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**APTA Signals and Communications
Working Group**

Wayside Intrusion Detection System Inspection and Testing

Abstract: This standard provides procedures for inspecting and testing rail transit wayside intrusion detection systems.

Keywords: inspection, seismic, seismic relay, signal, test, testing, wayside intrusion detection systems, zone

Summary: This document establishes standard requirements for inspecting and testing of rail transit wayside intrusion detection systems including right-of-way intrusion detection systems and seismic detection.



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 Signals and Communications Working Group as directed by the APTA Rail Transit Standards Policy 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-SC-S-044-03, which has been revised. Below is a summary of changes from the previous document version:

- Use of the new APTA template which standardizes and reorganizes the document.
- Scope and purpose have been combined for clarity and added a paragraph highlighting importance of considering application constraints.
- Updated list of participants.
- Updated definitions to be consistent with standard definitions.
- Minor editorial changes to clarify language.
- Annex A removed as extraneous since its contents were already mentioned in the document.



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Introduction

This introduction is not part of APTA RT-SC-S-044-03, “Wayside Intrusion Detection System Inspection and Testing.”

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

Rail transit system procedures shall include the processes and procedures required to maintain a safe, efficient and reliable system. Exported safety and non-safety related application conditions identified during design and system lifecycle, including OEM requirements, shall be addressed by the rail transit system inspection and maintenance procedure.

The purpose of this standard is to verify that wayside intrusion detection systems are operating safely and as designed through periodic inspection and testing, thereby increasing reliability and reducing the risk of hazards and failures.

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).

Wayside Intrusion Detection System Inspection and Testing

1. Inspection and testing requirements

1.1 Inspection and testing frequency

The inspection and testing procedures in this standard shall be performed when wayside intrusion detection systems are placed in service, when they are modified, repaired, or disarranged, or as otherwise deemed necessary by the rail transit system.

The rail transit system shall determine the need for additional inspection and testing frequencies for wayside intrusion detection systems. A review of the following factors may be useful in making this assessment:

- OEM-recommended intervals
- industry experience
- operating environment/conditions
- historical data
- reliability-centered maintenance program development
- failure analysis
- rail transit system testing and experience
- regulatory requirements

The frequency of tasks shall comply with applicable federal, state and local regulations.

1.2 Training

The rail transit system and/or their maintenance contractors shall develop and execute training programs that provide employees with the knowledge and skills necessary to safely and effectively perform the tasks outlined in this standard.

1.3 Materials

The following materials are required for inspecting and testing wayside intrusion detection systems:

- rail transit system–approved lubricants
- rail transit system–approved cleaning solutions
- additional materials as required by the OEM and/or rail transit system

1.4 Tools

The following tools are required for inspecting and testing wayside intrusion detection systems:

- multimeter*
- rail transit system–approved portable radio

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- standard tools carried by maintenance personnel
- additional tools as required by the OEM and/or rail transit system

NOTE: Tools marked with an asterisk (*) should be calibrated in accordance with OEM and/or rail transit system requirements.

1.5 Personal protective equipment

Personal protective equipment, as required by the rail transit system, shall be worn at all times during inspection and testing.

1.6 Safety

Rail transit system safety rules, procedures, and practices shall be followed at all times during inspection and testing.

1.7 Inspection and test procedures

Wayside intrusion detection inspection and testing procedures may be modified for each rail transit system's requirements (see Section 1.3) but shall contain the steps listed in sections 1.7.1 and 1.7.2 as a minimum.

1.7.1 Inspection

1. Notify the Operations Control Center (OCC) and/or other authorities of the inspection activities to be performed.
2. Inspect wayside junction boxes and other enclosures for rust, corrosion, damage, cracks, breaks, defective latches, hinges, locks, covers, seals, gaskets, loose conduit connections and missing or loose components and hardware. Holes and entrances not used for ventilation should be sealed.
3. Inspect junction boxes and enclosures for the presence and condition of stored circuit drawings, terminal lists, wire tags and instructions.
4. Inspect wayside cables/wiring and hardware for defective insulation, rust, corrosion, missing components, damage, and loose or broken connections, and for damage caused by standing water, water leaks, or water retention.
5. Inspect the wayside for any condition that may interfere with the operation of intrusion and detection systems and/or revenue operations.
6. Inspect wayside equipment for rust, corrosion, damage, cracks, breaks and defective latches, hinges, locks, covers, seals, gaskets, loose conduit connections, loose electrical connections and missing or loose components and hardware.
7. Inspect room and other signal equipment housing facilities for defective cable insulation, rust, corrosion, missing components, damage and loose or broken connections and for damage caused by standing water, water leaks or water retention. Holes and entrances not used for ventilation should be sealed.
8. Ensure that covers and locks are in place and secured.
9. Notify the OCC and/or other authorities when inspection is complete.

1.7.2 Test

1. Notify the OCC and/or other authorities of the testing activities to be performed.
2. Inspect equipment for active alarms and observe system status lights for proper system operation.
3. Check power sources and power supplies for proper values and tolerances.

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4. Perform system test using rail transit system procedures to verify proper operation by:
 - Simulating an intrusion and/or seismic detection.
 - Verifying if applicable, that the relay(s) or device(s) affected by the simulated intrusion and/or seismic detection are activated, have assumed the proper states and their proper indications are received at OCC, locally, and other facilities.
 - Verifying if applicable, that the proper intrusion and/or seismic detection zone indications and alarms are received at OCC, locally and other remote facilities.
5. Restore the system to normal operation and verify that the relay(s) or device(s) affected by the simulated intrusion and/or seismic detection are de-activated, have assumed the proper state, and the indications are received at OCC, locally, and other facilities.
6. Perform additional system functional testing as deemed necessary by the rail transit system to verify proper and safe system operation.
7. Ensure that covers, doors and locks are in place and secured.
8. Notify the OCC and/or other authorities when testing is complete.

1.8 Correction of deficiencies

Deficiencies identified during wayside intrusion detection system inspection and testing shall be corrected and documented in accordance with OEM and/or rail transit system requirements.

1.9 Documentation

Inspection and testing shall be documented, reviewed and filed in accordance with rail transit system procedures.

References

This document should be used in conjunction with OEM and rail transit system specifications for wayside intrusion detection systems inspection and testing.

Definitions

hazard: Any real or potential condition that can cause injury, death, or damage or loss of equipment or property.

Operations Control Center (OCC): That facility from which train control, train dispatching, and/or train supervision takes place for the entire rail transit system or for specific segments of a system if there is more than one control center. Also called *rail control center*, *rail operations center*, *rail service control center*, *train command center*.

original equipment manufacturer (OEM): The enterprise that initially designs and builds a piece of equipment.

personal protective equipment (PPE): All clothing and other work accessories designed to create a barrier against workplace hazards. Examples include safety goggles, blast shields, hard hats, hearing protectors, gloves, respirators, aprons, and work boots.

rail transit system: The organization or portion of an organization that operates rail transit service and related activities. Also called *operating agency*, *operating authority*, *transit agency*, *transit authority*, *transit system*.

seismic detection system: An accelerometer-based sensing system used to detect seismic activity and produce an electrical signal output.

Abbreviations and acronyms

OCC	operations control center
OEM	original equipment manufacturer
PPE	personal protective equipment

Document history

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