

36. Standard for Wayside Signal Inspection and Testing

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Abstract: This standard provides procedures for inspecting and testing rail transit wayside signals.

Keywords: wayside signal, signal, inspection, signal testing, test, testing

Introduction

(This introduction is not a part of APTA RT-SC-S-036-03, *Standard for Wayside Signal Inspection and Testing*.)

APTA rail transit safety standards represent an industry consensus on safety practices for rail transit systems to help achieve a high level of safety for passengers, employees, and the general public. This document was created by and for those parties concerned with its provisions; namely, rail transit systems (operating agencies), manufacturers, consultants, engineers, and general interest groups. This standard provides procedures for inspecting and testing rail transit wayside signals.

APTA recommends this standard for:

- Individuals or organizations that inspect, maintain, and/or operate rail transit systems
- Individuals or organizations that contract with others for the inspection, maintenance, and/or operation of rail transit systems
- Individuals or organizations that influence how rail transit systems are inspected, maintained, and/or operated (including but not limited to consultants, designers, and contractors)

This standard intends to meet the following objectives:

- To ensure special life/safety equipment is operational and reliable
- To help rail transit systems incorporate safety considerations during the inspection and maintenance process
- To identify inspection criteria and maintenance standards that provide a high level of passenger and personnel safety

The application of any standards, practices, or guidelines contained herein is voluntary. In some cases, federal and/or state regulations govern portions of how a rail transit system operates. In such cases, the government regulations override any conflicting practices this document requires or recommends.

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Contents

| | |
|---|------|
| 1. Overview | 36.1 |
| 1.1 Scope..... | 36.1 |
| 1.2 Purpose..... | 36.1 |
| 1.3 Alternate practices..... | 36.1 |
| 2. Definitions and acronyms | 36.2 |
| 2.1 Definitions..... | 36.2 |
| 2.2 Acronyms | 36.2 |
| 3. Inspection and testing requirements..... | 36.3 |
| 3.1 Inspection and testing frequency | 36.3 |
| 3.2 Training..... | 36.3 |
| 3.3 Materials..... | 36.3 |
| 3.4 Tools | 36.4 |
| 3.5 Personal protective equipment | 36.4 |
| 3.6 Safety | 36.4 |
| 3.7 Inspection and test procedure | 36.4 |
| 3.8 Correction of deficiencies..... | 36.6 |
| 3.9 Documentation | 36.6 |
| Annex A (informative) Bibliography..... | 36.7 |

Standard for Wayside Signals Inspection and Testing

1. Overview

1.1 Scope

This document establishes standard requirements for inspecting and testing of rail transit wayside signals.

1.2 Purpose

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

1.3 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 (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:

- a) Identify the specific APTA rail transit safety standard requirements that cannot be met
- b) State why each of these requirements cannot be met
- c) Describe the alternate methods used
- d) 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).

2. Definitions and acronyms

For the purposes of this standard, the following definitions and acronyms apply:

2.1 Definitions

2.1.1 aspect: The appearance of a fixed signal conveying an indication as viewed from the direction of an approaching train; the appearance of a cab signal conveying an indication as viewed by an observer in the cab.

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

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

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

2.1.5 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.

2.1.6 rail transit system (RTS): The organization or portion of an organization that operates rail transit service and related activities. *Syn:* **operating agency, operating authority, transit agency, transit authority, transit system.**

2.1.7 semaphore signal: A type of railroad signal whereby the daytime aspect is given by the position of a blade on an arm.

2.1.8 signal: An appliance that conveys information governing train movement.

2.1.9 wayside signal: A signal of fixed location along the track right-of-way.

2.2 Acronyms

| | |
|------------|---------------------------------|
| OCC | operations control center |
| OEM | original equipment manufacturer |
| PPE | personal protective equipment |
| RTS | rail transit system |

3. Inspection and testing requirements

3.1 Inspection and testing frequency

The inspection and testing procedures in this standard shall be performed when wayside signals are placed in service, when they are modified, repaired, or disarranged, or as otherwise deemed necessary by the RTS.

The RTS shall determine the need for additional inspection and testing frequencies for wayside signals. 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
- RTS testing and experience
- Regulatory requirements

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

3.2 Training

The RTS 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.

3.3 Materials

The following materials are required for inspecting and testing wayside signals:

- RTS-approved lubricants
- Additional materials as required by the OEM and/or RTS

3.4 Tools

The following tools are required for the inspecting and testing wayside signals:

- RTS-approved portable radio
- Standard tools carried by maintenance personnel
- Additional tools as required by the OEM and/or RTS

* Calibrate in accordance with OEM and/or RTS requirements.

3.5 Personal protective equipment

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

3.6 Safety

RTS safety rules, procedures, and procedures shall be followed at all times during inspection and testing.

3.7 Inspection and test procedure

Wayside signal 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 3.7.1-3.7.14 as a minimum.

- 3.7.1** Notify the operations control center (OCC) and/or other authorities of the inspection activities to be performed.
- 3.7.2** Inspect wayside signal equipment for an accumulation of debris. Remove and bag debris.
- 3.7.3** Inspect wayside drains for blockage or ineffective drainage.
- 3.7.4** Inspect wayside signal equipment for damage caused by standing water, water leaks, or retention.
- 3.7.5** Inspect wayside signal equipment for any condition that may interfere with the operation of the equipment.
- 3.7.6** Inspect wayside signal equipment cables/wiring, bonding, and hardware for defective insulation, rust, corrosion, missing components, damage and loose or broken connections. Holes and unused entrances not used for ventilation shall be sealed.

- 3.7.7** Inspect wayside signal equipment, for damage, cracks, breaks, defective latches, locks, hinges, covers, and loose, deteriorated, or damaged conduit connections, and hardware.
- 3.7.8** Inspect signal base, mast, head, hoods, ladder, and mounting hardware for damage, rust, corrosion, and missing or loose components.
- 3.7.9** Inspect number plates, signal lenses (outer and inner if applicable), sidelights and back lights for cracks, chips, loose or missing gaskets or other damage. Wipe the lenses.
- 3.7.10** Inspect terminal boards, lighting transformers, rectifiers, and other electrical hardware and components for defective wire insulation, corrosion, rust, and damaged, loose, or missing components.
- 3.7.11** Inspect signal bulbs, sockets (LED units where applicable) and hardware for defective wire insulation, corrosion, rust and damaged, loose, or missing components. Test equipment for proper operation.
- 3.7.12** Inspect trip stop releases and hardware for damage, cracks, breaks, and missing or loose components. Test equipment for proper operation.
- 3.7.13** Inspect route selection equipment and hardware for damage, cracks, breaks, and missing or loose components. Test equipment for proper operation.
- 3.7.14** Inspect semaphore lenses, arms, actuating mechanisms and hardware for corrosion, rust and damaged, loose or missing components. Test equipment for proper operation.
- 3.7.15** Inspect signal aspect focal point to ensure that filament unit is properly centered for maximum illumination.
- 3.7.16** Inspect signal head from the proper location and verify that it is in alignment with approaching trains.
- 3.7.17** Inspect polyvinyl chloride (PVC), fiberglass, rubber and other cable conduit material for damage, cracks, breaks, loose conduit connections, missing or loose components, and hardware.
- 3.7.18** Ensure covers, doors, and locks are in place and secured.
- 3.7.19** Notify the OCC and/or other authorities when testing is complete.

3.8 Correction of deficiencies

Deficiencies identified during wayside signals inspection and testing shall be corrected and documented in accordance with OEM and/or RTS requirements.

3.9 Documentation

Inspection and testing activities shall be documented, reviewed, and filed in accordance with RTS procedures.

Annex A

(informative)

Bibliography

- [B1] Original equipment manufacturer (OEM) specifications for wayside signal inspection and testing.
- [B2] Rail transit system (RTS) procedures for wayside signal inspection and testing.