

8. Recommended Practice for Train-to-Wayside Communication System Inspection and Testing

Approved June 10, 2003

APTA Rail Transit Standards Fixed Structures Inspection and Maintenance Committee

Approved September 28, 2003

APTA Rail Transit Standards Task Force

Authorized January 28, 2004

APTA Rail Transit Standards Policy Committee

Abstract: This recommended practice provides guidelines for inspecting and testing rail transit signal system train-to-wayside communication systems.

Keywords: antenna, communication, departure test, dispatching, inspection, receive, signal, test, testing, train, train-to-wayside communications, transmit

Introduction

(This introduction is not a part of APTA RT-SC-RP-008-03, *Recommended Practice for Train-to-Wayside Communication System Inspection and Testing*.)

APTA rail transit safety standards and recommended practices represent an industry consensus 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 recommended practice provides guidelines for inspecting and testing rail transit train-to-wayside communication systems.

APTA recommends this practice 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)

The application of any 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 recommends.

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Recommended Practice for Train-to-Wayside Communication System Inspection and Testing

1. Overview

1.1 Scope

This document establishes recommended guidelines for inspecting and testing rail transit train-to-wayside communication systems including station, departure test, and train dispatching components. This recommended practice does not cover testing OCC tracking and scheduling functions.

1.2 Purpose

The purpose of this recommended practice is to verify that train-to-wayside communication systems and equipment are operating safely and as designed through periodic inspection and testing, thereby increasing reliability and reducing the risk of hazards and failures.

2. Definitions and acronyms

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

2.1 Definitions

2.1.1 departure test: The process used to test rail transit vehicle systems controlled by train to wayside communication equipment.

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): A location or locations designed, equipped, and staffed for the purposes of monitoring and controlling RTS activities from a central location or locations.
Syn: rail control center, rail operations center, rail service control 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 receive signal: Energy containing encoded information sent from transit vehicle antennas to wayside antennas.

2.1.8 train dispatching: A automatic or supervisory process used to control and monitor the departure of rail transit vehicles from specific locations.

2.1.9 train-to-wayside communications (TWC): Non-vital transmission of data from a transit vehicle to wayside systems or from wayside systems to a transit vehicle, which may include train identification, length, door status, positioning reference information, approaching station information, speed and acceleration modification, departure testing, and dispatching instructions.

2.1.10 transmit signal: Energy containing encoded information sent from wayside antennas to transit vehicle antennas.

2.2 Acronyms

OCC	operations control center
OEM	original equipment manufacturer
PPE	personal protective equipment
RTS	rail transit system
TWC	train-to-wayside communications

3. Inspection and testing provisions

3.1 Inspection and testing frequency

The inspection and testing procedures in this recommended practice should be performed when train-to-wayside communications systems are placed in service, when they are modified, repaired, or disarranged, or as otherwise deemed necessary by the RTS.

The RTS should determine the need for additional inspection and testing frequencies for train-to-wayside communications 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
- RTS testing and experience
- Regulatory requirements

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

3.2 Training

The RTS and/or their maintenance contractors should develop and execute training programs that provide employees with the knowledge and skills necessary to safely and effectively perform the tasks outlined in this recommended practice.

3.3 Materials

No consumable materials are recommended for inspecting and testing train-to-wayside communications systems unless otherwise specified by the OEM and/or RTS.

3.4 Tools

The following tools are recommended for inspecting and testing train-to-wayside communications systems:

- Multi-meter*
- RTS-approved portable radio
- Standard tools carried by maintenance personnel
- Additional tools as recommended 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, should be worn at all times during inspection and testing.

3.6 Safety

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

3.7 Inspection and testing procedures

Train-to-wayside communication system inspection and testing procedures may be modified for each rail transit system's requirements but should contain the steps listed in Sections 3.7.1-3.7.2 as a minimum.

3.7.1 Inspection

- 3.7.1.1** Notify the operations control center (OCC) and/or other authorities of the inspection activities to be performed.
- 3.7.1.2** Inspect wayside equipment enclosures, and junction boxes 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.
- 3.7.1.3** Inspect wayside cables, conduit, and antennas for defective insulation, rust, corrosion, missing components, damage, and loose or broken connections.
- 3.7.1.4** Inspect transmit and receive equipment for physical damage, frayed, or loose wiring, properly secured plugs and connectors, loose or missing hardware, and proper insertion of printed circuit cards and components.
- 3.7.1.5** Inspect area for debris, water, or any other conditions that could adversely affect operation of the equipment.
- 3.7.1.6** Ensure covers and locks are in place and secured.
- 3.7.1.7** Notify the OCC and/or other authorities when inspection is complete.

3.7.2 Testing

- 3.7.2.1** Notify the OCC and/or other authorities of the testing activities to be performed.
- 3.7.2.2** Measure power supplies and power sources for proper values and tolerance.
- 3.7.2.3** Test and measure transmit signal parameters in accordance with RTS procedures.
- 3.7.2.4** Test and measure receive signal parameters in accordance with RTS procedures.
- 3.7.2.5** Observe train-to-wayside communication, departure test, and dispatching systems for proper operation using revenue or test train.
- 3.7.2.6** Perform additional functional testing as required by RTS to ensure proper operation.
- 3.7.2.7** Ensure covers and locks are in place and secured.
- 3.7.2.8** Notify the OCC and/or other authorities when testing is complete.

3.8 Correction of deficiencies

Deficiencies identified during train-to-wayside communication system inspection and testing should be corrected and documented in accordance with OEM and/or RTS requirements.

3.9 Documentation

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

Annex A

(informative)

Bibliography

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