

# **APTA Signal Standards Program Overview**

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# Phase I

## Industry Consensus

*Organize an industry meeting of signal system managers to review the status of federal recommendations and potential future regulations and define best approach to these challenges for transit systems.*



# **Initial Meeting held for Discussion in Washington, DC**

APTA/FTA TRANSIT TRAIN CONTROL ASSESSMENT  
2011 TRANSIT INDUSTRY MEETING, WASHINGTON DC

This effort sponsored by APTA and the FTA  
was intended to organize Transit Train  
Control Representatives to assess response  
to NTSB Recommendations



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# Principle Topics Associated with Industry Meeting of February 23<sup>rd</sup> and 24<sup>th</sup> 2011

Applies to those issues directly related to operation and maintenance in the transit environment. Principle actions agreed for future action:

1. How the manufacturers' vital technology approval process applies to maintenance practices.
2. The availability and reliability of a maintenance oversight software program that could be used to detect the possible occurrence of a track circuit failure.
3. The need to implement the use of interoperability criteria for the design, operation, and maintenance of audio frequency track circuit systems.



# **1. How the Manufacturers' Failure Mode and Effects Analysis Affects Maintenance**

- Failure Mode and Effects Analysis (FMEA) is a process the manufacturer uses to determine the failure modes of a vital circuit components and its affect on the safe operation of that system.
- The failure mode must be found to fail to a detectable status to satisfy the test criteria that a potentially unsafe failure will be acted on by maintenance organizations.
- It is imperative that the transit organization be aware of the potential of detectable vital failures.
- Often the same failure mode may indicate both a safety and a reliability failure. The potential for the failure mode to be a reliability or a safety failure must also be considered in maintenance practices.
- Care and experience are necessary to assure the potential failure modes are included in maintenance procedures and training programs



# Example of a Failure Mode Used to detect both Reliability and Safety Failure Detection

Intermittent track circuit operation.

- This failure mode is normally associated with a reliability failure failures resulting in operational delays and discomfort to passengers during daily operations.
- This failure mode is also used by manufacturers to define safety failures as detectable when such a failure occurs during FMEA testing. **Example: The track circuit is intermittently energizing while occupied by a train.**
- Maintenance procedures should assure the Transit Authority forces are aware of this this potential for both reliability and safety failure so as to assure consideration for any possible outcome.



# Need for Transit Maintenance Standardization

- Authority maintenance procedures and manufacturers recommended maintenance procedures need to be discussed in detail.
- The results of these discussions must be incorporated into the Transit Authorities approach to standardized maintenance procedures.
- It is also recommended there be a Transit Maintenance training program that assures a level of competence in technical skills that combined with training provides all necessary information to evaluate a problem and act quickly and efficiently assure a timely and safe result.
- **An audio frequency track circuit maintenance standard developed by the APTA standards group is now in editing and will soon be released for public comment as the last steps before being published as a standard.**



## **2. The Availability and Reliability of Maintenance Oversight Software Programs**

During the 2011 meeting several of the transit systems presented their software based testing methods used in the process of maintaining Audio Frequency Track Circuits. This included:

- MBTA Massachusetts Bay Transportation Authority
- CTA Chicago Transit Authority
- SEPTA Southeastern Pennsylvania Transportation Authority
- GCRTA Greater Cleveland Regional Transit Authority
- BART Bay Area Rapid Transit District
- WMATA Washington Metropolitan Area Transit Authority

Many of these methods required the use of dedicated workers and/or interruptions to revenue service. Of particular interest was the latest generation of the Track Circuit Monitoring Tool used at WMATA.





# Track Circuit Monitoring Tool

- The tool was developed by WMATA Engineering group and in part as a concept of Tim Shoppa of the WMATA IT group.
- The tool did show promise, during the original meeting, in its ability to detect the presence of track circuit abnormalities with a minimum of effort, in real time and with little to no affect on revenue service.
- The WMATA tool with improvements developed during Chicago Blue Line installation by software development company Rail-It, assisted with funding from an FTA grant, are proving to be an excellent addition to the CTA and MARTA maintenance management systems.
- **The recommend practice for this tool developed by the APTA Standards group is now in the process of editing and will soon be released for public comment as the last step before being published.**



### **3. The use of Interoperability Criteria for the Design, Operation, and Maintenance of Audio Frequency Track Circuit Systems**

- The discussion centered on the need to update existing and/or develop new maintenance standards and recommended practices.
- The goal would be to include the manufacturer's knowledge of the design and implementation process with the experience and needs of transit systems maintenance managers and consulting engineers.
- The objective would be to use the APTA proven standards program to develop documentation for industry approval that would then be used to assist Transit Agencies in the management of safe and reliable signal systems.



# Phase II

## APTA Standards Development

*Organize the next generation of an APTA standards development group and task them with the responsibility to develop Signal System maintenance standards for the transit rail industry.*



# Request Industry Participation

Convene the next generation industry review and evaluation group to assess all existing Transit Signal Standards and Recommended Practices. Include representatives from:

1. APTA
2. Industry Manufacturers
3. Transit Authorities
4. Consultant Engineers



# Results of Standards Group Review

The standard group initial review of the existing APTA documentation resulted in recommendations to:

1. Review and revise outdated existing documents to reflect industry changes and operators experience.
2. Classify the documents as one of two possibilities:
  - a) **Standards**: That reflect the mandated effort and tasks need to protect passenger safety.
  - b) **Recommend Practices**: That recommended a work effort and tasks necessary to assure operational reliability



# Committee Representatives

## Manufacturers

Alstom

Ansaldo

Siemens

## Operators

NYCT

MARTA

SEPTA

CTA

LAMTA

WMATA

GCRTA

MBTA

## Consulting Engineers

Mott MacDonald

Rail-IT

B&C

Hoelscher Consulting

TSE

Parsons Brinkerhoff

FTA

Note: Additional participation requests are welcome.



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# Task Assigned to Signal Standards Committee

The signal Standards and recommended practices are currently in review by the standards group and fall into the categories of being evaluated/updated, deleted, or created. At this time:

- Eight have been completed and are being processed through editing.
- Thirty six documents will be updated during future and ongoing secessions.
- Four documents have been deleted.
- Four new documents have been proposed.



# Future Progress Goals for APTA

- To take the lead in any regulatory requirements that may impact transit due to federal legislation.
- Provide maintenance standards and recommended practices approved by industry consensus that reflect good practice and efficient use of resources.
- Provide a permanent body of industry representatives who can update and modify at regular intervals all maintenance procedures for the transit signal industry.
- Provide a recourse to the industry for comments and future modification of these documents.





# Questions



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