MBTA Transit Safety Plan

Safety Management System

MANAGEMENT POLICY
RISK MANAGEMENT
ASSURANCE
PROMOTION

MASSACHUSETTS BAY
TRANSPORTATION AUTHORITY

10 Park Plaza
Boston, MA 02116

Revision 1
June 3, 2021

Applicability

The development and implementation of this safety plan applies to all MBTA directly operated and contract activities related to:

- Heavy Rail;
- Light Rail;
- Bus; and
- Paratransit Service.

MBTA passenger ferry operations regulated by the United States Coast Guard (USCG), as well as rail fixed guideway public transportation service regulated by the Federal Railroad Administration (FRA) are not subject to the requirements set forth in this safety plan.

This plan is intended to provide information on MBTA's Safety Management System.

Although MBTA's Transit Safety Plan complies with 49 CFR Part 673 and 220 CMR 151, the regulations allow for a multi-year implementation period. During the SMS implementation process, acceptance of this Transit Safety Plan by the Department of Public Utilities and the Federal Transit Administration does not constitute approval or acceptance of any process or component of the SMS. Refer to the SMS Implementation Plan and phases found in the preface of this plan for the status of each SMS process/component. MBTA employees and contractors are required to comply with the policies and procedures as they are being implemented during the SMS phases contained within this plan.

APPROVALS

The MBTA Transit Safety Plan composed within this document has been reviewed and approved by the Fiscal and Management Control Board; and signed by:

6/3/2021

Steve Poftak
General Manager and SMS Accountable Executive

Date

5/27/2021

Ronald Ester
Chief Safety Officer

Date

Table of Contents

List of Tables and Figures

PRF 1 ACRONYMS

APTA	American Public Transportation Association
CAP	Corrective Action Plan
CFR	Code of Federal Regulations
CMR	Code of Massachusetts Regulations
CSO	Chief Safety Officer
DGM	Deputy General Manager
DLS	Massachusetts Department of Labor Standards
DPU	Massachusetts Department of Public Utilities
ESC	Executive Safety Council
FMCB	Fiscal and Management Control Board
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GM	General Manager (General Manager and Accountable Executive are interchangeable terms)
MassDOT	Massachusetts Department of Transportation
MBTA	Massachusetts Bay Transportation Authority

MCRS	Maintenance Control and Reporting System
MIL-STD	Military Standard
NTD	National Transit Database
NTSB	National Transportation Safety Board
OCC	Operations Control Center
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Administration
PTASP	Public Transportation Agency Safety Plan (also referred to as the MBTA Transit Safety Plan)
QA/QC	Quality Assurance/Quality Control
ROW	Right of Way
SGR	State of Good Repair
SMRC	Safety Management Review Committee
SMS	Safety Management System
SMWG	Safety Management Working Group
SOP	Standard Operating Procedure
SRCP	Safety Rules Compliance Program
TAM	Transit Asset Management
TPD	Transit Police Department
USC	United States Code

PRF 2 DEFINITIONS

Accident: An event that involves any of the following: a loss of life; a report of a serious injury to a person; a collision involving a rail transit vehicle; a collision involving public transportation vehicles; a runaway train; an evacuation for life safety reasons; or any derailment of a rail transit vehicle, at any location, at any time, whatever the cause. An accident must be reported in accordance with the thresholds for notification and reporting set forth in 49 CFR Part 674, Appendix A and 220 CMR 151.09.

Accountable Executive: A single, identifiable person who has ultimate responsibility and accountability for the effective implementation and maintenance of the Safety Management System throughout the authority's transit system; responsibility for carrying out the agency's Transit Asset Management Plan; and control or direction over the human and capital resources needed to develop and maintain both the agency's Public Transportation Agency Safety Plan, in accordance with 49 CFR 673, and the agency's Transit Asset Management Plan in accordance with 49 CFR 625. MBTA's Accountable Executive is the General Manager.

Annual Internal Safety Audit Report: The report prepared by the MBTA describing safety performance and SMS activities s performed during the preceding twelve (12) months.

Causal Factors: The set of elements that affect an event's outcome. A causal factor is not necessarily a root cause, because whereas removing a causal factor can benefit an outcome, it does not with certainty prevent recurrence of a safety event.

Chief Safety Officer (CSO): An adequately trained individual who has responsibility for safety and reports directly to MBTA's Accountable Executive (General Manager). A Chief Safety Officer may not serve in other operational or maintenance capacities.

Closed-loop: The concept of a loop system where feedback is circulated back to the originator. Within the context of SMS, the employee promptly reports hazards to the manager, who will then notify appropriate parties and complete the loop by following up with the employee.

Configuration Management: The systematic control, monitoring, and documenting of all changes and/or modifications of a system's physical and operational features throughout its life cycle to ensure that the system and its various components reflect the current documentation. This plan incorporates by reference MBTA's Configuration Management and Control Safety Program (SAFE1.10.00).

Contractor: An entity that performs tasks required on behalf of the MBTA.

Continuous Improvement: Gradual, never-ending changes focused on meeting or exceeding MBTA's safety performance targets and safety objectives. Continuous improvement is a core sub-component found within Safety Assurance. Continuous improvement may come in the form of a safety recommendation, a corrective action plan, or other methods to improve safety at the MBTA.

Corrective Action Plan (CAP): A plan developed by the transit agency that describes the actions it will take to minimize, control, correct, or eliminate hazards; and the schedule for implementing the actions it will take to minimize, control, correct, or eliminate hazards.

Emergency: A situation that is life threatening or one that causes damage on or in any agency facility, right-of-way, or vehicle.

Employee Safety Reporting Program: A Program formally recognized and approved by the MBTA that describes the process for employees to report safety conditions to senior management, protections for employees who report safety conditions to senior management, and a description of employee behaviors that may result in disciplinary action.

Environment: Operational setting, right-of-way, passenger interface, pedestrian/vehicle interface, weather, subway/non-subway, regulatory, political, media, etc.

Form B: A written document that allows employees to anonymously or confidentially document unsafe conditions and bring them to MBTA Safety for resolution.

Good Faith Safety Challenge: A stoppage in work, initiated by an employee, whenever the employee makes a good faith safety determination that the employee has been directed to either: take actions that would violate federal, state, or local safety regulations; or to take actions that would violate MBTA's operating rules, policies, procedures, or programs.

Hazard: Any real or potential condition that can cause injury, illness, or death; damage to or loss of the facilities, equipment, rolling stock, or infrastructure of a public transportation system; or damage to the environment.

Incident: An event that involves any of the following: a personal injury that is not a serious injury; one or more injuries requiring medical transport; or damage to facilities, equipment, rolling stock, or infrastructure that disrupts the operations of a transit agency.

Investigation: The process of determining the causal and contributing factors of an accident, incident, occurrence, or hazard, for the purpose of preventing recurrence and mitigating risk.

Lagging Indicators: Measures of unsafe events that have occurred such as derailments, accidents, casualties, fires, or evacuations; also known as trailing indicators.

Leading Indicators: Measures of incident precursors that may be predictive of unsafe events, such as close calls, deterioration of asset conditions, or failures to comply with safety standards.

MassDOT/MBTA Railroad System Safety Program Plan: An FRA-regulated plan that documents system safety programs and processes used by MassDOT/MBTA Regional Rail employees, which satisfies the requirements of 49 CFR Part 270: System Safety Program.

MBTA Management: The collective management groups across all MBTA departments, which consist of field managers and executive managers.

MBTA Personnel: For purposes of this Transit Safety Plan, MBTA personnel include employees and contractors.

MBTA Safety: The MBTA's Safety Department and all personnel associated with the Department. MBTA Safety staff are responsible for corporate oversight of the safety processes and objectives described within the Safety Plan, and for providing corporate safety guidance to MBTA management, labor, and contractors in working to achieve safety performance objectives.

Occupational Health and Safety (OHS) Plan: A comprehensive plan that governs and defines the authority, responsibilities, roles, and processes related to MBTA's workplace safety programs. For detailed information related to MBTA's workplace safety programs, including hazardous materials, refer to the OHS Plan.

Occurrence: an event without any personal injury in which any damage to facilities, equipment, rolling stock, or infrastructure does not disrupt the operations of a transit agency.

Passenger: A person who is onboard, boarding, or alighting from a transit vehicle for the purpose of travel.

Personnel Directly Responsible for Safety: MBTA personnel involved in any of the following duties:

- Operating a revenue service vehicle, including when not in revenue service.
- Operating a nonrevenue service vehicle, when required to be operated by a holder of a Commercial Driver's License.
- Controlling dispatch or movement of a revenue service vehicle.
- Maintaining (including repairs, overhaul and rebuilding) a revenue service vehicle or equipment used in revenue service.
- Carrying a firearm for security purposes.
- A person employed or contracted by the MBTA who is in a formally-designated safety-sensitive position.

Personnel Directly Responsible for Safety Oversight: MBTA personnel whose primary job function includes the development, implementation and review of the agency's safety plan, and/or the SSOA requirements for the rail fixed guideway public transportation system pursuant to 49 CFR parts 659 or 674. MBTA's Chief Safety Officer and Safety personnel have primary job functions directly responsible for safety oversight.

Procedures: Rules, SOPs, orders, training, emergency procedures, notifications, investigations, reporting, data collection, etc.

Project Safety Management Certification Working Groups (Project SMWGs): Working groups formed on an as needed basis to administer and oversee the safety and security certification tasks and requirements for a specific project. They are then dissolved upon completion of a project. Project SMWGs usually consists of executive management.

Public Transportation Agency Safety Plan (PTASP): The documented, comprehensive agency safety plan for a transit agency that is required by 49 U.S.C. 5329 and 49 CFR Part 673. This MBTA Transit Safety Plan is intended to meet the PTASP requirements.

Public Transportation Agency: As referenced in this plan, the MBTA is the public transportation agency.

Rail Transit Vehicle: The MBTA's rolling stock specific to rail including, but not limited to, passenger and maintenance vehicles.

Recommendation: A safety action that usually addresses a specific issue uncovered during an internal safety audit, employee safety report, or safety data analysis. Recommendations may be developed in instances where MBTA is technically in compliance with applicable federal and state regulations and documented safety program requirements, but where no written plan, policy, or procedure is in place, where agency practices are not fully

consistent with relevant industry best practices and standards, or where organizational and resource issues have inhibited the performance of safety-related activities. A recommendation does not take the place of a Corrective Action Plan (CAP).

Regulator: An individual or organization that is granted oversight of a system in order to ensure its day-to-day efficiency and continual improvement.

Relevant Contractor: A person contracted by the MBTA who is involved in any of the following duties:

- Operating a revenue service vehicle, including when not in revenue service.
- Operating a nonrevenue service vehicle, when required to be operated by a holder of a Commercial Driver's License.
- Controlling dispatch or movement of a revenue service vehicle.
- Maintaining (including repairs, overhaul and rebuilding) a revenue service vehicle or equipment used in revenue service.
- Carrying a firearm for security purposes.
- A person contracted by the MBTA who is in a formally-designated safety-sensitive position.

Reportable Event: Any accident, incident, safety violation, or near miss that occurs within the MBTA transportation system that requires a formalized investigation process, reporting as required by federal or state regulations, and/or MBTA rules, policies, orders, directives, or regulation.

Right of Way: The property over which trains and authorized rail equipment operate, and ten feet from the centerline of track in any direction, including sidings and yards.

Risk: The composite of predicted severity and likelihood of the potential effect of a hazard.

Risk Likelihood: The likelihood that a consequence's chosen severity level will occur when the identified hazard is present/encountered. Risk likelihood may be expressed in quantitative or qualitative terms. The five MBTA risk likelihood levels are (refer to Table 8 of this Transit Safety Plan for descriptions):

- Frequent
- Probable
- Occasional
- Remote
- Improbable

Risk Severity: A qualitative measure in which a consequence/effect of a hazard's condition results in a certain level of severity. The five MBTA risk severity levels are (refer to Table 7 of this Transit Safety Plan for descriptions):

- Catastrophic
- Critical
- Moderate
- Minor
- Low

Rolling Stock: Transit vehicles such as buses, vans, cars, railcars, locomotives, trolley cars and trolley buses, as well as vehicles used for support and maintenance services.

Root Cause Analysis (RCA): A specialized, technical, in-depth investigation and analysis that identifies the primary cause(s) of events in order to make corrective recommendations to prevent reoccurrence. RCA is a reactive method of hazard analysis and is an effective tool for understanding why and how an event occurred.

Safety: The state in which the potential of harm to persons or property damage during operations related to provisions of services is reduced to and maintained at an acceptable level through continuing hazard identification and safety risk management activities.

Safety Advisory: A formal notification issued by MBTA's Chief Safety Officer to MBTA or contractor management advising of a real or potential hazard or unsafe system condition. Safety Advisories request review and assessment of the hazard/condition and recommend that recipients respond to any findings with a Corrective Action Plan (CAP). If the hazard/condition identified is severe enough, an Urgent Safety Advisory may be issued in place of a standard Safety Advisory. A Safety Directive may also be issued as a follow-up or higher level notification.

Safety Assurance: One of the four (4) main components of SMS; ensures and verifies effectiveness of MBTA's SMS safety performance, corrective action mitigations, and overall program.

Safety Certification: 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. This plan incorporates by reference MBTA's Safety Certification Program (SAFE1.09.00).

Safety Critical: A term applied to any system, part, condition, event, operation, process, or item whose failure or malfunction may result in:

- death or serious injury to people.
- loss or severe damage to property, equipment; or
- significant environmental impact
- major service interruption or system loss

Safety Culture: The safety culture of an organization is the product of the individual and group values, attitudes, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety programs. Organizations with a positive safety culture are characterized by communications founded on mutual trust, shared perceptions of the importance of safety, and confidence in the efficacy of preventative measures.

Safety Directive: A formal notification issued by the MBTA's Chief Safety Officer to MBTA or contractor management identifying an urgent and high level hazard or unsafe system condition. Safety Directives require a response from the recipient with a Corrective Action Plan (CAP) and may be issued in conjunction with or independently of a Safety Advisory.

Safety Event: FTA defines a Safety Event as an Accident, Incident, or Occurrence. Safety Events are also a term defined in the National Transit Database that involves one or more of the following:

- Collisions
- Fires (suppression)
- Derailments (mainline and yard) including non-revenue vehicles
- Hazardous Material Spills
- Acts of God

Other Safety Events (events that do not fall into any of the other categories, yet meet a reporting threshold other than immediate transport for medical attention for one person)[1]

Safety Hotline: A telephone communication method for employees to report safety conditions and/or hazards directly to the MBTA Safety department. The telephone number is (617) 222-SAFE (7233) and is checked every business day.

Safety Management Policy: A transit agency's documented commitment to safety, which defines the transit agency's safety objectives and the accountabilities and responsibilities of its employees in regard to safety.

Safety Management System (SMS): A formal, top-down, organization-wide, data-driven approach to managing safety risks and assuring the effectiveness of safety risk mitigations. SMS includes systematic procedures, practices, and policies for managing risks and hazards.

Safety Management Working Groups (SMWGs): Safety committees formed for the purpose of addressing safety issues within a system or subsystem. SMWGs consist of representatives, usually executive managers, from various departments. SMWGs are a way of establishing interdepartmental communication when addressing safety issues. They report to the SMRC.

Safety Notification: As it relates to the Employee Safety Reporting System, a Safety Notification is a form of communication an employee may use to document a hazard or safety concern and submit it via e-mail, fax, mail, or hand-delivery.

Safety Plan: A documented, comprehensive outline of activities and processes used to complete a safety objective(s) or comply with state or federal regulations.

Safety Promotion: One of the four (4) main components of SMS; provides visibility of executive management's commitment to safety and fosters improved safety performance by increasing safety awareness through safety communication and training.

Safety Risk Management: One of the four (4) main components of SMS; a process within a transit agency's Public Transportation Agency Safety Plan for identifying hazards and analyzing, assessing, and mitigating safety risk.

[1] The NTD Safety and Security Reporting Manual further define the term safety event and threshold reporting requirements.

Safety Stand-Down: A temporary stop in normal work where the entire work crew or site focuses on a particular safety issue. MBTA management can conduct a safety stand-down by taking a break to host a toolbox talk or a meeting to discuss a safety topic, like conducting safety equipment inspections, developing rescue plans, or talking about job-specific hazards.

Safety Validation: The process of determining whether a system's safety design requirements fulfill its intended safety design objectives before, during, and after its development and life cycle. The goal of the safety validation process is to determine the system and or product is built, tested, and designed correctly and in accordance with its intended safety design, purpose, performance expectations, and regulatory requirements and industry best practices.

Security: Freedom from harm resulting from intentional acts or circumstances.

Sole Source: All evidence of the safety event available to the MBTA is discovered by or otherwise predicated on the employee/contractor safety report through the Employee Safety Reporting Program (ESRP).

State of Good Repair: The condition in which a capital asset is able to safely operate at a full level of performance.

State Safety Oversight Agency: The entity established by the State and certified by the FTA to regulate and oversee state transit agencies, including fixed guideway systems (trolley, light & heavy rail), bus, and paratransit, ferry, and other transportation systems not otherwise regulated by the FRA (passenger rail operation) in accordance with 220 CMR 151, 220 CMR 155, 49 USC 5329, and 49 CFR Parts 673 and 674. The Department of Public Utilities (Department or DPU) is appointed as the SSOA for the state of Massachusetts.

Substance Abuse: The use of drugs not prescribed to the individual, the use of illicit substances, or overmedicating oneself using prescription medications.

System: A composite of people, procedures and equipment that are integrated to perform a specific operational task or function within a specific environment.

System Lifecycle: All phases of the system's life, including design, research, development, test and evaluation, production, deployment (inventory), operations and support, and disposal. Considering all phases of a system lifecycle is a standard practice of system safety.

System Modification: Any change to a system, facility, equipment, program, or department that may introduce a new hazard to the public transportation system. This safety plan incorporates by reference the MBTA System Modification Safety Program (SAFE1.08.00).

System Safety: The application of operating, technical, and management techniques and principles to the safety aspects of a system throughout its life cycle to reduce hazards to the lowest practical level through the most effective use of available resources.

System Safety Engineering: An engineering discipline that employs specialized professional knowledge and skills in applying scientific and engineering principals, criteria, and techniques to identify and eliminate hazards, in order to reduce the associated risk.

The RIDE: MBTA's door-to-door, shared-ride paratransit service. The RIDE is operated by the MBTA in compliance with the Americans with Disabilities Act (ADA). Demand-response service and paratransit service are synonymous with The RIDE in this Safety Plan.

Transit Asset Management (TAM) Plan: The MBTA's Transit Asset Management Plan which describes: the capital asset inventory; condition of inventoried assets; TAM performance measures, targets, and prioritization of investments aligned with the agency's TAM and SGR policy, strategic goals and objectives; as well as the strategies, activities, and resources required for delivering the plan (including decision support tools and processes); and other agency-wide approaches to continually improve TAM practices.

Triennial Safety Review: A formal, comprehensive, on-site examination by the oversight agency of a transit agency's safety practices to determine whether they comply with the policies and procedures required under the transit agency's system safety program plan.

Urgent Safety Advisory: A formal notification issued by the MBTA Chief Safety Officer to MBTA or contractor management advising them of an urgent hazard or unsafe system condition. Urgent Safety Advisories require immediate action and response by the recipient, with expedited development of a Corrective Action Plan (CAP).

***Willful* Disregard For Safety:** An intentional, voluntary act committed either with knowledge of the relevant MBTA rule or reckless disregard for whether the act violated the requirements of the MBTA rule. A willful disregard for safety must demonstrate a higher level of culpability than negligence.

PRF 3 SAFETY MANAGEMENT POLICY STATEMENT

policy statement on next page

2021 Safety Policy Statement

Dear Colleagues,

Safety is one of Massachusetts Bay Transportation Authority's (MBTA) core values. MBTA is committed to continually improving its safety culture and performance through implementation and support of a formal Safety Management System (SMS). MBTA's SMS incorporates safety policies, safety risk management, safety assurance, and safety promotion components to deliver safe and reliable service to its communities and customers. All levels of management, employees, and contractors are responsible for delivering the highest level of safety performance on a daily basis.

To promote an effective and sustainable safety culture and SMS throughout the entire organization, MBTA is committed to the following:

- Support SMS through all appropriate resources to elevate an organizational culture that fosters safe practices, encourages effective safety reporting and communication throughout the organization.
- Ensure safety management is a primary responsibility for all managers and employees.
- Establish and maintain workplace safety programs that meet or exceed state and federal standards.
- Improve and promote a hazard identification, reporting, and risk management process to eliminate and/or mitigate safety risks to achieve continuous improvement of MBTA's safety performance.
- Establish and measure MBTA's safety performance against realistic safety performance indicators and safety performance targets.
- Clearly define organizational responsibilities, accountabilities for all management, employees, and contractors for the achievement of MBTA's safety performance targets and implementation of SMS.
- Educate the entire MBTA workforce on our Safety Management System (SMS) through the SMS Fundamentals course.
- Continually improve MBTA's safety performance through oversight, monitoring, measurement, review, and interdepartmental collaboration to align with MBTA's safety goals, targets, and objectives.
- Ensure that externally supplied systems, contractors, vendors, and services that support MBTA comply with applicable MBTA safety plans, programs, policies and safety performance standards, including state and federal standards.
- Improve communication methods for employees to voluntarily report safety concerns or recommendations without fear of reprisal or disciplinary action. Note that all employees are responsible for and expected to promptly report any hazards, unsafe conditions, incidents, accidents, or injuries while on the job through OCC/MCC or appropriate reporting forms. *Willful* disregard for safety is unacceptable and subject to disciplinary action as outlined in MBTA policies and rules.

Every employee has a role and responsibility in safety. Through implementation of the SMS and working together, we can demonstrate safety as a core value at the MBTA and strive to provide a safe, reliable, convenient, accessible, cost-effective, and sustainable transit service to its communities and customers.

With respect,

Date 6/3/2021

Steve Poftak

MBTA General Manager and SMS Accountable Executive

PRF 4 MBTA SMS IMPLEMENTATION

In alignment with FTA SMS regulations and guidance material, MBTA is implementing its SMS in three phases. These phases correspond to three components of SMS: Safety Management Policy, Safety Risk Management, and Safety Assurance. The fourth SMS component, Safety Promotion, is embedded throughout these phases because it encompasses safety communication and safety training, ongoing activities that occur throughout all phases of SMS implementation.

Each of the three phases involves concrete tasks and activities that, once completed, will signify that the objectives of that SMS implementation phase have been achieved. Phase 1 through Phase 3 list tasks and activities to be completed in each phase of MBTA's SMS implementation. Refer to the MBTA SMS Implementation Plan for further information on implementation activities.

Phase 1 – Planning, Organization, and Policy Development (Completed)

Tasks completed within Phase 1 of SMS implementation included:

- Establishing an SMS Steering Committee (SMRC) and SMS Implementation Team (SMWG) for the implementation of SMS
- Conducting a review of existing safety programs at MBTA to new federal and state regulations
- Updating MBTA Safety Policy in accordance to new federal and state regulations
- Drafting and certifying the initial MBTA Transit Safety Plan in accordance with federal and state regulations.
- Ensuring MBTA's current voluntary, confidential, non-punitive employee safety reporting program meets federal and state regulations
- Identifying SMS accountabilities of MBTA management
- Developing a safety risk matrix to evaluate safety risks associated with service delivery operations
- Outlining essential activities and tools for the Safety Risk Management processes and Safety Assurance processes
- Identifying safety management training requirements
- Developing the infrastructure for safety and safety performance communication throughout MBTA
- Identifying safety assurance and oversight activities performed by external agencies

Phase 2 – Safety Risk Management (Current Phase)

Tasks to be completed within Phase 2 of SMS implementation include:

- Develop, deliver, and document training on SMS and Safety Risk Management
- Improve MBTA's voluntary, confidential, non-punitive employee safety reporting program
- Develop guidance for Executive Management and MBTA Safety to determine appropriate risk analysis/assessment
- Improve process for hazard tracking system input and updating the log
- Refine criteria for the elevation of safety risks to executive management
- Develop SRM worksheet that MBTA Safety, Executive Management, and Field Management can use
- Promote the employee safety reporting program to frontline employees

- Procure safety data management system and define process owners
- Identify and develop parameters to improve local safety committee meetings
- Communicate the completion of Safety Risk Management tasks to relevant MBTA personnel

Phase 3 – Safety Assurance (Planning)

Tasks to be completed within Phase 3 of SMS implementation include:

- Refine safety performance monitoring and measurement activities
- Refine safety performance indicators and targets
- Review and enhance the process to ensure no service delivery operations are initiated in a changed environment before the change has been evaluated for safety impacts
- Develop criteria for SMS continuous improvement
- Refine and enhance internal SMS assessment activities
- Develop, deliver, and document training on Safety Assurance
- Communicate the completion of Safety Assurance tasks to relevant MBTA personnel
- Measure employee perceptions of safety and culture at the MBTA, communicate the results, and take actions related to safety culture improvement

1 INTRODUCTION

The Massachusetts Bay Transportation Authority (MBTA) Transit Safety Plan is a comprehensive document intended to ensure the safety of customers, employees, contractors, emergency responders, and the general public.

MBTA is committed to developing forward-thinking innovation in managerial and technical safety processes. To that end, this Transit Safety Plan establishes Safety Management Systems (SMS) principles as its foundation. The four Safety Management System (SMS) components that apply to all facets of the Authority are:

1) **Safety Policy:** to align the entire MBTA under a safety management system for the purpose of prioritizing safety in management decision making.
2) **Safety Risk Management (SRM):** to implement processes that will identify, evaluate, and resolve risks; and track risk mitigations.
3) **Safety Assurance (SA):** to oversee that all the objectives are met through effective data collection and assessment.
4) **Safety Promotion:** to encourage workplace and public confidence in, knowledge of, and engagement with MBTA's commitment to ensuring safety.

These four components are the means to achieve the highest level of safety for MBTA's customers, employees, contractors, emergency responders, and the general public. Figure 1 provides a graphical view of the principal sets of processes of SMS: SRM and SA. Chapter 5 and 6 of this Safety Plan details the two processes of SRM and SA, respectively.

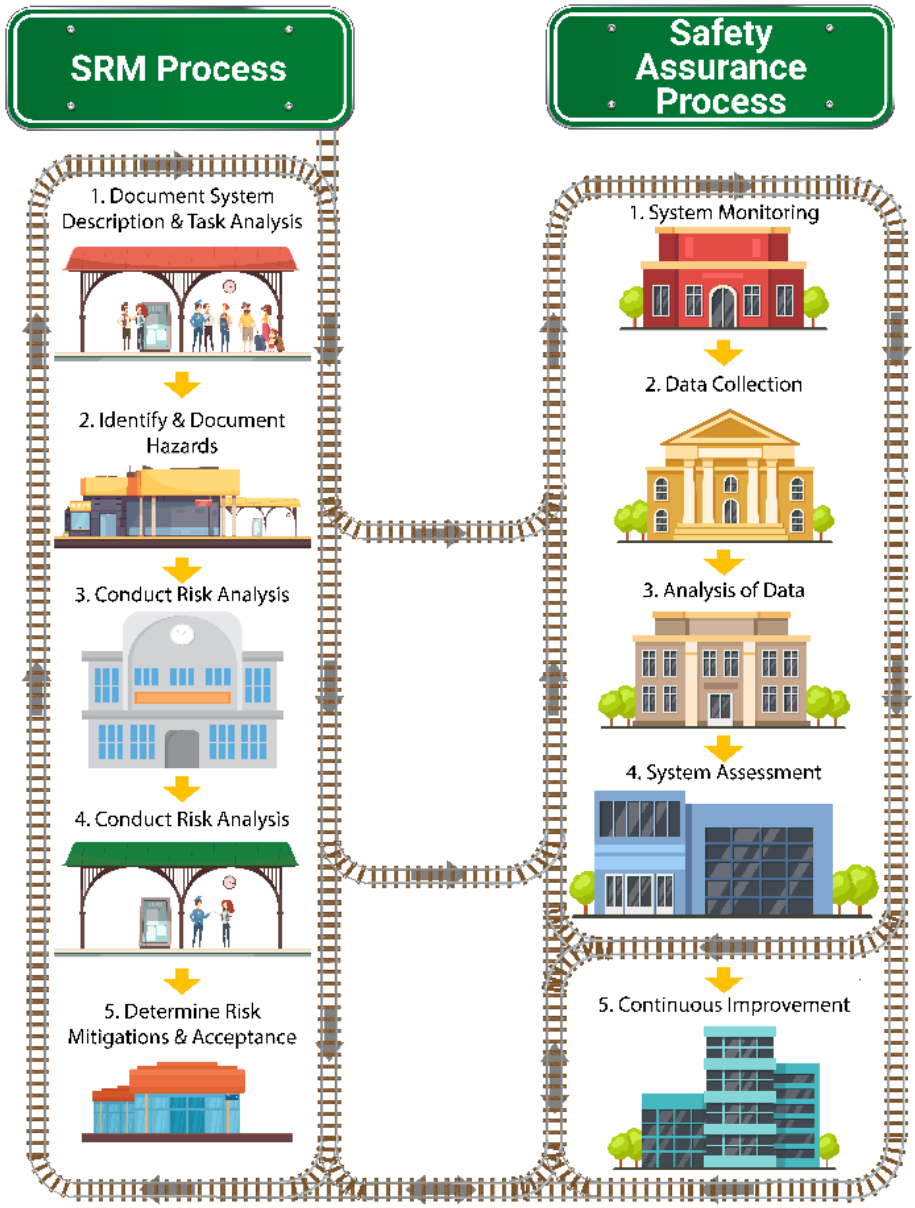

Figure 1: Safety Management Decision-making Process

SMS is a comprehensive, collaborative approach that brings management and labor together to build on MBTA's existing safety foundation to mitigate risk, detect and correct safety problems earlier, share and analyze safety data more effectively, and measure safety performance more carefully. SMS applies resources to risk and is based on ensuring that MBTA has the organizational infrastructure to support decision-making at all levels regarding the assignment of resources.

1.1 MBTA Transit Safety Plan Purpose

The MBTA Transit Safety Plan governs and defines the authority, responsibilities, roles, and processes prescribed herein. It assures compliance with and application of federal, state, and local regulations as well as industry best

practices. The MBTA Transit Safety Plan, and resulting safety programs, policies, rules, orders, implementation and processes, represents MBTA's commitment to safety as a core value.

1.2 MBTA Transit Safety Plan Scope

The scope of the Transit Safety Plan spans all facets of safety management to systematically achieve the highest practical level of safety for MBTA's transit system. All MBTA employees contribute to safety. This Plan is intended for use by all employees.

MBTA Safety have certain duties for which they have received in-depth specific training, but they alone cannot build safety into all facets of MBTA's operations. It is the responsibility of each employee to consider safety in all of their actions, and to report potential hazards to your supervisor detailing any analysis and correction.

The MBTA Safety Management System (SMS) applies to all MBTA employees, managers, relevant contractors and related service providers who are either directly or indirectly involved in providing transportation services. This includes MBTA bus, paratransit, ferry, and light and heavy rail activities including but not limited to operations, engineering, maintenance, administration, design, and construction; and including all equipment, vehicles, systems, sub-systems, and infrastructure.

1.3 Federal, State, and Local Authority

The Federal Transit Administration (FTA) administers a national transit safety program and program compliance oversight process to advance the provision of safe, reliable, and equitable transit service through adherence with legislative, policy and regulatory requirements.

In April 2005, the U.S. Congress expanded FTA's regulatory role by granting authority to develop State Safety Oversight Programs, as defined by 49 CFR Parts 659 and 674, *"Rail Fixed Guideway Systems; State Safety Oversight."*

In July 2012, Congress passed Moving Ahead for Progress in the 21st Century Act ("MAP-21"; Pub. L. 112-141), which created a new Public Transportation Agency Safety Program, and brought about major safety-specific changes to all modes of the transit industry. The key elements of the program include 49 U.S.C. § 5326, "Transit Asset Management" and 49 U.S.C. § 5329, "Public Transportation Safety Program," which resulted in the following FTA rulemakings:

- 49 CFR 625, "*Transit Asset Management*" (final rule effective October 1, 2016)
- 49 CFR 670, *"Public Transportation Safety Program"* (final rule effective September 12, 2016)
- 49 CFR 672, *"Public Transportation Safety Certification Training Program"* (final rule effective August 20, 2018)
- 49 CFR 673, *"Public Transportation Agency Safety Plan"* (final rule effective July 19, 2019)
- 49 CFR 674, *"State Safety Oversight"* (final rule effective April 15, 2016)

49 CFR 673, *"Public Transportation Agency Safety Plan,"* formally requires public transportation systems to develop a Public Transportation Agency Safety Plan based on the Safety Management System approach. The development and implementation of safety plans will help ensure that public transportation systems are safe nationwide.

1.3.1 State Safety Oversight: Massachusetts Department of Public Utilities (DPU)

FTA recognizes DPU as the State Safety Oversight Agency (SSOA) for the state of Massachusetts.[2] M.G.L. c. 161A, s. 3(i) empowers the Massachusetts Department of Public Utilities (DPU) to regulate the safety of equipment and operations at MBTA as prescribed in 220 C.M.R. 151.00, et seq., "*Rail Fixed Guideway System: System Safety Program Standard.*"

DPU exercises jurisdiction over safety of equipment and operations of MBTA and is responsible for establishing standards for rail safety practices. In addition, DPU oversees the execution of these practices and procedures to ensure compliance by utilizing a broad range of tools and powers.

MBTA is required to develop and implement the MBTA Transit Safety Plan to comply with 49 CFR Parts 673 and 674 and 220 CMR 151.00, subject to acceptance by DPU and ultimately FTA.

MBTA's relationship with its SSOA, DPU, is a safety partnership on many levels through regulation and collaboration. DPU and MBTA's Chief Safety Officer (CSO) meet at least monthly. DPU and MBTA management meet at least quarterly and DPU meets at least annually with the Accountable Executive and Board of Directors, or equivalent authority.

1.4 Plan Revisions

The MBTA Transit Safety Plan will be reviewed using the following internal review process on an annual (once per year) basis as required by regulation.

1.4.1 MBTA Transit Safety Plan Internal Review

MBTA makes all reasonable efforts to adhere to the MBTA Transit Safety Plan internal review process. The process ensures executive management has reviewed the MBTA Transit Safety Plan before any changes are submitted to DPU.

1.4.1.1 Safety Management Review Committee (SMRC) Review

- The SMS Implementation Team submits the MBTA Transit Safety Plan for review to the SMRC for any comments and/or corrections.
- Upon receiving comments and/or corrections, the SMS Implementation Team will review and update the Safety Plan as applicable.

1.4.1.2 Accountable Executive Review and Signature

- The CSO submits the updated Safety Plan to the Accountable Executive for review and signature.
- Upon receiving comments and/or corrections from the Accountable Executive, the SMS Implementation Team will update the Safety Plan and submit the updated Safety Plan to the Accountable Executive for approval and signature.
- MBTA's Accountable Executive provides certification of compliance with 49 CFR Part 673 and 220 CMR 151 by signing this Transit Safety Plan (and subsequent revisions) and providing the date of their signature as the certification date.

[2] Refer to 49 CFR 674, *"State Safety Oversight"* for detailed regulatory information.

1.4.1.3 Fiscal & Management Control Board (FMCB) Review and Approval

- The Safety Plan is submitted to the FMCB for review and approval before it can be formally submitted to the DPU.
- Upon receiving comments and/or corrections from the FMCB, the SMS Implementation Team will update the Safety Plan, inform the ESC and SMRC of any changes, submit the updated Safety Plan to the Accountable Executive for approval and signature, and then submit the signed, updated Safety Plan for FMCB approval.[3]

1.4.2 DPU Safety Plan Review and Approval

The Safety Plan internal review process must meet mandatory deadlines set by DPU.

1.4.2.1 Annual Review Cycle

- On or before September 1st, annually, MBTA submits an updated Safety Plan, and any accompanying procedures/references, for review and approval by DPU. The Authority may request an extension of the deadline for submission, which may be granted or denied at the discretion of DPU.

  MBTA must include an identification and explanation of any and all changes. If there are no updates required, MBTA notifies DPU in writing before September 1st.

1.4.2.2 Review and Approval

- Within fifteen (15) calendar days of receipt of the initial and revised MBTA Transit Safety Plan, DPU will issue a response that it approves, conditionally approves, or is unable to approve the Plan, along with the checklist used to review the MBTA Transit Safety Plan. DPU and MBTA reviews these objections and alternatives and agree on an appropriate course of action within twenty (20) calendar days from notice of rejection. The DPU may grant an extension beyond the 20 days for good cause shown.
- If the DPU is unable to approve a final document, or to resolve a dispute with the MBTA resulting from the development of the document, the DPU must either:
  1. Report the areas of disagreement in writing to, and negotiate with, the MBTA until the dispute is resolved;
  2. Develop its own document according to the requirements of the relevant section, and submit it to the MBTA for implementation; or
  3. Issue any Order that it deems necessary.

1.4.2.3 Modification Requests

Written modification requests may arise outside of the annual review cycle. Modification requests may come from:

[3] Absent new legislative action directing otherwise, the FMCB will cease operations on June 30, 2021, at which time governance of MBTA will revert to the MassDOT Board of Directors. The MassDOT Board of Directors will be informed of the FMCB's role and responsibility in this Safety Plan. Future updates to this Transit Safety Plan will reflect MBTA's governance under the MassDOT Board of Directors.

- DPU, due to internal audit report results, on-site reviews and investigations, changing trends in accident/incident or security data, or other reasons that may come to the attention of DPU.
- MBTA management, where changes identified will require modification of the MBTA Transit Safety Plan outside the annual review cycle, such as organizational changes or reassignment of functional responsibilities.

Within thirty (30) calendar days of the event prompting the modification request, MBTA must submit any Safety Plan changes to DPU for approval in electronic format via email. If MBTA objects to the request change, it must state its objection and suggest alternatives within thirty (30) calendar days.

1.4.3 **Safety Plan Review Process Flowchart**

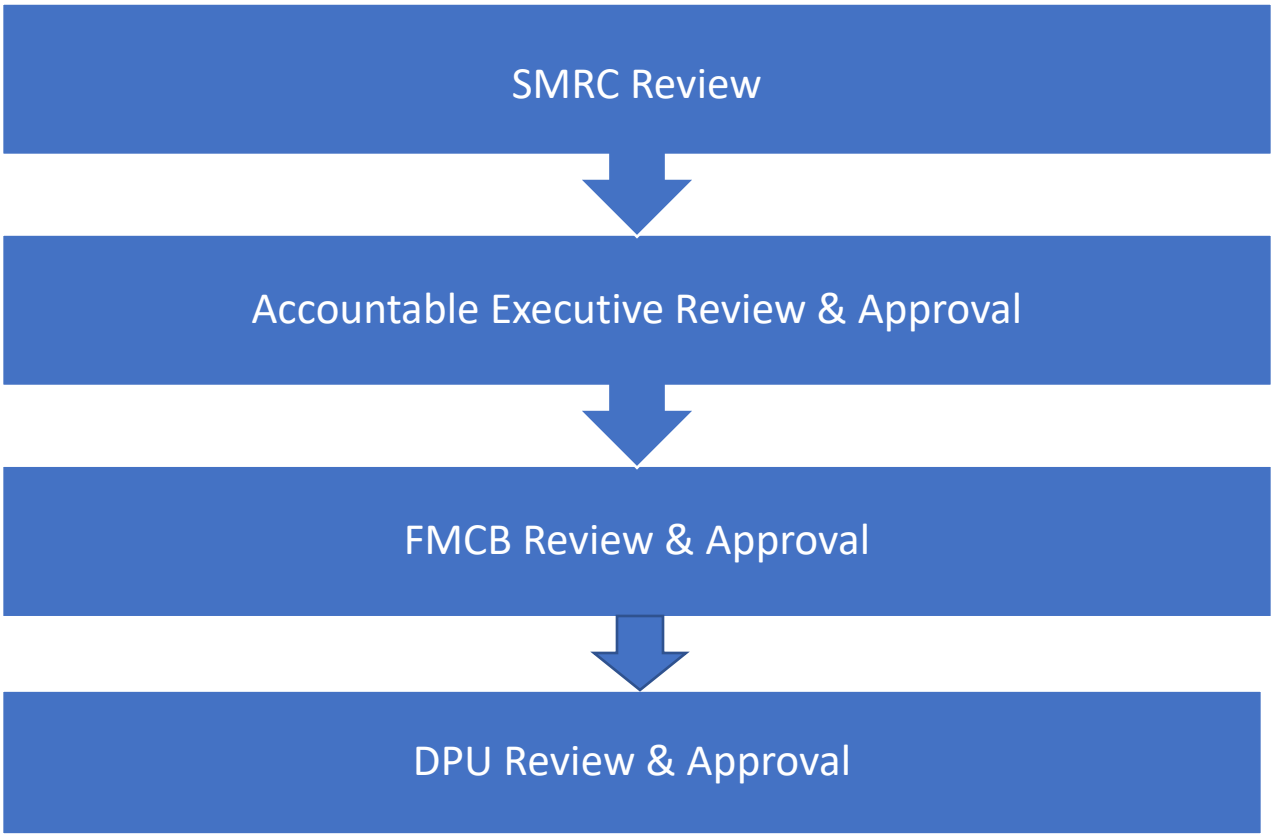

Figure 2: Transit Safety Plan Review Process

1.4.3.1 Method of Delivery

The Safety Plan will be delivered to DPU in electronic format via email. Once the Safety Plan has been approved by DPU, MBTA must submit a copy to DPU in an unalterable format (electronic or hard copy). Supporting procedures and referenced materials may be submitted in hard copy.

2 SMS POLICIES AND DOCUMENTATION

Safety is a core value at the MBTA- it is considered by every employee in every decision being made. Safety policies provide the foundation for an effective Safety Management System (SMS). MBTA uses safety policies, safety risk management, safety assurance, and safety promotion components to deliver safe and reliable service to its communities and customers. Every safety policy developed considers how it will impact the culture at MBTA. MBTA is committed to improving its safety culture through implementation and support of a formal SMS.

2.1 Safety Culture

MBTA defines its culture as the product of the individual and group values, attitudes, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety programs. Organizations with a positive safety culture are characterized by communications founded on mutual trust, shared perceptions of the importance of safety, and confidence in the efficacy of preventative measures. Culture consists of psychological (how people think), behavioral (how people act), and organizational elements.

It is the intention of senior management to institute a positive safety culture throughout the organization. In order to accomplish this all employees must be responsible for, and consider the impact of, safety in everything they do. This way of thinking must be so deep-rooted that it truly becomes the "MBTA culture." All decisions must consider the implications on safety. This culture will set the boundaries for acceptable behavior at MBTA.

As part of its SMS implementation, MBTA will measure its safety culture through the use of surveys, or an equivalent method. Having a baseline understanding of employee's perception of safety at the MBTA will help management understand what components of the SMS should be improved and where MBTA may be having success in implementing a positive safety culture.

2.1.1 **Reporting Culture**

Management and operational personnel freely share critical safety information without the threat of punitive action. Personnel are able to report hazards or safety concerns as they become aware of them, without fear of sanction or embarrassment.

2.1.2 **Learning Culture**

Learning throughout MBTA is seen as more than a requirement for initial skills training; rather it is valued as a lifetime process. People are encouraged to develop and apply their own skills and knowledge to enhance organizational safety. Employees are updated on safety issues by management, and safety reports are fed back to employees so that everyone can learn the pertinent safety lessons.

2.1.3 **Informed Culture**

Management intends to foster a culture where people understand the hazards and risks inherent in their areas of operation. Personnel are provided with the necessary knowledge, skills, and job experience to work safely, and they are encouraged to identify the threats to their safety and to seek the changes necessary to overcome them.

2.1.4 **Just Culture**

A *just* culture is described as an atmosphere of trust in which people are encouraged, and even rewarded, for providing essential safety-related information, but also are clear about where the differences between acceptable and unacceptable behavior.[4] Throughout MBTA's SMS implementation, employees should begin to perceive that atmosphere of trust for coming forward with safety concerns and issues.

While a non-punitive environment is fundamental for a good reporting culture, all employees must know what is acceptable and what is unacceptable behavior.[5] Reckless, or intentional violations will not be tolerated, even in the non-punitive environment. MBTA's just culture will recognize that, in certain circumstances, there may be a need for punitive action and management will define the line between acceptable and unacceptable actions or activities.

Unacceptable behavior is defined as:

- Criminal Activity;
- Substance Abuse;
- Use of Prohibited Substances;
- Falsification of employee report; or
- *Willful* Disregard for Safety.

Safety culture is the product of personal dedication and accountability to all employees. Individual efforts alone do not necessarily result in the desired outcome. MBTA realizes that a positive safety culture only develops with an aggregate attitude that is manifested by a pervasive type of safety thinking. This type of organizational thinking will permit employees to have an inherently questioning attitude, a resiliency to complacency, a commitment to excellence, and a sense of personal accountability. Senior management provides a vibrant, encouraging atmosphere in which individual growth is recognized and rewarded.

In order to further promote a positive safety culture throughout MBTA, senior management has instituted an employee SMS recognition program (Safety Awards) to honor individuals who make a significant contribution to safety.

2.2 MBTA Strategic Plan

The MBTA Strategic Plan is a blueprint for continuous improvement that will fulfill the vision of the MBTA that is needed to support the region's broader goals.

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[4] See James Reason (1997), Managing the Risks of Organizational Accidents.
[5] Different MBTA departments have specific rulebooks that address prohibited acts for employees.

Figure 3 documents the different safety plans that work together to inform one another and support the FMCB's MBTA Strategic Plan.

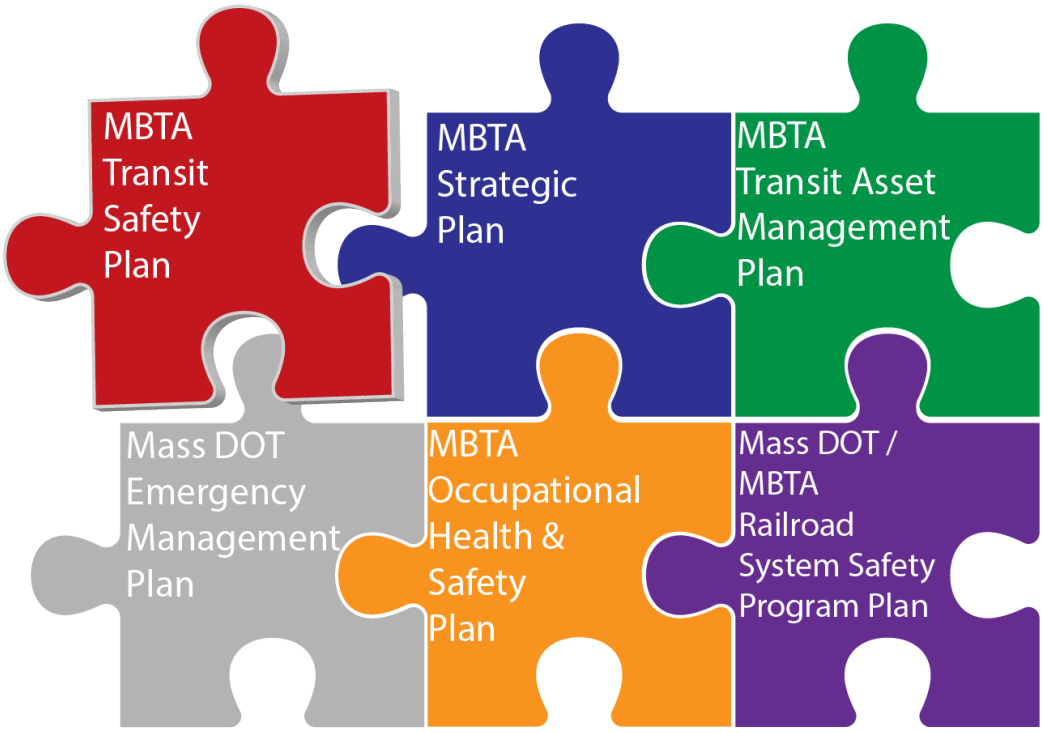

Figure 3: MBTA Safety-Related Plans

2.3 Emergency Preparedness and Response

While MBTA has taken every precaution to avoid emergency events and situations, it is inevitable that incidents/accidents may still occur. In order to deal with these unexpected situations in a predefined manner, an Emergency Management Plan (EMP) has been developed and is maintained by the MassDOT/MBTA Security Department. Furthermore, facility evacuation procedures are located on-site across the MBTA.

Transit evacuation drills take place at least annually at the MBTA. Coordination between MBTA departments and first responders provides a proactive approach to effectively managing safety risks. Lessons learned from real and simulated evacuations are reviewed for ineffective risk mitigations, which initiates the Safety Risk Management process described in Chapter 5 of this Transit Safety Plan.

The MBTA EMP satisfies FTA's requirement to include or incorporate by reference an emergency preparedness and response plan or procedures that addresses, at a minimum, the assignment of employee responsibilities during an emergency; and coordination with Federal, State, regional, and local officials with roles and responsibilities for emergency preparedness and response in the transit agency's service area.

2.4 Transit Asset Management Plan

MBTA's Transit Asset Management (TAM) Plan describes: the capital asset inventory; condition of inventoried assets; TAM performance measures, targets, and prioritization of investments aligned with the agency's TAM and State of Good Repair (SGR) policy, strategic goals and objectives; as well as the strategies, activities, and

resources required for delivering the plan (including decision support tools and processes); and other agency-wide approaches to continually improve TAM practices. Figure 4 is an infographic FTA created to illustrate the nexus between TAM and SMS components.

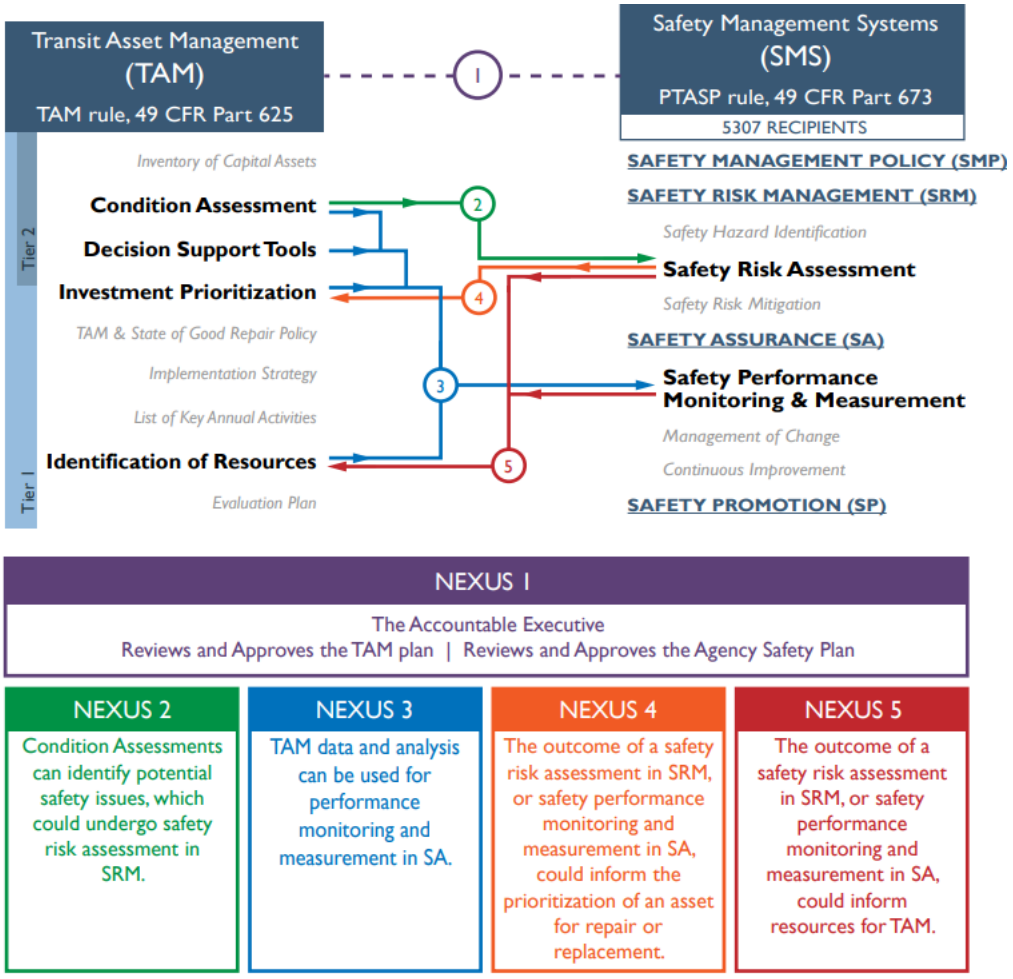

Figure 4: FTA's TAM – SMS Infographic

2.5 Occupational Health and Safety Plan

MBTA has transformed its occupational health and safety programs as part of Accountable Executive initiatives and state legislation requiring MBTA to comply with Federal OSHA standards. As MBTA implements SMS, occupational health and safety programs will also be implemented using SMS processes and procedures documented in this Plan. MBTA developed an Occupational Health & Safety (OHS) Plan and is located on the MBTA Intranet. MBTA describes workplace safety programs, such as Hazardous Communication/Materials, in the OHS Plan. The Massachusetts Department of Labor Standards provides oversight to workplace safety programs and the OHS Plan.

2.6 MassDOT/MBTA Railroad System Safety Program Plan

MassDOT/MBTA's Railroad System Safety Program Plan is regulated under 49 CFR Part 270 and is not subject to review by the Federal Transit Administration, however, it is important to note MBTA's different safety plans and how they interact with one another.

2.7 Documentation and Records Management

MBTA maintains critical files, important, records, and other information as dictated by regulatory compliance and good operating practice. These files are maintained using hard copy and/or electronic files. All records are maintained in structured systems that provide legibility, original dates, revision dates, and easy retrieval.

49 CFR 673.31 requires a transit agency to maintain documents related to this Safety Plan, including those related to the implementation of the SMS, and results from SMS processes and activities, for a minimum of three years after they are created. FTA, any other Federal entity, and the DPU have access to any SMS documentation maintained by the MBTA, upon request. Regulatory agencies may perform on-site visits to review any SMS documentation.

Table 1 lists SMS records that are retained in accordance with state and federal standards:

SMS Record	Bus/Rail Transit Unit Interfaces	Key Reports or Actions Required
Internal Safety Audits	All	Final Internal Audit/Review Report, which is submitted to DPU annually.
Reporting Data to NTD	TPD	Electronically submitted to NTD monthly and certified for accuracy annually.
Annual Revision of MBTA Transit Safety Plan	GM	MBTA Transit Safety Plan submitted to DPU.
Safety Data Analysis Report (SDAR)	All MBTA management	SDARs are distributed to all MBTA management monthly.
Emergency Management Plan	All	MBTA's emergency preparedness and response plan.
Transit Asset Management (TAM) Plan	All	MBTA TAM Plan certified by the Accountable Executive.
Board Monthly Safety Report	GM, Legal, FMCB	Monthly report detailing high-level safety data, significant incidents/injuries, State of Good Repair, and regulatory updates
Safety Certification of Capital Infrastructure Projects	Capital Delivery, and other affected departments	Certification letter sent to MBTA GM at completion of project including final signed Certified Items List (CIL) and open items log.
Safety Certification of Systems and Vehicle Procurements and Overhauls	Vehicle Engineering, and other affected departments	Certification letter sent to MBTA GM prior to system or vehicle entering revenue service. Signed CIL completed and Certificates of Conditional Safety Certification completed for each vehicle.
Root Cause Analysis	Transportation, E&M, CD, Vehicle Maintenance	Conducted for certain safety event investigations. Safety works with other departments to develop report and attainable corrective actions.

SMS Record	Bus/Rail Transit Unit Interfaces	Key Reports or Actions Required
Assessments	SMWGs as applicable	Formal reports are finalized and retained, or submitted to other departments, DPU, or outside agencies as applicable.
SRM Outputs/Products	SMWGs as applicable	Formal reports are finalized and retained, or submitted to other departments, DPU, or outside agencies as applicable.
Accident/Incident/Injury Investigation	Transportation, E&M, CD, Vehicle Maintenance	Formal deliverables are submitted to DPU (or DLS, for employee injuries) through a preliminary notification within one business day and a final report submitted with sixty days.
Respond to FTA and NTSB advisories and regulations	SMWGs as applicable	Formal responses are submitted to DPU and/or the relevant federal or state agency.

Table 1: SMS Documentation and Recordkeeping

2.8 Temporarily Suspending Safety Programs

In the case of unforeseen circumstances (e.g. COVID-19) that interfere with MBTA's ability to perform safety activities described in this Transit Safety Plan, MBTA may take the unusual step of temporarily suspending a Safety Program (e.g. Safety Rules Compliance Program). MBTA will notify DPU within two business days of any safety-related program suspension. An explanation will be provided to DPU as to why a particular Safety Program is suspended. A plan will be developed within 30 calendar days of Safety Program suspension to understand when MBTA may be able to proceed with its Safety Program requirements.

3 SAFETY PERFORMANCE

FTA has established safety performance criteria standards in the National Public Transportation Safety Plan (fatalities, injuries, safety events and system reliability) that all transit agencies must meet at a minimum. This section of the Safety Plan establishes the safety performance targets.

3.1 MBTA Safety Performance Targets

The MBTA Transit Safety Plan provides collaborative, strategic, and management performance objectives to affirm and execute its commitment to provide a safe, reliable, and sustainable regional transportation service, and ensures compliance with federal, state, and local regulations and appropriate industry best practices.

MBTA safety performance targets assist management in determining the status of the SMS. Safety performance targets will be reviewed monthly in the Safety Data Analysis Report (SDAR) and quarterly at the SMRC. The SMRC determines if the performance is adequate or if corrective actions/additional resources are necessary to ensure targets are being met. The Accountable Executive reviews the Safety Plan and incorporates safety performance targets annually for approval.

Operations and maintenance departments will be establishing performance commitments that are discussed in the relevant appendices. Subsequent versions of this Safety Plan will set safety performance targets that each department will strive to achieve.

Table 2 provides information on the safety performance targets MBTA sets for Calendar Years (CY) 2021 & 2022:

Safety Performance Targets

Safety performance targets based on the safety performance measures established under the National Public Transportation Safety Plan.

Calendar Year 2021

Mode of Transit Service	Fatalities (Total)	Fatalities (Rate per 1 million revenue miles)	Injuries (Total)	Injuries (Rate per 1 million revenue miles)	Safety Events (Total)	Safety Events (Rate per 1 million revenue miles)	System Reliability (Revenue miles traveled per major mechanical failure)
Heavy Rail	0	0	221	9.45	24	1.00	47,000
Light Rail	0	0	100	17.25	34	5.83	7,000
Bus	0	0	367	15.50	142	6.00	18,000
The RIDE[6]	0	0	36	2.30	37	2.22	66,000

Calendar Year 2022

Mode of Transit Service	Fatalities (Total)	Fatalities (Rate per 1 million revenue miles)	Injuries (Total)	Injuries (Rate per 1 million revenue miles)	Safety Events (Total)	Safety Events (Rate per 1 million revenue miles)	System Reliability (Revenue miles traveled per major mechanical failure)
Heavy Rail	0	0	195	8.46	23	1.00	47,500
Light Rail	0	0	84	14.70	31	5.58	7,500
Bus	0	0	324	14.00	120	5.21	25,000
The RIDE	0	0	27	1.91	26	1.99	60,000

Table 2: Summary of Safety Performance Targets for CY2021 & 2022

[6] The RIDE is MBTA's door-to-door, shared-ride paratransit service. The RIDE is operated by the MBTA in compliance with the Americans with Disabilities Act (ADA). Demand-response service and paratransit service are synonymous with The Ride in this Safety Plan.

The following safety performance measures are not an exhaustive list of all MBTA safety-related performance indicators, but includes the agency's overarching goals:

3.1.1 Safety Performance Measure: Fatalities

MBTA fatality rates vary across transportation modes due to distinct operating environments and the inherent safety risk exposure associated with each. MBTA is committed to reducing the number of fatalities across its system to zero. Every year, MBTA partners with Operation Lifesaver, which is a national nonprofit dedicated to educating the public on the dangers of trespassing on railway properties, with the goal of reducing the number of collisions, fatalities, and injuries on or near railroad tracks. In addition to partnering with Operation Lifesaver, MBTA partners with Samaritans, a nonprofit dedicated to preventing suicides. MBTA continues to invest in proactive solutions to reduce the number of fatalities to zero.

Fatalities are reported to the National Transit Database (NTD) and are defined as a death due to a collision, derailment, fire, hazardous material spill, act of God, personal security event, or other safety events. Fatalities that occur due to an illness or other natural causes are not reportable. In accordance with FTA guidance, trespassing and suicide-related fatalities are also excluded for this fatality safety performance measure. Table 3 presents MBTA's average number of fatalities, and average rate of fatalities per 1,000,000 revenue miles traveled over the past three years.

Fatality Performance Targets						
Mode	Three-Year Total Number of Fatalities[7]	Performance Target Count for CY2021	Performance Target Count for CY2022	Rate per 1 Million Vehicle Revenue Miles	Performance Target Rate for CY2021	Performance Target Rate for CY2022
Heavy Rail	0	0	0	0	0	0
Light Rail	0	0	0	0	0	0
Bus	1	0	0	0.06	0	0
The RIDE	0	0	0	0	0	0

Table 3: Fatality Safety Performance Targets

3.1.2 Safety Performance Measure: Injuries

Any harm to persons that requires immediate medical attention away from the scene because of a reportable event is considered to be a reportable injury. MBTA reports to the National Transit Database (NTD) anytime a person is transported away from the scene for medical attention as an injury, whether or not the person appears to be injured. For the purpose of this performance measure, injuries resulting from assaults and other crimes has been excluded.

[7] At the time of performance target development, data available included 2018 thru 2020 statistics.

For rail mode events, in addition to injuries requiring transport from the scene, injuries defined as serious are automatically reportable. Individuals with serious injuries may or may not have been transported away from the scene for medical attention. NTD defines a serious injury as one that:

- Requires hospitalization for more than 48 hours within 7 days of the event;
- Results in a fracture of any bone (except simple fractures of fingers, toes, or nose);
- Causes severe hemorrhages, or nerve, muscle, or tendon damage;
- Involves an internal organ; or
- Involves second- or third-degree burns, or any burns affecting more than five percent of the body surface.

For Bus and other non-rail events, if an individual seeks medical care several hours after an event or in the days following an event, that individual is not reportable as an injury. A reportable injury requires that the individual receive medical attention at a location other than the location at which the event occurred. This distinction serves to exclude minor first aid or other minor medical assistance received at the scene.

Table 4 presents MBTA's average number of reportable[8] injuries, and average rate of reportable injuries per 1,000,000 revenue miles traveled over the past three years. The performance target for MBTA's CY2022 is set using a 2% reduction in the average rate of reportable injuries per revenue miles traveled.

Injury Performance Targets						
Mode	Three-Year Average Total Number of Reportable Injuries[9]	Performance Target Count for CY2021	Performance Target Count for CY2022	Three-Year Average Rate per 1 Million Vehicle Revenue Miles	Performance Target Rate for CY2021	Performance Target Rate for CY2022
Heavy Rail	199	221	195	8.62	9.45	8.46
Light Rail	86	100	84	15.00	17.25	14.70
Bus	330	367	324	14.29	15.5	14.00
The RIDE	27	36	27	1.95	2.3	1.91

Table 4: Injury Safety Performance Targets

MBTA safety committees (e.g., Data Analysis Group (DAG)) continually meet to identify trends and analyze data to support injury reduction. Through Occupational Health and Safety (OHS) initiatives in the workplace, MBTA invests significant resources in employee health and safety.[10]

3.1.3 **Safety Performance Measure: Safety Events**

NTD defines a safety event involving one or more of the following:

[8] Further information regarding the thresholds for "reportable" injuries are defined in the NTD Safety and Security Reporting Manual.
[9] At the time of performance target development, data available included 2018 thru 2020 statistics.
[10] Refer to the MBTA OHS Plan for further details regarding workplace safety initiatives and performance targets.

- Collisions
- Fires (suppression)
- Derailments (mainline and yard) including non-revenue vehicles
- Hazardous Material Spills
- Acts of God
- Other Safety Events (events that do not fall into any of the other categories, yet meet a reporting threshold other than immediate transport for medical attention for one person)[11]

The safety events measure captures events meeting NTD reporting thresholds occurring on MBTA right-of-way or infrastructure, at a revenue or maintenance facility, rail yard, during the performance of maintenance activities or involving a transit revenue vehicle. The NTD reporting thresholds include fatalities, injuries requiring immediate medical attention away from the scene, derailment, substantial damage, and evacuation for life safety reasons.

Table 5 presents MBTA's average number of safety events, and average rate of safety events per 1,000,000 revenue miles traveled over the past three years. The performance target for MBTA's CY2022 is set using a 2% reduction in the average rate of safety events per revenue miles traveled.

Safety Events Performance Targets						
Mode	Three-Year Average Total Number of Safety Events[12]	Performance Target Count for CY2021	Performance Target Count for CY2022	Three-Year Average Rate per 1 Million Vehicle Revenue Miles	Performance Target Rate for CY2021	Performance Target Rate for CY2022
Heavy Rail	24	24	23	1.04	1.00	1.00
Light Rail	32	34	31	5.69	5.83	5.58
Bus	122	142	120	5.32	6.00	5.21
The RIDE	27	37	26	2.03	2.22	1.99

Table 5: Safety Events Performance Targets

Through proactive and reactive safety risk management (SRM), MBTA strives to reduce the rate of safety events, which will support efforts to reduce fatalities and injuries, as well as damages to transit assets.

3.1.4 **Safety Performance Measure: System Reliability**

[11] The NTD Safety and Security Reporting Manual further define the term safety event and threshold reporting requirements.
[12] At the time of performance target development, data available included 2018 thru 2020 statistics.

The system reliability measure expresses the relationship between safety and asset condition. The rate of vehicle failures in service, defined as mean distance between major mechanical failures, is measured as vehicle revenue miles operated divided by the number of major mechanical failures.[13] MBTA continues to invest and plan for a highly reliable, safe operation of its public transportation system. As the Authority introduces new vehicles across all of its modes of transportation over the next several years, it is anticipated that there may be a burn-in period for the vehicles that results in a decrease of reliability. As such, MBTA will strive to maintain the highest level of system reliability for CY2022.

The following system reliability targets were calculated reviewing an average of major mechanical failures and revenue miles traveled from 2018 - 2020.

System Reliability Performance Targets		
Mode	Performance Target Rate for CY2021	Performance Target Rate for CY2022
Heavy Rail	47,000 revenue miles	47,500 revenue miles
Light Rail	7,000 revenue miles	7,500 revenue miles
Bus	18,000 revenue miles	25,000 revenue miles
The RIDE	66,000 revenue miles	60,000 revenue miles

Table 6: System Reliability Safety Performance Targets

3.1.5 Additional Safety Performance Measures

In addition to FTA-required safety performance targets, MBTA measures these specific event types such as:

- Derailments
- Collisions
- Fire/Smoke Events

MBTA uses the Safety Data Analysis Report (SDAR) to trend safety performance measures against their associated targets.

3.2 Safety and State of Good Repair

The State of Good Repair (SGR) standards are defined by the National Safety Program and National Transit Asset Management (TAM) System, found in 49 CFR Part 625. These set forth conditions when safety risk analysis must be performed on capital assets such as equipment, rolling stock, infrastructure, and facilities. MBTA documents safety performance objectives in the Transit Assessment Management (TAM) Plan based on this definition and make informed investments in order to strive for a State of Good Repair for all assets.

3.3 Coordination with MPOs

[13] Major Mechanical System Failures: Major mechanical system failures prevent a vehicle from completing or starting a scheduled revenue trip because actual movement is limited or because of safety concerns. Examples of major bus failures include breakdowns of brakes, doors, engine cooling systems, steering, axles, and suspension.

MBTA disseminates and makes available safety performance targets to MassDOT and Metropolitan Planning Organizations (MPOs) to aid in the planning process. MBTA coordinates safety performance targets with the Boston Region MPO to the maximum extent practicable to assist Massachusetts and MPOs with the selection of Commonwealth-wide and regional safety performance targets. MBTA will meet with MPOs on an annual basis for discussion of MBTA's safety performance targets.

4 ORGANIZATIONAL STRUCTURE & RESPONSIBILITIES

Effective implementation of SMS requires senior management's commitment to safety. Agency Leadership is committed to the goal of making MBTA as safe as it can be for everyone, starting with transforming the core values of the organization into a positive safety culture.

4.1 Key Safety Management Responsibilities

4.1.1 Fiscal and Management Control Board (FMCB)

The Fiscal and Management Control Board (FMCB) consists of members with diverse backgrounds and experiences. The goals of the FMCB target governance, finance, agency structure, operations, and safety through recommended executive and legislative actions. The FMCB is the Board of Directors' equivalent authority that approves the Safety Plan.

Absent new legislative action directing otherwise, the FMCB will cease operations on June 30, 2021, at which time governance of MBTA will revert to the MassDOT Board of Directors. The MassDOT Board of Directors will be informed of the FMCB's role and responsibility in this Safety Plan. Future updates to this Transit Safety Plan will reflect MBTA's governance under the MassDOT Board of Directors.

The FMCB is required to approve the Safety Plan and its subsequent revisions using written verification.[14]

4.1.2 Accountable Executive

The Accountable Executive, General Manager of the MBTA, is responsible for reviewing and approving the Safety Plan, ensuring there is sufficient human and capital resources to develop and maintain the Safety Plan, adoption of safety performance objectives, reviewing ongoing safety data reports, reviewing summary reports related to safety events, and overseeing MBTA's safety management system (SMS). The Accountable Executive is accountable for ensuring action is taken to address substandard performance in MBTA's SMS.

The Accountable Executive may delegate risk management decisions to senior management; however, they are ultimately responsible for accepting safety risks or hazards at MBTA. Only the Accountable Executive may accept residual risk factors that are considered Unacceptable in relation to MBTA's safety risk acceptance criteria.

4.1.3 Chief Safety Officer

The GM has delegated to the Chief Safety Officer (CSO) the authority and responsibility to govern, administer, oversee, and monitor the safety plans and resulting safety programs, policies, rules, orders, implementation, and processes. The CSO reports directly to the Accountable Executive on matters related to MBTA's SMS.

The CSO collaborates with MBTA management to ensure safe work practices, and interfaces with federal, state, and local authorities, and industry professional organizations. The CSO does not serve in other operational or maintenance capacities.

When an immediate and serious safety risk exists, the CSO has the authority and responsibility to order hazardous conditions corrected to acceptable levels or eliminated altogether. Accordingly, the CSO is also empowered to

[14] *E.g.,* meeting minutes, video evidence of approval, etc.

order the cessation of unsafe activities or operations that are evaluated as creating immediate and serious safety risks within the system. The CSO is authorized to conduct mandatory internal safety audits to determine conformance with this Safety Plan. The CSO may also perform announced or unannounced audits, reviews, inspections, or assessments for the purpose of identifying and eliminating unsafe practices, operations, or conditions not immediately corrected by MBTA management.

4.1.4 **Agency Leadership**

Agency leadership, including direct reports to the General Manager, who oversee aspects of the organization that have a direct interface with safety-related matters include the following:

- Deputy General Manager
- Chief Administrative Officer
- Chief of Capital Programs
- Chief Legal Counsel
- Chief Operating Officer
- Chief of Transit Police

These individuals, including the Chief Safety Officer, also make up the Executive Safety Council (ESC).

Only the Accountable Executive and agency leadership may accept residual risk factors that are considered Undesirable in relation to MBTA's safety risk acceptance criteria.

4.1.4.1 Deputy General Manager

The MBTA Deputy General Manager is responsible for the complete oversight for all modes and all associated support departments for bus, paratransit, ferry, light, heavy and regional rail services. All operational and maintenance departments at the MBTA report to the Deputy General Manager.

4.1.4.2 Chief Administrative Officer

The MBTA Chief Administrative Officer (CAO) is responsible for MBTA's financial and administrative functions. The CAO oversees finance, human resources, labor relations, and other administrative departments.

4.1.4.3 Chief Operating Officer

The MBTA Chief Operating Officer (COO) is responsible for operational control of the public transportation system. The COO oversees bus and rail operations, job-specific training for transit operations, operations control centers, and maintenance activities related to the safe operation of MBTA vehicles. The COO is responsible for all Engineering & Maintenance (E&M) functions at MBTA. E&M is responsible for design, complying with the safety and security certification, workplace safety and supervision of E&M projects, system maintenance, improvement, and modernization programs associated with facilities, track, signals, communications, and power systems; contract administration; and station, facility, power, track, signal, communication, and security systems engineering and maintenance.

4.1.4.4 Chief of Capital Programs

The MBTA Chief of Capital Programs is responsible for helping program and project managers deliver the MBTA's Capital Investment Plan (CIP) with the goal of achieving on-budget and on-time performance. These investments include repair, modernization, expansion, and acquisition of the Authority's infrastructure, facilities, revenue vehicles and other capital investments including IT, fare collection, security and communications systems, non-revenue vehicles, major equipment and other capital investments.

4.1.4.5 Chief Legal Counsel

The MBTA Chief Legal Counsel provides strategic direction, business partnership, and day-to-day legal counsel, representation and support to the MBTA's General Manager and senior management team involving a broad range of complex legal, business and operations issues. The Chief Legal Counsel is responsible for all legal matters involving the MBTA as well as labor negotiations and contracts.

4.1.4.6 Transit Police Chief

The MBTA Transit Police Chief is responsible for providing public safety, security, and law enforcement services to MBTA. The MBTA Transit Police Department (TPD) is a civil service police department with full police powers within the cities and towns in the MBTA's service area.

4.1.5 **MBTA Executive Management**[15]

MBTA executive management is responsible for the implementation, success, and continual monitoring of the Safety Plan objectives and ensuring integration of SMS processes within all MBTA divisions, departments, working groups, committees, and activities. MBTA executive management personnel may serve as members of the SMRC, SMWGs, DAGs, and other relevant committees. They are responsible to continuously review safety performance and trends, assess and monitor identified risks, and recommend data-driven solutions in line with MBTA goals and objectives.

Only the Accountable Executive, agency leadership, and executive management may accept residual risk factors that are considered Acceptable with Risk Mitigation(s) and Monitoring in relation to MBTA's safety risk acceptance criteria.

4.1.6 **MBTA Field Management**[16]

MBTA field management reports to their department's executive management and may also be members of DAGs, Local Safety Committees, task teams, and roundtable discussions. At an individual level they are model examples of management committed to valuing safety and are expected to manage safety issues brought forth by employees and contractors on a daily basis. Field management is responsible for developing, implementing, and maintaining SMS processes within his/her area of responsibility which includes:

- Hazard identification and safety risk assessment
- Assuring the effectiveness of safety risk mitigations
- Promoting safety

[15] *E.g.*, chiefs, deputy chiefs, department managers, directors, and deputy directors.
[16] *E.g.,* facility managers, forepersons, inspectors, and field or facility supervisors.

- Reviewing and monitoring safety performance through data and trends
- Escalating issues that cannot be resolved and decisions that cannot be made at their level

When a safety concern is brought to management, the issue must be seriously considered and, if warranted, investigated. Thus, MBTA management is empowered to utilize safety risk management techniques and implement risk mitigation strategies to preserve safe operation of the system on a daily basis.

Only the Accountable Executive, agency leadership, executive management, and field management may accept residual risk factors that are considered Acceptable in relation to MBTA's safety risk acceptance criteria.

4.1.7 **MBTA Safety**

MBTA Safety staff are responsible for corporate oversight of the safety processes and objectives described within the Safety Plan, and for providing corporate safety guidance to MBTA management, labor, and contractors in working to achieve safety performance objectives.

4.1.8 **All MBTA Employees & Contractors**

All employees and contractors are responsible for safety within MBTA. Every employee, whether senior management or a new-hire, must consider the safety implications of everything she/he does. Employees are expected to promptly report any hazards, unsafe conditions, incidents, accidents or injuries while on the job through the appropriate investigation forms, the safety hotline number, or the safety notifications email address. Employees are also encouraged to submit safety recommendations for improvement without fear of reprisal or disciplinary action.

4.2 Safety Management Committee Structure

Safety communication is an essential SMS principle that establishes a two-way feedback loop between frontline employees and management about safety information. MBTA uses a committee structure to ensure communication is achieved at all levels of the Authority.

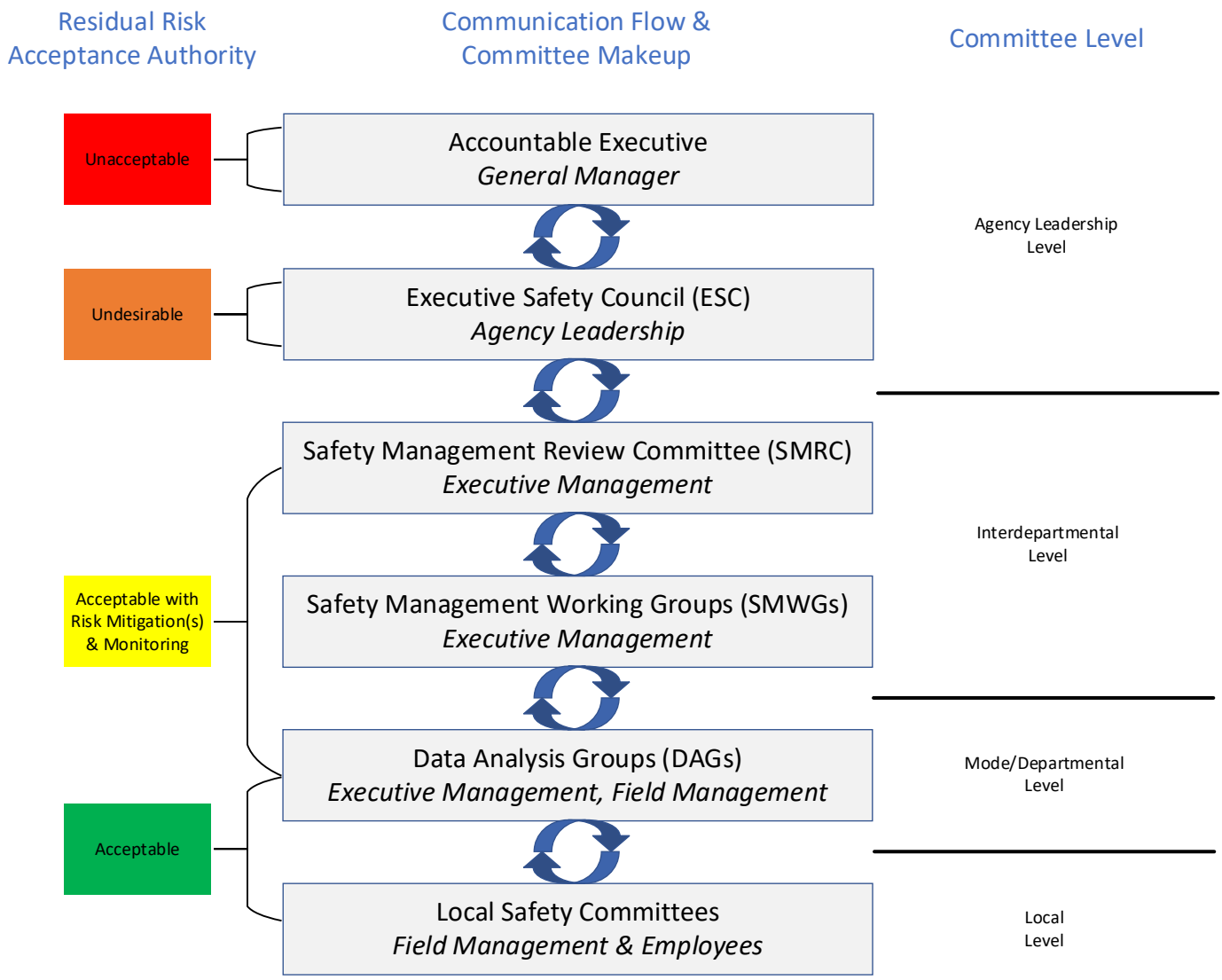

Figure 5: Safety Management Committee Structure

4.2.1 Executive Safety Council (ESC)

The Executive Safety Council (ESC), comprised of the CSO and agency leadership positions listed in Section 4.1, is the highest level safety committee at the MBTA. The purpose of the ESC is to ensure that all aspects of the Authority are informed of safety-critical matters and that safety is represented as a core value in the decision making process across the organization.

The ESC deliberates on the recommendations and requests for approval from the Safety Management Review Committee (SMRC) and evaluates the impact to all aspects of the Authority. The ESC updates the GM on all safety matters under review.

The ESC meets regularly (typically every quarter) and reports updates, recommendations, and requests for approval to the GM. The Chief Safety Officer (CSO) organizes, facilitates, and moderates the ESC meetings. The CSO meets regularly with the GM to communicate progress, decisions that have been made, requests for

approval/signature, and informs the GM of any emerging or unresolved issues arising during ESC or SMRC meetings.

4.2.2 **Safety Management Review Committee (SMRC)**

The purpose of the SMRC is to collaboratively review, discuss, analyze, and address safety concerns, findings, performance data, new regulations or programs, and other safety-related issues brought to them by the various working groups and committees as well as matters assigned to them by the ESC and/or the GM. The SMRC functions as the senior technical review of safety matters affecting or having the potential to affect the MBTA. The SMRC may direct the formation of committees and/or working groups to evaluate safety-related matters and report back to the SMRC.

The SMRC provides a summary of their review and recommendations to the ESC. Where Agency Leadership approval is required, the SMRC requests approval from the ESC. Similarly, the SMRC provides direction to SMWGs for implementation on safety issues that are within their sphere of influence.

The committee is facilitated by the Chief Safety Officer (CSO) and is comprised of high level executive management. The CSO ensures meeting agendas and minutes are documented and distributed, and safety items are logged, and resolutions are tracked. Representatives from interdepartmental working groups provide summary updates on issues and progress to the SMRC and submit proposed plans, procedures, policies, reports for review and approval.

The SMRC meets regularly (typically every month but the schedule may be adjusted based on needs) and reports updates, recommendations, and requests for approval to the ESC.[17]

4.2.3 **Safety Management Working Groups (SMWGs)**

SMWGs are interdepartmental level groups of executive management whose meetings are scheduled and facilitated by a Director (or equivalent) within Safety. They meet to discuss cross-departmental safety issues and to review findings, recommendations, and trends escalated from mode- and department-specific Data Analysis Groups (DAGs). The primary mission of each SMWG is to reinforce safety as a core value at the executive management level and demonstrate a commitment to SMS principles by: convening meetings to review and discuss issues related to the safety of operating vehicles and related facilities (e.g., NTSB recommendations; hazards); evaluating safety performance against stated objectives; making data-driven decisions and recommendations; ensuring implementation of the MBTA Transit Safety Plan; maintaining an action item matrix; recording meeting minutes; conducting reviews and safety assessments; developing solutions; and making recommendations to the SMRC.

4.2.4 **Data Analysis Groups (DAGs)**

DAGs are organized around a mode or departmental division – such as Rail, Bus, or Engineering & Maintenance – whose meetings are scheduled and facilitated by a Deputy Director within Safety. They meet to review safety performance indicators and trends that are aggregated by data analysts and that may be elevated from the Local

[17] Refer to the ESC and SMRC Charter for further information about committee organization and structure.

Safety Committee level. These groups, made up of a combination of departmental executive management, field management, and data analysts, review and analyze safety statistics against key performance indicator goals, safety performance objectives and targets, investigations and findings, risk assessments, corrective action plans, system changes, training offerings, and safety communications. When issues cannot be addressed at this level, or if they are determined to possibly affect multiple modes or departments, key findings from specific DAGs may be elevated to executive management in the SMWGs for further consideration or resolution as needed. Findings, decisions, and information that are produced as an output of DAGs are also distributed back down to Local Safety Committees for information sharing purposes with field management and frontline staff.

4.2.5 **Local Safety Committees**

Local Safety Committees are formed to discuss safety-related issues at the management-labor level, and are often organized around and held at a specific area, line, or facility. Regular meetings are scheduled and facilitated by the respective field management and/or their designee at employee locations and include supervisors, forepersons, officials, union representatives, and employees. Meeting minutes and action items are recorded and tracked by each respective department to resolution. Local Safety Committees address what they are able to and then raise concerns that cannot be resolved at this level or that are identified as a safety trend or performance issue to the appropriate DAG for further review. Local Safety Committees also act as a vehicle of communication to frontline employees by reporting out relevant information shared from higher level committees regarding hazards, risks, safety performance, and mitigations.

5 SAFETY RISK MANAGEMENT

Safety Risk Management (SRM) is a formal process to identify hazards and analyze, assess, and mitigate safety risk, when necessary, to prevent future accidents and incidents.

SRM identifies hazards and mitigates risk during operation, including hazards resulting from subsequent system extensions, modifications, operational or environmental changes, or hazards discovered during reviews, inspections, or investigations. The safety risk management process is reactive, proactive, and predictive. The process can also be used to prioritize the resulting process improvements to ensure the best allocation of our resources.

An effective safety risk management process is important in order to understand the safety impacts of operations and maintenance procedures, engineering change proposals, construction change orders, operational equivalencies, and the issuance of temporary permits and certificates. Hazard information will be managed through the entire safety risk management process as described in the left column in Figure 6.[18]

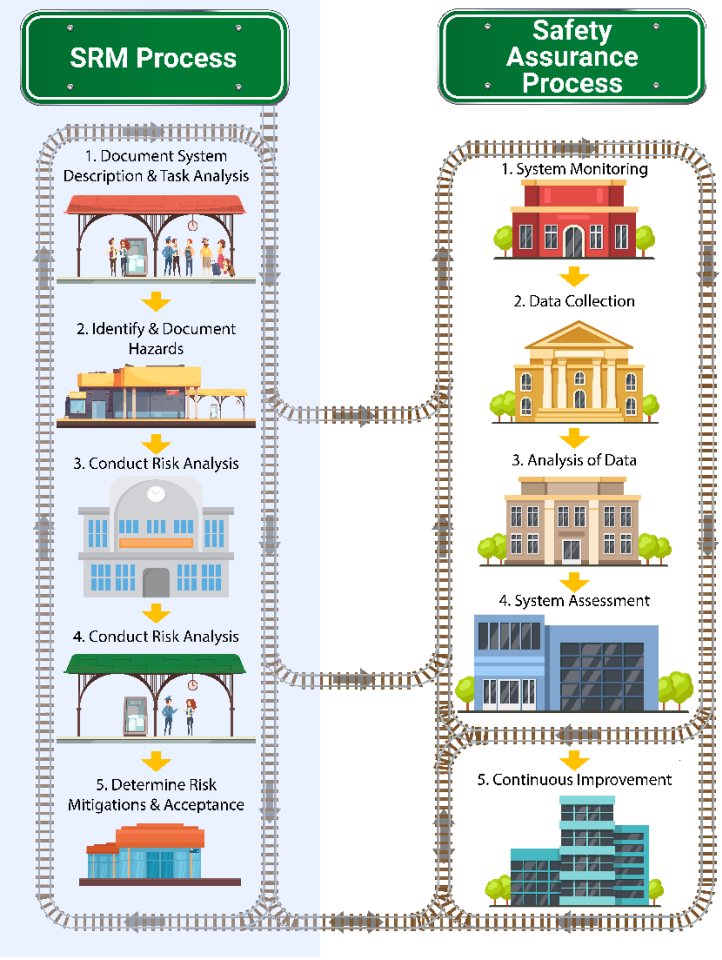

Figure 6: Safety Management Decision-making Process

[18] Refer to the Safety Risk Management Standard Operating Procedure (SOP) for further information into the step-by-step SRM process.

5.1 Application of Safety Risk Management

MBTA departments must apply safety risk management to the following (the eight triggers) throughout all elements of the transit system:

1. Design and implementation of new systems, equipment, and capital projects
2. Changes to existing systems, equipment, and infrastructure
3. New operations of service to the public
4. New operations or maintenance procedures
5. Changes to operations or maintenance procedures
6. Organizational changes, including Agency Leadership and Accountable Executive changes
7. Procurement process
8. Identification of hazards or ineffective risk mitigations through safety assurance activities.

5.1.1 Design and Implementation of New Systems and Other Capital Projects

Technology and innovation are changing the way people interact with their transit system. MBTA is in a constant state of design and implementation of new systems and other capital projects. MBTA's Safety Certification Program addresses the comprehensive safety risk management process used when new systems or other capital projects are proposed on or near the MBTA transit system.

5.1.2 Changes to Existing Systems

MBTA's System Modification Program addresses the change management process when existing systems are being updated/changed on or near the MBTA transit system. MBTA departments, such as Vehicle Engineering, conforms to MBTA's System Modification Program as well as their internal process

5.1.3 New Operations of Service to the Public

Prior to beginning new operations of service to the public, MBTA departments will be required to use a methodology for conducting safety risk management consistent with this Plan to ensure hazards and risks are identified and controlled to an acceptable level of safety. This is addressed through the Safety Certification Program or System Modification Program, when applicable.

5.1.4 New Operations or Maintenance Procedures

MBTA departments implementing new operations or maintenance procedures will be required to use a methodology for conducting safety risk management consistent with this Plan to ensure hazards and risks are identified and controlled to an acceptable level of safety. The Job Hazard Analysis (JHA) Program may be used when MBTA employees or contractors use new equipment or perform new job tasks.[19]

5.1.5 Changes to Operations or Maintenance Procedures

[19] Refer to the MBTA JHA Program for further information.

MBTA departments periodically review and update existing operations and maintenance procedures to ensure an acceptable level of safety is achieved at all times.

5.1.6 Organization Changes, Including Agency Leadership and Accountable Executive Change

MBTA organizational changes may have an impact on the SMS. For instance, MBTA procuring new Contractor services may result in a review of the Contractor's SMS; and triggers the SRM process.

Agency Leadership and Accountable Executive changes prompt MBTA Safety to perform a transition action plan to allow new agency leadership or Accountable Executive personnel to fully understand their role in the SMS. Agency Leadership and Accountable Executive changes prompt a review of the departing employee's safety management responsibilities and ensure new personnel are trained in SMS and understand their accountability in the SMS.

5.1.7 Procurement Process

The procurement process ensures new vehicles, rolling stock, systems, equipment, and other materials are systematically reviewed for compliance with safety requirements and verified prior to purchase, implementation, and use. The procurement process is documented through the MBTA Procurement Manual.

5.1.8 Identification of Hazards or Ineffective Risk Mitigations Through Safety Assurance Activities

MBTA deploys different safety assurance activities throughout the Authority. When a hazard or ineffective risk mitigations is identified through safety assurance activities, the MBTA department will be required to use a methodology for conducting safety risk management consistent with this Plan to ensure hazards and risks are identified and controlled to an acceptable level of safety.

5.2 Safety Risk Management Process

MBTA uses several methodologies for conducting safety risk management based upon the type of trigger referenced above. The safety risk management process consolidates all hazard information developed pursuant to the various methodologies for identifying and assessing safety risks into a single Hazard Tracking System (HTS).

For all light and heavy rail accidents, incidents, near misses, safety risks, and capital projects (including infrastructure, facility, equipment, and systems projects, procurements, and acquisitions), MBTA uses the following process:

5.2.1 Document the System Description and Task Analysis

Safety risk management begins with a system description and task analysis. A system is defined as operational components used to deliver transit related services. Systems may include hardware, software, people, procedures, resources, or functions directly related to the delivery of rail transit services.

The first step is to understand the aspects of the operation that might cause harm. When documenting the system description and task analysis, one may consider:

1. Ambient environment (e.g., physical conditions, weather);
2. Equipment (hardware and software);
3. External services (e.g., contract support, electric, telephone lines);

4. Human–machine interface;
5. Human operators;
6. Maintenance procedures;
7. Operating environment (e.g., temporary speed restrictions, automatic train control);
8. Operational procedures;
9. Organizational culture;
10. Organizational issues; and
11. Policies/rules/regulations.

Describing the system or task should completely explain the functions and interactions among the hardware, software, people, departments, and environment that make up the system in sufficient detail to identify hazards and perform risk analyses. Simple brainstorming sessions with working groups or committees of subject matter experts are often the most effective means of performing this step in the safety risk management process.

5.2.2 **Identify and Document Hazards**

The purpose of hazard identification is to allow for an analysis of the risks associated with the hazard and the subsequent elimination of the hazard or the reduction of its risks to an acceptable level. While the identification of every conceivable hazard is impossible, all employees must exercise due diligence to identify hazards related to their operations. These hazards can be existing or foreseeable.

Hazards are identified considering system hardware and software, system interfaces (to include human interfaces), and the intended use or application and operational environment. Consider and use event/incident data; relevant environmental and occupational health data; user physical characteristics; user knowledge, skills, and abilities; and lessons learned from legacy and similar systems. The hazard identification process considers the entire system life-cycle and potential impacts to personnel, infrastructure, systems, the public, and the environment. Identified hazards are documented in the HTS.

5.2.2.1 Reactive Hazard Identification

MBTA has reactive methods of hazard identification that may have contributed to an incident or accident. These reactive processes include the conduct of investigations into accidents, incidents, occurrences, close call reports, and regulatory violations. MBTA's reactive methodologies are shown below:

- Mandatory DPU-reportable events described in this Plan
- Employees who are aware of hazards are encouraged to report them through the voluntary employee reporting system described in this Plan (e.g., Form B: Notification to MBTA Safety," the Safety Hotline, Safety Notification email)
- Accident, incident, occurrence investigation documentation and procedures
- Findings from external audit process described in this Plan (FTA, DPU, APTA)
- TAM Assessments

5.2.2.2 Proactive Hazard Identification

MBTA also has proactive methods of hazard identification. Proactive methods attempt to identify and analyze hazards before they have resulted in an incident or accident. MBTA's proactive methodologies include:

- System Modifications
- Safety Certifications
- Configuration Management
- Employee Safety Reporting Program
- QA/QC data and inspections
- Monthly Safety Data Analysis Report
- Job Hazard Analyses (JHAs)
- Safety Rules Compliance Programs
- The internal safety audit process described in this Safety Plan
- Reports from other properties, outside consultants, DPU, APTA, FTA, NTSB, and the FRA
- TAM Assessments
- Continuous review of operational data and trend analyses to proactively identify hazards as described in this plan[20]

If the SRM working group or committee cannot identify any hazards to the system, document the disposition at which point a safety assurance activity should be considered.

5.2.3 **Risk Analysis**

Trained personnel will evaluate each identified hazard, and the system state(s) in which it exists, to determine what the worst-case, most reasonable, believable consequence(s) may be that stems from the hazard. Risk analysis will include events or conditions that could cause a consequence that reduces system operability or safety levels (triggering mechanism). Each hazard will be analyzed to determine its potential consequence(s) to cause damage or harm, known as risk.

The severity of each consequence is determined by its worst credible (reasonable or believable) outcome. MBTA employees trained in SRM will select the most appropriate severity category based upon the potential consequence identified. For instance, if the potential consequence is a collision, the severity category would be "Accident/Incident/OSHA." After a severity category is identified, the trained employee(s) would select the description of the severity level that most closely matches the potential consequence. This exercise should be used for each potential consequence documented for each hazard.

It is important that the likelihood of the severity of the consequence not be considered at this time. A chart explaining the severity levels is shown in Table 7.

[20] Operational data may include, but is not limited to: OCC daily logs, passenger reports, and personnel reports.

Severity (Most reasonable, believable, worst-case scenario)					
Regulatory (e.g. Internal/ External Audits, Non-Compliance)	Serious safety concern attributable to a direct non-compliance with regulations that will affect safety.	Finding which results from a direct non-compliance with regulations applicable to RTA that could affect safety.	Finding which results from a non-compliance with RTA policy and procedures that reference regulations applicable to RTA (i.e. a requirement derived from a directly applicable Rule.)	General safety concern that may lead to non-compliance with RTA policy or procedure(s).	No Findings.
Safety Event (Accident, Incident, Occurrence)	**Persons:** 1+ fatality and/or 2+ serious injuries. **Property:** Unrepairable damage or damage > $15M.	**Persons:** 1+ serious injury. **Property:** Damage that disrupts operations and costs < $15M.	**Persons:** Non-serious injury requiring medical transport. **Property:** Damage that disrupts operations and costs < $1M.	**Persons:** Non-serious injury requiring first aid or minor medical treatment on-scene. **Property:** Damage that disrupts operations and costs < $500K.	**Persons:** Non-serious injury requiring no medical treatment, or no reported injury. **Property:** Damage that does not disrupt operations.
Operational Events	State of emergency for an operational condition, impacting the immediate safe operation of a vehicle, Accident potential.	Event resulting in abnormal conditions, impacting the continued safe operation of a vehicle, potential for Incident with injury.	Event resulting in abnormal conditions with potential to impact safe operation of vehicle, potential for Incident without injury.	Event resulting in abnormal conditions with potential to impact safe operation of a vehicle, Occurrence potential.	Event resulting in normal conditions with potential to impact safe operation of a vehicle, safety margin degraded.
Systemic/PR Impact	International attention, system-wide impact on schedules, massive increase in costs > $10M.	Regional scheduling impact with National attention, major increase in costs < $10M.	Frequent delays or cancellations on a specific line, substantial increase in costs < $1M.	Limited/localized implication of MBTA, occasional delays, minor increase in costs < $250k.	No implication of MBTA, costs < $50k.
Severity Category / Severity Level	**Catastrophic (1)**	**Critical (2)**	**Moderate (3)**	**Minor (4)**	**Low (5)**

Table 7: Risk Severity Categories and Levels

The likelihood of outcomes is determined by quantitative analysis, historical event information, or by expert opinion in the absence of other data. In the absence of such quantitative frequency or rate data, reliance upon the qualitative text descriptions in Table 8 is necessary and appropriate. When determining the probability level, consider how often the selected consequence's severity level will occur when the identified hazard is

present/encountered. For example, if a severity level of Catastrophic is selected for a derailment (consequence) related to conflicting speed signs (hazard), the individual/group must then determine how often the Catastrophic derailment will occur when conflicting speed signs are encountered by a Motorperson. A chart explaining the likelihood and mitigation effectiveness definitions is shown in Table 8.

Reactive Event (a consequence which already occurred) (Mitigation Effectiveness)		**Predictive Event (a potential consequence that may occur) (Likelihood)**	
What was the effectiveness of the remaining mitigations within this event and the most reasonable, believable, worst case scenario?	**Not Effective (2):** Remaining mitigation were ineffective, or no mitigations remained. The only thing separating this event from a fatal accident was pure luck or exceptional skill, which is not trained or required.	**Frequent (2):** Likely to occur (Will occur in most circumstances, not surprised if it happened) or Occurs ≥ to 1 in 100 times.	How often will the selected consequence's severity level occur when the identified hazard is present/encountered?
	Minimal (3): Some mitigations left but their total effectiveness was minimal	**Probable (3):** Possible to occur (Might occur in some circumstances) or occurs 1 in 100 to 1,000 times.	
	Limited (4): An abnormal situation, more demanding to manage, but with still a considerable remaining safety margin	**Occasional (4):** Unlikely to occur (Could occur in some circumstances, surprised if it happens) or Occurs 1 in 1,000 to 10,0000 times.	
	Adequate (5): Consisting of several good mitigations	**Remote (5):** Rare to occur (May occur but only in exceptional circumstances, may happen but it would be highly unexpected) or Occurs 1 in 10,000 to 1,000,000 times.	
	Effective (6): All mitigations in place and working as intended	**Improbable (6):** Almost inconceivable to occur	

Table 8: Risk Probability Levels

Risk determination follows a simple three step process of: 1) condition (hazard); 2) potential consequence (worst case scenario (reasonable/believable)); and 3) risk (severity and likelihood/mitigation effectiveness of the potential consequence).

5.2.4 **Risk Assessment**

Assessed risks are expressed as a risk factor which is a combination of one severity level and one probability level. For example, a risk factor of '2' is the combination of a Catastrophic severity level and a Frequent probability level. Table 9 assigns a numerical risk factor.

Proactive Assessment	Catastrophic (1)	Critical (2)	Moderate (3)	Minor (4)	Low (5)	Reactive Event
Frequent (2)	2	4	6	8	10	Not Effective (2)
Probable (3)	3	6	9	12	15	Minimal (3)
Occasional (4)	4	8	12	16	20	Limited (4)
Remote (5)	5	10	15	20	25	Adequate (5)
Improbable (6)	6	12	18	24	30	Effective (6)

Table 9: Risk Assessment Matrix

5.2.4.1 Unacceptable Risk; Risk Factor between 2 - 4 (Red)

5.2.4.2 Undesirable Risk; Risk Factor between 5 – 8 (Orange)

5.2.4.3 Acceptable Risk with Risk Mitigation(s) and Monitoring; Risk Factor between 9 - 16 (Yellow)

5.2.4.4 Acceptable Risk; Risk Factor between 18 - 30 (Green)

5.2.5 **Risk Mitigations & Acceptance**

After hazards, consequences, and risks are fully understood from the preceding steps, risk mitigations must be designed and implemented, if necessary. MBTA operational and maintenance departments responsible for implementing risk mitigations will participate in the development of those risk mitigations. These may be additional or changed procedures, new supervisory controls, addition of hardware or software aids, changes to training, additional, or modified equipment, changes to staffing arrangements, or any number of other system changes.

The goal should always be to eliminate the hazard, if possible. When a hazard cannot be eliminated, the associated risk should be reduced to the lowest acceptable level within the constraints of cost, schedule, and performance by applying the hierarchy of risk mitigations.

5.2.5.1 Hierarchy of Risk Mitigations

The order of preference for the means to be used in resolving hazards at MBTA is as follows:

- **Design to Eliminate Hazard**: Design, redesign, refurbish, or retrofit to eliminate the hazards through design selection. This may be accomplished through the use of fail-safe devices and principles in design, the incorporation of high-reliability systems and components, and the use of redundancy in hardware and software design.

- **Substitution:** Replace the system or equipment that produces a hazard with a system or equipment that does not produce a hazard. To be an effective risk mitigation, the new substitute system or equipment should not produce a different hazard more dangerous than the initial hazard.
- **Engineering Controls:** Hazards that cannot be eliminated or substituted is controlled to an acceptable level through the use of fixed, automatic, or other protective safety design feature or device. Examples of safety devices include interlock switches, protective enclosures, or machine guards. Care must be taken to ascertain that the operation of the safety device reduces the loss or risk and does not introduce an additional hazard. Safety devices also permit the system to continue to operate in a limited manner. Provisions are made for periodic functional checks of safety devices.
- **Warning Devices:** When neither design nor safety devices can effectively eliminate nor control an identified hazard, devices are used to detect the condition and generate an adequate warning signal to correct the hazard or provide for remedial action such as evacuation. Warning signals and their application are designed to minimize the probability of incorrect personnel reaction to the signals are standardized within similar systems.
- **Procedures and Training:** Where it is impossible to eliminate or adequately control a hazard through design selection or use of safety and warning devices, procedures and training are used to control the hazard. Procedures may include the use of personal protective equipment. Precautionary notations are standardized as specified by MBTA Safety. Safety critical tasks and duties and activities throughout MBTA, such as rail vehicle operators' duties, require organizational certification of personnel proficiency.
- **Personal Protective Equipment (PPE):** PPE is the least effective means of controlling hazards and should only be used in addition to other risk mitigations. PPE may be used if MBTA cannot feasibly design, substitute, or control a hazard to an acceptable level.

5.2.5.2 Residual Risk

MBTA personnel who are trained in safety risk management and fully understand the nature of the specified hazard must evaluate whether the risk will be acceptable with the proposed safety risk mitigation applied, before the safety risk mitigation is implemented. Prior to the risk mitigation implementation, personnel trained in the safety risk management process will document an anticipated residual risk, or what personnel believe the risk factor will be after a risk mitigation is implemented. Once the risk mitigation is implemented and evaluated for effectiveness (using safety assurance activities) personnel can then document the actual residual risk.[21]

If no risk mitigation is implemented, the original baseline risk assessment becomes the residual risk and is documented within the hazard tracking system.

5.2.5.3 Substitute Risk

[21] MBTA operational or maintenance departments, as well as MBTA Safety, may be responsible for assuring the risk mitigation(s) was effectively implemented. During the development of the risk mitigation, the MBTA department responsible for implementation and MBTA Safety will determine how to effectively evaluate the risk mitigation, who will evaluate it, and at what interval(s) will the risk mitigation be evaluated.

It may not be possible to entirely eliminate risk, even when highly effective mitigations are used. After these mitigations are designed but before the system is placed into operation, an assessment must be made of whether the mitigations are likely to be effective and/or if they introduce new hazards to the system. The latter condition is referred to as "substitute risk," and should initiate a subsequent safety risk management process.

5.2.5.4 Risk Acceptance

MBTA has authorized key staff[22] trained in safety risk management to document the process used to identify hazards, assess risk, and determine effective risk mitigations. Table 10 identifies what safety management authority accepts certain residual risk factors.

Risk Acceptance Table	
Residual Risk Factor	MBTA Authority to Accept Risk
Acceptable	Field Management
Acceptable with Risk Mitigation(s) and Monitoring	Executive Management
Undesirable	Agency Leadership
Unacceptable	Accountable Executive

Table 10: Risk Acceptance Table

MBTA Safety personnel will facilitate the SRM process and guide operational management and leadership throughout the risk acceptance phase. The MBTA employee with authority to accept specific safety risks will be noted in the Hazard Tracking System. For example, an operational rule change that identifies certain safety risks would be accepted by the appropriate operational manager/leader with the authority to accept the residual risk factor.

Each risk acceptance decision is documented in the hazard tracking system.

5.2.6 **Risk Mitigation Tracking**

Verify the implementation and validate the effectiveness of risk mitigation measures through appropriate analysis, testing, demonstration, or inspection. Document the verification and validation in the hazard tracking system.

After a risk mitigation is implemented, MBTA will use safety assurance activities that considers any changes to include, but not limited to, the interfaces, users, hardware and software, and event/incident data. Procedures will be in place to ensure risk management personnel are aware of these changes, e.g., by being part of the configuration control process. MBTA Safety and the user community maintain effective communications to collaborate, identify, and manage new hazards and modified risks. If a new hazard is discovered or a known hazard is determined to have a higher risk level than previously assessed, the new or revised risk will need to be formally accepted by the appropriate authority or it must be analyzed using the safety risk management process documented in this chapter.

[22] Refer to the Key Staff section in chapter 4 of this Plan for further information on Key Staff responsibilities.

5.2.6.1 Risk Mitigation & Monitoring Plans

The Risk Mitigation & Monitoring process ensures the effectiveness of safety risk mitigation activities performed by key MBTA departments under formally-documented Corrective Action Plans (CAPs) and/or the safety risk management process. Through objective verification activities, risk mitigation and monitoring confirms that mitigations are effectively implemented, performing their intended functions, and ultimately safeguarding the MBTA, its personnel, contractors, and the public from hazards.[23]

5.3 Hazard Tracking System

All identified hazards will be monitored by MBTA Safety through the Hazard Tracking System (HTS).[24] An HTS is used for tracking the safety risk management process. The HTS allows MBTA to prioritize hazards based on the level of risk identified in the SRM process. Additional documentation, such as comprehensive corrective action plans or risk mitigation and monitoring plans, is developed for those hazards requiring complex and multifaceted resolutions.

MBTA has developed an HTS that reflects the consolidation of information in the safety risk management process by listing all identified hazards.

Applicable MBTA departments access a system to track hazards and assessment information, which includes, but is not limited to:

- Hazard tracking number
- Type of hazard
- Source from which it was identified, or element of the MBTA's operation affected by the hazard
- Requirements for ongoing reporting to the DPU regarding hazard management activities
- Status of the hazard
- Follow up Activity (risk mitigation/CAP evaluation)

5.4 Safety Risk Management – Safety Assurance Interaction

[23] Refer to the Risk Mitigation and Monitoring SOP for further information.
[24] DPU's Program Standard refers to a Hazard Tracking Log, which is incorporated into MBTA's Hazard Tracking System.

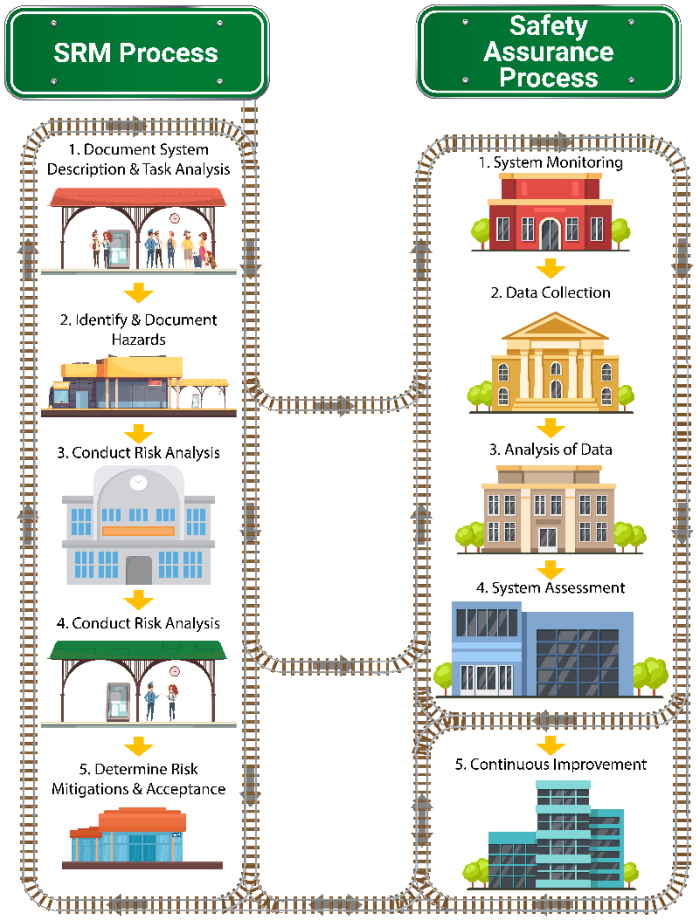

Figure 7: Safety Management Decision-making Process

MBTA safety risk management and safety assurance activities and interactions are summarized in Figure 7. Risk assessments may require risk mitigations, however, if deemed an acceptable level of risk, system monitoring may be the appropriate activity found in the safety assurance column.

System assessments may result in:

- Continuous improvement activities
- System Monitoring
- Safety Risk Management process

6 SAFETY ASSURANCE

Safety Assurance provides MBTA with the necessary process to ensure that its public transportation system is meeting safety objectives and that risk mitigations, corrective actions, and safety recommendations developed under Safety Risk Management are working. In Safety Assurance, the goal is to monitor and review what is happening to ensure objectives are being met. Thus, Safety Assurance requires measuring safety performance of operational processes and continuously improving the level of safety performance. Fully developed safety assurance processes will yield information used to continuously improve safety at MBTA.

Safety Assurance consists of the following:

- System Operation/Monitoring
- Data Collection
- Data Analysis and Measurement
- Safety Performance Assessment
- Continuous Improvement

The following diagram's right column depicts how safety assurance information flows in order for MBTA to continuously improve its public transportation system.

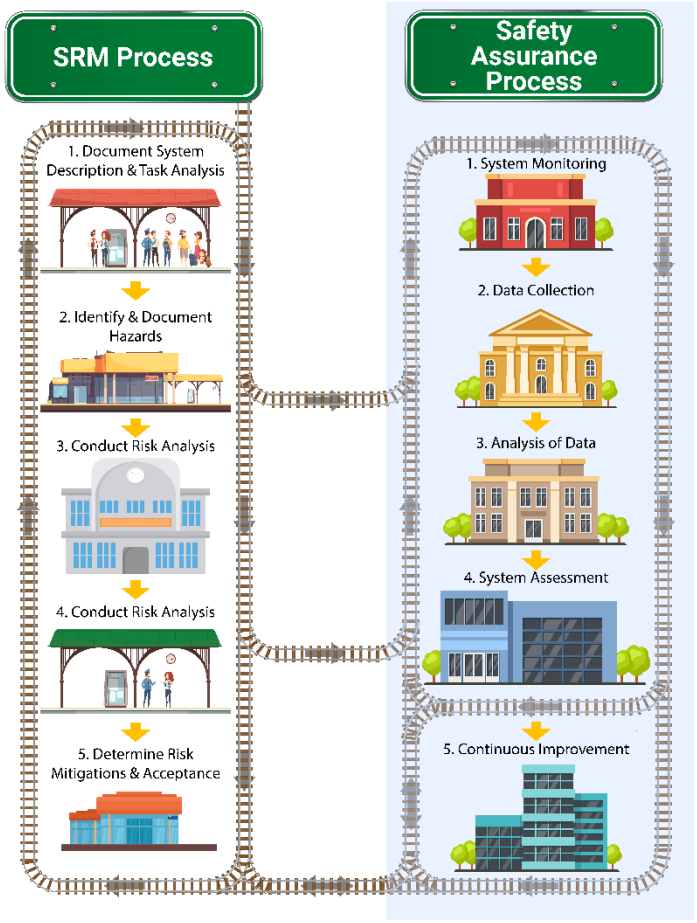

Figure 8: Safety Management Decision-making Process

6.1 System Operation/Monitoring

System operation/monitoring includes the monitoring of operational and maintenance processes and the operational environment of the public transportation system. Monitoring operational processes is the observation of the day-to-day, trip-by-trip, job-by-job performance of operational systems and their associated risk mitigations. This is done on a day-to-day basis by MBTA management.

MBTA's Operations Control Center (OCC) department actively monitors the transit system for issues and defects using the Incident Reporting Information System (IRIS) and Maintenance Control and Reporting System (MCRS). Information obtained from operators, engineering & maintenance employees, and other employees are logged in a centralized database and communicated to MBTA management and the DPU in real-time. Events involving potential DPU-reportable thresholds are investigated immediately.

6.2 Data Collection

Every business day, MBTA Safety personnel review IRIS to document safety-related events that occurred from the previous day(s) operation. Safety event information is collected for tracking and trending purposes, and to proactively monitor the operations to identify any safety risk mitigations that may be ineffective, inappropriate, or were not implemented as intended.

Information relevant to safety performance can be acquired from a variety of sources, including but not limited to:

1. Internal Quality Assurance/Quality Control by MBTA departments
2. Internal Safety Audits
3. External Audits
4. Maintenance Inspections
5. Facility and Equipment Inspections
6. Accident and Incident Investigations
7. Hazardous Conditions Investigations
8. Mandatory Reporting Programs
9. Voluntary Reporting Programs
10. Drug and Alcohol Program[25]

6.2.1 Internal Quality Assurance/Quality Control (QA/QC) by MBTA departments

MBTA departments monitor their processes and policies for compliance with, and sufficiency of, the Authority's procedures for operations and maintenance. Internal QA/QC by MBTA departments is a tool employed to monitor and measure department's procedures for operations and maintenance activities.

Through effective safety management, internal QA/QC assists in the assurance of MBTA safety commitments by utilizing the industry's best practices to:

[25] MBTA complies with all federal and state regulations regarding drug and alcohol testing. MBTA maintains drug and alcohol policies for all employees and contractors.

- Establish rules compliance oversight and verification of effective rule implementation
- Continuously train employees on applicable rules
- Ensure regular review and analysis of performance indicators, and other safety-related data found during rules compliance audits in order to identify, resolve, and track hazards related to rules compliance
- Communicate the purposes of safety-related rules and consequences of noncompliance to employees and contractors working on MBTA property

MBTA departments have internal policies and procedures to collect safety-related data, which is documented in the applicable appendix to this Plan. Elements of the QA/QC process for operations and vehicle maintenance departments are documented in the MBTA Safety Rules Compliance Program (SRCP).

6.2.2 **Maintenance Inspections**

MBTA maintenance inspections monitor and evaluate the overall safety of vehicle, facility, and infrastructure maintenance practices, both preventive and corrective. These inspections are used to evaluate:

- Conformance with safety requirements, standards, regulations and best practices
- Knowledge and implementation of safety rules and procedures
- Adherence to required routine maintenance schedules
- Effectiveness of established routine maintenance schedules

6.2.2.1 Vehicle Maintenance: In order to ensure compliance with the prescribed vehicle maintenance for each subway revenue vehicle, the Quality Assurance/Quality Control Division (QA/QC) staff visit each line in Subway Operations once per month and audit the inspection reports of a randomly chosen list of vehicles. The compliance inspection focuses mainly on verifying that periodic safety inspections are done in accordance with the Equipment Engineering and Quality Assurance (EE&QA) Manual.

6.2.2.2 Facility Maintenance: Audits and inspections of both routine and corrective facility maintenance are conducted regularly by Engineering and Maintenance (E&M) management and/or their contractors. E&M supervisors and forepersons ensure that maintenance to their facilities are completed successfully and documented, and that compliance with all applicable rules, regulations, and best practices is achieved.

6.2.2.3 Infrastructure Maintenance: Audits and inspections of infrastructure maintenance will be conducted regularly by Engineering and Maintenance management and/or their contractors. Supervisors and forepersons will ensure that maintenance to infrastructure is completed successfully and documented, and that compliance with all applicable rules, regulations, and best practices is achieved.

6.2.3 **Facility and Equipment Inspections**

All MBTA infrastructure, facilities, and equipment are subject to safety inspections. Facilities, infrastructure, and equipment subject to inspection include the following:

6.2.3.1 Facility Inspections: Facility safety inspections are conducted in all facilities to identify and document hazards and/or safety issues, as well as to monitor system-wide compliance with established policies and procedures. Compliance with fire protection requirements is verified through emergency drills, fire/life safety inspections, incident investigations, and periodic testing of fire protection and fire suppression systems. Additionally, MBTA's insurance company employs loss control engineers who routinely and periodically inspect all of MBTA's insured facilities, and issue reports and recommendations for improvement with respect to attaining and maintaining Highly Protected Risks status. Facilities subject to inspection include:

- Stations: Transit stations, parking lots, and surrounding customer circulation routes are periodically inspected for cleanliness, safety, and customer service issues. This includes scheduled inspections of all station equipment, stairs, platforms, restrooms, dead-ends, escalators, and elevators; routine monitoring of lighting levels on platforms, stairways, concourses, restrooms, and station entrance ways; and inspections of Police/Customer call boxes.
- Maintenance Facilities: Facility supervisors conduct inspections of environmentally sensitive areas and processes such as chemical storage areas, hazardous waste storage areas, chemical process areas, fuel dispensing areas, paint booths, spill containment, and personal protective equipment. These inspections also pertain to maintenance facilities equipment, such as lifts and cranes. These inspections may be conducted by contractors under MBTA oversight.

6.2.3.2 Vehicle Equipment Inspections: Safety inspections are regularly conducted for all vehicle equipment, including revenue and non-revenue vehicles, to identify and document hazards and/or safety issues, as well as to monitor system-wide compliance with established policies and procedures.

6.2.3.3 Infrastructure Inspections: MBTA-owned infrastructure and systems subject to routine inspections include the following:

- Bridges: Routine inspections of bridges are performed at established cycles using approved guidelines. The Authority has developed the Railroad Operations Commuter Rail Design Standards Manual to ensure compliance with the inspection and rating guidelines established in the FRA's "Statement of Agency Policy on the Safety of Railroad Bridges," which also incorporates bridge inspection and rating requirements for transit. The Authority also uses the Federal Highway Administration (FHWA) Pontis bridge management software as well as MassDOT's 4D database system that incorporates inspection forms for Authority-

owned highway, transit, and railroad bridges; loadings for highway, transit, and railroad cars; and other relevant information pertaining to highway, transit, and railroad bridges.

- Signals and Communication Systems: Inspections include but are not limited to train stop, car-borne Automatic Train Operation (ATO), two-way radio system, third rail heater system, and switch obstruction tests. DPU-required testing on vital relays is performed in-house on an ongoing basis. New signal installations undergo comprehensive verification testing prior to being placed into service. Signal engineers provide technical oversight for the testing program.
- Power Systems: Inspections include but are not limited to manhole, third rail, feeder cables, and inspections of overhead catenary systems (OCS).
- Track: Track inspections are regularly conducted in accordance with MBTA track standards manuals, which complies with DPU requirements in 220 CMR 151.11, Track Inspections.

6.2.4 **Safety Event Investigations**

Safety event (Accident, Incident, and Occurrence) investigations use a defined process of determining the causal and contributing factors of an accident, incident, or hazard, for the purpose of preventing recurrence and mitigating risk. Safety event investigations use a standard consistent with federal and state regulation as well as industry best practices. Although safety event investigations take place after an event has occurred, MBTA's ultimate goal is to identify and correct hazards and deficiencies before any injuries or property damage can occur.

The MBTA Safety Event Investigation Manual describes the process for an investigation at MBTA properties, Right of Way (ROWs), equipment, environment, rolling stock, personnel, and facilities where an accident, incident, or occurrence may occur or has already occurred. The investigation process includes the following:

- Site inspection and investigation
- Notification requirements
- Causal factor identification
- Lessons learned
- Corrective Action Plan development and implementation
- Communication and distribution of lessons learned

All pertinent information is obtained prior to MBTA investigators formally documenting causal factors. The classification of causal factors presents a systematic, multidimensional approach to error analysis and event prevention. MBTA investigators use the Human Factors Analysis & Classification System (HFACS) including the applicable HFACS attributes in the event analysis. Refer to MBTA's Safety Event Investigation Manual for further information on causal factors identification.

6.2.4.1 DPU and FTA Investigation Requirements

MBTA notifies the DPU and FTA within two hours of any accident occurring on the MBTA rail system. MBTA provides a written notice to the DPU of a hazard, accident or similar event, to the extent possible under the circumstances, includes:

1. Name and title of person reporting;
2. Event type;
3. Location, time, and date of event;
4. Fatalities;
5. Injuries;
6. MBTA vehicle(s) involved (type, number);
7. Other vehicle(s) involved (type, number);
8. Property damage estimate;
9. NTSB reportable;
10. FTA reportable;
11. MBTA primary person (i.e., Lead Investigator) conducting the investigation (name, title, phone and fax numbers, email address);
12. Description of the event;
13. Immediately implemented and/or planned corrective actions;
14. Name and telephone number of person from whom additional information may be obtained;
15. Method and time of notice to the DPU.

DPU oversees and monitors MBTA's investigation process. MBTA provides DPU access to documentation, investigation sites, and fact-finding activities. The MBTA and DPU coordinate to ensure investigation findings are analyzed prior to finalizing investigative reports. Coordination between MBTA and DPU is described in Section 6.2.5.2.

DPU may conduct its own investigation according to the requirements of 220 CMR 151.09 and submit the final report and subsequent findings to MBTA. MBTA reviews the DPU final report to assess its safety performance which may result in MBTA using its safety risk management process described in Chapter 5. If a corrective action plan (CAP) is required, MBTA will follow the CAP process described in Section 6.4.2 and 220 CMR 151.07. DPU allows MBTA an opportunity to file a written dissent.

6.2.5 **Hazardous Conditions Investigations**

Pursuant to 220 CMR 151.06(4), DPU shall be notified by MBTA Safety when any condition meeting the two highest risk levels is assessed within the Risk Assessment Matrix. MBTA notifies the DPU within two hours after the Safety Risk Assessment (see section 5.2.4) is completed and will provide the Safety Risk Management worksheet/process used to determine that an Unacceptable or Undesirable risk(s) exists.

After initial notification, the Department may require MBTA to conduct further activities in order to provide more detailed information, including conducting an investigation pursuant to 220 CMR 151.09(3) through (9).

6.2.5.1 Investigation Procedures for Hazardous Conditions

In the event DPU requires an additional investigation into the hazardous condition, MBTA will use the accident and incident investigation process described in section 6.2.4 of this Transit Safety Plan and documented in the Safety Event Investigation Manual.

6.2.5.2 On-Going Communication with DPU

In addition to the initial notification requirements, MBTA Safety also maintains ongoing communication with DPU regarding other identified hazards and safety risks. This ongoing communication is facilitated in several ways:

1. DPU access to MBTA's hazard tracking system
2. DPU receive OCC pages via mobile communication
3. DPU attendance and participation in standing Safety Committees (i.e., SRCP, Derailment, etc.)
4. Corrective Action Plans (CAPs)
5. Monthly meetings, which include a discussion of:
    - Newly identified hazards
    - CAP Statuses
    - Coordinated responses to FTA Safety Advisories and/or Proposed Rulemakings
    - Updates on accident, incident or employee injury investigations
    - Updates regarding changes to the SMS
    - Key findings from the SRM process

MBTA and DPU work collaboratively to ensure that ongoing communication is taking place throughout the investigation process, and MBTA will continue to update DPU on the status of any outstanding CAPs at each monthly meeting and as requested.

6.2.6 **Mandatory Safety Reporting Programs**

MBTA participates in several mandatory reporting programs. These reports are now incorporated into MBTA's SMS. This means that all reports will still be made to the FTA, DPU, or other regulatory bodies per standard procedures, but copies of the reports will also be supplied for inclusion into the Safety Risk Management process as appropriate.

6.2.6.1 Regulatory- Reportable Events

- Fatality at the scene or occurring within 30 days following the accident;
- One or more persons suffering serious injury or an injury requiring transport away from the scene;[26]
- Substantial property damage resulting from a collision involving a transit vehicle or the derailment of a rail transit vehicle;[27]

[26] Utilizing the FTA definition of "serious injury" in 49 CFR 674 and 220 CMR 151: "Any injury which: (a) requires hospitalization for more than 48 hours, commencing within seven days from the date that the injury was received; (b) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (c) causes severe hemorrhages, nerve, muscle, or tendon damage; (d) involves any internal organ; or (e) involves second- or third-degree burns, or any burns affecting more than 5% of the body surface."

[27] Utilizing the FTA definition of "substantial damage" from the National Transit Database: "Physical damage to transit or non-transit property including vehicles, facilities, equipment, rolling stock, or infrastructure. Substantial damage includes damage which adversely affects the structural strength, performance, or operating characteristics of the vehicle, facility, equipment, rolling stock, or infrastructure requiring towing, rescue, onsite maintenance, or immediate removal prior to safe operation. Substantial damage

- Evacuation due to life safety reasons or to the rail right-of-way;
- A mainline or yard derailment of revenue or non-revenue vehicles;
- Run-away train
- Collision with an individual or an object resulting in Serious Injury or fatality;
- Collision between a rail transit vehicle and second rail transit vehicle or a rail transit non-revenue vehicle;
- Collision at grade crossing (NTD) resulting in Serious Injury or fatality (DPU, FTA);
- Fires resulting in Serious Injury or fatality.
- System & Personal Security Event (only NTD)
- Suffered a work-related hospitalization
- Amputation
- Loss of an eye
- Fire originating on the bus with visible flames needing extinguishment
- Collision with a person or bicyclist requiring transport to a medical facility
- Bus collision resulting in a serious injury
- Event resulting in substantial damage
- Collision at a grade crossing

6.2.7 **Voluntary Safety Reporting Programs**

MBTA's voluntary, confidential, non-punitive 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.[28] Reported information should be used solely to support the enhancement of safety.

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. The intent is to promote an effective reporting culture and proactive identification of potential safety deficiencies. Reports will not be accepted into the voluntary, confidential, non-punitive employee reporting program if one of the following conditions are met:

- Criminal Activity;
- Substance Abuse;
- Use of Prohibited Substances;
- Falsification of employee report; or
- *Willful* Disregard for Safety.

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excludes damage such as cracked windows, dented, bent or small punctured holes in the body, broken lights, mirrors, or removal from service for minor repair or maintenance, testing, or video and event recorder download."

[28] Within the context of MBTA's voluntary employee safety reporting program, relevant contractors may also use any method necessary to report safety concerns without fear of reprisal.

Reports that are rejected for any of the reasons mentioned above will be archived and the appropriate state or federal authority will be notified.

Voluntary reporting systems are confidential, which protects the reporter from being identified. The reporter's identity is only known to the system's gatekeepers, in order to allow for follow-up action.

Voluntary safety reports are archived and de-identified once any necessary follow-up actions are taken. De-identified reports can support future trending analyses to track the effectiveness of risk mitigation and to identify emerging hazards.

To be effective, safety reporting tools are readily accessible to operational personnel. Operational personnel are educated on the benefits of MBTA's voluntary, confidential, non-punitive employee reporting program and provided with positive feedback regarding remedial actions taken in response to the report. Within the context of SMS, the employee promptly reports hazards to the manager, who will then notify appropriate parties and complete the communication loop by following up with the employee. The alignment of reporting system requirements, analysis tools, and methods can facilitate exchange of safety information as well as comparisons of certain safety indicators.

MBTA currently uses the following methods as a way for employees to report safety concerns to senior management without fear of reprisal or disciplinary action:

- 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: (617) 222-5127

Refer to the MBTA Employee Safety Reporting Program for further information related to the MBTA's voluntary reporting program.

6.3 Data Analysis

A critical component of SMS is tracking and analyzing safety data to make inferences about MBTA's safety performance and enhance our awareness of potentially hazardous situations. MBTA collects and analyzes safety data as described in this Safety Plan and supports the sharing of the data to continually improve the level of safety.

Data analysis is used to identify hazards and verify the effectiveness of implemented risk mitigations. Data analysis also identifies areas where safety could be improved.

Periodically, MBTA Safety Management Working Groups (SMWGs) will analyze safety data to identify adverse trends and to identify indicators of potential safety issues. Over time, this data will help identify indicators that point to potential problems in the public transportation system.

6.3.1 Management of Change

MBTA safety assurance activities serve as a check on the Safety Risk Management process. The procedures are designed to ensure that safety risk mitigations are effective, to collect safety performance data that will help MBTA predict future safety events and mitigate or eliminate them, and to analyze the potential safety risks of any

new practices or procedures adopted by MBTA. As such, MBTA has processes in place for identifying and assessing changes that may introduce new hazards or impact MBTA's safety performance. Outlined in this section are established safety programs that continue to be improved as SMS is implemented.

6.3.1.1 MBTA Configuration Management and Control Program

MBTA developed a process to evaluate and approve proposed changes, as well as document and analyze the efficacy of implemented changes to the public transportation system and/or safety critical aspects of the Authority's system, including operations, processes, administrative policies and procedures, rules, infrastructure, vehicles, and training. The Configuration Management and Control Program is the governing program for all safety-related MBTA system changes vetted for system safety effect through the System Modification Safety Program or Safety Certification Program.[29]

6.3.1.2 MBTA System Modification Program

MBTA developed a process for the control of changes and/or modifications to Authority owned and operated equipment and/or facilities. The system modification process ensures that changes and/or modifications to the public transportation system and/or safety critical aspects of the Authority's system has been systematically planned, evaluated, and approved by appropriate departments and/or personnel.[30]

6.3.1.3 MBTA Safety Certification Program

MBTA developed a process to ensure major capital projects that: rehabilitate; replace; extend; or modify infrastructure, systems, vehicles, and equipment are safe, and that hazards and safety risks are adequately addressed prior to use.

Several activities are conducted to assure that designs incorporate and achieve safety requirements. MBTA Safety reviews all facilities and system designs for safety input. Disposition of comments are resolved through MBTA design review process. In addition, designs are formally certified and safety items are identified through standards and requirements. Industry standards and experience are also used to evaluate unique issues related to transit safety. In several cases, special studies or analyses are performed to address specific safety issues. In the case of new capital projects, the MBTA Safety works with both the Capital Delivery department and the Transit Police to develop a Safety and Security Management Plan as required by FTA.[31]

6.4 Safety Performance Assessments

Following the analysis of data, the SMWGs will be required to determine whether MBTA's safety performance is effective, and whether MBTA is meeting its safety objectives and targets.

Assessments can have the following general outcomes:

- **Performance is acceptable**
    - Process returns to Safety Assurance's first step: System Monitoring.

[29] Refer to the MBTA Configuration Management and Control Safety Program (SAFE1.10.00) for further information.
[30] Refer to the MBTA System Modification Safety Program (SAFE1.08.00) for further information.
[31] Refer to the MBTA Safety Certification Program (SAFE1.09.00) for further information.

- **Conformity with risk mitigations, corrective actions, and regulations appears to be satisfactory, however, desired results are not being obtained**
    - SRM process would be warranted to determine potential risk mitigations.
- **Performance is not acceptable**
    - Corrective Action Plan or SRM process would be warranted. MBTA must develop and carry out a plan, under the direction of the Accountable Executive, to address safety deficiencies identified.

Additionally, if new or uncontrolled hazards are discovered during the course of safety performance assessments, the SRM process would be initiated.

6.4.1 **Agency Leadership Reviews**

Every month, MBTA Safety disseminates a Safety Data Analysis Report (SDAR) that documents safety performance indicators. On a quarterly basis, MBTA Agency Leadership will review its safety performance against its safety objectives during a standing ESC meeting. Failures to meets safety performance objectives and targets are reviewed and actions are identified to improve performance.

6.4.2 **Corrective Action Plan**

MBTA may develop a written corrective action plan (CAP) to address hazardous conditions and sub-standard safety performance. Circumstances that may require a CAP include, but are not limited to:

- NTSB Recommendations
- FTA Safety Advisories
- DPU Independent Assessments
- DPU unannounced on-site oversight activities
- Chief Safety Officer Directives
- Good Faith Safety Challenges
- External/Internal Audit Findings
- Safety Event Investigations
- Non-conformance with and sufficiency of MBTA rules and procedures
- Safety Risk Management Process

When the determination is made that an event/hazard requires a CAP, MBTA Safety and all affected departments collaborate to determine what sub-standard safety performance must be corrected. A CAP may be developed if the risk(s) of the identified hazard(s) warrant a risk mitigation. The affected departments draft a CAP to ensure a risk mitigation(s) is appropriate and feasible to mitigate the risk to an acceptable level.

CAPs are formally sent to DPU for review and acceptance within sixty (60) days from the identified event/hazard, as required by 220 CMR 151.07(3). MBTA develops written CAPs on DPU-approved forms to address hazardous conditions. The DPU reviews and approves the CAP prior to MBTA carrying out the plan.

If MBTA cannot submit a CAP to DPU within sixty (60) days of the discovery of the hazard and/or risk, MBTA submits a written request for an extension outlines the reason(s) for the extension, including the tasks to be completed and a timeline for completion.

MBTA Safety uses a web-based program to document all corrective action plans and recommendations through to closure.

Each CAP identifies the:

- Event or condition requiring corrective action
- Action necessary to eliminate or control occurrence or condition
- Schedule for implementation
- Person or department responsible for implementation
- The department supervisor who is attesting to the content of the CAP
- Anticipated schedule after implementation to perform data analysis over a sufficient period of time (e.g. 30, 60, 90 day reviews) to verify effective implementation
- Data sources to be used to determine if additional actions are required

MBTA periodically reports progress in carrying out CAPs to DPU at monthly meetings. CAPs remain open until DPU is notified and accepts that MBTA has successfully implemented all documented corrective actions, or that alternate actions have been implemented that would satisfy a CAP closure, subject to DPU review and approval.

All employees affected by a corrective action are made aware of the reason why a corrective action is being implemented. Communication methods (e.g. Safety Flash) are further discussed in Section 7.2.

6.4.2.1 Immediate or Emergency Corrective Actions

Immediate or emergency corrective actions are deployed by MBTA when an unacceptable risk poses an imminent danger to employees or the public. MBTA implements immediate or emergency corrective actions prior to communicating with the DPU, however, all efforts are made to notify DPU within 90 minutes after the risk is mitigated to an acceptable level. After such risk is mitigated to an acceptable level, MBTA holds an after action review meeting to determine if the corrective actions in place are adequate. If such emergency corrective actions are not adequate, MBTA follows its standard process for developing and implementing CAPs, subject to DPU approval.

6.5 Continuous Improvement

MBTA is committed to continually improving SMS and the overall level of safety. Actions taken to achieve continuous improvement are an output of the safety performance assessment process. If conformity with risk mitigations is found to be ineffective (e.g. required training not accomplished, procedures not followed) the appropriate SMWG would identify a course for corrective action.

It is standard practice to perform safety risk management when a risk mitigation is doing what is intended, but not producing the expected result.

Safety assurance processes documented in this Plan support improvements to the SMS through continual verification and follow-up actions. These objectives, at a minimum, are achieved through the application of internal safety audits external audits, and peer agencies review of the SMS.

6.5.1 **Internal Safety Audits**

The MBTA Internal Safety Audit (ISA) Program ensures safety-related tasks and activities performed by MBTA departments are adhering to written plans, programs, and procedures; and are consistent with federal and state regulations, as well as industry best practices. The comprehensive internal safety audit process verifies the Safety Plan is effectively implemented; performing its intended functions; achieving its performance objectives; and ultimately safeguarding MBTA personnel and the public from safety risks.

6.5.1.1 Annual Internal Safety Audit Report

MBTA prepares a report describing its internal audits conducted and the status of subsequent findings and corrective actions. The report is reviewed by Agency Leadership, signed by the Accountable Executive, and formally states the safety performance results in terms of the adequacy and effectiveness of this Transit Safety Plan.[32] The MBTA Internal Safety Audit process is documented in the MBTA Internal Safety Audit Program.

6.5.2 **External Audits**

MBTA complies with all local, state, and federal agencies' oversight activities on MBTA property. The Department of Public Utilities (DPU) conducts a continuous audit of the MBTA system and prepares a report annually, from which MBTA may use to identify safety concerns or hazards.

Every three years, the DPU and FTA audit the MBTA. The triennial safety review is a formal, comprehensive, on-site examination by the oversight agency of a transit agency's safety practices to determine whether MBTA complies with the policies and procedures required under the Safety Plan.

6.5.3 **Peer Agency SMS Reviews**

MBTA is a member of the American Public Transportation Agency (APTA) which supports the exchange of ideas and information from one transit agency to another. Over the course of SMS development and implementation, MBTA has had successful peer agency meetings to discuss their SMS. MBTA intends on meeting with like-size agencies on a bi-annual basis to discuss successes and challenges of the SMS. The goal of these meetings is to gather information on effective safety practices that could be incorporated into the SMS.

[32] Refer to 220 CMR 151.05(3) for regulatory context.

7 SAFETY PROMOTION

Safety promotion is one of the four components of SMS. Safety promotion refers to the collection of activities undertaken by MBTA to promote a positive safety culture, to communicate the outputs of SMS, and to ensure the application of safety lessons learned in order to foster the continuous improvement of safety in MBTA operations.

MBTA is committed to ensuring that all personnel are informed about safety policies and objectives, how well those goals are met, results of accident and incident investigations, new safety practices, and other pertinent safety information.

7.1 Safety Culture

Safety is a core value and MBTA will strive for continual improvement. In order to promote the positive safety culture that is desired, agency leadership has directed that all employees are responsible for and must consider the impact of safety in everything they do.

It is the stated purpose of our agency leadership to ensure the growth of a positive safety culture throughout the organization. To this end, an informed culture has been established at MBTA where people understand the hazards and risks inherent in their areas of operation. This is accomplished through high quality training, on-the-job training (OJT), and continued coaching to ensure that all personnel are provided with the necessary knowledge and skills to work safely. Training specific to SMS is described in this Plan.

MBTA will strive to build a robust reporting culture that encourages every employee to contribute to the overarching MBTA safety knowledge base. The reporting programs that have been implemented are described in this Plan.

In order to ensure the growth of a learning culture, the outputs from SMS, hazards identified, and safety lessons learned, are communicated to all employees throughout hew methods described in this section.

In order to achieve the growth of a positive safety culture, the following programs have been implemented:

1. A formal Safety Policy Statement has been published in the front of this Plan outlining MBTA's commitment to SMS.
2. MBTA management has allocated the resources that are required to operate and maintain the SMS.
3. Safety responsibilities for all MBTA personnel have been specified in this Plan.
4. All personnel must complete training on the Safety Management System as described in this Plan.
5. The employee safety reporting system described in this Plan is available 24 hours per day and provides for complete confidentiality or anonymity.
6. Internal safety audits are completed by all departments on a regular basis as described in this Plan.
7. MBTA maintains an electronic database of safety information collected from available sources. This data is regularly analyzed, assessed, and applied to improve safety.
8. Clear channels of communication are being established throughout MBTA.
9. A Safety Data Analysis Report (SDAR) is published on a monthly basis to keep all MBTA management current on the status of MBTA's activities, the operation of SMS, hazards identified, safety actions taken,

and safety lessons learned. This newsletter is distributed and is available to employees on the MBTA Intranet.

7.2 Safety Communication

Effective safety communication is an essential element to safety promotion. The Transit Safety Plan has been developed in order to ensure that employees are aware of SMS policies, processes, and tools that are relevant to their duties and responsibilities. MBTA's safety policy written by the Accountable Executive will be distributed and discussed during all initial and recurrent Right-of-Way training classes.

MBTA used a closed-loop communication method where feedback is circulated back to the originator. Within the context of SMS, the employee promptly reports hazards to the manager, who will then notify appropriate parties and complete the loop by following up with the employee.

MBTA has developed several different means to communicate hazard information, why safety actions have been taken, and why safety procedures are implemented or modified:

- Special Orders (Please refer to departmental appendices)
- Safety Advisories
- Safety Directives
- Safety Bulletins (distributed as needed)
- Safety Flashes (distributed as needed)
- Training Flashes
- Safety Blitzes
- Agents of Safety Awards
- Safety Stand-down's
- Rail Safety Week
- Safety Data Analysis Report (SDAR) (distributed monthly and annually by MBTA Safety)
- Between The Lines Newsletter
- Everbridge Notifications
- T-STOP

MBTA communicates lessons learned as well as proactive messages to ensure employees are continually involved in the SMS. Significant accident and incident investigation outcomes may be communicated to appropriate employee groups and relevant contractors. MBTA limits the amount of identifying information, when necessary, to ensure confidentiality for employees involved in the accident or incident.

8 SAFETY TRAINING

MBTA provides SMS training to all employees commensurate with their position in the organization and their duties relevant to the operation and performance of the SMS. Training consists of initial SMS training for all employees and further refresher training for management and front line employees with specific SMS-related duties. Rail transit safety-related positions, responsibilities, and authorities are defined, documented, and communicated throughout the MBTA. To ensure currency, SMS training modules are reviewed and updated periodically.

Successful operation of MBTA's SMS is tied to the success of the SMS training program. The training is designed to ensure that each employee understands his/her individual SMS responsibilities and is competent to perform such duties. Accordingly, safety training will begin with each employee's initial education and continue throughout the term of employment.

MBTA is committed to SMS training to provide all employees with the competencies to work safely and effectively. This will be accomplished by:

- Developing SMS training programs in co-operation with employees and operational areas
- Delivering appropriate SMS training programs in an effective and timely manner
- Maintaining training records of all training completed

The specific SMS training programs utilized are discussed in the sections below.

8.1 Personnel Requirements (Competence)

Competency is the result of knowledge, skills, and abilities that are obtained by education, training, and experience. In order to ensure competency at MBTA, minimum qualification standards have been developed for all personnel described in this section. Training will be provided to ensure that each individual meet or exceeds that standard.

8.1.1 Chief Safety Officer

The CSO has the authority and responsibility for day-to-day implementation and operation of MBTA's SMS. The CSO has competencies in hazard identification, incident investigation, safety certification, coordination with regulatory agencies, communication skills with agency leadership and front-line employees. The CSO has enrolled in training requirements outlined in 49 CFR Part 672: Public Transportation Safety Certification Training Program.

The CSO manages the SMS Function during SMS Implementation and has experience:

- Overseeing the safety function of MBTA
- Serving as MBTA's SMS Subject Matter Expert.
- Coordinating Key Staff to support SMS implementation.
- Facilitating the development of SMS processes and activities.
- Procuring technical resources for SMS implementation.

- Communicating SMS implementation progress and challenges.
- Socializing SMS activities to agency leadership and staff as necessary.

8.1.2 **Safety Engineering**

Safety engineering personnel have knowledge of the concepts, principles, theories, and methods to identify, control, mitigate, and eliminate safety hazards in the design and use of facilities, equipment, vehicles, systems, operations, and work processes.

8.1.3 **Safety Event Investigators**

MBTA safety event investigators have training and/or experience in investigations, systems analysis, root cause analysis, and risk management, as well as evaluation principles and techniques. Any one or combination of the following could accomplish training:

- MBTA prepared courses
- College courses
- Industry seminars and workshops
- Selected Transportation Safety Institute (TSI) courses

Refer to the MBTA Safety Event Investigation Manual for further information.

8.1.4 **Internal Safety Auditors**

220 CMR 151.05(2)(c) requires MBTA, "…use qualified personnel who are not supervising managers of the activity under review," to perform the Internal Safety Audit.

MBTA ISA auditors have training and/or experience in auditing, systems analysis, root cause analysis, and risk management, as well as evaluation principles and techniques. Any one or combination of the following could accomplish training:

- MBTA prepared courses
- College courses
- Industry seminars and workshops
- Selected Transportation Safety Institute (TSI) courses

MBTA created a required internal safety audit training module in The Learning Hub for any personnel conducting internal safety audits. Refer to the MBTA Internal Safety Audit (ISA) Program for further information.

8.1.5 **Personnel Directly Responsible for Safety Oversight**

MBTA Safety employees and relevant contractors are directly responsible for safety oversight at the MBTA. These individuals acknowledge their roles and responsibilities outlined in this Safety Plan; and whose primary job function includes the development, implementation and review of the MBTA Transit Safety Plan. Personnel directly responsible for safety oversight undergo initial and refresher training as it relates to MBTA's SMS performance.

MBTA personnel directly responsible for safety oversight are required to adhere to the following FTA-developed curriculum over a three-year period:

- One hour course on SMS Awareness—e-learning delivery (all required participants)
- Two hour courses on Safety Assurance—e-learning delivery (all required participants)
- Twenty hours on SMS Principles for Transit (all required participants)
- TSSP curriculum (minus Transit System Security (TSS) course) (all required participants—credit will be provided if participant has a Course Completion Certificate of previously taken TSSP courses)
    - Rail System Safety (36 hours)
    - Effectively Managing Transit Emergencies (32 hours)
    - Rail Incident Investigation (36 hours)

MBTA refresher training at a minimum includes a one hour course on SMS fundamentals.

8.2 MBTA SMS-Related Training Courses

The level of training provided will range from general safety familiarization to detailed risk management training. Training will be delivered in accordance with employee's duties relevant to the operation and performance of the SMS.

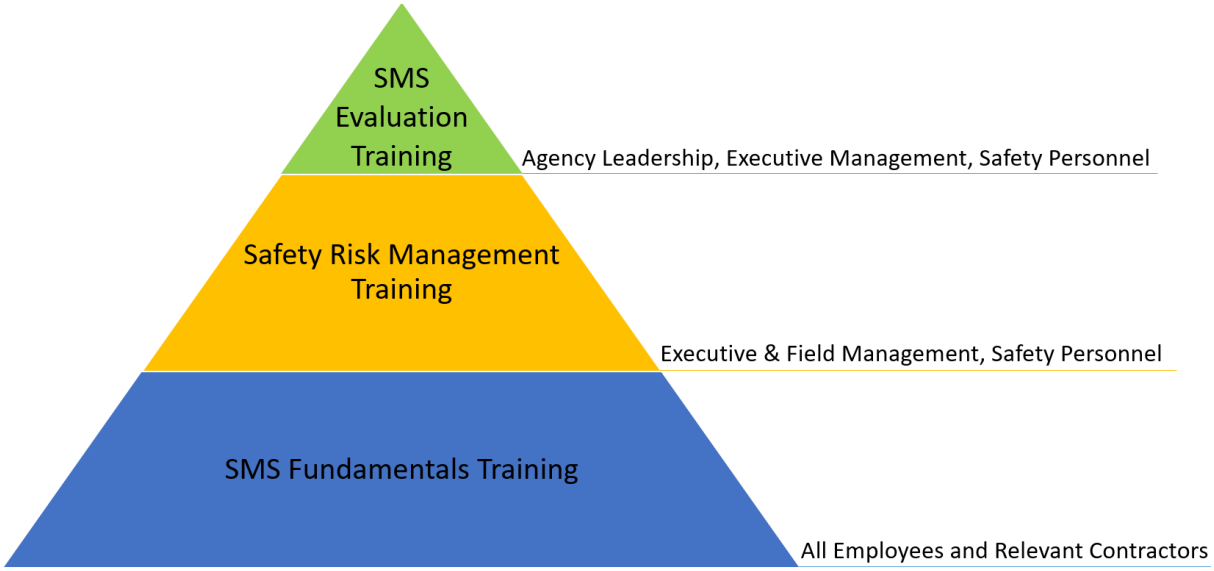

Figure 9: Safety Training Courses Supporting MBTA's SMS

MBTA will utilize the SMS training modules listed below:

- MBTA Safety Management System (SMS) Fundamentals Training (all employees and relevant contractors)
- Specialized Safety Risk Management Training (all safety personnel, executive and field management)
- Specialized SMS Evaluation Training (Agency Leadership, executive management, and safety personnel)

Details of the SMS-specific training content are provided below. This training is reviewed and updated periodically.

8.2.1 **MBTA SMS Fundamentals Training**

As part of new employment training, all employees are educated on the fundamentals of SMS and employee safety reporting systems. Initial MBTA SMS fundamentals training module addresses the objectives shown below:

- Define what an SMS is;
- What an employee's role is in the SMS;
- Hazard identification;
- How to report hazards and safety concerns; and
- Voluntary and mandatory reporting system differences

Current employees are required to attend the SMS fundamentals training hosted in The Learning Hub.[33]

Relevant contractors receive SMS fundamentals training in the initial and recurrent Right-of-Way course, provided to employees and relevant contractors every two years.

8.2.2 **Specialized Safety Risk Management Training**

Two SRM training modules were created for executive and field management, Safety personnel, and subject matter experts who participate in the SRM process.

8.2.2.1 Safety Risk Management at the MBTA Training

The Safety Risk Management at the MBTA training module is an introductory course to the safety risk management process. The training module addresses the objectives shown below:

- Define Safety Risk Management, including how it fits into MBTA's overall SMS;
- Describe why it is important to conduct SRM and the value it brings to MBTA;
- Recognize who is involved in SRM and what roles they play;
- Identify when and how to initiate the SRM process; and
- Understand the five steps of MBTA's SRM process.

8.2.2.2 SRM Facilitation Training

The SRM Facilitation training module is an in-depth course designed for Safety personnel and others who are required to complete the SRM process using the SRM worksheet, or equivalent. The training module addresses the objectives shown below:

- Recognize when and how to initiate the Safety Risk Management process.
- Describe how to effectively prepare for and conduct an SRM workshop.
- Use each part of the SRM worksheet to guide participants through the SRM process.
- Explain how to finalize the SRM worksheet and complete the process.

8.2.3 **Specialized SMS Evaluation Training**

[33] The Learning Hub is MassDOT/MBTA's learning management system.

In addition to specialized SRM training, senior management receive specialized SMS training applicable to their safety risk accountabilities. Every member of Agency Leadership and executive management who oversee the SMS implementation and maturation will receive two training modules: SMS Leadership Responsibilities; and Safety Performance & Oversight training.

8.2.3.1 SMS Leadership Responsibilities Training

The purpose of the SMS Leadership Responsibilities training module is to help MBTA executive management, Safety personnel, and other employees understand their leadership responsibilities for safety within the MBTA's SMS. The SMS Leadership Responsibilities training module addresses the objectives shown below:

- Define the purpose and scope of the MBTA Transit Safety Plan and how it aligns with regulatory requirements;
- Explain how the MBTA's organizational structure supports its SMS;
- Describe MBTA management responsibilities for safety under this Plan;
- Discuss safety culture and how it impacts an organization; and
- Identify elements, characteristics, and behaviors associated with a positive safety culture.

8.2.3.2 Safety Performance and Oversight Training

The purpose of the Safety Performance and Oversight training module is to provide MBTA executive management, Safety personnel, and other employees understand their roles and responsibilities regarding safety performance and oversight of SMS through safety assurance activities. The Safety Performance and Oversight training module addresses the objectives shown below:

- Define concepts related to safety performance and the safety assurance process;
- Identify your leadership role and responsibilities regarding oversight of MBTA's SMS;
- Set safety targets based on agency goals and objectives;
- Evaluate safety performance through measurements and trending; and
- Explain the importance of continuous improvement.

The following appendices outline how each operational department conforms to MBTA's SMS. It is anticipated that these appendices will assist in SMS implementation, safety performance target planning, and internal safety audits.

Appendix A. BUS MAINTENANCE DEPARTMENT

The Bus Maintenance department performs preventative maintenance and inspections to ensure passenger safety and vehicle reliability.

A.1 Safety Performance Indicators

Every year the Bus Maintenance department will analyze the previous year's data to create Department Performance Indicators that coincide with the overall corporate objectives found in the GM's Safety Policy Statement. The following performance indicators will be used to measure and ensure the Bus Maintenance department are meeting the Authority's safety objectives:

- Employee Injuries
- Safety Events
- Failures In Service
- System Reliability (Mean Miles Between Failures) by Fleet Type
- Near Misses

A.2 Safety Performance Monitoring and Measurement

Every day, OCC will document any safety or reliability information reported by Bus Operators into a log. When information is entered into the log, Bus Maintenance management reviews it immediately. Safety or reliability related events are entered into a shift log found in MCRS2. Garage foremen and supervisors review the shift log every morning for trends and investigation follow-up.

On a monthly basis, Bus Maintenance management personnel review the Safety Data Analysis Report (SDAR) generated from MBTA Safety. Bus Maintenance will review the data at standing committee meetings and follow-up with any safety trends and observations noted in the SDAR.

Bus Maintenance has a preventative maintenance program for all buses in the MBTA fleet. Bus Maintenance employees use standard repair times and manufacturer instructions to inspect and repair buses.

Bus Maintenance supervisors audit preventative maintenance work at least four times per month. Bus Maintenance supervisors review the work performed on a bus and ensure all safety-related items are in conformance. Bus Maintenance also partners with the quality assurance personnel who perform audits of the Bus Maintenance Supervisors. Quality assurance personnel perform quarterly safety audits to ensure maintenance practices are adhering to applicable rules and standards.

A.3 Safety Committees

The Chief Mechanical Officer oversees Bus Maintenance and is a member of the Safety Management Review Committee (SMRC). Bus Maintenance management personnel serve as members of applicable Safety Management Working Groups (SMWGs) which report directly to the SMRC.

Bus Maintenance has a safety committee structure that is aligned with MBTA's overall SMS. The Bus Accident Reduction Committee (BARC) meets monthly and is chaired by MBTA Safety personnel as well as Bus Management.

Every bus garage has a local safety committee meeting monthly or quarterly (depending on garage size) comprised of labor and management. Issues related to safety are reviewed and corrected immediately or are logged in the appropriate data management system to be resolved. Any issue a local safety committee cannot resolve is elevated to a monthly safety committee meeting comprised of labor, management, and an MBTA Safety representative. MBTA Safety will address safety concerns and any safety-related issues brought to the meeting.

A.4 Investigations

Bus Maintenance foremen and supervisors review the shift log every day for employee injuries or near misses that require an investigation. Bus Maintenance supervisors will perform on-site investigations, witness interviews, and other investigative techniques to identify causal factors related to the event.

A.5 Internal Safety Audits & Oversight

MBTA Safety will evaluate the safety performance of maintenance processes and services. Refer to the Internal Safety Audit Program document for details. MBTA Safety analyzes the collected data and provides the information to the Bus Maintenance department to be assessed at the applicable safety committee meetings.

Bus Maintenance tracks all recommendations and corrective actions until closed.

A.6 Employee Reporting

Bus Maintenance employees are encouraged to identify hazards and safety concerns within their work environment. MBTA Safety personnel are also notified of hazards reported by employees that cannot be resolved quickly at the local safety committee meetings. If Bus Maintenance field management are unable to resolve the hazard or safety concern, field management will inform the appropriate safety committee as to the nature of the hazard or safety concern. If necessary, the appropriate safety committee will perform safety risk management.

A.7 Safety Promotion

Bus Maintenance has at least one Safety Officer at each garage. Safety Officers are labor employees who volunteer to be a point-of-contact or safety related matters at a garage.

Bus Maintenance receives safety communication from MBTA Safety, primarily Safety Flashes. Bus Maintenance training personnel also distribute new/revised training procedures and ensure all appropriate employees are made aware of the changes.

Bus Maintenance conducts Safety Stand-down's periodically to address a relevant safety concern. Typically, Safety Stand-down's involve all Bus Maintenance employees.

A.8 Training

Bus Maintenance employees are trained on the types of buses that are housed in the garage. Typically, bus maintenance personnel receive 2-3 weeks of training any time they transfer to a garage with a different bus type (e.g. electric vs. diesel).

Safety officers and foremen are encouraged to participate in occupational health and safety classes offered at the MBTA.

A.9 Recordkeeping

Bus Maintenance uses PeopleSoft to maintain training records for its employees. Maintenance records are documented and signed-off when necessary. Bus Maintenance safety committees typically record attendance and meeting minutes. Quality assurance personnel perform documentation audits to ensure up-to-date maintenance records are maintained and processed in a timely manner.

Appendix B. BUS OPERATIONS DEPARTMENT

B.1 Safety Performance Indicators

Every year the Bus Operations department will analyze the previous year's data to create Department Performance Indicators that coincide with the overall corporate objectives found in the GM's Safety Policy Statement. The following performance indicators will be used to measure and ensure the Bus Operations department are meeting the Authority's safety objectives:

- Employee Injuries
- Safety Events (e.g., Collisions)
- Bus Operator Assaults
- Operational or Procedural Errors
- Near Misses

B.2 Safety Performance Monitoring and Measurement

Bus Operations monitors the OCC logs for any safety performance-related issues. Bus Operations also participates in the Safety Rules Compliance Program (SRCP). Bus Operations supervisors perform audits of Bus Operators to ensure pre-trip inspections, safe driving, and other safety-related tasks are being performed. Moreover, Bus Operations supervisors are audited to ensure the SRCP is being administered appropriately.

B.3 Safety Committees

The Assistant General Manager of Bus Operations oversees bus operations and is a member of the Bus Accident Reduction Committee (BARC), which reports findings and recommendations to the SMRC.

In addition to the BARC and SMRC, Bus Operations has monthly safety committee meetings at each facility for field management and frontline employees.

B.4 Investigations

Bus Operations responds to any safety event reported to OCC. An investigation into all safety performance indicators is conducted for causal factors.

B.5 Internal Safety Audits & Oversight

The Chief Safety Officer is responsible for the Internal Safety Audit program. MBTA Safety will evaluate the safety performance of Bus Operations. Refer to the Internal Safety Audit Program for details. MBTA Safety analyzes the collected data and provides the information to the Bus Operations department to be assessed at the applicable safety committee meetings.

Bus Operations tracks all recommendations and corrective actions until closed.

B.6 Employee Reporting

Bus Operations employees are encouraged to identify hazards and safety concerns within their work environment. MBTA Safety personnel are also notified of hazards reported by employees that cannot be resolved quickly at the

local safety committee meetings. If Bus Operations field management are unable to resolve the hazard or safety concern, field management will inform the appropriate safety committee as to the nature of the hazard or safety concern. If necessary, the appropriate safety committee will perform safety risk management.

B.7 Safety Promotion

MBTA Safety and Bus Operations work together to promote safety to all employees. Bus Roadeos highlight the safe driving of Bus Operators. Safety Flashes are created and distributed to appropriate personnel.

B.8 Training

Bus Operations have a training program designed to ensure all Bus Operators are ready to safely operate their vehicle before carrying passengers. Bus Operations personnel receive on-the-job training and refresher training on the latest changes to bus safety.

B.9 Recordkeeping

Bus Operations uses PeopleSoft to maintain training records for its employees. Pre-trip inspection records are documented and maintained by the bus garages. Bus Operations safety committees typically record attendance and meeting minutes. Quality assurance personnel perform documentation audits to ensure up-to-date maintenance records are maintained and processed in a timely manner.

Appendix C. CAPITAL DELIVERY DEPARTMENT

C.1 Safety Performance Indicators

Every year, the MBTA Capital Delivery department analyzes the previous year's data to create department-specific performance indicators that coincide with the overall corporate objectives found in the General Manager's Safety Policy statement. Performance indicators are used to measure and ensure Capital Delivery is meeting the Authority's safety objectives:

- Injuries
- Certifiable Items List (CIL) completion
- Inspection Sheets completion
- Management Meetings documenting safety-related items
- Contract Deliverables documenting safety-related items

C.2 Safety Performance Monitoring and Measurement

Monthly walkthroughs are performed by the Capital Delivery department project manager, resident engineer(s), contractor, and other staff to ensure workplace safety meets or exceeds MBTA standards. Certifiable Items List (CIL) forms are periodically reviewed by the Director of Quality Assurance/Quality Control (QA/QC) to ensure safety-critical items are documented and reviewed by project managers in a timely manner and consistent with the MBTA Safety Certification Program.

The Capital Delivery department has also begun documenting Job Hazard Analyses (JHAs) specific to the duties and tasks carried out by personnel who work in the field. JHAs are a proactive way to review job tasks being conducted on a daily basis and assure hazards are identified and risk mitigations are implemented using the JHA process.[34]

C.3 Safety Committees

The Deputy Assistant General Manager of Capital Delivery is a member of the Safety Management Review Committee (SMRC). The Capital Delivery department's Director of Quality Assurance/Quality Control serves as a member of Safety Management Working Groups (SMWG) which report directly to the Safety Management Review Committee (SMRC).

In addition to safety management committees, the Capital Delivery department holds weekly senior staff meetings which incorporates safety-related agenda items, as appropriate, and documented in meeting minutes.

Every other week, the Capital Delivery department holds progress meetings with appropriate staff to discuss safety-related topics, look ahead to the next steps in a project's design and construction, and to discuss non-conformance issues with the contractor.

[34] For further information, refer to the MBTA Job Hazard Analysis Program.

The Capital Delivery department will also meet and serve on ad-hoc safety committees and working groups that apply to its department.

C.4 Construction Safety Compliance

Monthly safety walkthroughs of Capital Delivery construction job sites are completed by Resident Engineers, ensuring contractor compliance with the 01568 Construction Safety specification. Any deficiencies are noted and a contractor plan for correction is requested.

C.5 Investigations

The Capital Delivery department investigates all employee injuries using the MBTA Safety Event Investigation Manual. Contractor injuries on MBTA property are also investigated by Capital Delivery employees and/or MBTA Safety to ensure appropriate corrective actions are taken to mitigate recurrence. Capital Delivery department project managers complete appropriate reporting forms which are submitted to MBTA Safety for tracking and trending purposes.

C.6 Internal Safety Audits

The Chief Safety Officer is responsible for the Internal Safety Audit program. MBTA Safety will evaluate the safety performance of capital delivery processes and services. Refer to the Internal Safety Audit Program for details. MBTA Safety analyzes the collected data and provides the information to the Capital Delivery department to be assessed at the applicable safety committee meetings.

Capital Delivery tracks all recommendations and corrective actions until closed.

C.7 Safety Promotion

The Capital Delivery department promotes safety by using MBTA Safety developed content and awareness campaigns.

The Capital Delivery department proactively ensures contractors promote their safety activities. MBTA Capital Delivery projects require contractors to assign a safety manager who will oversee the project and promote a safe workplace.

C.8 Training

All Capital Delivery department employees and contractors are Right-of-Way (ROW) certified. Refresher training occurs every two years.

C.9 Documentation and Recordkeeping

The Capital Delivery department maintains documents and records using common drives and file folders. The Capital Delivery department also maintains records using web-based platforms. CIL and safety-critical elements related to a project are submitted to MBTA Safety for tracking and trending purposes.

Appendix D. ENGINEERING & MAINTENANCE DIRECTORATE

MBTA's Engineering & Maintenance (E&M) directorate oversees the following departments:

- Signals and Communication Maintenance
- Transit Facilities Maintenance
- Power Systems Maintenance
- Maintenance of Way

D.1 Safety Performance Indicators

Every year the Engineering and Maintenance (E&M) department will analyze the previous year's data to create departmental safety performance indicators that coincide with the overall corporate objectives found in the GM's Safety Policy Statement. The following performance indicators will be used to measure and ensure the E&M department are meeting the Authority's safety objectives:

- Employee Injuries
- Safety Events
- State of good repair
- Work Order completion

D.2 Safety Performance Monitoring and Measurement

E&M departments monitor the MBTA system for deficiencies and defects on a daily basis. Work orders and maintenance logs document safety-related issues as well as safety events. E&M departments prioritize work efforts based upon the deficiencies and defects reported. E&M departments also proactively inspect their systems on a routine basis. Maintenance of Way, at a minimum, complies with DPU's program standard 220 CMR 151.

E&M also participates in the Safety Rules Compliance Program (SRCP) to ensure work activities are conforming to existing rules and procedures.

D.3 Safety Committees

The Senior Director of Engineering & Maintenance oversees E&M and is a member of the SMRC. E&M department's management serve as members of applicable SMWGs which report directly to the SMRC.

In addition to safety management committees, E&M departments have periodic local safety committee meetings and directorate meetings to discuss safety-related issues.

D.4 Investigations

E&M departments conform to the latest Safety Event Investigation Manual. When employee injuries occur or safety events are reported, E&M management is made aware immediately and an investigation is conducted.

D.5 Internal Safety Audits

The Chief Safety Officer is responsible for the Internal Safety Audit program. MBTA Safety will evaluate the safety performance of maintenance processes and services. Refer to the Internal Safety Audit Program document

for details. MBTA Safety analyzes the collected data and provides the information to the E&M departments to be assessed at the applicable safety committee meetings.

RVM tracks all recommendations and corrective actions until closed.

D.6 Employee Reporting

E&M departments encourage employees to identify hazards and safety concerns within their work environment. MBTA Safety personnel are also notified of any hazard reported by employees. If E&M department's field management are unable to resolve the hazard or safety concern, field management will inform the appropriate safety committee as to the nature of the hazard or safety concern. If necessary, the appropriate safety committee will perform safety risk management.

D.7 Safety Promotion

E&M departments periodically perform Safety Stand-down's to promote safety awareness to employees. E&M training personnel also communicate safety promotions through the use of Training Flashes. MBTA Safety distributes Safety Flashes as well to E&M employees.

D.8 Training

E&M departments train their employees to safety perform all aspects of their job. Most E&M employees are skilled tradespeople who are certified in the position (e.g., plumber, carpenter, electrician) they work.

D.9 Documentation and Recordkeeping

E&M departments use data management systems to house information related to safety concerns and issues. Each E&M department maintains its own documentation and recordkeeping methods when performing work or issuing special orders.

Appendix E. RAIL VEHICLE MAINTENANCE DEPARTMENT

Rail Vehicle Maintenance department is responsible for light rail and heavy rail maintenance, engineering changes, vehicle system modifications, carhouse/employee safety, and employee training.

E.1 Safety Performance Indicators

Every year the Rail Vehicle Maintenance department will analyze the previous year's data to create departmental safety performance indicators that coincide with the overall corporate objectives found in the GM's Safety Policy Statement. The following performance indicators will be used to measure and ensure the Rail Vehicle Maintenance department are meeting the Authority's safety objectives:

- Employee Injuries
- Safety Events
- Failures In Service
- System Reliability (Mean Miles Between Failures) by Fleet Type

E.2 Safety Performance Monitoring and Measurement

Vehicle inspections are one of the most important maintenance activities as it relates to passenger safety and vehicle reliability. In an effort to standardize maintenance documentation and to ensure both consistency and accuracy, Rail Vehicle Maintenance follows documented safety and quality assurance procedures:

- Every week, Rail Vehicle Maintenance collects performance information to analyze and disseminate to appropriate levels of MBTA management for review. This information is retained on a Rail Vehicle Maintenance common drive.
- Forepersons are responsible for inspecting revenue service vehicles outlined in QAP-002, incorporated by reference. Results of this inspection are retained on a Rail Vehicle Maintenance common drive.
- Mileage Inspection Procedures are outlined for each fleet type. Rail Vehicle Maintenance employees ensure safety-critical items are functioning properly and that any preventative maintenance is performed.
- Rail Vehicle Maintenance performs an audit of a vehicle that has just undergone the Mileage Inspection Procedure, at least every 90 days, outlined in QAP-004, incorporated by reference. Results of this audit are retained on a Rail Vehicle Maintenance common drive.

E.3 Safety Committees

The Chief Mechanical Officer oversees Rail Vehicle Maintenance and is a member of the Safety Management Review Committee (SMRC). Rail Vehicle Maintenance management personnel serve as members of applicable Safety Management Working Groups (SMWGs) which report directly to the SMRC.

In addition to safety management committees, Rail Vehicle Maintenance management meets with Transit Rail Operations, Scheduling & Planning, and Transit Facilities Maintenance management periodically to manage safety risks that effect operational aspects of the MBTA. These meetings incorporate safety-related agenda items, as appropriate, and are documented in meeting minutes.

The Rail Vehicle Maintenance department will also meet and serve on ad-hoc safety committees and working groups that apply to its department.

E.4 Investigations

The Rail Vehicle Maintenance department investigates all employee injuries using the MBTA Safety Event Investigation Manual. For details reference the Safety Event Investigation Manual.

E.5 Internal Safety Audits & Oversight

The Chief Safety Officer is responsible for the Internal Safety Audit program. MBTA Safety will evaluate the safety performance of maintenance processes and services. Refer to the Internal Safety Audit Program document for details. MBTA Safety analyzes the collected data and provides the information to the Rail Vehicle Maintenance department to be assessed at the applicable safety committee meetings.

RVM tracks all recommendations and corrective actions until closed.

E.6 Employee Reporting

Rail Vehicle Maintenance employees are encouraged to identify hazards and safety concerns within their work environment. MBTA Safety personnel are also notified of any hazard reported by employees. If Rail Vehicle Maintenance field management are unable to resolve the hazard or safety concern, field management will inform the appropriate safety committee as to the nature of the hazard or safety concern. If necessary, the appropriate safety committee will perform safety risk management.

E.7 Safety Promotion

Rail Vehicle Maintenance publishes special orders, training flashes, and other notices to employees. In addition to Rail Vehicle Maintenance publications, The Safety Data Analysis Report (SDAR) is published every month by MBTA Safety via email and on the MBTA Intranet. The SDAR contains information for all employees highlighting hazards and explains why corrective actions from safety hazards were implemented.

Rail Vehicle Maintenance uses electronic messaging boards to communicate safety promotion activities, as well as bulletin boards and in-person toolbox talks.

E.8 Training

Rail Vehicle Maintenance employees receive all mandatory MBTA-wide training courses. Rail Vehicle Maintenance has specific training for their employees which includes:

- General workplace safety
- New equipment training(s)
- New system training
- Forklift safety

E.9 Documentation and Recordkeeping

Rail Vehicle Maintenance Forepersons and managers have access to the MBTA Intranet and a computer-based common drive file folder structure. Training records, repair records, inspections, environmental audits, quality

assurance records are all retained in the common drive. Safety Rules Compliance Program (SRCP) information is submitted to the SRCP committee on a monthly basis.

Appendix F. TRANSIT RAIL OPERATIONS DEPARTMENT

MBTA's Transit Rail Operations has frontline employees involved in operating, training, and overseeing the safe and reliable operation of the subway system.

F.1 Safety Performance Indicators

Every year the Transit Rail Operations department will analyze the previous year's data to create Department Performance Indicators that coincide with the overall corporate objectives found in the GM's Safety Policy Statement. The following performance indicators will be used to measure and ensure the Transit Rail Operations department are meeting the Authority's safety objectives:

- Employee Injuries
- Safety Events
- Operational or Procedural Errors
- Vehicle Damage

F.2 Safety Committees

The Transit Rail Operations department has a robust safety committee structure. The Transportation Safety Management Working Group (T-SMWG) was formed to manage safety risk identified within the transit rail environment. The T-SMWG reviews the monthly Safety Data Analysis Report (SDAR) for trends and other systemic issues identified using data. Changes to the environment, procedures, and other human factors are also discussed at a management level to determine if the Safety Risk Management process should be performed. The T-SMWG meets monthly to discuss issues/hazards that were not able to be resolved at the local committee level.[35]

The T-SMWG conducts assessments of its safety performance against the departmental safety objectives to:

1. Ensure compliance with safety risk mitigations
2. Evaluate the performance of the SMS
3. Evaluate the effectiveness of established risk mitigations and identify any ineffective risk mitigations.
4. Identify changes in the operational environment that may introduce new hazards.
5. Identify new hazards.

After the System Assessment the T-SMWG will determine:

1. The analysis has shown that safety performance is acceptable and departmental objectives are being met (Continue to monitor).
2. The analysis has discovered that safety performance is not acceptable, and an issue lies with complying with Authority policies/special orders or necessary procedures are not being followed (Implement a corrective action.)

[35] The local committee level is made up of management and frontline staff to improve workplace safety and identify safety concerns and/or hazards. Local committees are typically line-specific (e.g. green line safety committee) and discuss issues relevant to their operation.

3. The analysis has discovered a new uncontrolled hazard, or ineffective risk mitigation (Follow SRM process in Chapter 4.)

F.2.1 T-SMWG Members

The Assistant General Manager - Rail Operations has overall responsibility of the Transit Rail Operations safety committees; however, he has delegated the District Superintendents to facilitate their respective local safety committee meetings. The key members of the safety committees are accountable to develop, implement, and maintain SMS processes in the Transit Rail Operations department including:

1. Hazard identification and safety risk assessment
2. Assuring the effectiveness of safety risk mitigations
3. Promoting safety
4. Advise the Assistant General Manager - Rail Operations who will update the Chief Operating Officer on the performance of the SMS.

F.3 Safety Performance Monitoring and Measurement

The Transit Rail Operations department utilizes many different processes to measure and/or monitor safety performance:

- Continuous Monitoring
- Departmental Audits (e.g. speed sign audits)
- Internal Safety Audit Program administered by MBTA Safety
- External Audits
- Investigations
- Employee Reporting

F.3.1 Continuous Monitoring

Continuous monitoring is what the Transit Rail Operations department perform on a day-to-day basis. The continuous monitoring process is designed to ensure each department is monitoring its services, operational processes, and operational environment to detect changes. The Transit Rail Operations department utilize the following programs.

1. Operations Control Center (OCC) Communication Logs
2. SOP2 reports
3. Quality Assurance/Quality Control
4. Inter-departmental meetings
5. Daily Operational Meetings

F.3.2 Departmental Audits

The Assistant General Manager - Rail Operations is responsible for the departmental auditing program. The Transit Rail Operations department will utilize both internal department audits and external audits.

A. Internal Departmental Audits

The Transit Rail Operations department will perform a scheduled audit each month to ensure compliance with operations and maintenance processes. Non-scheduled audits will be performed at the discretion of the Assistant General Manager - Rail Operations.

The Safety Rules and Compliance Program (SRCP) was started by the Rail Transit Operations department and continues to evolve into other departments at MBTA. Rail Transit Operations performs weekly audits of its operations and maintenance procedures to monitor its system for compliance with, and sufficiency of, the Authority's procedures for operations and maintenance. Data collected from this program is analyzed by a committee of management representatives in order to track and trend valuable safety data.

B. External Audits

Any external audit including but not limited to FTA, DPU, and APTA audits will be analyzed by the Assistant General Manager - Rail Operations and included in the applicable safety committee meetings for assessment.

F.3.3 Internal Safety Audits

The Chief Safety Officer is responsible for the Internal Safety Audit program. MBTA Safety will evaluate the safety performance of operational processes and services. Refer to the Internal Safety Audit Program for details. MBTA Safety analyzes the collected data and provides the information to Rail Transit Operations department to be assessed at the applicable safety committee meetings.

F.3.4 Investigations

MBTA Safety has developed an investigation form to investigate incidents and accidents involving Rail Transit Operations employees. For details reference the Safety Event Investigation Manual.

F.3.5 Employee Reporting

Multiple employee reporting systems, in which employees can report hazards, issues, concerns, incidents, as well as recommendations, have been developed and maintained.

1. Mandatory incident reporting

Rail Transit Operations employees are required to report to their supervisor and/or OCC for events outlined in applicable rulebooks and SOPs. Mandatory reporting for rail transit employees includes the following events:

- Derailment
- Collision of any kind
- Employee Injury
- Customer Injury
- Signal Violation
- Clearance Violation
- Wrong Route
- Fire / Code 1

- Employee Assault
- OCS/Pantograph Damage
- Vehicle Damage
- ROW Safety Violation

2. Safety Hotline/Notifications

MBTA Safety manages an anonymous/confidential reporting program via a telephone number and email address. All reports involving Rail Transit Operations employees will be de-identified and assessed by MBTA Safety management and Rail Transit Operations management, and/or appropriate safety committees.

F.4 Safety Promotion

Transit Rail Operations publishes special orders, safety flashes, and other notices to employees. In addition to Rail Transit Operations publications, The Safety Data Analysis Report (SDAR) is published every month by MBTA Safety via email and on the MBTA Intranet. The SDAR contains information for all employees highlighting hazards and explains why corrective actions from safety hazards were implemented.

F.5 Training

Transit Rail Operations employees receive all mandatory MBTA-wide training courses. Transit Rail Operations has a specialized training department that ensures its employees are trained and competent to perform in their job functions.

F.6 Documentation and Recordkeeping

All Transit Rail Operations department safety risk assessments will be maintained by MBTA Safety for as long as the risk mitigations remain relevant, but for a minimum of 3 years.

Safety assurance outputs will be maintained in internal databases and folders for a minimum of 3 years.

SMS training records will be maintained in PeopleSoft (or equivalent web-based platform) by MBTA Safety for a minimum of 3 years.

Safety communication published by MBTA Safety will be maintained on the MBTA Intranet for a minimum of 3 years.

Appendix G. PARATRANSIT SERVICES

MBTA oversees paratransit services and ensures conformance to this Safety Plan. Contractors have responsibilities to perform safety functions to ensure they are conforming to the SMS outlined in this Safety Plan. MBTA will audit paratransit services to ensure contractors/vendors are in conformance to this Safety Plan.

Appendix H. MBTA REFERENCE DOCUMENTS

Table 11 is a list of MBTA-controlled documents incorporated by reference to support the overarching MBTA Safety Program:

Document Title:	Conformance to:	Chapter/Section Reference in this Safety Plan:
SMS Implementation Plan	§ 673.11(a)(2)	Applicability; PRF 4
Employee Safety Reporting Program	§ 673.23(b); § 673.27(b)(4)	PRF 3; 2.1.4; 6.2.5; 6.2.6
Emergency Management Plan	§ 673.11(a)(6)	2.3
TAM Plan	Part of MBTA's overarching Safety Program, including state of good repair and condition assessments.	2.4
OHS Plan	Part of MBTA's overarching Safety Program, including workplace safety programs and hazardous materials.	2.5
MassDOT/MBTA Railroad System Safety Program Plan	Part of MBTA Safety Program, including FRA requirements.	2.6
Safety Risk Management Standard Operating Procedure	§ 673.25	Chapter 5
Procurement Manual	§ 673.25(d)	5.1.7
Risk Mitigation & Monitoring Standard Operating Procedure	§ 673.27	5.2.6.1
Safety Event Investigation Manual	§ 673.27(b)(3)	6.2.4; 8.1.3
Configuration Management and Control Program	§ 673.27(c)	6.3.1.2
System Modification Program	§ 673.27(c)	6.3.1.2
Safety Certification Program	§ 673.27(c)	6.3.1.3
Internal Safety Audit Program	§ 673.37(d)	6.5.1
Job Hazard Analysis (JHA) Program	Part of MBTA's overarching Safety Program.	
Drug and Alcohol Policies	Part of MBTA's overarching Safety Program.	
Environmental Management System Manual	Part of MBTA's overarching Safety Program.	

Table 11: MBTA-Controlled Documents Supporting MBTA's Overarching Safety Program

Appendix I. REFERENCED STANDARDS AND GUIDANCE DOCUMENTS

49 CFR Part 672 – Public Transportation Safety Certification Training Program
49 CFR Part 673 – Public Transportation Agency Safety Plan
49 CFR Part 670 – Public Transportation Safety Program
49 CFR Part 674 – State Safety Oversight
Advisory Circular (AC) 120-92B – Safety Management Systems (FAA)
FTA's Bus Template Reference Guide
FTA's Comparison of Definitions: Part 673 versus Part 659
FTA's Roadmap for Transition from the SSPP to the Agency Safety Plan
International Civil Aviation Organization: Safety Management Manual, 3rd edition
MIL-STD-882E – Department of Defense Standard Practice: System Safety
FTA's National Public Transportation Safety Plan

Appendix J. RECORD OF REVISION

Revision	Section (If applicable)	Approved By:	Signed By:	Date Submitted to DPU:	Description
0	ALL	FMCB	Steve Poftak	06/22/2020	INSERT ALL PAGES
1	PRF; 1; 2; 3; 4; 5; 6; 7; and 8	FMCB	Steve Poftak	6/25/2021	Updated internal Safety Plan review process; Added Safety Performance Targets for 2022; Updated organizational structure and safety committees; Modified SRM definitions; and Updated SMS training requirements. Contact MBTA Safety for a complete description of revisions.