



Appendix K

Version: 10/01/2021

Hazard Management Plan

Review and Approval Process

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HAZARD MANAGEMENT PROCESS

This section of the Program Standard Documents and Procedures introduces the NJDOT SSO Program's requirements for the Hazard Management Process which must be maintained by the RTA/RFGPTS, and formally reviewed by the NJDOT SSO program. Note that in the future, the hazard management process will be included/integrated as part of the Safety Management System (SMS) Safety Risk Management (SRM) and Safety Assurance (SA) processes.

Objective

The objective of the Hazard Management process is to provide the NJDOT SSO program with an ongoing role in overseeing the RTA's/RFGPTS identification, assessment, and resolution of hazards.

Minimum Requirements

The NJDOT SSO program requires each RTA/RFGPTS to develop and document a process to identify and resolve hazards for new start projects, extensions, or modification of existing systems, operational or environmental changes, or from hazards discovered during reviews, compliance audits, inspections, and investigations.

The hazard management process must, at a minimum:

- (1) Define the RTA's/RFGPTS approach to hazard management and the implementation of an integrated system-wide hazard resolution process
- (2) Specify the sources of, and the mechanisms to support, the on-going identification of hazards. This includes problems identified during maintenance audits and inspections.
- (3) Define the process by which identified hazards will be evaluated and prioritized for elimination and control
- (4) Identify the mechanism used to track the identified hazards through resolution
- (5) Define the minimum thresholds for the notification and reporting of hazards to the NJDOT SSO program
- (6) Specify the process by which the RTA/RFGPTS will provide on-going reporting of hazard resolution activities to the NJDOT SSO program
- (7) Provide a monthly report of corrective actions for hazards which include the date the corrective action will be implemented; later changes to the implementation date shall be included without eliminating the original implementation date.

Hazard Tracking Log

Each RTA/RFGPTS must establish and manage a Hazard Tracking Log which reflects the consolidation of information in the hazard management process. The log must contain all hazards identified through the various methods used by the RTA/RFGPTS. The Hazard Tracking Log will contain, as a minimum, the following information:

- Assigned hazard number
- Date hazard identified



- Hazard Title
- Hazard Description
- Source from which it was identified
- The element of the RTA's/RFGPTS operation affected by the hazard.
- Initial Hazard Classification
- Current Hazard Classification
- Corrective Action Plan

The **Hazard Log** shall be updated regularly to reflect its current status and be part of the RTA's/RFGPTS monthly report. The Hazard Tracking Log shall be maintained in an ongoing basis. Corrections should be able to be made but the original record not changed or altered.

Monthly CSO Meetings on the Hazard Management Process

The NJDOT SSO program requires the RTA/RFGPTS to host monthly meetings to review the Hazard Tracking Log and the other activities associated with the hazard management process. **Appendix M** outlines the agenda for the monthly CSO meetings.

During the monthly meetings, the NJDOT SSO program may review any records maintained by the CSO documenting the results of its hazard management process. If these records are not available at the meetings, they will be transmitted to the NJDOT SSO program via email NJOFGSSO@dot.nj.gov.

Meeting minutes from each monthly meeting will be prepared by the and submitted to the NJDOT SSO program no later than two weeks after each monthly meeting.

Hazard Management Process Methodologies

This section identifies the process by which the RTA/RFGPTS identifies, analyzes, categorizes, resolves, and documents hazards occurring in operations, maintenance, and engineering. The process, accessible to all levels of the organization, includes analysis of potential impacts on the operating system, and a means to resolve the identified impacts, acceptable to management. A Hazard Management Process consists of three primary components:

- Hazard Identification
- Hazard Classification
- Hazard Resolution

Hazard Identification

Describe the methods used to ensure that a systematic effort is made to identify all hazards and they are entered into the Hazard Management Process. These methods may include such exercises as Preliminary Hazard Analysis (PHA), Operating Hazard Analysis (OHA), Critical/Catastrophic Items List (CCIL), Fault Tree Analysis, Subsystem Interface Analysis, various Human Factors Analysis and Joint Railroad - Fixed Guideway Corridor Operations.



New systems, with minimum history available for analyses of the existing operations, require Contractors (performing design, construction and procurement services) to conduct hazard analysis as part of contract services.

Systems that have operated over a period of years may elect to use the input of operations and maintenance personnel as sufficient for the hazard analysis process. In both cases, the process remains formal to sufficiently document a procedure with appropriate sign-off and checks and balances. The process, available to all units of the organization, is reviewed, administered on a routine basis, and has high level visibility and participation. Hazard Identification is an ongoing process, viable throughout the system life cycle. Previously unidentified hazards associated with accidents and incidents, must enter the Hazard Management Process. Hazards and problems identified during maintenance audits and inspections shall be integrated into the hazard management process.

Hazard Classification

Once a hazard is identified, an analysis to determine its potential severity and probability of occurrence is performed. The RTA/RFGPTS standardizes the process for this analysis and documents the approved procedure. While developing a qualitative methodology for this type of analysis is possible, the most practical method for fixed guideway transit system application is simple deductive reasoning, applied on a collective or organizational basis. The composite management staff of all key line and staff departments, administered by the safety unit, can effectively determine the severity of all but the most difficult or unusual hazards.

The following sections represent a methodology adopted from the Military Standard 882E (MIL-STD-882E). Hazards are rated in terms of their effects on employees, passengers, transit system, property and/or the environment.

Hazard Severity

Hazard Severity relates to the subjective measure of the worst credible mishap resulting from personnel error, environmental conditions, design inadequacies, and/or procedural deficiencies for system, subsystem, or component failures or malfunctions, categorized as follows:

- **I (Catastrophic)** - Operating conditions are such that human error, environment, design deficiencies, element, subsystem or component failure or procedural deficiencies may cause death or major system/property/environmental loss.
- **II (Critical)** - Operating conditions are such that human error, environment, design deficiencies, element, subsystem or component failure or procedural deficiencies may cause severe injury or illness or major system/property/environmental damage.
- **III (Marginal)** - Operating conditions are such that human error, environment, design deficiencies, element, subsystem or component failure or procedural deficiencies may cause minor injury or illness or minor system/property/environmental damage.
- **IV (Negligible)** - Operating conditions are such that human error, environment, design deficiencies, element, subsystem or component failure or procedural deficiencies will result in less than minor illness or injury or negligible system/property/ environmental damage.



Hazard Probability (Likelihood)

This is the probability that a specific hazard will occur during the planned life expectancy of the system element, subsystem, or component. It can be described subjectively in potential occurrences per unit, events, population, items, or activity, ranked as follows:

- **A – (Frequent)** - Likely to occur frequently in life of an item; continuously experienced in fleet/inventory.
- **B – (Probable)** - Will occur several times in life of an item; will occur frequently in fleet inventory.
- **C – (Occasional)** - Likely to occur sometime in the life of an item; will occur several times in fleet/inventory.
- **D – (Remote)** - Unlikely but possible to occur in life of an item; unlikely but it can be expected to occur in fleet/inventory.
- **E – (Improbable)** - So unlikely, it can be assumed the occurrence may not be experienced; unlikely to occur, but possible in fleet/inventory.

The combination of severity and probability associated with a hazard is defined as hazard risk. The hazard risk can be described using the alphanumeric identifier established using the definitions provided above.

It is important to determine in advance the exact mechanism for implementation of this process. The plan provides for an administrative review process, should a consensus on categorizing a specific hazard prove too difficult to achieve. Included in the administrative review process, the plan provides for a mechanism that may provide for outside assistance, as necessary.

Hazards identified on an ongoing basis enter the formal process, the same as those identified by formal analyses techniques associated with new procurement and new system construction. All employees involved in the hazard identification process know and understand their respective roles.

Hazard Resolution

Hazard Resolution is the analysis and subsequent actions to reduce to the lowest level practical, the risk associated with an identified hazard. Hazard Resolution is not synonymous with hazard elimination. In the fixed guideway transit systems environment, some hazards are impossible to eliminate and others are highly impractical to eliminate. Using protective and warning devices or special procedures are ways to consider a reduction of risk. Some hazards present unacceptable risks because of severity and high probability. These hazards are the first priority for risk reduction through mitigation and hazard management.

Part of the Hazard Resolution procedure is a predetermined matrix prescribing which identified hazards are acceptable, undesirable (acceptable with mitigation), and unacceptable. Once this matrix is defined by the RTA/RFGPTS, deviation from the prescribed resolution process should occur only through approved, predetermined channels. The Figure below provides a Sample Hazard Resolution Matrix - provided for use by the RTA/RFGPTS.



Figure Hazard Resolution Matrix (Sample)

Hazard Resolution Matrix				
	I Catastrophic	II Critical	III Marginal	IV Negligible
A Frequent	UNACCEPTABLE	UNACCEPTABLE	UNACCEPTABLE	<i>Acceptable^(WRI)</i>
B Probable	UNACCEPTABLE	UNACCEPTABLE	UNDESIRABLE	<i>Acceptable^(WRI)</i>
C Occasional	UNACCEPTABLE	UNDESIRABLE	UNDESIRABLE	ACCEPTABLE
D Remote	UNDESIRABLE	UNDESIRABLE	<i>Acceptable^(WRI)</i>	ACCEPTABLE
E Improbable	<i>Acceptable^(WRI)</i>	<i>Acceptable^(WRI)</i>	<i>Acceptable^(WRI)</i>	ACCEPTABLE
<i>Acceptable^(WRI)</i> — ACCEPTABLE with review by management staff				

Coordinating with the State Oversight Agency

Hazards shall be reported in a monthly report to the NJDOT SSO program so that the NJDOT SSO program stays informed about hazard status and corrective action taken/plans undertaken to reduce hazard risk. The monthly reports must be submitted to the NJDOT SSO program prior to the monthly meeting. The corrective actions shall be reported with the anticipated date of the correction being implemented. That initial corrective action implementation date shall not be deleted in subsequent monthly reports. Should the implementation date change, that changed implementation date shall be added to subsequent reports.

Unacceptable Hazardous Conditions

Notification of UNACCEPTABLE Hazardous Conditions

During the application of the hazard management process, should the RTA/RFGPTS determine that the current risk assessment of the hazard identified is “unacceptable” using the criteria and assessment process specified in its ASP, the RTA/RFGPTS must notify the NJDOT SSO program in accordance with Procedure SSO-003. Documentation of the unacceptable hazard must also be transmitted to the NJDOT SSO program.

Investigation of Significant Hazardous Conditions

The RTA/RFGPTS must investigate a hazard reported to the NJDOT SSO program as unacceptable in accordance with the provisions specified in its ASP and the Accident/Incident Procedure submitted to and approved by the NJDOT SSO program. The RTA/RFGPTS maintain a file of hazards reported to the NJDOT SSO program and make them available to the NJDOT SSO program upon request.



The RTA/RFGPTS must submit an initial report of its investigation of the unacceptable hazard within seven (7) calendar days of the hazard being reported to the NJDOT SSO program. Status Reports are thereafter required to be submitted to the NJDOT SSO program to provide updates until the investigation is completed. A final investigation report of the unacceptable hazard is prepared upon completion of the investigation and includes a description of activities, findings, identified causal factors and a corrective action plan.

The report is submitted to the NJDOT SSO program for review, and within thirty (30) days of receipt, the NJDOT SSO program will issue to the RTA/RFGPTS written approval of the report. In the event the NJDOT SSO program does not accept the report, the NJDOT SSO program will communicate in writing the area(s) of disagreement or concern. The report shall not be considered final until all conditions are met and the report is approved by the NJDOT SSO program.

As required, the RTA/RFGPTS will develop a Corrective Action Plan to correct those elements or activities identified as deficient. Procedures associated with the development of corrective action plans are also submitted to the NJDOT SSO program for review and approval.

At all times, the NJDOT SSO program reserves the right to conduct independent investigations of identified unacceptable hazards. If the NJDOT SSO program determines that an investigation is required, the NJDOT SSO program will notify the RTA/RFGPTS no later than seven (7) calendar days following receipt of the RTA's/RFGPTS initial report.

NJDOT SSO Review of Hazard Management Process

The NJDOT SSO must periodically review the RTA/RFGPTS Hazard Management Process using the attached Conformance Checklist, to ensure that it contains the following:

- (1) The description in the Agency Safety Plan (ASP) Safety Risk Management (SRM) must contain the required elements.
- (2) It must be executed in accordance with the description in the ASP SRM.
- (3) The Hazard Tracking Logs contain necessary content and are being updated regularly.
- (4) Deliverables are provided to the SSO on time.
- (5) Meetings are being held and minutes adequately documented.
- (6) Hazards are being resolved according to prioritization.

Updated:

- March 5, 2018 – initial release with Version 1.0
- October 1, 2021 – changes to account for support to the ASP/SMS Safety Risk Management process, as well as the Hazard Log in Safety Assurance; monthly meetings with CSO; revised rail property to RFGPTS



**SUMMARY CONFORMANCE CHECKLIST
 FOR REVIEW AND APPROVAL OF HAZARD MANAGEMENT PROCESS**

FIXED GUIDEWAY SYSTEM: _____ _____ REV. NO: _____ NO. _____ ITEM _____	ACCEPTABLE	UNACCEPTABLE	PLAN TITLE: _____ _____ DATE: _____ NO. _____ ITEM _____	ACCEPTABLE	UNACCEPTABLE
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1	Clearly stated Hazard Management Process: - Identification - Assessment - Resolution and Corrective Actions - Hazard Management Log - Notification to OSSO and other agencies - Reporting to OSSO and other agencies			13	Does the FGT System have a monthly safety meeting of department managers including the System Safety Manager and System Security Manager and police at which all accidents, incidents, hazards and security concerns are discussed?		
2	Defined responsibilities of FGTS/RTS personnel for the implementation and management of the Hazard Management Process						
3	Specific sources of and the mechanisms and methods to support the hazard management process						
4	Defined process for the assessment of identified hazards						
5	Methods for notification to OSSO, NTSB, OSHA and, or other agencies for incidents meeting the reporting thresholds						
6	Mechanisms for tracking hazards from identification to closure						
7	Methods by which ongoing reporting is provided to OSSO and other regulatory parties						
8	Verification of a Hazard Tracking Log for organized tracking of identified hazards						
9	Methods by which FGTS/RTS departments participate in the reporting of hazards						
10	Established hazard identification, assessment, and resolution criteria as stated in the ASP and associated procedures						
11	Identification of the investigation process in response to hazardous conditions						
12	Report hazards: Does the monthly report to the OSSO contain accidents, incidents, hazards together with their corrective actions						

THE HAZARD MANAGEMENT PROCESS IS:
 _____ ACCEPTABLE
 _____ UNACCEPTABLE, REVISE AND RESUBMIT

REVIEWED BY: _____	DATE: _____
APPROVED BY: _____	DATE: _____

Conformance Checklist Form (For NJDOT Use Only)

Comments



SUMMARY OF HAZARDOUS CONDITION

HAZARD ID:

NJ Tracking Number:

Service Line:

Hazard Title:

OSS Reviewed

Log Status

Date Initiated

Time Initiated

Implementation Date

Archived Date

SMS Manager

SMS Manager Department

Reported By Name

Source

Hazard Category

Hazard Aspect

Hazard Category Definition

Description

Root Cause

Worst Credible Outcome



SUMMARY OF HAZARDOUS CONDITION

HAZARD ID:

NJ Tracking Number:

Service Line:

Hazard Title:

Initial HRI

Hazard Rater

Hazard Rater Dept.

Residual HRI

Hazard Severity Matrix

Hazard Probability Matrix

Risk

Definition

Resolution Requirements

Historical HRI

Immediate Risk Reduction

Mitigation

Long Term Risk Reduction

Resolution Status

Comments