



APTA STANDARDS DEVELOPMENT PROGRAM

## RAIL STANDARD

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Practices Committee

# Rail Transit Accident/Incident Investigation

**Abstract:** This standard provides a common framework for rail transit systems to develop accident/incident investigation plans. Additional recommendations on how rail transit systems should implement the policies and procedures contained in the plan required by this standard are given in the informative Annex A, Recommended Process for Performing Rail Transit Accident/Incident Investigations.

**Keywords:** accident, incident, investigation, notification, reporting

**Summary:** This standard describes requirements that a rail transit system (RTS) shall develop and implement for accident/incident investigation plans. The standard requires that the RTS 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 reporting. The requirements that a RTS shall follow to develop its accident/incident investigation plan are provided in the main body text of this standard. Individual rail transit systems shall apply this standard as it relates to that RTS's organizational structure and operating environment. Recommendations for the process (a system or set of procedures) the RTS should follow to perform accident/incident investigations are given in Annex A. Annex A does not contain additional requirements.

**Scope and purpose:** This standard is intended to assist RTS 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 be applied to, nor required for, every RTS 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, or subject people to liability for their actions, or to recommend disciplinary action. The purpose of this standard is to help rail transit systems obtain accident/incident investigation results to learn more about mechanical and other failures and human factors and to correct unsafe conditions.

This *Rail Standard* represents a common viewpoint of those parties concerned with its provisions, namely, transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any standards, practices or guidelines contained herein is voluntary. In some cases, federal and/or state regulations govern portions of a transit system's operations. In those cases, the government regulations take precedence over this standard. APTA recognizes that for certain applications, the standards or practices, as implemented by individual transit agencies, may be either more or less restrictive than those given in this document.

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## Introduction

(This introduction is not a part of APTA RT-OP-S-002-02 Rev 2, *Standard for Rail Transit Accident/Incident Investigation*)

This Standard for Rail Transit Accident/Incident Investigation represents a common minimum framework for those parties concerned with its provisions, namely, transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. In some cases, Federal and/or State regulations govern portions of a Rail Transit System's (RTS) operations. In those cases, the government regulations take precedence over this standard. APTA recognizes that for certain applications, the standards or practices, as implemented by an individual RTS may be either more or less restrictive than those given in this document. This standard is intended to assist RTS 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 be applied to, nor required for, every RTS accident/incident investigation.

## 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. An RTS may develop alternates to the 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 Investigation & Notification

## 1. Accident/incident investigation requirements

### 1.1 Policies and procedures

The RTS shall develop formal policies and procedures for performing accident/incident investigations. These policies and procedures shall be implemented whenever the investigation threshold set by the RTS in Section 1.2 is met or exceeded.

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

### 1.2 Investigation thresholds

The RTS shall set internal thresholds that trigger the need for a formal accident/incident investigation. Mandated federal accident/incident notification thresholds that may be used by the RTS to trigger an internal, independent investigation are detailed in Section 1.3.4.1 of this standard. However, the RTS is free to set any thresholds that do not conflict with federal or local laws or regulations.

### 1.3 Notification

The RTS shall develop and implement accident/incident notification procedures. These procedures shall include the following.

#### 1.3.1 Control center

All loss-causing accidents/incidents involving RTS personnel or property shall be reported to the appropriate control center in accordance with the appropriate regulations, rules and procedures. The control center may also be referred to as the operations control center (OCC).

#### 1.3.2 Employee witness

Any employee involved in, or witnessing, a loss-causing accident/incident shall immediately notify the appropriate control center or immediate supervisor.

#### 1.3.3 Manager, supervisory and emergency response

The control center shall notify appropriate management, supervisory and emergency response personnel in accordance with a notification protocol that each agency shall develop. Internal notifications shall be made as soon as practical.

### 1.3.4 National Response Center (NRC)

#### 1.3.4.1 Accident/incident notification criteria

According to current 49 CFR Part 840, “Rules Pertaining to Notification of Railroad Accidents,” the RTS shall make telephonic notification to the National Response Center if the accident/incident involves any of the following:

- Passenger or employee fatality.
- Serious injuries requiring admission to a hospital (two or more passengers or employees)
- Damage of \$25,000 or more to a passenger train, the railroad and the non-railroad property.
- Damage of \$150,000 or more to railroad and non-railroad property.
- Damage to tank car or container resulting in the release of hazardous materials lading or general public evacuation.
- Evacuation of a passenger train.
- Fatality at a grade crossing or other right-of-way location.

Thresholds listed above are accurate as of the date of publication of this standard and are subject to change. The RTS shall modify all reporting practices or procedures to reflect any changes to the Federal requirements.

Routine removal of passengers from a train at a station to take the train out of service is not an evacuation.

#### 1.3.4.2 National Response Center notification requirements

The information provided to the NRC by telephone shall include the following:

- Name and title of person reporting.
- Name of RTS.
- Location of accident/incident (relate to nearest city).
- Time and date of accident/incident.
- Description of accident/incident.
- Casualties (FRA defines a casualty in 49 CFR part 225)
  - Fatalities
  - Injuries.
- Property damage (estimate).
- Name and telephone number of person from whom additional information may be obtained.

### 1.3.5 State safety oversight agency notification

The state safety oversight agency, if applicable, shall be notified as per instructions defined according to state safety oversight agency requirements per 49 CFR Part 659 and applicable section of the RTS System Safety Program Plan.

### 1.3.6 Federal Railroad Administration

The Federal Railroad Administration, if applicable, shall be notified as per instructions defined according to the requirements of 49 CFR Part 225 and applicable section of the RTS System Safety Program Plan.

### 1.3.7 Federal, state, transit, local police or other law enforcement agency

The RTS shall notify the applicable enforcement agency as required by federal, state, local or other governing authorities.

## 1.4 Coordination with government or regulatory agencies

### 1.4.1 General

The RTS shall coordinate with appropriate government and regulatory agencies as required by law or RTS policy.

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

### 1.4.2 RTS liaison

If a third-party agency elects to conduct an independent investigation and/or participate in the RTS's investigation, the RTS shall establish a point of contact (liaison) for the RTS, 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.

### 1.4.3 Coordination tasks

When a government or regulatory agency advises the RTS that a third-party investigation will be conducted, the RTS shall institute the following minimum coordination tasks:

- Ensure preservation of the accident/incident scene in accordance to instructions and/or requirements provided by the third-party agency. These third-party instructions may supersede or supplement the RTS's own actions to secure the scene.
- Identify and make available qualified personnel to represent the RTS 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 RTS'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 (e.g., the NTSB public information officer is 202-314-6100).

## 1.5 Investigation process

The Accident/Incident Investigation Plan shall describe the policies and procedures to be used by the RTS to investigate accidents/incidents. Recommendations on a process (a system or set of procedures) that rail transit systems should use to perform accident/incident investigations are contained in informative Annex A.

## 1.6 Training

The RTS shall train employees responsible for performing accident investigations to ensure that they are thoroughly familiar with and capable of implementing that rail transit system's accident/incident investigation policies and procedures.

## 1.7 Post-accident reporting

### 1.7.1 Internal reporting requirements

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

The following references provide additional guidance for preparing accident/incident investigation reports:

- “FRA Guide for Preparing Accidents/Incidents Reports,” June 2011
- Federal Transit Administration’s “2010 Annual Reporting Manual”

### 1.7.2 External reporting requirements

RTS shall identify and develop a formal process for reporting, as required. RTS shall identify procedures for collecting and reporting data to the following, as applicable:

- Federal Transit Administration
- National Transit Database
- State Safety Oversight Agency
- Federal Railroad Administration
- Other agencies

## 2. References

This standard shall be used in conjunction with the following publications. If the following publications are superseded by an approved revision, then the revision shall apply.

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 655 (FTA), “Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations”
- 49 CFR Part 659 (FTA), “Rail Fixed Guide Way Systems; 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.

<http://safetydata.fra.dot.gov/OfficeofSafety/ProcessFile.aspx?doc=FRAGuideforPreparingAccIncReports.pdf>

Federal Transit Administration “2010 Annual Reporting Manual, 2010.

[http://www.ntdprogram.gov/ntdprogram/pubs/ARM/2010/html/2010\\_Reporting\\_Manual\\_Table\\_of\\_Contents.htm](http://www.ntdprogram.gov/ntdprogram/pubs/ARM/2010/html/2010_Reporting_Manual_Table_of_Contents.htm)

United States Code:

- 49 USC 5335(c), “Reports and Audits”

## 3. 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.

**loss-causing:** Term used to describe bodily injury, loss of life and/or property, to be defined specifically by RTS.

**major accident:** At a minimum, major accidents are defined as meeting the criteria listed in Section 1.3.4.1 this standard. Individual properties may require notifications at thresholds lower than stated in Section 1.3.4.1 of this standard.

**minor accident:** Those accidents not covered under the criteria to be met in Section 1.3.4.1 of this standard, at the discretion of the RTS.

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

**investigator in charge:** The RTS 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.

**rail transit train:** Any motorcar, locomotive or other self-propelled on-rail vehicle, with or without other cars coupled. A regular train is a train authorized by a schedule. An extra train is any train that is not in the schedule.

#### 4. Abbreviations and acronyms

AHJ	authority having jurisdiction
CFR	Code of Federal Regulations
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
IC	incident command
IIC	investigator in charge
ME	medical examiner
NTB	National Transit Database
NTSB	National Transportation Safety Board
OCC	operations control center
OSHA	Occupational Safety and Health Administration
RTS	rail transit system
USC	United States Code



## **Annex A (Informative): Recommended process for performing rail transit accident/incident investigations**

### **A.1 Overview**

This annex 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 annex will not necessarily be applied to, nor required for, every RTS accident /incident investigation. RTS management should rely on the experience and good judgment of the IIC. Each individual RTS 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 RTS determines if an investigation is required.

If an investigation is required, the RTS should designate an investigator in charge to conduct the investigation in accordance with the procedures contained in the RTS Accident/Incident Investigation Plan developed to comply with this standard.

### **A.3 Initial RTS 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 RTS's on-site incident command (IC). The RTS'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 RTS investigation thresholds. The RTS may support the IIC with an accident investigation team.

##### **A.3.2.2 Response**

Upon notification of an accident/incident meeting RTS investigation thresholds, the IIC will respond to the scene when practical. He or she 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 RTS'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 RTS 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 (IIC)

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

#### A.3.3.2 Incident command (IC)

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.

#### 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
- Track
- Power
- Communications
- Vehicle 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 scene:

- To secure the scene to ensure safety and to prevent a second accident.
- 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, witnesses "disappear," etc.) 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 scene, the IIC should arrange to have the scene photographed as soon as possible from a panoramic view, preferably before the accident 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 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 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 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. 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
- 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

### A.4.6 Casualty factors

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

- Injuries – total number, personal information (if possible)
- Fatalities– total number, personal information (if possible)
- Identification of responder units that treated or transported casualties
- Identification of hospitals where casualties were transported

### A.4.7 Toxicological factors

The RTS 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. RTS field supervisory personnel making determinations should meet qualification standards.

#### A.4.7.1 Identify if testing is required

Determine if event factors meet criteria for drug and alcohol testing. Determine which employees, if any, are subject to testing based upon the 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 include the following:

- FTA (for cause, post-accident)
- FRA (for cause, post-accident)
- State safety oversight agency
- RTS (for cause, post-accident)
- Local or regional police

## A.5 Accident/incident off-site data development

Once the accident scene has been recovered, the RTS Investigator-in-Charge (IIC) has three objectives for data development:

- To collect remaining applicable non-perishable data.
- To conduct interim research and analysis of all collected data to date to reconstruct the event.
- To 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, etc.). 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 discipline(s) 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
- On-board 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.

### 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 pre-existing 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 RTS operating instructions

Identify all applicable transit operating instructions at the location of 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, tape 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

#### **A.5.7.3 Fitness for duty**

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

- Visual acuity
- Pre-existing medical conditions
- Consumption of prescription/non-prescription medication

#### **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 to 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 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 supervisor's individual reports
- Interview reports
- Technical reports (vehicle, infrastructure, other)
- Outside agency reports

- Data contained on records, if applicable
- Hand-written statements
- Event log data
- Radio/communication tapes and/or transcripts
- Maps, drawings, or diagrams
- Photographs or videos

The IIC should keep in mind that the investigation might not have reached the final stage. It is essential the IIC understands that future evidence may surface which 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 RTS. 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 RTS 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/videotapes and control center tapes
- Physical evidence retention procedure
- Procedure for destructive/nondestructive testing
- 

### **A.7.5 Record keeping**

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

## **A.8 Follow-up**

### **A.8.1 Implementing recommendations**

The RTS 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 RTS 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 RTS should prepare an internal status report of corrective action plan activity and completion status. The RTS should provide this report to the senior manager of each part of the RTS organization responsible for implementation of the corrective action. The RTS 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 RTS develop prearranged protocols with emergency responders which will minimize disruption to transit service without impeding accident or incident response and investigation.