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Operating Practices Working Group

Rail Transit Accident/Incident Notification and Investigation Requirements

Abstract: This standard provides a common framework for rail transit agencies to develop accident/incident investigation plans. Additional recommendations on how rail transit agencies should implement the policies and procedures contained in the plan required by this standard are given in the informative Appendix A.

Keywords: accident, incident, investigation, notification, reporting

Summary: This standard describes requirements that a rail transit agency shall develop and implement for accident/incident investigation plans. The standard requires that the rail transit agency accident/incident investigation plan address policies and procedures; notification and reporting; investigation thresholds; coordination with government and regulatory agencies; formal investigation process; training; and post-accident/incident reporting. The requirements that a rail transit agency shall follow to develop its accident/incident investigation plan are provided in the main body of this standard. The main body of this standard also includes requirements for the organized management of accident/incident investigation activities that often involve multiple internal and external parties. This standard introduces consideration of contributing factors such as human factors, near misses, fatigue and other issues that may be relevant to understanding the root causes of a given accident or incident. Individual rail transit agencies shall apply this standard as it relates to their structure and operating environment. Recommendations for the process that the rail transit agency should follow to perform accident/incident investigations are given in Appendix A. Appendix A does not contain additional requirements.

Foreword

The American Public Transportation Association is a standards development organization in North America. The process of developing standards is managed by the APTA Standards Program's Standards Development Oversight Council (SDOC). These activities are carried out through several standards policy and planning committees that have been established to address specific transportation modes, safety and security requirements, interoperability, and other topics.

APTA used a consensus-based process to develop this document and its continued maintenance, which is detailed in the manual for the APTA Standards Program. This document was drafted in accordance with the approval criteria and editorial policy as described. Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

This document was prepared by the Operating Practices Working Group as directed by the Rail Standards Policy and Planning Committee.

This document represents a common viewpoint of those parties concerned with its provisions, namely transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. APTA standards are mandatory to the extent incorporated by an applicable statute or regulation. In some cases, federal and/or state regulations govern portions of a transit system's operations. In cases where there is a conflict or contradiction between an applicable law or regulation and this document, consult with a legal adviser to determine which document takes precedence.

This document supersedes APTA RT-OP-S-002-02, Rev. 3, which has been revised. Below is a summary of changes from the previous document version:

- Reformatted to align with the new APTA rail transit standards.
- Document title changed from "Rail Transit Accident/Incident Investigation & Notification" to "Rail Transit Accident/Incident Notification and Investigation Requirements."
- Updated references to applicable FTA and FRA reporting requirements
- Committee membership updated.
- Some global changes to section headings and numbering resulted when sections dealing with references and acronyms were moved to the end of the document.
- Changed references from "rail transit system (RTS)" to "rail transit agency."
- The following sections, which appeared in the first edition published in 2004, have been deleted. They outlined the methods for capturing and reporting the data, and given that this type of information is subject to change and is available from the FTA and FRA websites, it was determined to delete them from the document:
    - 4.7.2.1 FTA reporting requirements
    - 4.7.2.2 FRA reporting requirements
- There were other cosmetic changes such as capitalization, punctuation, grammar, etc.
- Added a new section A.9 Operations Coordination in Appendix A.
- In the References section, additional CFR regulations and USC codes were added to reflect other reporting requirements.

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Introduction

This introduction is not part of APTA RT-OP-S-002-02, "Rail Transit Accident/Incident Notification and Investigation Requirements."

APTA recommends the use of this document by:

- individuals or organizations that operate rail transit systems;
- individuals or organizations that contract with others for the operation of rail transit systems; and
- individuals or organizations that influence how rail transit systems are operated (including but not limited to consultants, designers and contractors).

Scope and purpose

This standard is intended to assist rail transit agency personnel in investigating accidents/incidents in a logical and organized manner. Since each accident/incident may be different, the procedures and steps described in this document will not necessarily apply to, nor be required for, every rail transit agency accident/incident investigation. The purpose of accident/incident investigation is to gather and assess facts in order to determine cause(s) and to identify corrective measures to prevent recurrence. Accident/incident investigation is not intended to affix blame, subject people to liability for their actions, or recommend disciplinary action. The purpose of this standard is to help rail transit agencies obtain accident/incident investigation results to learn more about mechanical, organizational, human, and other factors in order to correct unsafe conditions and to better manage safety risk.

Note on alternate practices

Individual rail transit systems may modify the practices in this standard to accommodate their specific equipment and mode of operation. APTA recognizes that some rail transit systems may have unique operating environments that make strict compliance with every provision of this standard impossible. As a result, certain rail transit systems may need to implement the standards and practices herein in ways that are more or less restrictive than this document prescribes. A rail transit system may develop alternates to APTA standards so long as the alternates are based on a safe operating history and are described and documented in the system's safety program plan (or another document that is referenced in the system safety program plan).

Documentation of alternate practices shall:

- identify the specific APTA rail transit safety standard requirements that cannot be met;
- state why each of these requirements cannot be met;
- describe the alternate methods used; and
- describe and substantiate how the alternate methods do not compromise safety and provide a level of safety equivalent to the practices in the APTA safety standard (operating histories or hazard analysis findings may be used to substantiate this claim).

Rail Transit Accident/Incident Notification and Investigation Requirements

1. Event investigation requirements

1.1 Policies and procedures

The rail transit agency shall develop formal policies and procedures for performing event investigations in accordance and in compliance with Federal Transit Administration and rail transit agency–established thresholds.

The rail transit agency shall describe differentiation or delineation of roles and responsibilities of agency staff who participate in an accident/incident response and investigation.

The FTA has defined accident, event, incident and occurrence as follows.

> **NOTE:** FTA definitions are subject to change, and the rail transit agency shall comply with all current definitions and requirements.

- **Accident** means an event that involves any of the following:
  - a loss of life
  - a report of a serious injury to a person
  - a collision of public transportation vehicles; a runaway train
  - an evacuation for life safety reasons
  - any derailment of a rail transit vehicle, at any location, at any time, whatever the cause.
- **Event** means any accident, incident or occurrence.
- **Incident** means an event that involves any of the following:
  - a personal injury that is not a serious injury
  - one or more injuries requiring medical transport
  - damage to facilities, equipment, rolling stock or infrastructure that disrupts the operations of a transit agency
- **Occurrence** means 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.

Recommendations on how to implement these policies and procedures are given in informative Appendix A.

1.2 Investigation thresholds

Reporting and investigation thresholds are established by a variety of regulatory bodies, including but not limited to the FTA, FRA (where applicable), NTSB, state safety oversight agency (SSOA), and other regulatory bodies.

The rail transit agency shall set internal thresholds that trigger the need for a formal accident/incident investigation. Mandated federal accident/incident notification thresholds may be used by the rail transit

agency to trigger an internal, independent investigation. However, the rail transit agency has the authority to set any thresholds that do not conflict with federal, state or local laws or regulations. No rail transit agency threshold shall supersede or eliminate any federal, state or local laws and regulations.

1.3 Employee responsibility for reporting

The rail transit agency shall establish its reporting requirements for any employee involved in, having knowledge of or witnessing any event that meets the rail transit agency's definition of an accident or incident. The rail transit agency should consider how such reporting requirements relate to rail transit agency near miss reporting requirements.

The rail transit agency shall establish procedures for employees to follow if they are involved in an accident/incident/event.

Please see APTA RT-OP-RP-026-20, "Roadway Worker Near Miss Reporting Requirements," for additional information regarding reporting.

1.4 OCC notification requirements

The rail transit agency shall develop a policy that prioritizes the immediate safe response to accidents/incidents over notification requirements. The rail transit agency shall develop and implement accident/incident notification procedures. These procedures shall include operations control center (OCC) notification to the following groups:

- emergency response
- rail transit agency response personnel
- O&M considerations/contractor management
- safety department
- safety risk management
- management
- customer service

The rail transit agency shall determine the priority and order in which notifications shall be made and method for documenting such requirements.

Some rail transit agencies may choose to utilize technology that provides for group notifications.

The rail transit agency shall identify who has responsibility for reporting accidents and incidents both internally and externally and what information must be reported within defined timelines. The rail transit agency may assign different responsibilities for reporting to different departments or individuals in the rail transit agency.

1.4.1 SSOA, FTA, FRA and other regulatory notification

The rail transit agency shall define the reporting procedures to notify state safety oversight of a reportable accident/incident. The state safety oversight agency, if applicable, shall be notified as per instructions defined according to SSOA requirements per 49 CFR Part 674 and applicable section of the Agency Safety Plan.

The rail transit agency shall report all applicable events to the FTA's Transportation Operations Center in accordance with FTA requirements.

The FRA, if applicable, shall be notified as per instructions defined according to the requirements of 49 CFR Part 225 and applicable section of the Agency Safety Plan.

The NTSB has established reporting criteria for certain rail accidents. The rail transit agency shall ensure that its reporting protocols incorporate such reporting requirements.

1.4.2 Federal, state, transit, local police or other law enforcement agency

The rail transit agency shall notify any other applicable enforcement agency as required by federal, state, local or other governing authorities.

1.4.3 Consistency of information gathering and reporting

The rail transit agency shall ensure that any reported information is consistently reported to avoid conflicting information in future investigation activities. In cases where previously reported information is updated and changes, future notifications shall include a brief acknowledgment of the additional information learned and change in information.

1.5 Coordination with government or regulatory agencies

1.5.1 General

The rail transit agency shall coordinate with appropriate government and regulatory agencies as required by law or rail transit agency policy. While 49 CFR Part 674 requires the SSOA to investigate all rail transit agency reportable accidents, it permits the states to delegate that responsibility to the rail transit agency, with the state then reviewing and concurring with the rail transit agency's investigation report. The SSOA typically reserves the right to still conduct its own investigation.

The rail transit agency shall also coordinate with those agencies, notified pursuant, that elect to conduct an independent investigation and/or participate in the rail transit agency's investigation. These agencies may include, but are not limited to, NTSB, FTA, FRA, OSHA, SSOAs and/or state and local police.

1.5.2 Rail transit agency liaison

If a third-party agency elects to conduct an independent investigation and/or participate in the rail transit agency's investigation, the rail transit agency shall establish a point of contact (liaison) for the rail transit agency, who will formally communicate with the third-party agency and the investigator in charge (IIC). The liaison should be knowledgeable and available (preferably at the scene) to the third-party agency. The rail transit agency shall ensure that the rail transit agency liaison and IIC hold a Transit Safety and Security Program (TSSP) certificate for the rail mode in accordance with the Public Transportation Safety Certification Training Plan (PTSCTP) (49 USC 5329).

Within the rail transit agency, the liaison shall have authority to gather all necessary information agencywide to support the requests of any internal or external investigators.

1.5.3 Coordination tasks

When a government or regulatory agency advises the rail transit agency that it will conduct a third-party investigation, the rail transit agency shall institute the following minimum coordination tasks:

- Ensure preservation of the accident/incident scene in accordance with instructions and/or requirements provided by the third-party agency. These third-party instructions may supersede or supplement the rail transit agency's own actions to secure the scene.

- Identify and make available qualified personnel to represent the rail transit agency on the various modal and/or technical (discipline) investigative teams that are organized by the third-party agency.
- Establish points of contact to discuss appropriate responsibilities and roles for accident/incident scene management and evidence preservation.
- Provide the name and telephone number (landline and wireless) of the rail transit agency's public information officer.
- Refer any press inquiries on the investigation to the public information officer for the appropriate government, regulatory or third-party investigation agency.

1.6 Investigation process

The accident/incident investigation plan shall describe the policies and procedures to be used by the rail transit agency to investigate accidents/incidents. Recommendations on a process that rail transit agencies should use to perform accident/incident investigations are contained in informative Appendix A.

The rail transit agency shall identify the roles and responsibilities of the parties who must coordinate and cooperate in carrying out any investigation activities.

1.7 Scene preservation and securement for investigation

The rail transit agency shall establish protocols and processes governing the preservation of an accident/incident scene to ensure that appropriate source data is secured that will result in a complete investigation.

1.8 Incident command structure/management of the investigation scene

The rail transit agency shall establish the requirements for appropriately managing the accident/incident investigation scene to ensure that only necessary individuals are involved and that they have defined responsibilities. The rail transit agency shall ensure that scene management protocols incorporate safe working and operating practices. The rail transit agency shall incorporate National Incident Management System (NIMS) incident command structures as appropriate and in accordance with rail transit agency requirements.

1.9 Training of internal and external investigation parties

The rail transit agency shall develop a policy outlining the training requirements for employees tasked with performing accident/incident investigation. The rail transit agency shall train employees responsible for performing accident/incident investigations to ensure that they are thoroughly familiar with and capable of implementing the rail transit agency's accident/incident investigation according to the PTASP and rail transit agency policies and procedures.

The rail transit agency shall determine if any roadway worker protection requirements must be incorporated into accident/incident investigation training.

The rail transit agency shall identify which investigators must possess TSSP and PTSCTP training requirements in accordance with federal rail transit safety regulations (49 CFR Part 674.35).

The rail transit agency may test training effectiveness via the use of tabletop and/or full-scale exercises.

The rail transit agency shall identify its requirements for providing emergency response training to emergency first responders.

1.10 Event investigation reports

The rail transit agency's independent investigation shall produce a final investigation report that details the finding(s) and probable cause(s) of the accident/incident and makes recommendations for corrective action when necessary.

Event investigation report components should include the following:

- Introduction
- Background
- Investigation methodology
- Facts surrounding the accident/incident
- Analysis of the facts
- Causal and contributing factors
- Risk assessment (e.g., risk matrix)
- Findings and probable causes
- Contributing factors
- Recommendations

1.11 Internal rail transit agency coordination

The rail transit agency shall identify the roles and responsibilities for all affected departments to consistently be available to participate in and contribute to accident/incident investigations so that complete information can be considered in the comprehensive development of the accident/incident investigation report.

1.12 Scale and scope of investigation report

The rail transit agency shall determine the minimum requirements for scale and scope of accident/incident investigation reports to ensure that all aforementioned topic areas are appropriately comprehensive and complete.

1.13 Investigation and determination of primary and contributing factors

The rail transit agency shall determine the process for establishing primary and contributing factors that are determined to have led to the accident/incident being investigated.

The rail transit agency shall include an analysis of primary and contributing factors in its investigation report.

1.14 Human factors considerations

The rail transit agency shall consider human factors in conducting the investigation while avoiding seeking blame. The rail transit agency shall use human factors considerations to identify effective corrective actions that will yield agency-wide benefits, taking into account the following potential sources of root causes:

- individual performance
- team performance
- management system

1.15 Corrective action plan

The purpose of the accident/incident investigation is to determine cause and develop strategies to prevent event reoccurrence. The rail transit agency shall ensure that in identifying causal and contributing factors in the course of the investigation that appropriate corrective action plans are developed that seek to resolve the underlying issue to prevent reoccurrence.

1.16 Data analysis

The rail transit agency shall consider what data is reported in accident/incident investigations that may be helpful for longer term trend analysis and what longer-term trends may have presented themselves as contributing factors to the accident/incident being investigated.

The rail transit agency shall consider reviewing a wide range of data and utilizing various skills or technologies to review and interpret the data. Agencies may consider use of video analytics to review extensive amounts of video. The rail transit agency may use broader industry data in relation to its own data.

The rail transit agency should consider the longer-term implications of accident/incident findings in order to develop effective corrective action plans.

1.17 Safety committee responsibilities

The rail transit agency shall identify the roles and responsibilities of any safety committee (e.g., joint labor–management safety committee) in reviewing and contributing to accident/incident investigation activities and reports, as well as resultant trend analysis.

Some rail transit agencies have established accident committees or accident review boards that are convened depending on the severity or seriousness of an accident or incident and the need for specific attention to the investigation.

Related APTA standards

APTA RT-OP-RP-026-20, "Roadway Worker Near Miss Reporting Requirements"
APTA RT-OP-RP-025-20, "Use of Unmanned Aircraft Systems (UAS) in Rail Transit Environments"
APTA RT-OP-RP-024-19, "Crash and Fire Protected Inward and Outward Facing Audio and Image Recorders in Rail Transit Operating Compartments"
APTA RT-OP-S-23-17, "Fatigue Management Program Requirements"
APTA RT-OP-S-15-09, "Train Operator Hours of Service Requirements"
APTA RT-OP-S-018-12, "Fitness for Duty (FFD) Program Requirements"

References

Code of Federal Regulations:
29 CFR Part 1904 (OSHA), "Recording and Reporting Occupational Injuries and Illnesses"
49 CFR Part 225 (FRA), "Railroad Accidents/Incidents: Reports Classification, and Investigations"
49 CFR Part 270 (FRA), "System Safety Program, Final Rule"
49 CFR Part 655 (FTA), "Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations"
49 CFR Part 672 (FTA), "Public Transportation Safety Certification Training Program"
49 CFR Part 673 (FTA), "Public Transportation Agency Safety Plan"
49 CFR Part 674 (FTA), "State Safety Oversight, Final Rule"
49 CFR Part 840 (FRA), "Rules Pertaining to Notification of Railroad Accidents"

Federal Railroad Administration Guide for Preparing Accidents/Incidents Reports, June 2011. https://safetydata.fra.dot.gov/OfficeofSafety/ProcessFile.aspx?doc=FRAGuideforPreparingAccIncReports.pdf

Federal Railroad Administration, New Instructions for Completing Form FRA F6180.54- Rail Equipment Accident/Incident Report, 2016. https://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/FormFRAF6180RailEquipmentAccidentReportInstructions.aspx

Federal Transit Administration "2017 Safety and Security Policy Manual," 2017. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/2017%20NTD%20Safety%20and%20Security%20Policy%20Manual_1.pdf

United States Code: 49 USC 5335(c), "Reports and Audits"

Definitions

accident/incident: An unexpected loss-causing event that results in a fatality, bodily injury or property damage.

authority having jurisdiction: The organization with the legal responsibility for overseeing an investigation.

fatality: The death of a person either at the time an accident/incident occurs or within 24 hours thereafter.

rail incident commander: The rail transit agency staff member responsible for managing and responding to emergencies/incidents and for acting as a liaison with emergency responders.

investigator in charge (IIC): The rail transit agency staff member (generally from the safety department, or alternately the risk department) responsible for the detailed investigation of an emergency/incident.

rail transit: All forms of non-highway ground transportation that run on rail.

Abbreviations and acronyms

AHJ authority having jurisdiction
CCTV closed-circuit television
CFR Code of Federal Regulations
FRA Federal Railroad Administration
FTA Federal Transit Administration
IC incident command
ICS incident command system
IIC investigator in charge
NTSB National Transportation Safety Board
O&M operations and maintenance
OCC operations control center
OSHA Occupational Safety and Health Administration
PTASP public transportation agency safety plan
PTSCTP Public Transportation Safety Certification Training Plan
SCADA Supervisory Control and Data Acquisition
SSOA state safety oversight agency
TSI Transportation Safety Institute
TSSP Transit Safety and Security Program
USC United States Code

Document history

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Fourth revision	Nov. 1, 2024	Dec. 3, 2024	Dec. 24, 2024	Jan. 15, 2025	Jan. 17, 2025

Appendix A (informative): Recommended process for performing rail transit accident/incident investigations

A.1 Overview

This appendix provides a recommended process of steps to follow when performing an accident/incident investigation.

Since each accident/incident may be different, the tasks and procedures detailed in this appendix will not necessarily apply to, nor be required for, every rail transit agency accident/incident investigation. Rail transit agency management should rely on the experience and good judgment of the IIC. Each individual rail transit agency should apply this recommended process as it relates to its own organizational structure.

A.2 Initiation of investigation

Using the investigation threshold requirements developed to meet the requirements of Section 1.2 of this standard, the rail transit agency determines if an investigation is required.

If an investigation is required, the rail transit agency should designate an IIC to conduct the investigation in accordance with the procedures contained in the rail transit agency accident/incident investigation plan developed to comply with this standard.

A.3 Initial rail transit agency response

A.3.1 Incident command

Upon notification of an accident/incident, responsible modal supervisory personnel will respond to the scene and establish, as necessary, the rail transit agency's on-site incident command (IC). The rail transit agency's on-site IC will coordinate with the incident command established by outside emergency responders and become a resource to the incident commander.

A.3.2 Investigator in charge

A.3.2.1 Authority

The IIC will initiate, coordinate and conduct an independent on-site investigation of accidents/incidents that meet the rail transit agency investigation thresholds. The rail transit agency may support the IIC with an accident investigation team.

A.3.2.2 Response

Upon notification of an accident/incident meeting rail transit agency investigation thresholds, the IIC will respond to the scene when practical. They will also be the point of contact/communication with any responding regulatory agency.

A.3.2.3 Coordination with incident command

The IIC will coordinate with the rail transit agency's on-site IC.

A.3.2.4 Securing the scene

When possible and if not in conflict with any authority having jurisdiction (AHJ), the IIC will secure the scene in order to preserve site conditions and evidence to ensure accurate data development. Each rail transit agency should develop its own protocol for restoring the scene.

A.3.3 Coordination and provision of technical assistance/expertise

A.3.3.1 Investigator in charge

The IIC will coordinate with the IC to obtain, as needed, technical assistance/expertise in conducting required post-accident/incident assessments of vehicles, infrastructure, physical plant and/or equipment.

A.3.3.2 Incident command

If the IIC requests technical assistance/expertise, then the IC will ensure that the required technical assets are made available and deployed to the scene in a timely manner. The IIC should ensure that tests are completed in a timely manner. The Emergency Management Institute of FEMA provides education in various levels of IC. Examples of these educational courses include the following:

- ICS-100: Introduction to the Incident Command System
- ICS-200: ICS for Single Resources and Initial Action Incidents
- ICS-300: Intermediate ICS for Expanding Incidents
- ICS-400: Advanced ICS for Command and General Staff
- IS-700: National Incident Management System, An Introduction
- IS-701: NIMS Multiagency Coordination System (MACS)
- IS-702: NIMS Publication Information Systems
- IS-703: NIMS Resource Management
- IS-704: NIMS Communication and Information Management
- IS-706: NIMS Intrastate Mutual Aid – An Introduction
- IS-800: National Response Framework, An Introduction
- G-191: Incident Command System/ Emergency Operations Center Interface
- G-402 Incident Command System (ICS) Overview for Executives/Senior Officials
- G-775: Emergency Operations Center (EOC) Management and Operations

A.3.3.3 Investigation committee

Consideration should be given to the formation of a multifunctional investigation committee consisting of operations, mechanical, engineering and safety personnel under the leadership of the IC.

A.3.3.4 Technical assistance content

Examples of technical assistance/expertise include, as applicable, inspection, testing and operational assessment of the following:

- signals/train control
- databases
- event data recorders
- CCTV and audio playback
- OCC and SCADA playback
- track
- power systems
- structures and facilities
- communications and SCADA
- vehicles and equipment

A.4 Accident/incident on-site data development

The transit system's IIC has four objectives for data development when initially responding to an accident/incident scene:

- To secure the scene to ensure safety and to prevent a second accident/incident.
- To preserve short-term and long-term physical evidence.
- To develop a preliminary sequence of events to determine what happened.
- To identify employees, passengers and other eyewitnesses to obtain preliminary statements and contact information.

Once an event occurs, short-term information becomes quickly perishable as an accident scene is recovered (e.g., equipment or obstructions are moved or rearranged, equipment controls are repositioned, and witnesses "disappear"). The primary task of on-site data collection is to prioritize the retrieval of such perishable information.

A.4.1 Initially photographing the scene

Upon arrival on the accident/incident scene, the IIC should arrange to have the scene photographed as soon as possible from a panoramic view, preferably before the scene is disturbed. This panorama should include camera photographic shots of the involved vehicle(s) in full view; nearby infrastructure features; and any evident significant obstructions, objects or conditions. Accident scene photographs should be taken using a "four-point compass" method. The entire scene should be photographed from multiple vantage points. The photographer should attempt to provide sufficient depth of field to show relative positioning of objects and subjects for later comparison with diagrams.

A.4.2 Documenting general observational information

A.4.2.1 General information upon arrival

Document the following checklist items:

- location
- day and date of occurrence
- time of occurrence
- time of arrival of IIC, supervisory staff and responders
- visibility (dawn, day, dusk, dark)
- weather (clear, cloudy, rainy, foggy, snowing, sleeting)
- approximate temperature

A.4.2.2 Eyewitness information

Obtain eyewitness information as quickly as possible. Information should include the following:

- name, address, telephone number
- witness category (employee, passenger, bystander)
- status of witness (observer or principal involved in accident)
- brief description or account of what was or was not observed

A.4.3 Documenting vehicle and infrastructure factors and conditions

A.4.3.1 Vehicle condition at scene

Document the damage and condition of the vehicle(s), including monetary damage estimate. Checklist items should include, as a minimum, the following:

- car body condition (visible damage)
- positions of all operator controls (controller and brake handles, headlight and other switches, air gauge readings, etc.)
- wheels/axles/trucks/sanders
- brake systems (friction, electric [dynamic], track)
- door positions or other entry/exit location conditions
- headlights, marker lights, indicator lights status

A.4.3.2 Vehicle dynamics

Document evidence relative to vehicle travel/speed to include, as a minimum, the following:

- Ensure that event log data (where in service) is secured.
- Identify wheel marks on track.
- Identify evidence of sanding.
- Identify evidence indicating the area of contact/collision.
- Determine line-of-sight distances.
- Ensure arrangement to secure recorded communication data.

A.4.3.3 Infrastructure and environmental conditions at scene

Document the damage and condition of the infrastructure and environmental conditions, including a monetary damage estimate. Checklist items should include, as a minimum, the following:

- damage (observable) to track, signals, bridges, structures, buildings, and other infrastructure equipment or machinery
- damage (observable) to crossing protection apparatus, if relevant
- roadway approaches and visible pedestrian approaches (unauthorized or otherwise), if relevant
- evidence (observable) of recent environmental alteration (washout, landslide, etc.)
- evidence (observable) of recent miscreant alteration (vandalism)
- point of derailment, collision or other incident

A.4.4 Diagramming and measuring the scene

A.4.4.1 Diagramming

Sketch the scene, as appropriate, regarding the relative location of track(s), vehicle(s), signals, equipment, apparatus, buildings, bridges and other structures. Include noteworthy landmark features, such as roadways, waterways, pathways, flora, etc. Diagram alignment should be relative to geographic north.

A.4.4.2 Marking and measuring

Indelibly mark points of reference in the field (e.g., paint or chalk markings). Document correlation of points of reference with resting positions of objects or subjects. Use feet as a standard unit of measure.

A.4.5 Photographing specific circumstances

Arrange to have specific objects or subjects photographed as soon as possible from both normal periphery and close-up views, preferably before the accident scene is disturbed. Establish what constitutes an official

photograph for investigation purposes and how photographs are retained for the investigation. The photographer should attempt to ensure appropriate depth of field to sufficiently record subject material. These photographs should attempt to include, as a minimum, the following:

- each vehicle involved, exterior four sides, including number
- each vehicle involved, interior compartment
- each vehicle involved, operating control compartment
- resting position of wheels if off track, including evidence of sanding
- manually made markings of vehicle location and other factors of the scene (see Section A.4.4.2)
- all visible points of vehicle damage
- evidence of wheel marks on rail
- all visible points of infrastructure damage
- any visibly evident contributing obstructions, objects or conditions
- position of casualties, if stationary
- any other subject that appears out of the ordinary

Rail transit agencies that choose to use unmanned aircraft systems to capture photographic and video evidence of an accident scene should ensure that protocols are established for their use. See APTA RT-OP-RP-025-20, "Use of Unmanned Aircraft Systems (UAS) in Rail Transit Environments."

A.4.6 Casualty factors

Document the current status of all known casualties, including the following:

- total number and personal information (if possible) of injured people
- total number and personal information (if possible) of fatalities
- identification of responder units that treated or transported casualties
- identification of hospitals where casualties were transported

A.4.7 Toxicological factors

The rail transit agency is mandated by 49 CFR Part 655, "Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations," to conduct toxicological testing based upon regulatory requirements, collective bargaining agreements or standard policy. rail transit agency field supervisory personnel making determinations should meet qualification standards.

A.4.7.1 Identify whether testing is required

Determine whether event factors meet criteria for drug and alcohol testing. Determine which employees, if any, are subject to testing based upon federally mandated and/or rail transit agency–required criteria.

A.4.7.2 Authority and type of test

Identify the authorization to conduct the test and the type of test that is required. Authorization and types may include the following:

- FTA (for cause, post-accident)
- FRA (for cause, post-accident)
- SSOA
- rail transit agency (for cause, post-accident)
- local, regional or state police

A.5 Accident/incident off-site data development

Once the accident scene has been recovered, the rail transit agency IIC has three objectives for data development:

- Collect remaining applicable nonperishable data.
- Conduct interim research and analysis of all collected data to date to reconstruct the event.
- Determine probable cause and contributing factors.

In the aftermath of an accident, long-term information that is nonperishable must be collected (e.g., operational speeds and conditions, maintenance and inspection records, damage estimates). The primary task of off-site data collection is to coordinate documentation to support evaluation of system, vehicle and employee performance.

A.5.1 Coordination and provision of technical assistance/expertise

Coordinate needed post-accident research and analysis with all support departments and independent outside agencies. As recommended in Section A.3.3.4, arrange for providing specialized technical support within the respective disciplines and/or departments.

A.5.2 Vehicle and component performance

A.5.2.1 Inspections/tests

Conduct and/or document post-accident inspections/tests on vehicles as needed to determine if pre-existing conditions contributed to the accident. Applicable components to be tested should include, as a minimum, the following:

- operator controls
- wheels/axles/trucks/sanders
- braking systems friction, electric (dynamic), track
- onboard signal/speed control systems
- communication system
- lights
- whistle/horn/gong

A.5.2.2 Engineering specifications

Obtain all applicable engineering specifications and drawings, as applicable.

A.5.2.3 Maintenance history

Research prior maintenance history of vehicle or components to determine if any significant conditions or performance levels existed prior to the accident. Identify relevant protocols and recommended frequency. Identify activities performed or omitted, the dates and by whom they were performed.

A.5.2.4 Data comparison

Compare systems performance data (inspections/tests, maintenance history) vs. prescribed engineering limits/specifications to determine if there were any contributing factors to the accident.

A.5.2.5 Damage costs

Verify vehicle damage and repair costs.

A.5.3 Vehicle dynamics

A.5.3.1 Event log data

Recover event log data to determine actual vehicle performance prior to and at the time of the event.

A.5.3.2 Communication data

Recover recorded radio or other communication data to determine if the flow of information is of significance. APTA RT-OP-RP-024-19, "Crash and Fire Protected Inward and Outward Facing Audio and Image Recorders in Rail Transit Operating Compartments," establishes additional guidance concerning onboard communication data and the handling thereof.

A.5.4 Infrastructure system performance

A.5.4.1 Inspections/tests

Conduct and/or document timely post-accident inspections/tests on infrastructure as needed to determine if preexisting conditions contributed to the accident. Infrastructure components to be tested should include, as a minimum or as applicable, the following:

- track structure
- traction power system
- signal systems
- routing systems
- buildings and other structures
- bridges
- grade crossing protection apparatus
- other equipment or machinery

A.5.4.2 Event log data

Recover data from any off-vehicle event recorders, such as signal system event recorders or other software-driven records systems.

A.5.4.3 Engineering specifications

Obtain all applicable engineering specifications and drawings.

A.5.4.4 Maintenance history

Research prior maintenance history of systems to determine if any significant conditions or performance levels existed prior to the accident. Identify relevant protocols and recommended frequency. Identify activities performed or omitted, the dates, and by whom they were performed.

A.5.4.5 Data comparison

Compare systems performance data (inspections/tests, maintenance history) vs. prescribed engineering limits/specifications to determine if there were any contributing factors to the accident.

A.5.4.6 Damage costs

Verify infrastructure damage and repair costs.

A.5.5 Operational conditions and factors

A.5.5.1 Rail transit agency operating instructions

Identify all applicable transit operating instructions at the location of the accident. These include, but are not limited to, the following:

- maximum authorized speed and speed restrictions
- operating signs and locations
- wayside signal locations and aspects capable of being displayed
- bulletins or other special operating orders in effect at time of accident
- automatic signal systems in effect (train control, cab signals, interlockings, automatic block, etc.)
- any special operating conditions

A.5.5.2 Other operating instructions

Obtain and research applicable federal and state rules/regulations to determine compliance and effect on accident dynamics. As applicable, these should include, as a minimum, the following:

- Motor Vehicle Code
- operating standards and practices
- equipment standards
- qualification/certification level requirements
- inspection/maintenance standards
- safety standards and practices

A.5.6 Interviews and outside reports

A.5.6.1 Primary interviews

Conduct detailed face-to-face interviews as needed to determine the sequence of events leading up to and at the time of the accident. If possible, record the interview and obtain the interviewee's signature.

Interviews should include, as a minimum or as applicable:

- crew members
- other employees directly or indirectly involved in the sequence of events
- non-employee accident principals
- passengers
- bystander witnesses

A.5.6.2 Secondary interviews

Obtain any interview data conducted by other independent sources.

A.5.6.3 Supervisory reports

Obtain applicable supervisory reports of investigation.

A.5.6.4 Outside agency reports

Obtain applicable reports of investigation prepared by outside agencies and police.

A.5.7 Documenting human factors

A.5.7.1 Employee records

Research employee records for performance history or incidents relating to accident dynamics. These records should include, but are not limited to, the following:

- operating and safety practices compliance
- qualification/certification levels and experience
- training and continuing education history
- accident/incident history
- toxicological and medical history
- attendance/discipline history

A.5.7.2 Fatigue factors

Research and document employee hours of service before accident. This should include the following:

- time employee reported for duty
- elapsed time from on-duty time until time of accident
- break periods before accident
- available off-duty hours before reporting for assignment
- number of consecutive days worked prior to day of accident
- nature of off-duty activity prior to accident

Refer to APTA RT-OP-S-23-17, "Fatigue Management Program Requirements," for guidance pertaining to fatigue risk management for rail transit personnel. Refer to APTA RT-OP-S-05-09, "Train Operator Hours of Service Requirements," for more guidance pertaining to hours of service requirement for rail transit personnel.

A.5.7.3 Fitness for duty

Research and document the employee's fitness for duty. This should include the following:

- visual acuity
- preexisting medical conditions
- consumption of prescription/nonprescription medication

APTA RT-OP-S-018-12, "Fitness for Duty (FFD) Program Requirements," provides additional guidance.

A.5.7.4 Employee performance

Consider all aspects of employee performance comparative to operating conditions, vehicle and infrastructure conditions, and human physical limitations. Compare research data with event log and communication data to determine performance level.

A.5.8 Follow-up casualty factors

A.5.8.1 Contacting hospitals and verifying casualties

Contact hospitals to verify casualties. Obtain the following:

- number
- identities
- severity (injuries vs. fatalities); include medical examiner reports

A.5.8.2 Trespasser events

Conduct additional research for trespasser events. Research the following:

- police reports related to indications of suicide or foul play
- medical examiner toxicological reports

A.5.8.3 Potential injury dynamics/survival factors

Document vehicle, infrastructure or operating conditions that could have contributed to or increased severity of casualties.

A.5.9 Follow-up toxicological factors

A.5.9.1 Testing results

Obtain results of post-accident toxicological testing.

A.5.9.2 Testing determination

Obtain determination of toxicological significance, if available.

A.5.10 Reconstruction

As considered relevant, reconstruct the accident dynamics and sequence of events based upon all data developed from on-site investigation and off-site research. Establish facts that were contributory to the accident. Fact-finding should include, as a minimum, the following categories:

- actual vehicle performance
- actual infrastructure performance
- actual employee performance
- mathematical calculations
- scale drawings/diagrams
- photographic evidence

A.6 Analysis

When all readily obtainable information is assembled, the IIC should ensure that all existing evidence is evaluated and should make a general determination as to the contributing factors and probable cause of the accident. As applicable, the following information should be included:

- IIC's primary report
- all other supervisors' individual reports
- interview reports
- technical reports (vehicle, infrastructure, other)
- outside agency reports
- data contained on records, if applicable
- handwritten statements
- SCADA outputs and recordings, if applicable
- event log data
- radio/communication tapes and/or transcripts
- maps, drawings or diagrams
- photographs or videos
- CCTV videos from the rail transit agency or from adjacent properties

The IIC should keep in mind that the investigation might not have reached the final stage. It is essential that the IIC understands that future evidence may surface that could change the determination of probable cause.

A.7 Preparing reports and recommendations

A.7.1 Investigator in charge

The IIC should prepare a summary report detailing the data and analysis to support a determination of cause and recommended corrective action, where needed.

A.7.2 Draft report

A draft report should be completed in a time period to be determined by the AHJ or rail transit agency. Suggested report formats are detailed in sections A.7.3 and A.7.4.

A.7.3 Accident/incident report

As a minimum, the accident/incident report should include the following sections:

- Executive summary
- Sequence of events
- Prior to the accident/incident
- The accident/incident
- Subsequent to the accident/incident
- Findings/analysis
- Conclusions
- Probable cause
- Contributory causes
- Recommendations

A.7.4 Evidence retention

The rail transit agency should establish a protocol to retain, secure and store physical evidence and documentation developed pursuant to investigations for future criminal, tort or AHJ action. The protocol should attempt to include, as a minimum, the following:

- chain of custody procedure
- validation of photographs, video files and control center data
- physical evidence retention procedure
- procedure for destructive/nondestructive testing

A.7.5 Recordkeeping

Items to be archived and indexed should include, as applicable, those listed in Section A.6 and any others as determined by the rail transit agency.

A.8 Follow-up

A.8.1 Implementing recommendations

The rail transit agency should coordinate with affected departments to draft a corrective action plan for implementing recommendations developed after an accident/incident investigation.

A.8.2 Corrective action plan summary

The rail transit agency should prepare a corrective action plan summary for all recommendations developed after an accident/incident investigation.

A.8.3 Corrective action plan information

The corrective action plan should include the following information:

- The recommendation and plan for correction.
- Activity to meet objectives of the plan.
- Responsible department/individual for plan implementation and task activity.
- Scheduled completion dates.
- Estimated cost.
- Follow-up:
    - Ensure that recommendation is implemented.
    - Ensure that recommendation does not result in other safety issues.

A.8.4 Periodic reporting

The rail transit agency should prepare an internal status report of corrective action plan activity and completion status. It should provide this report to the senior manager of each part of the rail transit agency responsible for implementation of the corrective action. The rail transit agency should have a follow-up review to check that the corrective actions have been implemented.

A.8.5 Assigned tasks

Departments and/or individuals designated as the responsible party for specific action plan objectives should complete the assigned tasks.

A.9 Operations coordination

It is recommended that the rail transit agency develop prearranged protocols with emergency responders, which will minimize disruption to transit service without impeding accident or incident response and investigation

