38. Recommended Practice for Signal System Event Recorder and Data Logging Equipment Inspection and Maintenance

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Abstract: This recommended practice provides guidelines for inspecting and maintaining rail transit signal system event recorder and data logging equipment.

Keywords: chart recorder, data logging equipment, event recorder, inspection, maintenance, pen graph, pen recorder, signal, signal system event recorder, strip chart recorder

Introduction

(This introduction is not a part of APTA RT-SC-RP-38-03, *Recommended Practice for Signal System Event Recorder and Data Logging Equipment Inspection and Maintenance*.)

APTA rail transit safety standards and recommended practices represent an industry consensus on 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 maintaining rail transit signal system event recorder and data logging equipment.

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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Contents

Recommended Practice for Signal System Event Recorders and Data Logging Equipment Inspection and Maintenance

1. Overview

1.1 Scope

This document establishes recommended guidelines for inspecting and maintaining rail transit signal system event recorders and data logging equipment.

1.2 Purpose

The purpose of this recommended practice is to verify that signal system event recorders and data logging equipment are operating safely and as designed through periodic inspection and maintenance, 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 data logging equipment: A device used to capture and store defined analog or digital data. *Syn:* **data logger**, **event recorder**.

2.1.2 event recorder: A device used to capture and store defined analog or digital data. *Syn:* **data logger**.

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

2.1.4 multiplexer: A digital device that can select one of a number of inputs and pass the logic level of that input onto the output.

2.1.5 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.**

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

2.1.7 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.

2.1.8 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.**

2.2 Acronyms

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

3. Inspection and maintenance provisions

3.1 Inspection and maintenance frequency

The inspection and maintenance procedures in this recommended practice should be performed when signal system event recorders and data logging equipment 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 maintenance frequencies for signal system event recorders and data logging equipment. 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

The following materials are recommended for inspecting and maintaining signal system event recorders and data logging equipment:

– RTS-approved cleaning solvent

– RTS-approved lint free wipes

– Additional materials as required by the OEM and/or RTS

3.4 Tools

The following tools are recommended for inspecting and maintaining signal system event recorders and data logging equipment:

– Multi-meter*

– Electrostatic discharge protection equipment

– 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 maintenance.

3.6 Safety

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

3.7 Inspection and maintenance procedures

The inspection and maintenance procedures in this recommended practice may be modified for each rail transit system's requirements but should contain the steps listed in Sections 3.7.1-3.7.3 as a minimum.

3.7.1 Chart-type event recorder 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 area for debris, water, or any other conditions that could adversely affect operation of the equipment.

3.7.1.3   Inspect equipment for physical damage, frayed or loose wiring, plugs and connectors are properly secured and loose or missing hardware.

3.7.1.4   Ensure event recorder is clean and free of debris and/or spilled ink, if applicable.

3.7.1.5   Inspect chart pens to ensure proper tension is applied to the pen bank.

3.7.1.6   Inspect chart pens to ensure that each pen moves full stroke, indicates properly and writes legibly.

3.7.1.7   Inspect paper roll and retrieval system to ensure that there is no binding or defects present that could impede movement.

3.7.1.8   Check ink well, if applicable, to verify ink supply is adequate. Replace ink as per RTS procedures.

3.7.1.9   Check paper to verify supply is adequate. Replace paper as per RTS procedures.

3.7.1.10   Check system time and date information. If necessary, adjust as per RTS procedures.

3.7.1.11   Notify the OCC and/or other authorities when inspection is complete.

3.7.2 Processor-based recorders inspection

3.7.2.1   Notify the OCC and/or other authorities of the inspection activities to be performed.

3.7.2.2   Follow RTS electro-static discharge protection procedures to prevent damage to the equipment.

3.7.2.3   Inspect area and equipment for debris, excessive dust or dirt buildup, water, or any other conditions that could adversely affect operation of the equipment.

3.7.2.4   Inspect equipment for physical damage, frayed or loose wiring, plugs and connectors are properly secured, loose or missing hardware, and proper insertion of printed circuit cards and components.

3.7.2.5   Measure power supplies and power sources for proper values and tolerances.

3.7.2.6 Inspect input multiplexers and isolation modules 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.

3.7.2.7 Inspect equipment for active error codes and observe system status lights and input indication lights for proper system operation.

3.7.2.8 If applicable, check system batteries and replace batteries as needed.

3.7.2.9 Ensure covers and locks are in place and secured.

3.7.2.10 Notify the OCC and/or other authorities when inspection is complete.

3.7.3 Processor-based system maintenance

3.7.3.1 Notify the OCC and/or other authorities of the maintenance activities to be performed.

3.7.3.2 Perform system diagnostic testing per OEM and/or RTS procedures to verify proper system operation.

3.7.3.3 Perform functional testing using per OEM and/or RTS procedures to verify proper system operation.

3.7.3.4 Test system peripheral equipment to verify proper operation.

3.7.3.5 Test input multiplexers and isolation modules to verify proper operation.

3.7.3.6 Verify system inputs are properly represented and indicate the actual state.

3.7.3.7 Test system data storage utilities to verify proper operation.

3.7.3.8 Test system power back-up system to verify proper operation.

3.7.3.9 Check system time and date information. If necessary, adjust as per RTS procedures.

3.7.3.10 Produce a system generated report to verify proper operation.

3.7.3.11 Notify the OCC and/or other authorities when maintenance activities are complete.

3.8 Correction of deficiencies

Deficiencies identified during signal system event recorders and data logging equipment 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 signal system event recorders and data logging equipment inspection and maintenance.

[B2]   RTS procedures for signal system event recorders and data logging equipment inspection and maintenance.