

12. Standard for Closed Circuit Television (CCTV) Inspection, Testing and Maintenance

Approved June 25, 2002
APTA Rail Transit Standards Fixed Structures Inspection and Maintenance Committee

Approved January 10, 2003
APTA Rail Transit Standards Task Force

Authorized June 8, 2003
APTA Rail Transit Standards Policy Committee

Abstract: This standard provides procedures for inspecting, testing, and maintaining rail transit closed circuit television (CCTV) systems.

Keywords: CCTV, closed circuit television, communication, inspection, maintenance, test, testing

Introduction

(This introduction is not a part of APTA RT-S-SC-012-03, *Standard for Closed Circuit Television (CCTV) Inspection, Testing and Maintenance.*)

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, testing, and maintaining rail transit closed circuit televisions.

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.

Participants

APTA greatly appreciates the contributions of the following members of the Signals and Communications Subcommittee who provided the primary effort in drafting the *Standard for Closed Circuit Television (CCTV) Inspection, Testing and Maintenance*:

Carlton “Don” Allen, P.E.
Sal Arceo
Gabrielle Bayme
Paul Camera

Lenny De Meyer
Michael Esford
Patrick Lavin
Ruben Madrigal

Thomas Peacock
Stephen Roberts
Carey Vaughn

The following members of the Rail Transit Standards Fixed Structures Inspection and Maintenance Committee contributed to the review and approval process of the *Standard for Closed Circuit Television (CCTV) Inspection, Testing, and Maintenance*:

James Dwyer, Chair
Frank Cihak, Vice Chair

Anthony Adams
Carlton “Don” Allen, P.E.
Sal Arceo
Roger Avery
Peter Bertozzi
Steven Bezner, P.E.
Raymond Borge
Michael Brown
John Bumanis
Clay Bunting
R. Sean Burgess
Paul Camera
David Cappa, P.E.
Gricelda Cespedes
Robert Chappell
Frank Cihak
Catherine Cronin
Lenny De Meyer
Tom Devenny

David Dunderdale
James Dunn
James Dwyer
William Early, P.E.
Percy Erves
Michael Esford
Richard Falcon
Ray Favetti
Peter Fedun, P.E.
Steve Feil
Robert Fiore
John Gaito
Ricky Green
Mohammad Irshad
Patrick Lavin
Harry Lupia
Frank Machara
Ruben Madrigal
Michael Monastero

Bill Petit
David Rankin
Pingali Rao, P.E.
Richard Raschke
James Redding
Stephen Roberts
Charles Slavis, P.E.
Frederick Smith, P.E.
Richard Spatz
Charles Stanford
F. Brian Steets
Paul Swanson, P.E.
Steven Thompson
Fred Tijan
Gary Touryan
Carey Vaughn
James Wang, P.E.

APTA Rail Transit Standards Fixed Structures Inspection and Maintenance Committee project consultants:

Peter Gentle, P.E., *STV Incorporated*
Carol Rose, *STV Incorporated*

APTA Rail Transit Standards project team:

Gabrielle Bayme, *Standards Development Program Specialist and Project Editor*
Saahir Brewington, *Administrative Assistant and Project Editor*
Antoinette Hankins, *Program Assistant*
Thomas Peacock, *Director-Operations & Technical Services*
David Phelps, *Senior Project Manager - Rail Programs*

Contents

1. Overview	12.1
1.1 Scope.....	12.1
1.2 Purpose.....	12.1
1.3 Alternate practices	12.1
2. Definitions and acronyms	12.2
2.1 Definitions	12.2
2.2 Acronyms.....	12.2
3. Inspection, maintenance, and test requirements.....	12.3
3.1 Inspection, maintenance, and test frequency	12.3
3.2 Training.....	12.3
3.3 Materials	12.3
3.4 Tools	12.4
3.5 Personal protective equipment.....	12.4
3.6 Safety	12.4
3.7 Inspection, testing, and maintenance procedures	12.4
3.8 Correction of deficiencies.....	12.6
3.9 Documentation.....	12.6
Annex A (Informative) Bibliography.....	12.7

Standard for Closed Circuit Television (CCTV) Periodic Inspection, Testing and Maintenance

1. Overview

1.1 Scope

This document establishes standard requirements for inspecting, testing, and maintaining rail transit closed circuit television (CCTV) systems installed in stations and other fixed locations. This standard is not applicable to vehicle-mounted CCTV systems.

1.2 Purpose

The purpose of this standard is to verify that CCTV circuitry, systems, and equipment are operating safely and as designed through periodic inspection, testing, and maintenance, 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 cartridge fuse: A device used to protect an electric circuit from the effect of excessive current draw enclosed in an insulating cartridge. *See also:* **fuse**.

2.1.2 closed circuit television (CCTV): A non-broadcasting system for processing video and text information.

2.1.3 fuse: A device used to protect an electric circuit from the effect of excessive current draw. *See also:* **cartridge fuse**.

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

2.1.5 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**.

2.1.6 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**.

2.1.9 ribbon fuse: A cylindrical fuse consisting of a ribbon shaped fusible metal enclosed in a glass or transparent plastic cylinder with end caps.

2.2 Acronyms

CCTV	closed circuit television
OCC	operations control center
OEM	original equipment manufacturer
PPE	personal protective equipment
RTS	rail transit system

3. Inspection, maintenance, and test requirements

3.1 Inspection, maintenance, and test frequency

The inspection, maintenance, and testing procedures in this standard shall be performed:

- a) Annually
- b) When CCTV systems are placed in service
- c) When CCTV systems are modified, repaired, or disarranged
- d) As otherwise deemed necessary by the RTS

The RTS shall determine the need for additional inspection, maintenance, and test frequencies for CCTV 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 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 the inspection, maintenance, and testing of CCTV systems:

- RTS-approved cleaning and lubrication materials

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

3.4 Tools

The following tools are required for the inspection, maintenance, and testing of CCTV systems:

- Portable monitor
- 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, testing, and maintenance.

3.6 Safety

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

3.7 Inspection, testing, and maintenance procedures

CCTV system inspection, maintenance, 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 3.7.1-3.7.3 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 each camera enclosure for proper sealing and for signs of moisture, heat discoloration, or damage.
- 3.7.1.3** Ensure that connections are tight and that there are no missing or damaged support brackets/fasteners and mounting hardware.
- 3.7.1.4** For cameras mounted at outdoor locations, check camera views under different lighting conditions for conflicts with ambient lighting conditions.
- 3.7.1.5** Inspect condition of recording tapes and change as required.

- 3.7.1.6 Inspect cabling and wiring to ensure that it is not frayed, burnt, broken, cut, or otherwise defective.
- 3.7.1.7 Inspect cables to ensure they do not exceed their normal bending radius and are positioned to prevent chafing or cutting.
- 3.7.1.8 Inspect electrical connections for signs of corrosion, broken wires, broken connections, missing hardware, loose connections, frayed or burned wires, defective insulation, and moisture.
- 3.7.1.9 Inspect ribbon or cartridge type fuses and other electrical protection equipment for burned, separated, or otherwise damaged elements and replace as required.
- 3.7.1.10 Notify the OCC and/or other authorities when inspection is complete.

3.7.2 Test

- 3.7.2.1 Notify the OCC and/or other authorities of the test activities to be performed.
- 3.7.2.2 Check each camera's view from the remote monitoring location and test the system's ability to re-focus and re-align.
- 3.7.2.3 Test the systems used to retrieve stored images and select views.
- 3.7.2.4 Test remote controls (pan, tilt, zoom) and switching equipment for proper operation.
- 3.7.2.5 Test each local CCTV recorder for proper operation.
- 3.7.2.6 Test heater and fan assemblies for proper operation.
- 3.7.2.7 Notify the OCC and/or other authorities that testing is complete.

3.7.3 Maintenance

- 3.7.3.1 Notify the OCC and/or other authorities of the maintenance activities to be performed.
- 3.7.3.2 Clean camera lens and outer enclosure cover window.
- 3.7.3.3 Re-coat outer enclosure windows and camera lenses.
- 3.7.3.4 Re-coat mounting hardware.
- 3.7.3.5 Clean tape recorder heads in systems using removable tapes.
- 3.7.3.6 Lubricate moving parts.
- 3.7.3.7 Notify the OCC and/or other authorities that maintenance activities are complete.

3.8 Correction of deficiencies

Deficiencies identified during CCTV system inspection, testing, maintenance shall be corrected and documented in accordance with OEM and/or RTS requirements.

3.9 Documentation

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

Annex A

(Informative)

Bibliography

- [B1] CCTV system circuit diagrams and associated documentation.
- [B2] Original equipment manufacturer (OEM) specifications for CCTV inspection, testing, and maintenance.
- [B3] RTS procedures for CCTV inspection, testing, and maintenance.