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Signals and Communications Working Group

Cable Plant Inspection and Testing

Abstract: This standard provides procedures for inspecting and testing rail transit cable plants.

Keywords: cable plant, cable testing, cable inspection, signal

Summary: This document establishes standard requirements for inspecting and testing rail transit cable plants.

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-011-03, which has been revised. Below is a summary of changes from the previous document version:

- Migration to the new 2025 APTA document template which standardizes and reorganizes the document's content; a document summary and foreword were added; the scope and purpose have been combined and updated to be more specific.
- Updated list of participants.
- Updated definitions, abbreviations and acronyms to be consistent with standard definitions; specifically, RTS has been replaced with rail transit system throughout the document.

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Introduction

This introduction is not part of APTA RT-SC-S-011-03, "Cable Plant 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).

This standard intends to meet the following objectives:

- to ensure that 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

Scope and purpose

This document establishes standard requirements for inspecting and testing rail transit cable plants. The purpose of this standard is to verify that cable plants 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).

Cable Plant Inspection and Testing

1. Inspection and test requirements

1.1 Inspection and test frequency

The inspection and testing procedures in this standard shall be performed when cable plants 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 test frequencies for cable plants. 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
- equipment and tools should be calibrated in accordance with OEM and/or rail transit system requirements.

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

1.2 Training

The rail transit system and/or its 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

No consumable materials are required for inspecting and testing cable plants unless otherwise specified by the OEM and/or rail transit system.

1.4 Tools

The following tools are required for inspecting and testing cable plants:

- multimeter*
- megohmmeter (megger)*
- rail transit system–approved portable radio
- rail transit system–approved discharging equipment
- 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 testing procedures

Cable plant inspection and testing procedures may be modified for each rail transit system's requirements (see "Note on alternate practices") but shall contain the steps listed in sections 1.7.1 through 1.7.3 as a minimum.

Perform the cable discharging procedure after disconnecting and prior to reconnecting all cables in accordance with OEM and/or rail transit system recommendations.

1.7.1 Inspection

1. Notify the Operations Control Center and/or other authorities of the inspection activities to be performed.
2. Inspect wayside cables, wiring, junction boxes and other enclosures for rust, corrosion, damage, cracks, breaks and defective insulation, latches, hinges, locks, covers, seals, gaskets, loose conduit connections, and missing or loose components and hardware.
3. Inspect wayside cables, wiring, junction boxes and other enclosures for damage caused by standing water, water leaks or retention, and any condition that may interfere with testing and/or revenue operations. Holes and entrances not used for ventilation should be sealed.
4. Inspect junction boxes and enclosures for the presence and condition of stored circuit drawings, terminal list, wire tags and instructions.
5. Notify the OCC and/or other authorities when inspection is complete.

1.7.2 Continuity test

1. Notify the OCC and/or other authorities of the test activities to be performed.
2. Remove power from the equipment and circuits identified for testing.
3. Perform cable discharging procedure after disconnecting cables in accordance with rail transit system procedures.
4. Isolate conductors identified for testing.

5. Perform continuity test on each conductor identified for testing in accordance with rail transit system procedures.
6. Verify that continuity test measurements are in accordance with rail transit system procedures.
7. Perform cable discharging procedure prior to reconnecting cables in accordance with rail transit system procedures.
8. Reconnect conductors to their termination points.
9. Restore power and equipment to normal operation.
10. Perform equipment functional testing to verify operation in accordance with rail transit system procedures.
11. Ensure that covers, doors, slider straps and locks are in place and secured.
12. Notify the OCC and/or other authorities when testing is complete.

1.7.3 Insulation resistance test (meggering)

1. Notify the OCC and/or other authorities of the test activities to be performed.
2. Remove power from the equipment and circuits identified for testing.
3. Perform cable discharging procedure after disconnecting cables in accordance with rail transit system procedures.
4. Isolate conductors identified for testing.
5. Perform insulation resistance test on each conductor to ground and between all conductors in a multi-conductor cable in accordance with rail transit system–approved procedures.
6. Verify that insulation resistance test measurements are in accordance with rail transit system procedures.
7. Perform cable discharging procedure prior to reconnecting cables in accordance with rail transit system procedures.
8. Reconnect conductors to their termination points.
9. Restore power and equipment to normal operation.
10. Perform equipment functional testing to verify operation in accordance with rail transit system procedures.
11. Ensure that covers, doors, slider straps and locks are in place and secure.
12. Notify the OCC and/or other authorities when testing is complete.

1.8 Correction of deficiencies

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

1.9 Documentation

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

References

This document shall be used in conjunction with OEM specifications and rail transit system procedures for cable plant inspection and testing.

Definitions

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

megger: A small, portable instrument that gives a direct reading of insulation resistance in ohms or megohms.

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: 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*.

Abbreviations and acronyms

OCC Operations Control Center
OEM original equipment manufacturer

Document history

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