 mi or 90 days ²⁰
	HVAC System Inspections	Quarterly
	Extensive PM Program	Annual
Blue Line	PM Inspections No. 5 cars	6,000 mi (partial) and 12,000 mi (full)
	HVAC System Inspections	12,000 mi
Green Line	PM Inspections No. 7 cars	7,500 mi or 90 days
	PM Inspections No. 8 cars	90 days
	PM Inspection No. 9 cars	90 days
	HVAC System Inspections	Annual
	Air Compressor Inspections	Annual

Table 2: MBTA Rail Transit Vehicle Maintenance Activities Identified in the 2018 MBTA Fleet Management Plan

The MBTA also performs routine part replacement and maintenance campaigns as needed to maintain reliability and performance.

Rail Transit Infrastructure

The Engineering and Maintenance (E&M) directorate is responsible for the physical infrastructure of the rail transit system, including the inspection and maintenance of facilities,

¹⁸ Strategies/activities are identified in MBTA's 2018 Fleet Management Plan.

¹⁹ The 2018 Fleet Management Plan states that this car will follow the same plan as the Blue Line when delivered. These cars had not been delivered at the date of the Plan.

²⁰ The 2018 Fleet Management Plan states that this car will follow the same plan as the Blue Line when delivered. These cars had not been delivered at the date of the Plan.

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power, maintenance of way, and signals. The E&M directorate reports to the Chief Engineer, who reports to the Deputy General Manager of Operations.

Maintenance of Way (MOW)

The MBTA MOW Department is responsible for all rail transit system track, including track for both revenue and non-revenue service. This includes inspections, preventive and corrective maintenance, and capital improvement and construction. MOW also performs trash removal, pothole repair, snow removal, and landscaping.

MOW is responsible for inspecting 178 miles of active track and 803 switches. These inspections are conducted in accordance with:

- DPU's 220 Code of Massachusetts Regulations (CMR) 151.00,
- MBTA Agency Safety Plan,
- MBTA Light Rail Transit Track Maintenance and Safety Standards, and
- MBTA Heavy Rail Transit Track Maintenance and Safety Standards.

Rail Transit Mode	MOW Activity	Frequency
Heavy Rail	Heavy Rail Passenger-Service Track	Twice per week, with at least one calendar day interval between inspections
	Heavy Rail Yard and Storage Track Inspection	Weekly, with at least three calendar days interval between inspections, or before use, if track is used less than once a week
	Internal Rail Defects Inspection	At least once per year
Light Rail	Light Rail Yard and Storage Track Inspection	Weekly, with at least three calendar days interval between inspections, or before use, if track is used less than once a week
	Light Rail Passenger-Service Track Inspection	Three times per week, with at least one calendar day interval between inspections
	Internal Rail Defects Inspection	At least once per year

Table 3: Frequency of MOW Inspection Activities

Power System Maintenance (PSM)

The MBTA's PSM Department is responsible maintaining and inspecting all equipment used to generate and distribute power across the transit agency. This includes:

- Gas-generated power plant and generator control system,
- Bulk power yard,
- Two switching stations and two power control centers,

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- 200 miles of alternating current (AC) cabling and AC duct bank system
- 1,000 miles of direct current (DC) cabling and DC duct bank system
- 47 traction power substations and 96 unit substations,
- 125 miles of overhead catenary system, and
- Power Supervisory Control and Data Acquisition system.

PSM Activity	Frequency
DC Circuit Breaker Routine Maintenance	Twice per year or as required
Transformer Maintenance	Once per year or as required
AC Switchgear Assembly Maintenance	Once every three years or as required
Rectifier Substation Maintenance	Twice per year, or as required
Filter Maintenance	Twice per year
AC Feeder Tests	Once per month
DC Feeder Tests	Once per week
Overhead Wire Preventive Maintenance	Every eight to 26 weeks, depending on type and location)
Overhead Wire Head System Video Car Inspection	Quarterly

Table 4: Frequency of Key PSM Activities

Transit Facilities Maintenance (TFM)

The MBTA's TFM Department is responsible for the maintenance and inspection of physical structures throughout the system, including buildings, passenger stations and rail facilities, parking garages, bridges, tunnels, culverts, and retaining walls.²¹ The MBTA performs these activities in compliance with State and national standards, codes, guidance, and as directed by the agency's insurance company. The MBTA owns and maintains approximately 46.2 miles of tunnels. The MBTA's tunnel assets include walls, utility lines, ceilings, signage, de-watering equipment, ventilation systems, and electrical and lighting systems.

Asset	TFM Activity	Frequency
Station / Facility	Detailed System Inspections	Monthly
Bridges	Routine Bridge Inspections	Bi-Annually
	In-Depth Bridge Inspection	Every 5 years

²¹ Capital Delivery also conducts elements of MBTA's bridge inspection program, including routine/in-depth bridge inspections every 5 years, and load ratings every 10 years.

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Asset	TFM Activity	Frequency
	Bridge Load Rating (Structural Analysis)	Every 10 years

Table 5: Frequency of Key TFM Activities

Signal and Communications Maintenance (SCM)

The MBTA's SCM Department maintains and inspects signaling systems for all four rail transit lines. This includes the Operations Control Center (OCC) software and all wiring and physical hardware used in the systems' communications networks. Signal assets under SCM include track circuits, wiring, bonds, switches, third rail heaters, and instrument houses/wayside cases. MBTA's communications assets include telephone hardware, fiber optic cables, call boxes, public address systems, customer communication alarms, and message boards.

SCM Activity	Frequency
Relay Testing	Once every two and four years
Track Circuit Testing	Once every two years
Switch Obstruction Testing	Monthly
Automatic Train Stop Testing	Monthly
Ground Testing	Monthly
Track Mapping	Monthly

Table 6: Key SCM Signal Activities

Capital Program

The MBTA released its latest five-year [Capital Investment Plan \(CIP\) for FY23-27](#) in May 2022. As described, the CIP “includes \$9.6B in investments to improve our core infrastructure and advance key expansion initiatives [and] includes the procurement and overhauls of subway cars, buses, and commuter rail locomotives and coaches; the repair, rehabilitation, and replacement of bridges and tunnels; improvements to passenger facilities, including accessibility upgrades; modernization of bus maintenance facilities; and critical track, signal, and power upgrades.” Of this \$9.6B, an estimated \$7.5B will be spent on safety-related projects.

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Capital Program²²	Line	Status
Back Bay Station Improvements <i>Ventilation improvements</i>	Orange Line	Construction
Beachmont Improvements <i>Tower replacement</i>	Blue Line	Construction
Station Brightening <i>General maintenance</i>	All lines	Implementation
Orange Line Maintenance Work <i>Track maintenance</i>	Orange Line	Implementation
Blue Line Maintenance Work <i>Track maintenance</i>	Blue Line	Construction
North Quincy Garage and Development <i>Garage construction</i>	Red Line	Construction
South Station Tower One Interlocking Project <i>Updates to existing equipment</i>	Red Line	Final Design
Longfellow Approach Viaduct Rehabilitation <i>Infrastructure repair and replacement</i>	Red Line	Design
Alewife Garage Repairs <i>Infrastructure repair and replacement</i>	Red Line	Construction
South Shore Garages <i>Garage rehabilitation</i>	Red Line	Construction
System-Wide Accessibility Improvements <i>Upgrades to infrastructure for accessibility</i>	Red Line Orange Line Green Line	Various
Forest Hills Station Improvements <i>Upgrades to infrastructure for accessibility and rehabilitation</i>	Orange Line	Conceptual Design

²² Open programs listed on MBTA's [Building a Better T](#) website listed in reverse order, oldest to newest.

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Capital Program²²	Line	Status
Red Line Maintenance <i>Track maintenance</i>	Red Line	Implementation
Downtown Crossing Accessibility Phase I <i>Upgrades to infrastructure for accessibility</i>	Red Line Orange Line	Design
South Station Transportation Center Improvements <i>Upgrades to infrastructure</i>	Red Line	Construction
Harbor Tunnel Infrastructure Improvements <i>Infrastructure rehabilitation</i>	Blue Line	Construction
Dorchester Avenue Bridge Replacement <i>Bridge replacement</i>	Red Line	Construction
Elevator Accessibility Upgrades <i>Elevator rehabilitation and replacement</i>	Red Line Orange Line Green Line	Design
Suffolk Downs Pedestrian Bridge <i>Structural repairs</i>	Blue Line	Construction
Mattapan Line Transformation	Red Line	Scoping
Green Line Extension	Green Line	Construction
Ruggles Station Improvements <i>Structural repairs and accessibility improvements</i>	Orange Line	Construction
Oak Grove Station Accessibility Improvements <i>Upgrades to infrastructure for accessibility</i>	Orange Line	Construction

Table 7: Open MBTA Capital Programs²³

²³ Complete list of capital programs can be found [here](#).

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In addition to these individual programs, MBTA is currently executing transformational programs on its Red, Orange, and Green lines.

Transformation Program	Projects In Progress
Red Line ²⁴	Signal upgrades
	New vehicles
	Cabot Yard and Maintenance Facility updates
	Codman Yard expansion and improvements
	Alewife crossover improvements
Orange Line ²⁵	Track and signal upgrades
	Vehicle replacement
	Wellington Yard updates
	Wellington Vehicle Maintenance Facility updates
	Traction Power Substation Upgrades
Green Line ²⁶	GLTPS
	Track upgrades
	Hynes Station accessibility improvements
	Solar-powered e-ink signs
	D Branch Station accessibility improvements
	Newton Highlands Station accessibility improvements
	Symphony Station accessibility improvements

Table 8: MBTA Line Transformational Programs

²⁴ All information from [MBTA Red Line Transformation Program](#).

²⁵ All information from [MBTA Orange Line Transformation Program](#).

²⁶ All information from [MBTA Green Line Transformation Program](#).

Findings and Required Actions

FTA made 20 total findings in four categories addressed to the MBTA. To ensure that FTA's SMI findings are resolved, FTA is issuing four Special Directives (22-9 through 22-12) that identify required actions to be completed by MBTA.

- **Category 1 – Managing the impact of operations, maintenance, and capital project requirements on the existing workforce:** FTA found that an organizational focus on capital projects has diverted management attention and resources from the agency's operations and maintenance, allowing the agency to operate a level of service that is not adequately staffed, trained, supervised, or maintained. In addition, existing staffing levels and capabilities do not provide adequate safety oversight for the design, construction, and testing of new capital projects and do not support widespread safety certification of these projects, which is an industry standard practice. MBTA also has experienced a series of construction safety events due to the lack of oversight of worksites. To ensure that the system remains safe for both passengers and workers, and to support the safety of MBTA's projects and worksites, FTA issues four findings requiring additional assessment and resource prioritization for operations and maintenance activities.
- **Category 2 – Prioritization of safety management information:** FTA found limited evidence that MBTA has adopted SMS practices in the field to support the identification, analysis, and prioritization of safety information. To ensure this critical capability, FTA issues six findings requiring enhanced and expedited implementation of the agency's SMS, including the development of procedures, safety management training, safety risk assessment, and safety assurance activities to enhance the organization's capability to identify safety concerns and to prioritize action to mitigate safety risk.
- **Category 3 – Effectiveness of safety communication:** FTA found that there is a lack of routine, consistent, and meaningful communication regarding safety issues across departments and with frontline workers. To address this concern, FTA issues three findings requiring improvements in the MBTA's management of its safety committee process, employee safety reporting program, and safety promotion activities.
- **Category 4 – Operating conditions and policies, procedures, and training:** FTA found several areas where MBTA is not meeting its own written requirements; does not have adequate procedures, processes, or requirements; does not have adequate training, coordination, and supervision; and does not have independent quality assurance and quality control (QA/QC) capabilities. FTA also found instances where procedures are well-documented and available but are not followed or enforced, and where workers were required to perform specific activities but were not given the resources or guidance necessary to complete the work. Conversely, FTA found outdated procedures

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and a lack of operational assessments to ensure revisions accurately capture changes in the system and required work practices. To address these concerns, FTA issues seven findings requiring additional monitoring of rail transit operations, new Quality Assurance/Quality Control capabilities, and new training and procedures.

In addition, FTA made four findings related to the DPU's oversight of MBTA's rail transit system. To ensure that FTA's SMI findings are resolved, FTA is issuing Directive 22-13 to DPU which identifies corrective actions to be completed by DPU.

- **Category 5 – Safety oversight of MBTA rail transit system:** FTA found that DPU has not been actively engaged in overseeing MBTA's SMS implementation. To ensure that DPU fulfills its statutory oversight requirements and maintains its Federal SSO program certification, FTA issues four findings requiring DPU to re-assess its staffing, technical capacities, capabilities, and authorities to conduct engaged and independent safety oversight. FTA also requires DPU to adopt and oversee implementation of Corrective Action Plans developed by the MBTA and approved by FTA to address the findings and required actions identified in this SMI.

These five categories of concern and the resulting findings are discussed below, including:

- the focus of the category,
- the finding,
- the situation as documented by FTA's SMI for each finding, and
- the required corrective action.

Category 1: Managing the Impact of Operations, Maintenance and Capital Projects Requirements on the Available Workforce

Focus

FTA reviewed the resources available to support the safe operation and maintenance of the MBTA's legacy rail transit system and to manage the MBTA's \$2 billion annual capital project budget. FTA reviewed the extent to which the MBTA's capital initiatives are facilitated with existing MBTA personnel, which requires the sharing of critical operations and maintenance resources. FTA also assessed the extent to which resources have been stretched to serve multiple functions, including the extent to which MBTA resources have been used to oversee the safety of construction sites for capital projects, incorporate safety engineering and certification into capital projects, and ensure safety sign-off prior to the placement of capital projects into passenger service. Finally, FTA examined the extent to which staffing assessments and workload analyses have been authorized and completed to address staffing impacts and challenges associated with the significant increase in the MBTA's capital budget.

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Finding 1. MBTA’s staffing levels are not commensurate with the demand for human resources required to carry out current rail transit operations and maintenance in addition to expanding capital program activities.

Situation

FTA’s SMI determined that the MBTA is not effectively balancing safety-critical operations and maintenance activities with its efforts to deliver capital projects. This lack of balance is at the center of many of the MBTA’s safety challenges.

Over the last four years, the MBTA’s capital budget has more than doubled, from approximately \$875 million in fiscal Year 2018 to over \$2 billion in fiscal Year 2022. At the same time, the MBTA is still recovering from the long-standing impact of funding cuts made in 2015-2019 to the MBTA’s operations and maintenance budget, which resulted in a reduction in hundreds of millions of dollars and hundreds of positions.

Since 2020, the MBTA’s transit organization (agency-wide) has averaged a 10-percent vacancy rate from budgeted positions. For example, MBTA’s Transit Workforce Staffing Report by Department (budgeted vs actual) for fiscal year 2022 (beginning July 1, 2021) shows 5,554 active employees for 6,349 budgeted positions - a staffing gap of 795 positions or 12.5 percent. For fiscal year 2021 (beginning July 1, 2020), there were 5,537 active employees for 6,279 budgeted positions – a staffing gap of 742 position or 11.8 percent. So far in fiscal year 2023 (beginning July 1, 2022), there are 5,781 active employees for 6,679 budgeted positions, or a staffing gap of 898 positions or 13.4 percent.

In addition, specifically for MBTA’s rail transit system, over the last two years, some key technical and supervisory positions have averaged 20 to 35 percent vacancy rates, including Operations Control Center dispatchers and supervisors, signal technicians, vehicles repairers, and traction power technicians.

Interviews with MBTA personnel at all levels of the agency indicate that budgeted positions, which have increased under MBTA’s current leadership team, do not reflect the true measure of required staff levels because they do not consider the additional responsibilities associated with capital project delivery. In some instances, required staff levels are calculated to rely on overtime to cover staff vacations and training. Interviews with a range of personnel throughout the MBTA’s organization indicate that the overall MBTA transit system may be between 1,500 and 2,000 active positions short in managing its current level of activity.

The Rail Vehicle Maintenance Department provides an example of the impact of staffing shortages. The Rail Vehicle Maintenance Department is responsible for managing the heavy and light rail transit fleets and schedules and conducts periodic inspections, mid-life overhauls, annual services/preventative maintenance, and component overhauls along with discretionary, targeted campaigns to maintain rail vehicle performance. During interviews and inspections,

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MBTA personnel reported high staff vacancies, ranging between 15 and 30 percent, for “repairers” for both heavy and light rail vehicles. MBTA noted that these vacancies impact both preventive and corrective maintenance activities, and as a result, vehicles required for service, particularly on the Red Line, were not available for roll-out.²⁷ Additionally, MBTA personnel reported that “repairers” on the Red Line have not yet attended training on the new CRRC railcars, further exacerbating limitations in their availability to service the rail cars. Overtime is currently being used to offset gaps in resource scheduling to the extent feasible. Whenever issues or concern emerge with the performance of MBTA’s aging fleet or new vehicles, MBTA’s “repairers” fall further behind as they must manage these issues through new maintenance inspections or campaigns.

The 2019 SRP report indicated that the emphasis on delivering capital projects could come at the expense of efforts to maintain the existing system, conduct required preventive maintenance inspections and repairs, and carry out day-to-day operations. The 2019 SRP report issued three recommendations and four corrective actions on this topic, directing MBTA to conduct a zero-based budgeting analysis of each MBTA department and to identify the appropriate level of resources needed to ensure the safe delivery of service, management of preventive maintenance, and support for capital project delivery. MBTA has begun working on but not completed any of these corrective actions, nor has DPU required MBTA to complete these actions.

MBTA reported that, due to the challenges and uncertainties of the COVID-19 public health emergency, they have not taken corrective action on these items. Nevertheless, during this same period, MBTA aggressively moved forward with its \$2 billion-per-year capital program, supported largely by existing and overtime resources from the agency’s operations and maintenance departments and contractors. In January 2022, MBTA’s leadership team and Board of Directors took the unprecedented step of transferring an additional \$500 million from the MBTA’s operating budget to its capital budget.²⁸

FTA’s SMI found that MBTA’s leadership is focused on using longer-term capital projects to “build the agency” out of many of the challenges of a legacy system. However, as discussed in FTA’s Special Directive 22-4, key elements of this approach are significantly impacting preventive maintenance inspections and repairs for the aging system, exacerbating the deterioration of aging infrastructure and assets that are not the focus of the capital program.

FTA also found that MBTA lacks resources to adequately manage its \$2 billion capital program and complete capital projects on time and without need for retrofits and workarounds. This situation has resulted in deteriorated assets, whether rail transit vehicles, track, switches,

²⁷ MBTA policy is that vehicles requiring preventive maintenance inspections or workorders are not placed in revenue service.

²⁸ A total of \$480M was transferred to the Capital Program, while \$20M was identified for "Employee Recruitment and Retention Initiatives" advanced employee-focused initiatives, including recruitment and retention.

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stations, facilities, or other elements, remaining in service longer than intended with additional maintenance needs. These assets are vulnerable to failure in new and potentially unexpected ways, such as the September 28, 2021 safety event, when a piece of a restraining rail assembly came loose on the track outside of Broadway station and derailed a train; the April 10, 2022 event when an aging door assembly malfunctioned and a train took power with a passenger trapped between its door panels, resulting in a fatality; or the July 21, 2022 train fire on the transit bridge over the Mystic River, where a rusty sill panel fell off a rail transit train and contacted the third rail.

The chronic lack of personnel resources to address requirements for operations, maintenance, and capital projects results in a situation where the organization is overwhelmed, there is chronic fatigue in key positions in the agency, there is a lack of support for training and supervision, and limited professional development is available for the MBTA's workforce. In this environment, emphasizing capital project demands above passenger operations and preventive maintenance can negatively impact the safety culture of the agency. FTA found that unwritten norms have emerged that emphasize a "get it done and go" mentality over following safety rules or ensuring compliance with minimum safety standards, particularly when staff are working 12 to 16-hour days, six days a week.

At this critical juncture, FTA is requiring the MBTA to conduct a workforce analysis to determine the level of operations, maintenance, and capital project delivery that its workforce can sustain, particularly in key technical, supervisory, and engineering positions. This assessment must be conducted in concert with work underway as part of FTA's Special Directive 22-6 to address staffing, training, and qualification for the Operations Control Center and to manage maintenance work plans developed to address backlogs in FTA's Special Directive 22-4.

The objective of this analysis is to ensure that the MBTA defines what level of organizational service it can provide with its available staffing for at least the next five fiscal years. However, the MBTA's workforce analysis should include and define assumptions regarding attrition, employee retention, hiring and recruitment, and training and qualification for operating, maintenance, and capital project delivery activities for at least the next fiscal five years. The MBTA has access to numerous contractors and specialists in a range of technical disciplines who may be helpful in supporting this analysis.

As the MBTA addresses the findings below, FTA urges the MBTA to use the data assessed to establish its fiscal year 2023 hiring plan²⁹ to support the required workforce analysis for the next five fiscal years.

²⁹ See [MBTA General Manager Report, July 19, 2022](#), beginning on Slide 7

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Finding	Required Action
<p>Finding 1: MBTA’s staffing levels are not commensurate with the demand for human resources required to carry out current rail transit operations and maintenance in addition to expanding capital program activities.</p>	<p>MBTA must conduct and submit to FTA a workforce analysis and associated workforce planning to include:</p> <ol style="list-style-type: none"> 1. <i>Required activities that must be performed for rail transit operations, maintenance, and capital projects delivery:</i> A description of present and projected day-to-day requirements for rail transit operations, preventive and corrective maintenance, and capital delivery through the next five fiscal years. 2. <i>Required resources to perform mission-critical activities:</i> A description of the assignment of the necessary human resources to support present and projected day-to-day requirements for rail transit operations, preventive and corrective maintenance, and capital delivery through the next five fiscal years per the description above. 3. <i>Current staffing capabilities for mission-critical activities:</i> The results of an assessment of MBTA’s ability to safely operate, maintain, and complete capital project delivery for its rail transit system at current service levels of workforce. 4. <i>Safety case for mission-critical activities that can be performed within current and projected resources over the next five fiscal years:</i> The identification of safety risk associated with current staffing shortages and how they are or will be mitigated and any needed changes or reductions in activities.

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Finding 2. MBTA has not demonstrated the organizational capacity to recruit and hire personnel to meet authorized staffing levels.

Situation

For the last five years, the MBTA's budgeted positions have exceeded its actual active workforce by approximately 7 to 10 percent.³⁰ The agency also is experiencing significant attrition and retirement of seasoned personnel, with a large cohort of MBTA's technical and supervisory personnel now eligible for retirement. As discussed in Finding 1, vacancies in technical positions affect the safety of MBTA's operations, maintenance, and capital project delivery.

FTA notes that MBTA's leadership team has established a strategic hiring plan³¹ for fiscal year 2023. This plan sets a goal of hiring over 2,000 workers, including 330 workers funded by the capital budget and 1,759 workers funded by the operating budget in fiscal year 2023. Nearly 900 of those positions across both capital and operating are existing vacancies, and another 447 positions would be added to last year's budget. The plan also estimates that in fiscal year 2023, MBTA will need to backfill another 744 positions to cope with attrition as workers retire or resign. This level of hiring would more than double last year's hiring initiative where MBTA officials reported hiring approximately 800 new employees in fiscal year 2022, but with attrition and retirements saw a net gain of only 100 employees.

The MBTA's fiscal year 2023 strategic hiring plan may offset some of these challenges, but only if it is successfully executed with a focus on filling positions with safety impact for the agency. During interviews with FTA, MBTA personnel at all levels discussed the challenges of recruiting and hiring. Challenges included:

- Issues regarding how new vehicle operators are brought into the agency – vehicle operators are required to begin as part-time operators in rail yards and are often required to stay part-time for two years or more before beginning full-time employment. During this time, employees make \$22.21 per hour for 30 hours per week.³² Waiting for two years before full-time employment is a deterrent to accepting this type of position.
- Challenges with pay equity between salaried and officials eligible for overtime that make promotions to salaried positions less attractive because officials may earn less and work the same hours.

³⁰ Budgeted positions from FY 2019 through FY 2023 totaled 31,099 (across 5 years) with 28,197 active positions during this same time, for an approximately 9 percent vacancy rate over the five-year period.

³¹ See [MBTA General Manager Report, July 19, 2022](#), beginning on Slide 7.

³² During operator training, trainees are paid \$16.66/hour, 40 hours/week for eight weeks of training. After training, new hires start at \$22.21/hour, 30 hours/week, with the potential to advance to 40 hours/week after two years or so. Signing bonuses and benefits are also available.

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- Work schedules that strongly encourage significant overtime each week and may require it for certain classifications.
- Retirement eligibility makes it difficult to keep veteran employees and retain institutional knowledge.
- MBTA's focus on internal hiring and promotion, which limits the labor pool for both technical positions and advancement within the MBTA's organization.
- Lack of partnership with local universities and community colleges to attract talent to the MBTA.

Finding	Required Action
Finding 2: MBTA has not demonstrated the organizational capacity to recruit and hire personnel to meet authorized staffing levels.	MBTA must develop and implement a recruitment and hiring plan to address findings from its workforce analysis and associated workforce planning for at least a five-year period, including how it will expand its capabilities for recruiting and hiring personnel to fill operations, maintenance, and capital project delivery positions.

Finding 3. Additional resources are needed to support MBTA's safety engineering and safety certification process for capital projects.

Situation

MBTA's Agency Safety Plan defines safety certification as "a process used to verify safety-related requirements are incorporated into a project, thereby demonstrating that it is operationally ready for revenue service and safe and secure for passengers, employees, public safety agencies, and the general public." MBTA's Agency Safety Plan also incorporates by reference MBTA's Safety Certification Program (SAFE 1.09.00), as the guiding document outlining MBTA's safety certification process.

The MBTA's safety certification program requires MBTA's Safety Department to review all facilities and system designs for safety input. For most capital projects, MBTA's Engineering and Maintenance (E&M) functions are responsible for safety engineering including project design, compliance with safety and security certification, workplace safety, and supervision of E&M projects.

Documents and records shared by the MBTA reveal a minimal safety certification process for most capital projects. The MBTA was unable to provide formal safety certification plans as requested for the Green Line Wayside Signal, Green Line B Branch Consolidation, and Green

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Line D Branch Track and Signal capital projects, among others.³³ Interviews confirmed that most capital projects do not have a dedicated safety certification plan, instead relying on Certified Item Lists (CILs) (the individual items in the capital project subject to additional review and verification through safety certification) and the certification letter to the General Manager.

CILs are typically minimal and do not include many industry-standard items. For example, the new Green Line Type 9 rail cars, included just four (4) Certifiable Items List (CIL) elements for braking. At many transit agencies, the CIL for a rail transit vehicle may contain hundreds or thousands of items, focused on electrical wiring, electronic subcomponents, propulsion, door controls, wheel and wheel assemblies, accessibility features and climate controls, to name a few major categories. As a result, the Green Line Type 9 rail car CIL does not include elements commonly expected in such documentation. In addition, even though the Safety Department is a final signatory on capital project and vehicle certifications, FTA did not find any records showing the results of review made by the Safety Department on the certification packages for these vehicles beyond the signature for concurrence.

Due to staffing shortages, MBTA Safety Department personnel and other MBTA personnel are not always available to support safety engineering and safety certification reviews or system designs. Several MBTA personnel interviewed indicated that additional support from the Safety Department for these reviews, if it were available, would greatly support that implementation of the agency's safety certification program. Interviews also indicated that there is a shortage of Safety Department and other MBTA personnel to support project engineering, start-up, and testing activities. The lack of available personnel can also impact testing and acceptance schedules as well as the activities that can be performed.

For example, interviews with MBTA's Capital Transformation team revealed that Green Line D Branch track and signal contractor had consistently been denied access for several scheduled work outages due to a lack of MBTA personnel necessary to support access. This results in needless delays and can place pressure on the completion of safety critical tests and verification activities.

Interviews at all levels of the organization also revealed significant resource concerns with MBTA engineering and maintenance personnel needed to support safety engineering and safety certification for projects. MBTA personnel reported that Design-Bid-Build projects do not have Project Management contract support, and instead rely on availability of MBTA resources. Limited resources supporting the safety certification review for MBTA Capital Transformation have impacted schedule and oversight, and completed projects have extensive punch-list items that can take months to complete.

³³ MBTA provided safety certification CILs for these three projects, which included 38 items tracked for Green Line Train Protection System, 33 items for Green Line D Branch Track and Signal Replacement (listed as examples for information only), and 12 CILs for the Green Line / B Line Station Consolidation and Accessibility Improvements.

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FTA requires MBTA to expand resources devoted to safety engineering and safety certification.

Finding	Required Action
Finding 3: Additional resources are needed to support MBTA's safety engineering and safety certification process for capital projects.	MBTA must modify safety engineering and certification requirements for its capital projects and vehicle procurements and ensure they are addressed through additional E&M and Safety Department staffing, contractor resources, or a combination of approaches. This may be done as part of the workforce analysis in Finding 1, or as part of a separate initiative.

Finding 4. MBTA requires additional oversight of contractor work sites.

Situation

The MBTA conducts a range of capital projects to replace, upgrade and expand infrastructure elements on its rail transit system. Many of these projects include active worksites on MBTA property that are managed by contractors according to work, and safety plans approved by the MBTA. While on MBTA property, all persons are required to follow MBTA safety rules such as requirements for flagging and right-of-way personal protective equipment. Many of these contractor managed worksites are accessed by MBTA employees and vehicles as part of normal operations (e.g., the MBTA will continue to use yards that are under construction to house or repair out of service vehicles). Therefore, during the SMI, FTA reviewed several safety events that occurred at contractor worksites on MBTA property, including derailments of work vehicles, electrocutions, fire and smoke events, burns, and falls and found instances of noncompliance with MBTA safety rules. As a result of these reviews, FTA finds that additional supervision at MBTA's contractor work sites would be beneficial to ensure compliance with MBTA's safety requirements.

Finding	Recommended Action
Finding 4: MBTA requires additional oversight of contractor work sites.	FTA recommends that MBTA review the inspection and resident engineering resources needed to ensure compliance with MBTA safety rules related to the Right of Way to ensure the safety of personnel while in active work zones through additional staffing, contractor resources, or a combination of approaches.

Category 2: Prioritization of Safety Management Information

Focus

Category 2 addresses how the MBTA's SMS supports the management of safety concerns. FTA focused on the organizational structures, processes, and procedures in place to effectively support the collection, analysis, and movement of safety data and information to support the prioritization of resources to address safety risk. FTA included an assessment of MBTA's safety management capabilities as it relates to:

- Safety management governance structure,
- Safety management accountabilities, authorities, and responsibilities,
- Resources and staffing allocated to SMS processes, activities, and tools,
- Criteria for assessing and elevating safety risk and establishing and monitoring safety risk mitigations,
- Training of personnel to support their role and responsibilities within the SMS,
- Analysis and movement of safety data and information, and
- Systems and tools in place to support safety management activities and decision making.

Finding 5. MBTA has not ensured that the necessary structures are in place to support effective implementation and operation of its SMS.

Situation

MBTA's Agency Safety Plan specifies a multi-year implementation period for its SMS. This approach is documented in the MBTA's SMS Implementation Plan, a high-level document that describes how the MBTA will implement SMS across its system. MBTA employees and contractors are required to comply with policies and procedures as they are implemented during the SMS phases contained within this plan. The DPU approved the MBTA's Agency Safety Plan and monitors the SMS Implementation Plan.

To assess the status of SMS implementation, FTA reviewed MBTA's SMS implementation plan. FTA found that the SMS implementation plan lacks basic project management principles, including actionable details. MBTA did not provide any documentation reflecting the overall SMS implementation plan or detailed discrete tasks, timeframes, and responsibilities.

FTA found that the MBTA last updated its SMS Implementation Plan in late 2021. In the plan, the MBTA established roles and responsibilities for SMS implementation, including:

- "Accountable Executive – [who is] accountable for ensuring MBTA's SMS is effectively implemented throughout the MBTA's transit rail, bus, and paratransit services. The Accountable Executive is accountable for ensuring action is taken, as necessary, to address substandard performance in the agency's SMS."

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- “Chief Safety Officer/SMS Executive – [who is] an adequately trained individual who has responsibility for safety and reports directly to the Accountable Executive. The Chief Safety Officer is responsible for SMS implementation activities and approving each Exit SMS Phase Criteria – Checklist” (allowing the movement from one phase to the next).
- “SMS Steering Committee [within the Safety Management Executive Review Committee (SMRC)] ... responsible for setting the overall SMS implementation strategy and ensuring resources were allocated to support SMS implementation.”
- “SMS Transition Task Team - was responsible for implementing the Steering Committee’s strategy in the most effective means practical.”

After interviews and document reviews, including discussion regarding MBTA’s SMS training program, FTA concluded that, beyond the definition of the roles and responsibilities above, the MBTA has not established a safety management governance structure that includes:

- Clear descriptions of SMS accountabilities, authorities, and responsibilities for other positions within the MBTA organization, nor
- Explicit descriptions of the coordination required across positions with different accountabilities, authorities, and responsibilities to ensure effective SMS operation.

In interviews and field observations, FTA found that information provided in SMS training had not widely permeated the organization. Also, to assess the status of SMS implementation FTA requested, but did not obtain, minutes or records of action from meetings related to SMS implementation activities. During interviews, SMS implementation tasks were presented in general terms, with limited details related to timelines or responsibilities for tasks and outcomes.

FTA found that the lack of detail in the plan and missing meeting documentation makes it unlikely that MBTA executives and managers can determine the extent of SMS implementation and the integration of SMS processes and activities effectively into its operations. Effective implementation of an SMS requires adherence to defined actions, timeframes, responsibilities, and expected outcomes.

As a result, FTA observed gaps among MBTA leadership knowledge regarding SMS processes, activities, and their role within the SMS. FTA found that MBTA leadership, from executives through managers to supervisors, did not have a clear understanding of their role in SMS. During field activities when discussing SMS, MBTA officials’ answers were general and lacking in detail and examples. It was evident to FTA that neither MBTA staff nor contractors could readily articulate how MBTA’s SMS (and Agency Safety Plan) requirements related to their programs and activities.

MBTA’s leadership demonstrated a lack of familiarity with safety risk management principles. For example, when discussing available safety reporting channels in safety risk management most MBTA leaders interviewed by the FTA were aware only of the Employee Safety Hotline.

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Other avenues of obtaining safety information, such as Local Safety Committees, SRM workshops, data analysis groups specified in the Agency Safety Plan, hazard logs, and routine review of normal operations and maintenance were never identified. Significantly, many MBTA leaders indicated that it was solely the responsibility of the Safety Department to identify safety concerns.

FTA interpreted the lack of familiarity with safety risk management principles overall as a symptom of the ineffectiveness in MBTA's approach to engage key stakeholders with the agency's established safety risk assessment or safety risk mitigation activities.

FTA finds that the imbalance in the allocation of resources between operations and capital project oversight, discussed in Category 1 above, also negatively impacted MBTA's SMS implementation planning and plan execution.

For effective SMS implementation and operation, the Accountable Executive (MBTA's General Manager) must set specific expectations for SMS outcomes, as well as provide adequate resources for SMS implementation activities to ensure the integration of the management system into day-to-day operations. Importantly, the Accountable Executive must set expectations regarding how the SMS generates and prioritizes safety information, and the type of safety information executive leadership needs to support safety risk resource allocation decisions. This should be done in a similar fashion to how any other management system within MBTA supports pertinent risk allocation decisions. The Accountable Executive's direction and focus drive implementation of the SMS and, ultimately, its day-to-day operation.

FTA concluded that the structures necessary for effective SMS implementation and operation are not yet in place within MBTA.³⁴ FTA also did not observe field implementation of MBTA's SMS training program. Important gaps exist in the following areas:

- formality in SMS planning,
- detail in SMS implementation tasks, individuals responsible, timelines, and outcomes.
- ongoing status monitoring and reporting that would provide project management controls to support resourcing decisions,
- safety management governance structure that ensures MBTA executives are provided with prioritized and actionable safety information for safety risk resource allocation decision making,
- incorporation of safety management processes under SMS at the executive level in a manner commensurate with the management processes of the management systems of other business functions.
- centralization trending, assessment, and monitoring of hazards and safety risks, and
- relevant and appropriate training on key SMS processes for involved personnel.

³⁴ DPU's review of MBTA's Agency Safety Plan did not identify or document gaps along the lines of those discovered by FTA. See Category 5 for findings related to DPU.

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The above gaps impact the ability of MBTA to ensure:

- its SMS is implemented and integrated into agency-wide risk management processes and tools, and
- safety management information is timely and actionable to support prioritization of resource allocation decisions to address safety risk.

While recognizing that the implementation of SMS is a complex and multi-year progressive process, the evidence available to FTA indicates ineffective performance of the components of SMS already implemented.

Findings 5 through 9, below, highlight shortcomings in MBTA's organizational arrangements and executive direction that must be addressed for effective SMS implementation.

Finding	Required Action
Finding 5: MBTA has not ensured that the necessary structures are in place to support effective implementation and operation of its SMS.	<ol style="list-style-type: none">1. MBTA must conduct a critical and comprehensive review of its entire SMS planning, implementation, and operational processes and activities to address the gaps discussed in this finding.2. MBTA must update its SMS Implementation Plan to reflect the results of this review, including defined actions, timeframes, responsibilities, and expected outcomes.

Finding 6. MBTA executive leadership does not receive prioritized and actionable information related to safety risks or shortcomings in safety risk mitigations.

Situation

MBTA has established a structure of safety committees and meetings to facilitate safety information sharing. During interviews, MBTA's Deputy General Manager (DGM) and Chief Safety Officer (CSO) presented the timing and frequency of safety meetings (including formal safety committee meetings) as follows:

- Daily
 - 7:45am DGM Operations call starts with Safety Hotline calls/notifications, safety performance review, and incidents and worker injuries reports for the previous day
 - Safety Snapshot emailed to management

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- Three meetings per month with affected departments to discuss prior week's safety incidents, performance, and Hotline calls (4th meeting each month to discuss open CAPs)
- Bi-weekly meetings with Operations to discuss safety concerns and open items/CAPs
- Monthly
 - Management of affected Departments meet to review open CAPs/CAP compliance
 - Executive safety performance review with affected department managers, GM, and DGM
 - Safety Data Analysis Report (SDAR) review which includes safety trends
 - MBTA Board safety subcommittee reviews presentation of SDAR
 - Code 1 Committee meetings (fire and smoke events)
 - SRCP Committee meetings

MBTA's executive leadership engages in the daily review of reported safety concerns. FTA found that the daily DGM Operations call demonstrates a commitment from management to discuss frontline employee reported concerns. FTA acknowledges MBTA executive management's desire to acquire a general awareness of the information reported through the Safety Hotline.

FTA did not find evidence that, from a safety management perspective, these committees and meetings generate actionable safety information, in terms of the explicit identification of safety priorities, to effectively support the escalation of priorities to executive leadership. FTA finds that the difference between safety data (facts) and safety information (interpretation of the facts to support action) is not evident in MBTA's SMS processes. MBTA Leadership cannot effectively prioritize resources to address safety concerns without clear safety information.

FTA found that MBTA safety data analysis and subsequent reporting primarily focuses on outcome (lagging) data. SDAR are presented at various executive meetings, including the monthly report to the MBTA Board safety subcommittee. Committee members and managers receive raw data from small datasets that, while not unimportant, are limited in scope from a safety management perspective (i.e., reliability and performance data and lagging safety data).

The SDAR provides exclusively outcome data that needs additional levels of analysis to become truly actionable information (outcome data reflects symptoms as opposed to causes or sources of safety problems). This is historical safety data and leads only to generalized and limited action. For example, FTA observed during a Board subcommittee meeting on safety that if a safety target is missed ("in the red") for three consecutive months then the Safety Department must report on remedial actions being taken during the next meeting with the Board. However, this structure means that actions are proposed only after a four-month lag period.

FTA is concerned about the lack of prioritization applied to safety concerns. A tenet of an effective SMS is the presentation of safety information to senior management in such a manner

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that they can quickly and accurately make decisions related to the prioritization of resources to address safety risk. FTA acknowledged the candor from MBTA executives who confirmed that while they believe they are current with safety concerns they also believe that information is not prioritized by safety risk nor is it presented in a manner that is easily actionable (i.e., analyzed data presented in a manner that clearly depicts the actions and/or decisions needed from executive management).

FTA also finds that MBTA’s executive leadership has yet to provide explicit direction regarding the type of safety information it requires or the necessary organizational structures to support the movement of safety data (transformed into actionable safety information) from the field to the Board room. MBTA’s executive leadership has not established and communicated its priorities to guide the collection, analysis, and reporting of safety information. The result of this absence is that MBTA senior managers across the agency are left without priorities, or must establish their own, to guide analysis efforts.

FTA determined from interviews and document reviews that in the absence of direction MBTA leadership and managers receive raw, unanalyzed safety data as opposed to prioritized information to support strategic decisions related to safety resource allocation. This conclusion was confirmed during interviews with managers within multiple MBTA operating and maintenance departments. The consequence of this situation is that in MBTA’s safety management processes, raw data has become the currency of MBTA safety reporting and, by extension, MBTA’s safety risk decision making. Under this framework everything becomes a safety priority, overwhelming supervisors, managers, senior managers, and executive management, and resources are allocated to address symptoms rather than causes of safety concerns.

Finding	Required Action
Finding 6: MBTA executive leadership does not receive prioritized and actionable information related to safety risks or shortcomings in safety risk mitigations.	<p>MBTA leadership must:</p> <ol style="list-style-type: none"> 1. Work with safety and operating department leads (including maintenance and engineering departments) to define explicit criteria for prioritizing safety risks. 2. Include explicit safety risk acceptance criteria in its Agency Safety Plan and/or reference documents. 3. Work with MBTA's Safety Department and operating department leads (including maintenance and engineering departments) to define how safety

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Finding	Required Action
	<p>information must be presented to MBTA leadership in a prioritized and actionable manner.</p> <p>4. Require, and provide means for, operating department leads (including maintenance and engineering departments) to elevate proposed safety risk mitigations, including their status, that require MBTA leadership approval for resourcing. This must include safety risk mitigations deemed ineffective or inappropriate and that require executive level decision regarding the redirection of, or additional, resourcing.</p>

Finding 7. MBTA Executive Management does not consistently ensure its decisions related to safety risks are based on safety data analysis or documented facts.

Situation

Another impact of the gap identified in Finding 6 above is that in the absence of analyzed data, and therefore actionable information, decision makers must significantly lean on subject matter experts instead of safety information. During interviews and document reviews, FTA identified that MBTA primarily relies on corporate memory and management experience as the means to support decision making related to safety concerns and safety risk. FTA appreciates the role that both corporate memory and experience play during safety risk management and safety assurance activities; however, MBTA was unable to provide evidence of safety analyses to support decisions made to assess and/or mitigate safety risk.

FTA found that the failure of executive leadership to require the presentation of safety data analyses meant that MBTA was conducting safety risk assessments to support safety risk mitigation decisions in the absence of actionable information. This failure was demonstrated in the safety risk assessment of events involving rail car uncoupling in rail yards (including several runaway trains), vehicle derailments, and OCC dispatcher staffing challenges.

FTA observed that limited accountability is placed on operating groups and the Safety Department to provide executive management with information that factually substantiates safety risk assessments and the development of safety risk mitigation strategies or provide executive leadership actionable information for safety resource allocation decision making.

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MBTA's organizational safety currency does not yet include data compiled, analyzed, and prioritized into information.

In the absence of pertinent safety data at the operational level, and actionable information at the executive level, the MBTA lacks the necessary parameters to measure the effectiveness of its safety risk mitigations.

Finding	Required Action
Finding 7: MBTA Executive Management does not consistently ensure its decisions related to safety risks are based on safety data analysis or documented facts.	<ol style="list-style-type: none">1. MBTA must map its safety data flows and supporting processes.2. MBTA must establish explicit accountabilities and responsibilities for safety data flows as a component of safety information management (collection, analysis, communication, storage, and retrieval of safety data).3. MBTA must provide formal training in safety information management to relevant personnel.4. MBTA must demonstrate that its executive management uses and promotes the usage of safety data analysis and/or documented facts in decision-making related to safety risk.

Finding 8. MBTA's safety investigations and safety assurance activities do not consistently collect and analyze information on precursor factors.

Situation

As mentioned under Finding 5, MBTA's ability to utilize data from proactive safety management (such as monitoring safety performance and safety risk mitigation effectiveness or expanding safety investigations to collect accident precursor data) is primarily limited to its Safety Hotline and safety rules compliance checks. The Safety Department does conduct internal safety audits; however, the scope of the audits for 2021 were not aligned with known safety concerns and their safety risk mitigations.³⁵ There did not appear to be direction from MBTA executive or

³⁵ While MBTA performed Internal Audits in compliance with the DPU Program Standard, as documented in 220 CMR 151.05, in 2022, Section 220 CMR 151.05 does not preclude MBTA from including identified safety concerns that have resulted in accidents or organizational deficiencies in implementation of safety requirements.

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safety leadership to ensure the limited Safety Department resources for conducting safety assurance activities were prioritized to address high-profile safety. In addition, MBTA leadership has not provided explicit direction to its operating departments that supports ongoing safety data collection related to the effectiveness of safety risk mitigations. FTA understands that MBTA is in the process of developing its safety assurance activities and sees this finding as an opportunity for MBTA moving forward.

FTA also found that operating departments do not routinely collect data to monitor safety concerns. Based on interviews and records reviews, FTA found this to be primarily a symptom of the lack of sufficient resources for operations and maintenance needs and a lack of consistent processes for determining safety priorities. As a result, MBTA relies on information from safety accidents, incidents, and occurrences to identify weaknesses or shortcomings in safety risk mitigations instead of aligning its safety monitoring, auditing, and compliance activities with data-driven safety management priorities.

For example, as addressed in Special Directive 22-4, FTA observed that with respect to track maintenance, most of the work orders that were generated and closed focused on addressing red conditions (i.e., eliminating speed restrictions is the priority). FTA determined that MBTA does not have the resources to perform corrective maintenance for green and most yellow defects. Yellow conditions may be addressed as part of other projects or activities, but this is opportunistic and based on scheduled capital projects. FTA found that yellow defects can exist in combinations of conditions that collectively could result in red conditions (e.g., track component failures or derailments). Also, under certain circumstances, yellow and green conditions can rapidly deteriorate if left unaddressed.

FTA learned that the Maintenance of Way Department (MOW) tries to “piggyback” on capital projects to utilize the track time allocated to those projects to obtain access for its own maintenance activities. However, capital projects tend to emphasize rail replacement for easy and high-percentage on-time and on-budget delivery while MOW has several key locations that need renewal and/or replacement that do not fit these categories.

FTA observed that MBTA has invested heavily in the digitization of its records and is beginning to see the benefits of this transition away from paper records. Digitalization of records can support MBTA in the documentation and audit of inspections as well as with maintenance planning. MBTA has developed a series of codes to document defects by geographic location on the system through use of its MaxTrax application which allows for more precise defect tracking. This approach may allow MBTA to align its safety monitoring, auditing, and compliance activities with data-driven safety priorities.

FTA also reviewed over 100 safety event investigation reports completed by MBTA from 2019 through July 2022 and found that MBTA has greatly improved its investigation fact finding

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process. FTA observed improvement in the level of detail, analysis, and identification of probable cause and contributing factors included in the investigation reports.

While there have been improvements, FTA observed gaps that remain in the safety event data collection process and opportunities for additional data and fact finding beyond information provided by MBTA’s Safety Department during interviews and document submissions. During onsite SMI activities, MBTA experienced serious safety events including the loss of the tread break unit (TBU) from a new Orange Line vehicle, two uncoupling events in the yard leading to a runaway train, a train-to-train collision on the Green Line, and an unintentional coupling while in service, also on the Green Line.

Finding	Required Action
<p>Finding 8: MBTA’s safety investigations and safety assurance activities do not consistently collect and analyze information on precursor factors.</p>	<ol style="list-style-type: none"> 1. MBTA must update its Safety Assurance process to include monitoring of safety risk mitigations with a) compliance-based activities to provide the baseline for monitoring implementation status and b) performance-based activities to monitor the actual effectiveness of safety risk mitigations. 2. MBTA must prepare a monthly look-ahead schedule for prioritized safety risk monitoring activities that include safety risk mitigations and corrective actions in place to address MBTA's highest safety priorities. 3. MBTA must develop and document guidance, and deliver training for safety investigators that ensure the consideration of precursor factors in the analysis of the chain of events leading to a safety event (accident, incident, or occurrence), including but not limited to, for example: <ul style="list-style-type: none"> • Suitability of resources available to frontline personnel for operational and maintenance activities

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Finding	Required Action
	<ul style="list-style-type: none"> • Deficiencies in policies, procedures, rulebooks • Outdated policies, procedures, and rulebooks • Deficiencies/inadequacies in training Shortcomings in supervision • Deviations from procedures and rules Reasons for lack of adherence to procedure and rules • The limited success of discipline to address safety issues

Finding 9. MBTA’s safety risk assessment guidance as part of its Safety Risk Management is ambiguous and has led to confusion among stakeholders regarding their responsibilities and authorities, which has created delays in carrying out safety risk assessments activities.

Situation

FTA reviewed MBTA documentation related to safety risk assessments. This included MBTA’s “Agency Safety Plan,” “SRM [safety risk management] SOP,” the completed safety risk assessment “SRM -13: Motorperson Situational Awareness,” and MBTA’s “Safety Assessment Decision Tool.” In addition, FTA reviewed MBTA’s various hazard logs and held discussions with MBTA officials involved in, or responsible for an element of, safety risk assessments.

FTA noted that MBTA has begun and completed at least two formal safety risk assessment workshops³⁶ and MBTA’s Chief Safety Officer indicated that more workshops are being scheduled. The formal safety risk assessment workshops follow an extensive process, laid out in the “SRM SOP.” However, because of the absence of a formal process to establish safety risk priorities, there are no criteria for determining the topic of a safety risk assessment workshop. FTA did not receive a list of safety risk assessment workshop topics or priorities, or a schedule for upcoming workshops from the Chief Safety Officer. Though the Safety Department does maintain a list of planned safety risk assessment workshops, key MBTA executives could not confirm the existence of a schedule for safety risk assessments. Given the high-profile safety events and concerns raised by FTA in its Special Directives issued in June 2022, FTA anticipated

³⁶ MBTA officials indicated that four others had been conducted, however, FTA has still yet to receive related documentation as requested.

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that MBTA would have considered the allocation of safety management resources for safety risk assessments as a priority.

At the strategic level, safety risk assessments must be a direct and immediate response to the identification of hazards and hazard identification is an on-going activity that does not necessarily follow a prescribed pattern. Therefore, a schedule of safety risk assessment workshops is counterintuitive to the situational nature of hazard identification and is inconsistent with the basic principles of safety management.

FTA observed confusion amongst MBTA officials related to the purpose, how, and when safety risk assessments should be conducted as well as regarding responsibilities for conducting safety risk assessments. For example, during interviews FTA learned that:

- There remains confusion regarding the scope of safety risk management, as indicated by a perceived conflict in the allocation of resources to either capital improvements or to “safety” rather than the integrated allocation of resources towards safety risk mitigations that would be jointly owned and managed by operating groups.
- There is a perception that safety risk assessment is exclusively within the purview of the Safety Department. On multiple occasions, interviewees indicated that the Safety Department conducts the safety risk assessments. However, in conversations with Safety Department officials, FTA learned that operating departments are responsible for performing safety risk assessments (as would be anticipated).
- Hazards are typically identified, and mitigations or corrective actions are applied, without safety risk assessments.
- Safety risk assessments (not including contracted activities within capital projects) at MBTA are primarily based on expert opinion and corporate memory as opposed to data.

Though MBTA uses the safety risk assessment workshops as a formal means for assessing risk, safety risk assessment can also be done informally. An example of the informal nature of assessing safety risk is illustrated by MBTA’s response to FTA’s Special Directive 22-6 (OCC). FTA required MBTA to assess required staffing changes related to dispatchers and hours of service. MBTA took immediate action to address OCC dispatcher, supervisor, and manager work schedules. Although FTA understands that MBTA had very little time to make its adjustments in OCC staffing to address the critical nature of the Special Directive, FTA did not receive a formal safety risk assessment from MBTA to explain the proposed staffing changes. FTA would have expected to see a safety risk assessment detailing the parameters for the assessment of safety risk related to staffing decisions and ultimate increase in service headways, and the parameters to monitor the appropriateness of the safety risk assessment and the efficacy of the staffing changes proposed.

According to MBTA’s Agency Safety Plan, Section 6.3.1.1 of MBTA Configuration Management and Control Program requires that, “MBTA develop a process to evaluate and approve proposed changes, as well as document and analyze the efficacy of implemented changes to

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the public transportation system and/or safety critical elements of the Authority’s system, including operations, processes, administrative policies and procedures, rules, infrastructure, vehicles, and training.” However, in response to Special Directive 22-6, MBTA submitted documentation depicting analysis that incorporated “the experience and knowledge of the OCC management team when they worked as dispatchers, supervisors, and/or trainers. They...crafted this process with institutional understanding, rules, guidelines, and procedures to perform an informal SRM.” It must be clarified that under existing FTA guidance, “informal SRM” does not exist. MBTA’s submittal went on to state that the revised staffing plan was “formally drawn up and reviewed initially with [MBTA’s] Chief Safety Officer who offered advice about staffing levels and hours of service.”

FTA believes that MBTA will benefit from defining explicit direction related to identifying criteria for conducting safety risk assessments that is consistent with the basic principles and tenets of SMS. MBTA must also define explicitly related accountabilities, roles and responsibilities, outcomes, and deliverables for safety risk assessments. MBTA may also benefit from investigating whether a designated safety risk committee, with accompanying rules, policies, and procedures, could help formalize its current process.

Finding	Required Action
<p>Finding 9: MBTA’s safety risk assessment guidance as part of its Safety Risk Management is ambiguous and has led to confusion among stakeholders regarding their responsibilities and authorities, which has created delays in carrying out safety risk assessments activities.</p>	<ol style="list-style-type: none"> 1. MBTA must develop and document criteria for conducting safety risk assessments consistent with the basic principles of safety management and the tenets of SMS as conveyed in FTA’s SMS guidance materials. 2. MBTA must develop explicit direction for the ownership of safety risk assessments among the Safety Department and the operating departments. Documentation must include providing explicit roles, responsibilities, and thresholds of authority of each department involved. 3. MBTA must include in the above criteria directives to ensure that operating departments including subject matter expertise, own safety risk assessments, while safety officials provide support for safety risk assessments and reports on results to Executive Leadership for safety resource allocation priorities.

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Finding	Required Action
	<p>4. MBTA must expand its policy of establishing a pre-defined schedule of safety risk assessment workshops and develop criteria attuned with the nature of hazard identification (I.e., as they are identified), to expedite safety risk assessments to support prioritization for resource allocation.</p>

Finding 10. MBTA safety information management tools (hazard log, safety risk mitigation log, etc.) do not fully support prioritization of resources to address safety risk and safety performance monitoring.

Situation

MBTA leadership committed substantial resources to digitize operations and maintenance data from hard copy materials. FTA observed the improvements in operations and maintenance data tools that provide MBTA officials the opportunity for efficiencies in management, analysis, and monitoring activities. MBTA officials indicated that they are waiting for the implementation of CIVIX’s enterprise agency software platform, which includes a Transit Safety & Operations Compliance System (TSOCS) solution. MBTA’s Safety Department indicated that, unlike their current system, the TSOCS will help integrate safety data (such as hazards, occurrences in operations, and leading indicators) to support a proactive approach to safety data management. MBTA officials explained that the TSOCS will allow the Safety Department to access regular and actionable maintenance data that may support identification and analysis related to data such as preventative maintenance records and status and asset management condition data. In addition, MBTA officials indicated that the TSOCS will allow for compilation, analysis, assessment, and reporting of safety risk.

FTA found that the Safety Department has limited direct access to operations and maintenance data and primarily relies on the receipt of Microsoft Excel workbooks. The lack of integration between data sets results in substantial manual entry of data such as CAP implementation and status, accident investigation activity and document tracking, and analysis and trending. During interviews, MBTA officials indicated that there is a lack of interaction between operations and safety departments to discuss strategies and tactics for improving data accessibility.

Currently, the Safety Department maintains different logs designed to support hazard identification, employee safety reporting, safety risk assignment, and safety risk mitigation monitoring. FTA found that occasionally the logs contain information related to the same hazardous condition meaning that the Safety Department is manually entering singular data

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points into multiple sheets. FTA also found instances where the likelihood and severity ratings, as well as the safety risk indexing, did not correspond to MBTA’s safety risk assessment Agency Safety Plan requirements. This could be due to the duplicate manual entry of similar data or a lack of sufficient internal training on the safety risk assessment process.

The department recently stood up a spreadsheet for tracking safety risk mitigations and a web database tool, “Knack.” This tool allows for very quick creation of new forms and simple databases to support activities such as safety rules compliance checks and general observations and anyone in the Safety Department can access Knack from their computer or phone.

As previously discussed, MBTA currently lacks an integrated plan that defines outcomes for safety management activities and that includes utilization of safety data-related tools. The lack of necessary leadership direction and data integration negatively impacts the Safety Department’s ability to analyze, prioritize, and report on safety data in a timely manner. The current suite of tools requires a level of manual entry and data manipulation beyond Safety Department resource capacity.

MBTA would benefit from developing business requirements for CIVIX and other safety data tools to ensure that safety data information needs, and workflows are integrated into the implementation of its safety information management systems.

Finding	Required Action
Finding 10: MBTA safety information management tools (hazard log, safety risk mitigation log, etc.) do not fully support prioritization of resources to address safety risk and safety performance monitoring.	<ol style="list-style-type: none">1. MBTA must evaluate (and correct) the data contained in its hazard log and safety risk mitigation log for accuracy and relevancy to SMS.2. MBTA must expedite the build out of its safety risk and safety risk mitigation monitoring information tools.3. MBTA must demonstrate use of its safety information management tools to effectively prioritize its resources to address the results of:<ul style="list-style-type: none">• Safety Risk Monitoring• Safety Performance Monitoring

Category 3: Effectiveness of Safety Communication

Focus

FTA focused on the organizational structures, processes, and procedures in place to support effective communication of safety information throughout the organization including safety committees, the employee safety reporting program, labor unions, and the MBTA Board.

Finding 11. MBTA has not established explicit and formal provisions to ensure safety information from safety committees results in a consistent outcome of documented, prioritized, and actionable safety information.

Situation

As mentioned in Findings 5 and 6, MBTA has an elaborate structure of safety committees and groups to facilitate safety information sharing discussion of safety topics, including:

- Executive Safety Committee (ESC)
 - Deliberates on the recommendations and requests for approval from the Safety Management Review Committee (SMRC)
- Safety Management Review Committee
 - May direct the formation of committees and/or working groups to evaluate safety-related matters and report back to the SMRC.
- Safety Management Working Groups (SMWG)
 - Meets to discuss cross-departmental safety issues and to review findings, recommendations, and trends escalated from mode- and department-specific Data Analysis Groups (DAGs).
- Data Analysis Groups
 - Meetings are scheduled and facilitated by a Deputy Director within the Safety Department
 - Meet to review safety performance indicators and trends that are aggregated by data analysts and that may be elevated from the Local Safety Committee
- Local Safety Committees (discussed under Finding 12)

During interviews, FTA was able to confirm MBTAs commitment that committee and group meetings are convened as scheduled. FTA obtained detailed anecdotal information of the items discussed during the meetings and learned that the safety committee and group meetings are a primary venue for safety-related decisions.

Through interviews and records reviews, FTA also learned that safety information from these meetings (that may include presentations, safety data, and analysis) is not formally captured within MBTA, either by the Safety Department or by other function. FTA found this to be a fundamental flaw in the outcome of the meetings. MBTA could not provide meeting minutes or

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other documentation regarding safety issues raised and discussed or records of safety decisions to demonstrate a formal process for managing the outcomes of these discussions. MBTA explained this gap by indicating that this formal process is still “work in progress” and that there is not a consistent format or platform for capturing and communicating the information. Based on this, FTA found that the communication regarding the outcomes of the discussions of the meetings is informal at best.

Given FTA’s findings related to shortcomings in safety data prioritization and presentation (findings 7 and 10), FTA finds that the absence of outcome documentation from the meetings can lead to:

- subsequent actions that are left to interpretation and individual departmental prioritization,
- absence of clearly assigned departmental responsibilities regarding implementation and monitoring of actions, and
- undefined timeframes for actions.

Finding	Required Action
<p>Finding 11: MBTA has not established explicit and formal provisions to ensure safety information from safety committee results in a consistent outcome of documented, prioritized, and actionable safety information.</p>	<p>1. MBTA must develop and describe, in the organization's SMS documentation, instructions regarding the conduct, recording, communication and follow up of the outcome consensus decisions specific for each of the following meetings - taking into consideration the nature (strategic or tactical) of each meeting:</p> <ul style="list-style-type: none"> • Operations and Safety Biweekly call (currently every other Friday) • Operations and Safety weekly meeting (currently on Wednesdays) • Executive Safety Committee (ESC) • Safety Management Review Committee (SMRC) • Safety Management Working Groups (SMWGs) • Data Analysis Group (DAG) • Local Safety Committee Meetings • Joint Labor/Management Safety Committee (required by Bipartisan Infrastructure Law)

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Finding	Required Action
	2. In support of the above, MBTA must develop and describe, in the organization's SMS documentation, a formal mechanism and associated guidelines to ensure that the meetings are consistent in the identification and analyses of safety concerns and hazards; prioritization of safety risks; implementation of corrective actions; and safety risk mitigation effectiveness monitoring.

Finding 12. MBTA has not documented explicit and formal provisions to ensure the participation of frontline employees in local safety committees as part of their job responsibilities in relation to the agency's SMS.

Situation

MBTA has established local safety committees, which are smaller workforce groups based on work location, as a primary forum to receive safety information from frontline personnel. These forums provide an avenue for workers to share, and the agency to obtain, information on the safety performance of the agency in the field. During interviews and records review, FTA learned that:

- a representative of the Safety Department attends the meetings,
- local safety committee meetings often do not have frontline representation (FTA confirmed this with Safety Department officials and Local 589 union members and union leadership),
- staffing shortages prevent frontline employee participation because they are scheduled for work during meetings,
- there is no demonstrated accountability of the Safety Department representative to document or report out the information discussed during the meetings,
- there are challenges in ensuring issues are captured because of a lack of departmental accountability, and
- frontline personnel provide information to supervisors who serve as their proxies, but there is no requirement for employee safety concerns to be documented or acted upon by supervisors.

Finding	Required Action
Finding 12: MBTA has not documented explicit and formal provisions to ensure the	1. MBTA must develop explicit and formal guidelines for the expected role and

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Finding	Required Action
<p>participation of frontline employees in local safety committees as part of their job responsibilities in relation to the agency's SMS.</p>	<p>contribution of frontline employees to the local safety committee meetings.</p> <p>2. MBTA must develop instructions for the conduct of the meetings, including explicit departmental accountabilities for meeting outcome information capture, communication and follow up.</p>

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Finding 13. MBTA management has not effectively communicated clear direction to frontline employees on what to report and what not to report through the Safety Hotline.

Situation

In 2019, MBTA established its Employee Safety Reporting Program (ESRP). MBTA's Agency Safety Plan states that "MBTA's voluntary, confidential, non-punitive³⁷ employee reporting program allows for the submission of information related to observed hazards, sole-source safety events, or inadvertent errors without an associated legal or administrative requirement to report. Reported information should be used solely to support the enhancement of safety" and "Voluntary reporting is non-punitive because it affords protection to reporters, thereby ensuring the continued availability of such information to support continuous improvements in safety performance."

MBTA established the following methods for employees to report safety concerns:

- Safety Hotline: (617) 222-SAFE (7233).
- Safety Notification email: SafetyNotification@mbta.com.
- Direct reporting to an MBTA Safety official.
- Form B "Notification to MBTA Safety;" forward to MBTA Safety office or fax form to: (617) 222-5127.

During interviews with MBTA officials, FTA learned:

- The Safety Hotline is the most frequent source of information for MBTA on daily safety concerns observed or experienced by frontline personnel.
- MBTA's Safety Department (primarily management) considers the Safety Hotline as a reliable source of safety information.
- De-identified employee Safety Hotline reports from the previous day are shared during the 7:45am daily Deputy General Manager Operations call.
- In 2019, when the ESRP was first established, the MBTA received 2-3 employee reports per month. At the time of FTA's SMI, MBTA averaged 20-25 employee Safety Hotline reports per month.
- Most reports received through the Safety Hotline during 2020 were related to COVID-19 protocols and concerns over face mask requirements put in place to address the COVID-19 pandemic.
- A safety analyst is assigned to the ESRP full-time, fields calls (typically voicemail messages) and emails and enters reports into an ESRP log. The safety analyst follows up

³⁷ Except in cases where the reports indicate the likelihood of criminal activity, substance abuse, suspected use of prohibited substances, falsification of employee report, or willful disregard for safety.

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with employees (if the employee provided identifying information) and directs de-identified reports to appropriate departments/individuals for follow-up.

- MBTA's Safety Department works actively to encourage employees to report, protect employee confidentiality (through de-identification), and maintain employee anonymity in all interactions with other MBTA departments

FTA observed, and MBTA officials agreed, that the MBTA's ESRP is in actual practice largely limited to the Safety Hotline. FTA analyzed the Safety Hotline log and noted that many of the reports are anonymous which may indicate a weakness in the program as MBTA is unable to follow up with workers on reported concerns. The 20 to 25 Safety Hotline reports per month for an organization of the size of MBTA may indicate a reluctance or skepticism in the safety reporting environment.

Frontline employees have the option to report safety concerns verbally to supervisors who must then elevate the report to the Safety Department. However, there is no established procedure nor controls that ensure that all reports verbally submitted to supervisors are elevated through the system. FTA finds that this creates the probability for loss of potentially valuable safety information and results in under-reporting. One Safety Department official anecdotally indicated that holding small meetings in the field with frontline employees (e.g., during breaks, etc.) yields more detailed information related to safety than is received through the Safety Hotline. While these small meetings may serve as a supplemental form of safety reporting, it raises questions regarding the status of MBTA's ESRP. The same official indicated a belief that the Safety Department management overvalues the information that the Safety Hotline yields.

FTA reviewed the Safety Hotline log and found that only a small percentage of reports are about safety concerns and most reports do not rise above the level of individual location "housekeeping" issues or complaints. MBTA indicated that it has conducted ESRP training and consistently promotes the program; however, FTA did not see evidence (neither during discussions with employees nor through a review of the Safety Hotline log) that frontline employees have clarity or instruction on what to report and, most importantly, what not to report through the safety hotline. This potentially generates a situation of "noise versus signal" in the Safety Hotline log, in which the log contains many reports, but those reports contain scarce actionable safety information. The large number of reports (the "noise") make it difficult to isolate actionable safety information (the "signal").

FTA finds that an over-reliance on the Safety Hotline, the likelihood of safety information not rising beyond supervisory ranks, and the lack of actionable safety information are an outcome of safety reporting concerns. FTA finds that relying on the Safety Hotline as it is currently used at MBTA is not sufficient to provide the benefits that an effective and efficient ESRP may bring to the safety management processes of an agency.

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Finding	Required Action
Finding 13: MBTA management has not effectively communicated clear direction to frontline employees on what to report and what not to report through the Safety Hotline.	<ol style="list-style-type: none"> 1. MBTA must expedite the development of an effective ESRP as a fundamental source of safety information for hazard identification and safety performance monitoring. 2. As part of the development of an effective ESRP, MBTA must provide explicit direction to frontline employees on what to report and what not to report through the ESRP (including the safety hotline). 3. As part of the development of an effective ESRP, MBTA must provide refresher training to stakeholder personnel on the role of employee safety reporting within SMS and the crucial contribution managers and supervisors play in the development of an effective safety reporting context.

Category 4: Operating conditions and policies, procedures, and training:

Focus

FTA reviewed MBTA’s implementation of required safety, operations, maintenance, and capital project delivery rules and procedures. FTA also reviewed how the MBTA assesses its own compliance with its procedures and how the agency determines when operating and maintenance practices are no longer working or need to be revised to reflect new conditions, new technology, or different approaches for completing work. FTA’s SMI also assessed the extent to which training supports MBTA employees in understanding rules and carrying out work safety and “as written” in MBTA procedures. Finally, FTA examined the extent to which MBTA has devoted resources to training and professional development of MBTA’s workforce.

Finding 14. Documented operating and maintenance rules and procedures are not implemented as required.

Situation

Throughout the SMI, FTA observed instances where employees were not complying with required safety, operations, and maintenance rules and procedures. Many of these instances of non-compliance are noted in FTA’s Special Directives 22-4, 22-5, 22-6, and 22-7. For example,

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FTA noted violations in right of way safety rules and vehicle operating rules, preventive maintenance inspections that were not completed as required, inappropriate storage of chemicals in rail yards, an unlocked signal on the right of way, incomplete repairs, and rule violations in readying trains for moves in the rail yard. FTA also observed a rail transit vehicle speeding through a work zone.

In addition, FTA reviewed over 100 final investigation reports completed for major safety events experienced at the MBTA between January 1, 2019, and April 29, 2022. In over 85 percent of these reports MBTA identified non-compliance with at least one safety, operating, or maintenance rule as a primary or contributing cause of the accident. Review of these reports also reveals the frequent use of unvetted and ad hoc shortcuts in work practices, outdated procedures that have not kept paces with changes in work environments, violations of safety rules to meet deadlines or vehicle counts, and lack of time and resources to review and update rules and procedures to align them with system changes. Finally, FTA found that MBTA does not use many tools, including checklists, to support implementation of key operating and maintenance procedures in the Operations Control Center (OCC) and rail yards.

MBTA's current activities to monitor compliance with operating and maintenance rules include requirements that supervisors monitor daily job duties for operations and maintenance employees, though most departments do not require formal documentation of this monitoring activity. FTA found that supervisors have a range of responsibilities at the MBTA and do not always have time to complete this monitoring or to follow-up with employees regarding their performance. In interviews across operations and maintenance departments, MBTA staff and supervisors indicated that due to a lack of supervisory personnel and officials, it was challenging to provide frontline personnel, particularly new MBTA hires, with additional support and oversight that they may need to understand and comply with all rules, given the complexity of MBTA's operating environment.

MBTA conducts a Safety Rules Compliance Program or SRCP, as discussed in several other findings. Training instructors monitor how MBTA employees carry out work and MBTA hires contractors to support independent quality assurance/quality control for specific activities, including rail vehicle maintenance and condition assessments for safety critical infrastructure.

Nevertheless, FTA finds that more can be done to identify safety-critical rules and procedures, to support MBTA personnel in understanding these requirements and how to comply with them, and to monitor the overall performance of the agency in complying with these procedures. FTA finds a lack of consistency in how compliance with operating and maintenance rules is monitored across departments.

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Finding	Required Action
<p>Finding 14: Documented operating and maintenance rules and procedures are not implemented as required.</p>	<ol style="list-style-type: none"> 1. Each operating and maintenance department must establish a group to review department-wide information on levels of non-compliance with key rules and procedures critical to the safety of activities performed by the department. 2. Each department must establish and act on a prioritized list of most frequently violated rules and procedures with the most significant potential safety consequences. 3. Each department must develop and implement approaches, which could include audits, use of checklists and guides, campaigns, and training, to improve compliance. 4. Each department must report to the Safety Department monthly on its compliance with identified key rules and procedures critical to the safety of activities performed by the department. 5. The Safety Department must review and audit these reports and compile a monthly compliance report for MBTA’s executive leadership team. 6. Each department must continue to review safety data to assess effectiveness of actions and to improve compliance with safety rules and procedures.

Finding 15. MBTA does not monitor operations, including the conditions of the operating environment, to identify the reasons for deviations between formal, established standards, rules and procedures, and actual operations and maintenance practices.

Situation

The primary source of MBTA's internal oversight of its operations is the Safety Rules Compliance Program. As with any compliance program, MBTA's program aims to detect and eliminate deviations from rules, standard operating procedures, and so forth. This is aligned with the historical view of safety compliance programs, which hold that strictly following established rules and procedures guarantees safety and that non-compliances are *per se* causes of accidents.

Recent history, however, indicates that generally when an agency investigates safety events from an organizational perspective it finds many instances of non-compliance due to "traditional" causes (lack of discipline, knowledge, or skills, etc.) as well as other reasons for non-compliance linked to organizational challenges or deficiencies such as:

- lack-of or inappropriate resources to do the job,
- rules that have become obsolete,
- procedures that have become difficult, if not impossible, to execute in real time or due to changes in the operating conditions, and
- similar reasons associated with the organization and not with individuals.

FTA found there are reasons beyond one-off non-compliance for employee deviations from policies and procedures. For example, FTA observed that MBTA's Right of Way (ROW) Safety Rule Book has not been updated since 2014. However, in a dynamic and constantly changing environment such as with public transportation operations and maintenance activities, it is likely that safety conditions in the ROW have changed. Therefore, deviations from the ROW Safety Rule Book should be expected. FTA found numerous procedures and rulebooks that were out of date during its document review and interviews with frontline employees and managers.

In the absence of updated rules, rulebooks, procedures, or resources frontline personnel devise informal practices to get the job done. However, because these informal practices are workarounds of existing formal rules and procedures, these practices have not been verified as "safe" under the lens of strict compliance. In such situations, tolerance for shortcuts, optimizations, and even violation of safety rules may become the norm given service pressure, aging infrastructure, and outdated procedures. Therefore, actions by managers and supervisors to eliminate deviations from procedures (i.e., non-compliances) through discipline may seem inconsistent with previous passive approval.

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For this reason, an SMS framework oversight of operations starts with observing compliance as the baseline and extends to monitoring performance to understand the actual reasons for deviations from the baseline.

FTA, during interviews and document review, found that MBTA's oversight of its operations rarely extends beyond monitoring compliance. FTA observed limitations in MBTA's Safety Rules Compliance Program, in terms of providing actionable information to address safety risk.

Specifically, FTA found that:

- The focus on enforcement and ensuring procedures are being followed/complied with identifies very few instances of violation or non-conformance (for example, less than 10 incidents out of over 20,000 annual observations). This cannot be considered as an effective "return on investment" in terms of identifying safety risk and suggests a probable misallocation of resources.
- Most observations of operations are limited in scope and focus on single items (door operations, berthing in stations, announcements, etc.). This approach to observation of procedures - piecemeal and without context - yields negligible information with value for safety risk management.
- MBTA audits are randomly conducted and are also often focused on a single item.
- MBTA adjusts its scheduled compliance checks based on feedback from multiple, but not prioritized, sources including observations from supervisors (which may be opinions) and incidents (reaction to the latest problem). This suggests a probable misallocation of resources towards safety concerns that may be of relatively smaller significance when compared to a dataset containing precursor information and based on safety risk prioritization efforts.
- MBTA monthly reviews the total number of compliance checks, the types of checks, and violations observed. MBTA did not demonstrate any use of the conclusions that these reviews generate, or their relevance for safety risk management.
- The checklist for in-service ride evaluations consists of 44 items, which summarize operator rules collated into 5 categories: ROW, Service Stops, Observance of General Rules, Road Operation, and Intersection Operation. FTA was advised that all 44 items did not necessarily need to be reviewed in a ride evaluation, and that there is discretion regarding which rules are reviewed. FTA finds that MBTA must evaluate whether observers should have discretion or if it should provide explicit parameters for choosing or discarding items to be evaluated.

Finding	Required Action
Finding 15: MBTA does not monitor operations, including the conditions of the operating environment, to identify the reasons for deviations between formal, established standards, rules and procedures,	MBTA must develop, document, and communicate a mechanism to monitor operations, and provide training to stakeholder safety and operating personnel on this mechanism, to enable the analysis

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Finding	Required Action
and actual operations and maintenance practices.	and understanding of situations of non-compliance.

Finding 16. MBTA's QA/QC program is not sufficiently independent from the activities it oversees.

Situation

The MBTA uses a QA/QC program to support maintenance and engineering activities. The MBTA states in its Preventive Maintenance Inspection (PMI) and Documentation Policy that it employs three separate quality verification processes:

- The Inspection Foreman randomly selects inspection tasks at the completion of the rail car inspection to verify the activity complied with the inspection procedure.
- A Superintendent Quality Control Audit occurs once per quarter and requires a team approach (i.e., a foreperson, a repair person, and an executive (or their designee)).
- The Quality Department performs quality control audits monthly. These audits are also conducted using a team approach like that of the Superintendent Audit (i.e., comprising a foreperson, a repair person, a Superintendent (or designee) and a member of the Quality Department).

While not discussed in the PMI and Documentation Policy, monthly reports for Preventive Maintenance Inspection audits from the MBTA's General Engineering Consultant (GEC) contractor were provided to FTA. These inspections provide findings, but the inspections are limited to one vehicle per month from each of the four lines. FTA noted that the tracking log provided with these monthly inspection reports did not include any re-inspection dates or activities to address the findings.

FTA could not verify that the various levels of inspection verification audits include a documented QA/QC procedure or manual to guide the activities or explain how nonconformance findings are logged, tracked, and resolved. The current process for quality control auditing, selecting random vehicles or activities on an infrequent basis, lacks a daily ongoing assessment of the rail vehicles that would assure that rail vehicles with safety critical nonconformances stay out of revenue service. This process for quality control auditing is almost entirely performed by personnel reporting to rail vehicle maintenance management, thus lacking the independence necessary for an effective QA/QC program.

MBTA delegates the rail car acquisition program QA/QC to the rail car manufacturer and the MBTA's program management consultant. A QA/QC Plan for MBTA's oversight of these processes was not provided to FTA (QA/QC manuals from the rail car manufacturer and contractor were provided). Not unlike the preventive maintenance policy, the rail car

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acquisition process lacks an MBTA-specific documented QA/QC program with procedures and roles and responsibilities for an independent internal group to report directly to the highest levels of MBTA management.

MBTA primarily delegates its quality management program to contractors and frontline supervisors that only verify adherence to maintenance procedures on a random basis. MBTA would benefit from QA/QC program administration by independent entities that report directly to MBTA's upper management (such as the Safety Department function) because operating and engineering departments have competing priorities that may conflict with effective QA/QC oversight.

Finding	Required Action
Finding 16: MBTA's QA/QC program is not sufficiently independent from the activities it oversees.	<ol style="list-style-type: none"> 1. MBTA must develop and administer a QA/QC program to independently oversee of ongoing QA/QC activities. 2. MBTA must ensure that the QA/QC functions are independent of the functions of the Safety department and report directly to the GM. 3. MBTA must develop a formal QA/QC procedure that details the oversight of and accountability and roles and responsibilities for QA/QC programs provided by railcar manufacturers and MBTA consultants related to quality control of its railcars and subcomponents. 4. MBTA must ensure that the MBTA QA/QC independent group is staffed with a sufficient SMEs in necessary disciplines to ensure a complete and thorough understanding of the responsibilities under the purview of railcar maintenance and engineering.

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Finding 17. Technical training for operations and maintenance departments is under-resourced and decentralized, without sufficient resources and direction, and relies significantly on on-the-job-training (OJT) which is informal and lacks oversight. Emergency response training is poorly integrated into overall training program.

Situation

Technical training for maintenance personnel is embedded within each technical department (vehicle engineering, maintenance of way, signal and train control, communications, facilities, traction power, etc.). MBTA's OCC and Training Department trains all operations personnel and provides right of way (ROW) safety training. MBTA's Human Resources and Labor Relations Department also provide or support other administrative training and orientation for new employees. Finally, MBTA's Safety Department provides certain environmental, occupational safety, and general safety training.

FTA generally found that while strong technical courses have been developed in many areas, there are insufficient resources available to provide enough offerings to adequately train and refresh personnel. Operations personnel face significant challenges in establishing professional service standards, utilizing different adult learning strategies, and taking advantage of technology to bring the field into the classroom. As a result, there is a great reliance on informal, on-the-job training which is not standardized or overseen.

The MBTA also faces challenges in managing training data. While the agency can pull information that tracks the status of the training of its employees, this data must be pulled from various management systems including Cornerstone, PeopleSoft, spreadsheets, and paper documents. To keep on top of data management the MBTA's OCC and Training Department commits a full-time trainer to review and update scheduling, individual record status, and documentation. This is a labor-intensive process that if made more efficient could free up the use of the trainer presently assigned to this work.

As discussed in Category 1, the lack of personnel resources, including instructors, restricts the MBTA's ability to onboard new personnel. At the time of the SMI MBTA's Training Department proposed staffing levels did not address the need to train the new hires budgeted for fiscal year 2023. FTA found that given the importance of training to MBTA's personnel issues, MBTA should consider additional support for the Training Department to keep up with regular training requirements, conduct more frequent enforcement operational reviews, provide mentoring services to motorpersons, dedicate trainers who focus on accident prevention training, find a data management technical and/or personnel solution that does not divert a full-time trainer from the Training Department's daily operations, and keep up with other unscheduled eventualities such as emergencies, accidents, and other unforeseen issues that divert the attention of training staff from their regular duties.

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Based on interviews, records reviews, and field observations conducted across several technical disciplines, FTA found that MBTA has no agency-wide strategy for technical training to ensure the proficiency of MBTA personnel and that many gaps in training exist for operations and maintenance departments. FTA found that training is under-resourced and fractured and that MBTA relies heavily on on-the-job training.

Finally, FTA’s SMI found outdated emergency procedures and training. Review of over 100 safety event investigation reports dating back to January 1, 2019, indicates inconsistencies in emergency response and the way that the agency is managing emergencies.

Finding	Required Action
Finding 17: Technical training for operations and maintenance departments is under-resourced and decentralized, without sufficient resources and direction, and relies significantly on on-the-job-training (OJT) which is informal and lacks oversight. Emergency response training is poorly integrated into overall training program.	<ol style="list-style-type: none">1. MBTA must conduct a training needs assessment for rail transit operations and maintenance departments, to include emergency response training. This assessment should identify training that needs to be updated, developed, and supported with additional resources.2. MBTA must implement the results of the training needs assessment.3. MBTA must consider opportunities and adopt technology and other resources to support training development and training management and record-keeping.

Finding 18. MBTA lacks formal resource manuals in key maintenance areas and does not currently provide employees with checklists or other tools to support training and implementation of maintenance rules and procedures.

Situation

In Special Directive 22-7, FTA identified lapsed annual re-certifications for rail transportation personnel as an immediate safety concern. FTA found that MBTA could do more to effectively train and certify personnel responsible for the movement of railcars, including updating out-of-date rules and procedures and providing additional tools and resources to support the ability of operations personnel to respond in an emergency. As a result, FTA directed MBTA to “create, review, and/or update its training materials to include:

- Training and certification manuals for each rail transit line, to include manuals for operators and supervisors.
- Updated rulebooks for all train lines, enforce version control.

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- A compilation of temporary and permanent orders.”

FTA also required MBTA “to make training materials available electronically and ensure that employees who have enrolled for training have completed the training.”

Throughout the SMI, FTA observed similar issues with a lack of resources and materials for some maintenance workers in the maintenance of way, power systems maintenance and transit facilities maintenance departments. The MBTA should review existing maintenance rules and procedures in these three departments and identify and implement opportunities to develop checklists, tools, resources, and manuals that may help employees perform their work and help to standardize training.

Finding	Required Action
Finding 18: MBTA lacks formal resource manuals in key maintenance areas and does not currently provide employees with checklists or other tools to support training and implementation of maintenance rules and procedures.	<ol style="list-style-type: none"> 1. In coordination with required actions already underway to address FTA’s Special Directive 22-7, the MBTA must review its existing maintenance rules and procedures; identify opportunities for tools and checklists to support employees in carrying out maintenance rules and procedures; and develop, distribute, maintain, and update these materials. 2. MBTA must include frontline maintenance personnel in the development evaluation of these tools and checklists.

Finding 19. Due to workforce turnover, MBTA’s new motorpersons and officials no longer have access to mentoring from experienced motorpersons and officials (inspectors, chief inspectors, and supervisors).

Situation

MBTA is in the process of hiring hundreds of new motorpersons to replace those who are retiring or leaving through attrition and to support the promotion of veteran motorpersons to other positions within the rail transit system. As the MBTA addresses FTA’s SMI findings under Category 1, additional hiring will be necessary.

Due to current staffing shortage on-call supervisors are used as operators for weekends and evenings. In interviews, MBTA’s rail transit leadership acknowledges that some new operators seem to be struggling in maintaining a balance between learning MBTA heavy rail operations

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and preserving a focus on safety. Interviewed MBTA officials identified a range of possible reasons for this:

- high number of new motorpersons and new officials means that sometimes it is the “new teaching the new” because veterans are no longer on the system,
- limited number of supervisors and challenges in actively modeling and mentoring for new motorpersons means that new motorpersons may not always pick up the best habits and practices,
- elimination of the train attendant position approximately 10 years ago removed a step in the progression to full-time (FT) motorperson (previously, new hires would move from part time (PT) train attendant to PT yard motorperson to PT motorperson operating revenue service to FT train attendant then to FT motorperson over an approximately 2-year period³⁸ – now PT motorpersons move directly from operating in the yard to operating revenue service), and
- different learning styles and experiences of younger new hires may require more practical/hands-on training in heavy rail operations (perhaps more like light rail and bus training).

In addressing these challenges, numerous MBTA personnel at all levels of the agency noted that MBTA’s bus operations implements mentoring activities that many new bus operators find beneficial. There was strong support for bringing these practices to rail transit operations. MBTA leadership also noted that they are considering the option of establishing a new instructor position assigned formally to each heavy rail line to work with new PT and FT motorpersons.

Finding	Required Action
Finding 19: Due to workforce turnover, MBTA’s new motorpersons and officials no longer have access to mentoring from experienced motorpersons and officials (inspectors, chief inspectors, and supervisors).	MBTA must evaluate expanding its existing mentoring program from Bus Transit Operations to include new part-time and full-time rail transit operators or consider establishing a mentoring program specific to rail transit operations. In its evaluation, MBTA should consider opportunities and resources to support the professional development of rail transit operations personnel.

³⁸ Length of time to FT motorperson status fluctuated based on seniority, attrition and needs; 2 years is an approximate average.

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Finding 20. Radio quality is deficient in several key locations and does not support adequate communications between OCC and field employees to ensure the safety of MBTA operations and maintenance.

Situation

FTA reviewed over 100 safety event investigation reports between January 1, 2019, and April 29, 2022, and identified several events where poor radio quality was identified as a contributing factor in the event. Interviews with frontline operations, maintenance, and OCC personnel highlighted the following key locations where radio quality does not consistently support effective radio communications:

Blue Line

Bowdoin Station

Green Line

Beacon junction

Hynes to Kenmore (switch#61) WB

Arlington to Boylston EB

Haymarket Station to Government Center WB

Orange Line

Oak Grove Station

Red Line

Alewife yard

Alewife Crossover to platform

Between Porter and Davis north and south

Kendall, southbound end

South Station, southbound end

Ashmont to Shawmut

Fields Corner, middle of platform southbound

Quincy Center, Platform

Radio communications are critical to the safety of the MBTA's rail transit service and FTA finds that more must be done to improve radio quality in these locations.

Finding	Required Action
Finding 20: Radio quality is deficient in several key locations and does not support adequate communications between OCC and field employees to ensure the safety of MBTA operations and maintenance.	<ol style="list-style-type: none">1. MBTA must confirm radio dead spots with frontline motorpersons and maintenance workers.2. MBTA must improve the performance of its radio system in these dead spots.

Category 5: Safety Oversight of MBTA's Rail Transit System

Focus

FTA's SMI reviewed the organization, staffing, and technical capacity of the DPU to oversee a rail transit agency of the size and complexity of the MBTA. FTA's SMI also assessed the financial and legal relationship between DPU and the MBTA. FTA evaluated DPU's actions to oversee implementation of the MBTA's Agency Safety Plan and SMS. FTA also assessed opportunities for DPU's SSO program to conduct more active and engaged oversight of MBTA's rail transit system.

Finding 21: DPU does not use its available resources as effectively as it could to support field observations, audits, and inspections of MBTA's rail transit system to identify safety deficiencies and require their immediate resolution.

Situation

The State Safety Oversight (SSO) regulation requires that each State demonstrate that it has determined an appropriate staffing level for the SSO agency commensurate with the number, size, and complexity of the rail transit system(s) in the State. As part of FTA's 2019 SSO audit, FTA found that DPU did not have a staffing level commensurate with the actual oversight needs of the MBTA. The FTA required DPU to develop, submit, and implement a revised workload assessment that reflects an appropriate staffing level for overseeing the MBTA, a revised technical training plan, and a plan for hiring and training personnel and/or contractors to fill the identified staffing needs.

Since that time, DPU has expanded both its staff and the agency's technical capacity to conduct oversight activities. The DPU has a full-time SSO Director and six full-time equivalent (FTE) field staff, including two Compliance Officers, three Engineers, and one Auditor. The DPU also has considerable engagement from DPU's Director of Transportation Oversight and, more recently, from DPU's Chairman. DPU also has access to contractor resources to provide additional expertise in rail transit disciplines.

While DPU has significantly increased its staff from 2019, many DPU employees are relatively new and still learning SSO requirements and activities. Agency activities have focused on onboarding, training, and building competency in MBTA systems and requirements. The DPU is still working to address FTA's 2019 findings more fully regarding staffing and technical capacity, including recruiting two more engineers, two auditors, three compliance officers, one assistant director, and one Rail Specialist at a director level. Many of these positions have been added to DPU's budget in the last year.

FTA's SMI finds that DPU does not use its available resources as effectively as it could to support field observations, audits, and inspections of MBTA's rail transit system to identify safety deficiencies and require their immediate resolution. FTA finds that the DPU is actively

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engaged in overseeing MBTA’s safety event investigations and has overseen an expanded number of corrective actions submitted by MBTA to address findings from these investigations (from 4 in 2019, to 12 in 2020, to 42 in 2021). However, FTA remains concerned that the DPU has not utilized its existing regulatory and statutory enforcement authority to ensure the timely resolution and closure of the related Corrective Action Plans.

Finding	Required Action
<p>Finding 21: DPU does not use its available resources as effectively as it could to support field observations, audits, and inspections of MBTA’s rail transit system to identify safety deficiencies and require their immediate resolution.</p>	<ol style="list-style-type: none"> 1. DPU must update its workload assessment to reflect the results of the SMI and address FTA’s Special Directives 22-8 and 22-13. 2. DPU must match its resources to those identified in its updated workload assessment. 3. DPU must update its technical training plan, and, if bringing on new resources, must develop a plan for hiring and training personnel and/or contractors to fill the identified staffing needs. 4. DPU must review and update its processes and thresholds for using its existing enforcement authority to ensure timely resolution of CAPs or other required actions for safety.

Finding 22: DPU must examine and ensure its organizational and legal independence from the MBTA.

Situation

The DPU is overseen by a three-member Commonwealth Utilities Commission appointed by the Secretary of the Executive Office of Energy and Environmental Affairs with approval by the Governor. The Secretary designates one of the Commissioners as Chairman. The DPU’s SSO Program Manager reports to the Director for Transportation Oversight, who reports to the Department’s Chairman.

The SSO regulation requires an SSOA to be financially and legally independent from any rail transit system under its oversight jurisdiction, unless the Administrator has issued a waiver of

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this requirement. During the initial SSO certification review, FTA verified DPU’s independence from MBTA through review of enabling legislation and organizational charts for both agencies. A series of on-site interviews indicated multiple reporting layers between DPU’s SSO Program and the Governor’s Office and showed MBTA as a separate legal division of the Massachusetts Department of Transportation, overseen by the Fiscal Management and Control Board (FMCB).

FTA reviewed DPU’s independence from MBTA again during the 2019 SSO audit. Since that time however, the FMCB has been replaced by a new Board for MBTA, consisting of seven members, including the Secretary of Transportation, who reports directly to the Governor. The remaining Board Members are appointed by the Governor.

As a result, FTA finds that DPU must review its independence from MBTA, given shared agency reporting relationships to the Governor and the Governor’s role in appointing MBTA Board Members and approving DPU’s three-member Commonwealth Utilities Commission.

Finding	Required Action
Finding 22: DPU must examine and ensure its organizational and legal independence from the MBTA.	DPU must complete a legal assessment regarding its organizational independence from MBTA. This assessment must include review of organizational mechanisms, including recusals, limited reporting relationships, and other features that provide legal separation between the two agencies and ensure DPU’s independence to take enforcement action against MBTA.

Finding 23: DPU has not validated MBTA’s fatigue management approach for rail transit officials and maintenance and engineering personnel.

Situation

Per 220 CMR 151.00, and in compliance with 49 CFR Part 674, DPU is responsible for establishing minimum standards for rail safety practices and procedures to be used by the MBTA. The DPU has issued minimum safety standard for track inspection, track maintenance, and the use of portable electronic devices while on duty.

A major finding of FTA’s SMI relates to the excessive hours worked by MBTA personnel throughout the rail transit agency. FTA’s Special Directives 22-6 and 22-7 focus on this issue for rail transit motorpersons and MBTA personnel working in the Operations Control Center.

To ensure that this potential safety concern is addressed for other classifications of employees at the MBTA, including rail transit officials, infrastructure maintenance and engineering

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personnel, and vehicle maintenance and engineering personnel, FTA directs DPU to use its oversight authority to assess this issue and require needed and appropriate corrective actions. Current MBTA work hours for these positions include the following:

Employees	Maximum Work Hours per Day	Required Time Off Between Shifts	Maximum Overtime Hours per Week³⁹
MBTA Officials			
Instructor	20 hours	4 hours	24 hours
Yardmaster	20 hours	4 hours	24 hours
Chief Inspector	20 hours	4 hours	24 hours
Inspectors	20 hours	4 hours	24 hours
Infrastructure Maintenance and Engineering			
Maintenance of Way	16 within a 24-hour period	6 hours	24 hours
Transit and Facilities	16 within a 24-hour period	6 hours	24 hours
Power System Maintenance	16 within a 24-hour period	6 hours	24 hours
Signals and Communication	16 within a 24-hour period	6 hours	24 hours
Vehicle Maintenance and Engineering			
Repairers	16 within a 24-hour period	8 hours	24 hours
Foreperson	16 within a 24-hour period	8 hours	24 hours
Car Cleaner	16 within a 24-hour period	8 hours	24 hours
Vehicle Engineers	16 within a 24-hour period	6 hours	24 hours maximum with Supervisor authorization

Table 9. Current MBTA Hours of Service Limitations

Finding	Required Action
Finding 23: DPU has not validated MBTA's fatigue management approach for rail transit officials and maintenance and engineering personnel.	DPU must conduct an assessment and determine if additional action is required. If DPU finds that additional action is needed to reduce service hours to ensure the safety of MBTA employees and passengers, then DPU

³⁹ May be overridden by Supervisor in an emergency or any unforeseen situation in which service is required to ensure public safety or to prevent unreasonable interruptions of service.

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Finding	Required Action
	must use its own authority to require this action.

Finding 24: DPU has not demonstrated an ability to address safety issues and concerns identified during FTA’s SMI.

Situation

As set forth in Section 12 of Title XXII, Chapter 159 of the Massachusetts General Laws, the DPU has the power to supervise and regulate the transportation or carriage of persons or property, or both, by railroads, street railways, electric railroads, and trackless trolleys between points within the Commonwealth of Massachusetts. In exercise of its oversight authority, DPU can take actions including review of Corrective Action Plans (CAPs) submitted by MBTA and oversight of MBTA’s implementation of corrective actions.

FTA expects DPU to carry out its oversight program using its authority, while working with FTA and MBTA to ensure that the safety findings and required actions identified as part of this SMI, and documented in Special Directives 22-9 through 22-12, are addressed and resolved in a timely manner.

To complete this work, FTA expects DPU to:

- adopt FTA’s findings and required actions, to the extent such adoption is necessary to ensure DPU oversight and closeout of these items in coordination with FTA;
- review and approve Corrective Action Plans submitted by MBTA to address Special Directives 22-9 through 22-12;
- oversee MBTA’s implementation of these corrective actions; to verify and close-out implementation of corrective actions, in coordination with FTA; and
- use its authority to issue Orders, or undertake any other action or enforcement proceeding authorized under State law, including judicial actions authorized under Sections 16 and 40 of Title XXII, Chapter 159 of the Massachusetts General Laws, as necessary to ensure completion of verifiable corrective action by the MBTA.

Finding	Required Action
Finding 24: DPU has not demonstrated an ability to address safety issues and concerns identified during FTA’s SMI.	<ol style="list-style-type: none"> 1. DPU must adopt FTA’s findings and required actions in Special Directives 22-9 through 22-12. 2. DPU must, in coordination with the FTA, require, review, and approve corrective action plans from MBTA to address FTA’s findings and required actions in Special Directives 22-9, 22-10, 22-11 and 22-12, and oversee the timely implementation and close-out of these CAPs.

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Finding	Required Action
	3. DPU must identify the specific activities that it will undertake to ensure MBTA’s completion of the required actions, a milestone schedule for completion of MBTA’s required actions, and the parties at DPU and MBTA responsible for completing the required actions.

Appendix – List of Findings and Required Actions

Findings and Required Actions for the MBTA

Finding	Required Action
<i>Category 1 – Managing the Impact of Operations, Maintenance, and Capital Project Requirements on the Existing Workforce</i>	
Finding 1: MBTA’s staffing levels are not commensurate with the demand for human resources required to carry out current rail transit operations and maintenance in addition to expanding capital program activities.	<p>MBTA must conduct and submit to FTA a workforce analysis and associated workforce planning to include:</p> <ol style="list-style-type: none"> <i>Required activities that must be performed for rail transit operations, maintenance, and capital projects delivery:</i> A description of present and projected day-to-day requirements for rail transit operations, preventive and corrective maintenance, and capital delivery through the next five fiscal years. <i>Required resources to perform mission-critical activities:</i> A description of the assignment of the necessary human resources to support present and projected day-to-day requirements for rail transit operations, preventive and corrective maintenance, and capital delivery through the next five fiscal years per the description above. <i>Current staffing capabilities for mission-critical activities:</i> The results of an assessment of MBTA’s ability to safely operate, maintain, and complete capital project delivery for its rail transit system at current service levels of workforce. <i>Safety case for mission-critical activities that can be performed within current and projected resources over the next five fiscal years:</i> The identification of safety risk associated with current staffing shortages and how they are or will be mitigated and any needed changes or reductions in activities.
Finding 2: MBTA has not demonstrated the organizational capacity to recruit and hire personnel to meet authorized staffing levels.	MBTA must develop and implement a recruitment and hiring plan to address findings from its workforce analysis and associated workforce planning for at least a five-year period, including how it will expand its capabilities for recruiting and hiring personnel to fill operations, maintenance, and capital project delivery positions.

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Finding	Required Action
Finding 3: Additional resources are needed to support MBTA's safety engineering and safety certification process for capital projects.	MBTA must modify safety engineering and certification requirements for its capital projects and vehicle procurements and ensure they are addressed through additional E&M and Safety Department staffing, contractor resources, or a combination of approaches. This may be done as part of the workforce analysis in Finding 1, or as part of a separate initiative.
Finding 4: MBTA requires additional oversight of contractor work sites.	FTA recommends that MBTA review the inspection and resident engineering resources needed to ensure compliance with MBTA safety rules related to the Right of Way to ensure the safety of personnel while in active work zones through additional staffing, contractor resources, or a combination of approaches.
Category 2 – Prioritization of Safety Management Information	
Finding 5: MBTA has not ensured that the necessary structures are in place to support effective implementation and operation of its SMS.	<ol style="list-style-type: none"> 1. MBTA must conduct a critical and comprehensive review of its entire SMS planning, implementation, and operational processes and activities to address the gaps discussed in this finding. 2. MBTA must update its SMS Implementation Plan to reflect the results of this review, including defined actions, timeframes, responsibilities, and expected outcomes.
Finding 6: MBTA executive leadership does not receive prioritized and actionable information related to safety risks or shortcomings in safety risk mitigations.	<p>MBTA leadership must:</p> <ol style="list-style-type: none"> 1. Work with safety and operating department leads (including maintenance and engineering departments) to define explicit criteria for prioritizing safety risks. 2. Include explicit safety risk acceptance criteria in its Agency Safety Plan and/or reference documents. 3. Work with MBTA's Safety Department and operating department leads (including maintenance and engineering departments) to define how safety information must be presented to MBTA leadership in a prioritized and actionable manner. 4. Require, and provide means for, operating department leads (including maintenance and engineering departments) to elevate proposed safety risk mitigations, including their status, that require MBTA leadership

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Finding	Required Action
	approval for resourcing. This must include safety risk mitigations deemed ineffective or inappropriate and that require executive level decision regarding the redirection of, or additional, resourcing.
Finding 7: MBTA Executive Management does not consistently ensure its decisions related to safety risks are based on safety data analysis or documented facts.	<ol style="list-style-type: none"> 1. MBTA must map its safety data flows and supporting processes. 2. MBTA must establish explicit accountabilities and responsibilities for safety data flows as a component of safety information management (collection, analysis, communication, storage, and retrieval of safety data). 3. MBTA must provide formal training in safety information management to relevant personnel. 4. MBTA must demonstrate that its executive management uses and promotes the usage of safety data analysis and/or documented facts in decision-making related to safety risk.
Finding 8: MBTA's safety investigations and safety assurance activities do not consistently collect and analyze information on precursor factors.	<ol style="list-style-type: none"> 1. MBTA must update its Safety Assurance process to include monitoring of safety risk mitigations with a) compliance-based activities to provide the baseline for monitoring implementation status and b) performance-based activities to monitor the actual effectiveness of safety risk mitigations. 2. MBTA must prepare a monthly look-ahead schedule for prioritized safety risk monitoring activities that include safety risk mitigations and corrective actions in place to address MBTA's highest safety priorities. 3. MBTA must develop and document guidance, and deliver training for safety investigators that ensure the consideration of precursor factors in the analysis of the chain of events leading to a safety event (accident, incident, or occurrence), including but not limited to, for example:

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Finding	Required Action
	<ul style="list-style-type: none"> • Suitability of resources available to frontline personnel for operational and maintenance activities • Deficiencies in policies, procedures, rulebooks • Outdated policies, procedures, and rulebooks • Deficiencies/inadequacies in training Shortcomings in supervision • Deviations from procedures and rules Reasons for lack of adherence to procedure and rules • The limited success of discipline to address safety issues
<p>Finding 9: MBTA’s safety risk assessment guidance as part of its Safety Risk Management is ambiguous and has led to confusion among stakeholders regarding their responsibilities and authorities, which has created delays in carrying out safety risk assessments activities</p>	<ol style="list-style-type: none"> 1. MBTA must develop and document criteria for conducting safety risk assessments consistent with the basic principles of safety management and the tenets of SMS as conveyed in FTA’s SMS guidance materials. 2. MBTA must develop explicit direction for the ownership of safety risk assessments among the Safety Department and the operating departments. Documentation must include providing explicit roles, responsibilities, and thresholds of authority of each department involved. 3. MBTA must include in the above criteria directives to ensure that operating departments including subject matter expertise, own safety risk assessments, while safety officials provide support for safety risk assessments and reports on results to Executive Leadership for safety resource allocation priorities. 4. MBTA must expand its policy of establishing a pre-defined schedule of safety risk assessment workshops and develop criteria attuned with the nature of hazard identification (I.e., as they are identified), to expedite safety risk assessments to support prioritization for resource allocation.
<p>Finding 10: MBTA safety information management tools (hazard log, safety risk mitigation log, etc.) do not</p>	<ol style="list-style-type: none"> 1. MBTA must evaluate (and correct) the data contained in its hazard log and safety risk mitigation log for accuracy and relevancy to SMS

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fully support prioritization of resources to address safety risk and safety performance monitoring.	<p>2. MBTA must expedite the build out of its safety risk and safety risk mitigation monitoring information tools.</p> <p>3. MBTA must demonstrate use of its safety information management tools to effectively prioritize its resources to address the results of:</p> <ul style="list-style-type: none"> • Safety Risk Monitoring • Safety Performance Monitoring
Category 3: Effectiveness of Safety Communication	
Finding 11: MBTA has not established explicit and formal provisions to ensure safety information from safety committee results in a consistent outcome of documented, prioritized, and actionable safety information.	<p>3. MBTA must develop and describe, in the organization's SMS documentation, instructions regarding the conduct, recording, communication and follow up of the outcome consensus decisions specific for each of the following meetings - taking into consideration the nature (strategic or tactical) of each meeting:</p> <ul style="list-style-type: none"> • Operations and Safety Biweekly call (currently every other Friday) • Operations and Safety weekly meeting (currently on Wednesdays) • Executive Safety Committee (ESC) • Safety Management Review Committee (SMRC) • Safety Management Working Groups (SMWGs) • Data Analysis Group (DAG) • Local Safety Committee Meetings • Joint Labor/Management Safety Committee (required by Bipartisan Infrastructure Law) <p>4. In support of the above, MBTA must develop and describe, in the organization's SMS documentation, a formal mechanism and associated guidelines to ensure that the meetings are consistent in the identification and analyses of safety concerns and hazards; prioritization of safety risks; implementation of corrective actions; and safety risk mitigation effectiveness monitoring.</p>
Finding 12: MBTA has not documented explicit and formal provisions to ensure the participation of frontline employees in local safety committees as part	<p>1. MBTA must develop explicit and formal guidelines for the expected role and contribution of frontline employees to the local safety committee meetings.</p> <p>2. MBTA must develop instructions for the conduct of the meetings, including explicit departmental accountabilities</p>

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of their job responsibilities in relation to the agency's SMS.	for meeting outcome information capture, communication and follow up.
Finding 13: MBTA management has not effectively communicated clear direction to frontline employees on what to report and what not to report through the Safety Hotline.	<ol style="list-style-type: none"> 1. MBTA must expedite the development of an effective ESRP as a fundamental source of safety information for hazard identification and safety performance monitoring. 2. As part of the development of an effective ESRP, MBTA must provide explicit direction to frontline employees on what to report and what not to report through the ESRP (including the safety hotline). 3. As part of the development of an effective ESRP, MBTA must provide refresher training to stakeholder personnel on the role of employee safety reporting within SMS and the crucial contribution managers and supervisors play in the development of an effective safety reporting context.
<i>Category 4: Operating conditions and policies, procedures, and training:</i>	
Finding 14: Documented operating and maintenance rules and procedures are not implemented as required.	<ol style="list-style-type: none"> 1. Each operating and maintenance department must establish a group to review department-wide information on levels of non-compliance with key rules and procedures critical to the safety of activities performed by the department. 2. Each department must establish and act on a prioritized list of most frequently violated rules and procedures with the most significant potential safety consequences. 3. Each department must develop and implement approaches, which could include audits, use of checklists and guides, campaigns, and training, to improve compliance. 4. Each department must report to the Safety Department monthly on its compliance with identified key rules and procedures critical to the safety of activities performed by the department. 5. The Safety Department must review and audit these reports and compile a monthly compliance report for MBTA's executive leadership team.

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	6. Each department must continue to review safety data to assess effectiveness of actions and to improve compliance with safety rules and procedures.
Finding 15: MBTA does not monitor operations, including the conditions of the operating environment, to identify the reasons for deviations between formal, established standards, rules and procedures, and actual operations and maintenance practices.	MBTA must develop, document, and communicate a mechanism to monitor operations, and provide training to stakeholder safety and operating personnel on this mechanism, to enable the analysis and understanding of situations of non-compliance.
Finding 16: MBTA's QA/QC program is not sufficiently independent from the activities it oversees.	<ol style="list-style-type: none"> 1. MBTA must develop and administer a QA/QC program to independently oversee of ongoing QA/QC activities. 2. MBTA must ensure that the QA/QC functions are independent of the functions of the Safety department and report directly to the GM. 3. MBTA must develop a formal QA/QC procedure that details the oversight of and accountability and roles and responsibilities for QA/QC programs provided by railcar manufacturers and MBTA consultants related to quality control of its railcars and subcomponents. 4. MBTA must ensure that the MBTA QA/QC independent group is staffed with a sufficient SMEs in necessary disciplines to ensure a complete and thorough understanding of the responsibilities under the purview of railcar maintenance and engineering.

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Finding 17: Technical training for operations and maintenance departments is under-resourced and decentralized, without sufficient resources and direction, and relies significantly on on-the-job-training (OJT) which is informal and lacks oversight. Emergency response training is poorly integrated into overall training program.	<ol style="list-style-type: none"> 1. MBTA must conduct a training needs assessment for rail transit operations and maintenance departments, to include emergency response training. This assessment should identify training that needs to be updated, developed, and supported with additional resources. 2. MBTA must implement the results of the training needs assessment. 3. MBTA must consider opportunities and adopt technology and other resources to support training development and training management and record-keeping.
Finding 18: MBTA lacks formal resource manuals in key maintenance areas and does not currently provide employees with checklists or other tools to support training and implementation of maintenance rules and procedures.	<ol style="list-style-type: none"> 1. In coordination with required actions already underway to address FTA's Special Directive 22-7, the MBTA must review its existing maintenance rules and procedures; identify opportunities for tools and checklists to support employees in carrying out maintenance rules and procedures; and develop, distribute, maintain, and update these materials. 2. MBTA must include frontline maintenance personnel in the development evaluation of these tools and checklists.
Finding 19: Due to workforce turnover, MBTA's new motorpersons and officials no longer have access to mentoring from experienced motorpersons and officials (inspectors, chief inspectors, and supervisors).	MBTA must evaluate expanding its existing mentoring program from Bus Transit Operations to include new part-time and full-time rail transit operators or consider establishing a mentoring program specific to rail transit operations. In its evaluation, MBTA should consider opportunities and resources to support the professional development of rail transit operations personnel.
Finding 20: Radio quality is deficient in several key locations and does not support adequate communications between OCC and field employees to ensure the safety of MBTA	<ol style="list-style-type: none"> 1. MBTA must confirm radio dead spots with frontline motorpersons and maintenance workers. 2. MBTA must improve the performance of its radio system in these dead spots.

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Finding	Required Action
operations and maintenance.	

Findings and Required Actions for the DPU

Finding	Required Action
<i>Category 5: Safety Oversight for MBTA's Rail Transit System</i>	
Finding 21: The DPU does not use its available resources as effectively as it could to support field observations, audits, and inspections of MBTA's rail transit system to identify safety deficiencies and require their immediate resolution.	<ol style="list-style-type: none"> 1. DPU must update its workload assessment to reflect the results of the SMI and address FTA's Special Directives 22-8 and 22-13. 2. DPU must match its resources to those identified in its updated workload assessment. 3. DPU must update its technical training plan, and, if bringing on new resources, must develop a plan for hiring and training personnel and/or contractors to fill the identified staffing needs. 4. DPU must review and update its processes and thresholds for using its existing enforcement authority to ensure timely resolution of CAPs or other required actions for safety.
Finding 22: DPU must examine and ensure its organizational and legal independence from the MBTA.	DPU must complete a legal assessment regarding its organizational independence from MBTA. This assessment must include review of organizational mechanisms, including recusals, limited reporting relationships, and other features that provide legal separation between the two agencies and ensure DPU's independence to take enforcement action against MBTA.
Finding 23: DPU has not validated MBTA's fatigue management approach for rail transit officials and maintenance and engineering personnel.	DPU must conduct an assessment and determine if additional action is required. If DPU finds that additional action is needed to reduce service hours to ensure the safety of MBTA employees and passengers, then DPU must use its own authority to require this action.
Finding 24: DPU has not demonstrated an ability to address safety issues and concerns identified during FTA's SMI.	<ol style="list-style-type: none"> 1. DPU must adopt FTA's findings and required actions in Special Directives 22-9 through 22-12.

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	<p>2. DPU must, in coordination with FTA, require, review, and approve corrective action plans from MBTA to address FTA’s findings and required actions in Special Directives 22-9, 22-10, 22-11 and 22-12, and oversee the timely implementation and close-out of these CAPs.</p> <p>3. DPU must identify the specific activities that it will undertake to ensure MBTA’s completion of the required actions, a milestone schedule for completion of MBTA’s required actions, and the parties at DPU and MBTA responsible for completing the required actions.</p>