SMS Techniques for Monitoring Operations and Maintenance Procedures

February 24, 2022

**Public Transportation Agency Safety Plan
Technical Assistance Center
(PTASP TAC)**

U.S. Department of Transportation
Federal Transit Administration

Objectives

- Explain how monitoring operations and maintenance procedures can help verify that procedures are being followed and work as expected
- Identify data collected from monitoring procedures and demonstrate how this data can be used in Safety Management Systems (SMS) processes throughout the agency
- Explain how monitoring procedures helps monitor and manage overall safety risk

Agenda

- Requirements for monitoring operations and maintenance procedures

- Procedure monitoring techniques in SMS

- Guest Speaker

- Q&A on monitoring operations and maintenance procedures

For information related to the Bipartisan Infrastructure Law:

- Sign up for FTA's March 1, 2022 [Bipartisan Infrastructure Law webinar](#)

- Please visit FTA's [Bipartisan Infrastructure Law](#) webpage

- Contact FTA-IIJA@dot.gov with your questions related to the Bipartisan Infrastructure Law

Requirements for Monitoring Operations and Maintenance Procedures

Safety Management Systems (SMS)

The PTASP regulation establishes requirements for an SMS, including Safety Management Policy, Safety Risk Management, **Safety Assurance**, and Safety Promotion

Safety Performance Monitoring and Measurement Requirement

§ 673.27(b)(1)

A transit agency must establish activities to: Monitor its **system** for **compliance** with, and **sufficiency** of, the **agency's procedures for operations and maintenance**.

Procedures in an SMS Context

- Procedures can include operations and maintenance rules, policies, standard operating procedures (SOPs), practices, and requirements
  - Some procedures address safety risk and may be considered safety risk mitigations
  - If these procedures are not being implemented or do not work as intended, the safety risk likely has not been mitigated
- Monitoring compliance with and sufficiency of procedures provides reasonable assurance that the established procedures are being followed and are effective in meeting your agency's safety goals

Safety Performance Monitoring and Measurement Requirement

§ 673.27(b)(1)

A transit agency must establish activities to: Monitor its system for **compliance with**, and sufficiency of, the agency's procedures for operations and maintenance.

Compliance Monitoring

- Monitoring compliance with procedures helps answer the question, *"Does our agency carry out our operations and maintenance procedures as written?"*

  - Shows where procedures designed to control safety risk are not being followed

  - Noncompliance and practical drift can indicate a need to take further action to address the safety risk

- Agencies may define compliance thresholds to guide risk management decisions

  - Agencies may have different appetites for risk for different types of procedures

Safety Performance Monitoring and Measurement Requirement

§ 673.27(b)(1)

A transit agency must establish activities to: Monitor its system for compliance with, and **sufficiency of**, the agency's procedures for operations and maintenance.

Sufficiency Monitoring

- Monitoring the sufficiency of procedures helps answer the question, *"Do our operations and maintenance procedures successfully ensure their intended outcome?"*

  - Shows whether procedures are effective in addressing safety risk they were intended to address

- Results from monitoring the sufficiency of procedures may identify a need for a new or updated safety risk assessment of the safety risk the procedure was designed to address

  - The agency may decide to develop new procedures, update their procedures, or implement other safety risk mitigations
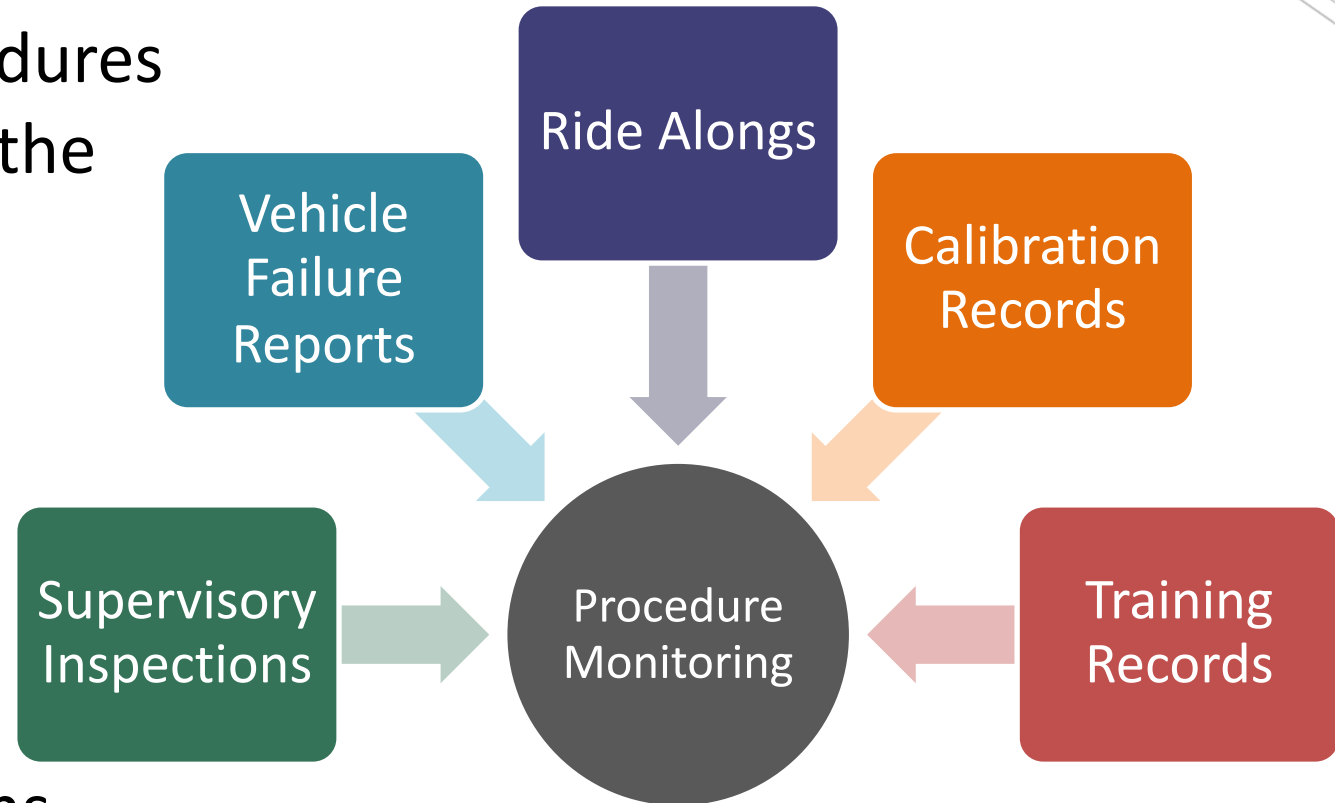
Monitoring Procedures within an SMS Context

- The key function of an SMS is to manage safety risk
- Compliance monitoring activities and sufficiency monitoring activities support the overall SMS
  - Monitoring helps agencies determine whether the system is acting as designed and intended (whether the agency is managing its safety risk as intended)
  - Monitoring helps agencies identify areas where procedures may be falling short (are not successfully managing safety risk) and should be addressed through other SMS processes
  - Information gathered through monitoring can inform other elements of the SMS, including Safety Risk Management, other Safety Assurance processes, and Safety Promotion

Procedure Monitoring Approach in SMS

Keys to Monitoring Procedures

- Activities for monitoring procedures are identified or referenced in the Agency Safety Plan

- Data may exist in different departments across your organization that can support procedure monitoring

- Results of compliance and sufficiency monitoring programs must be documented and maintained for at least three years

Vehicle Failure Reports

Ride Alongs

Calibration Records

Supervisory Inspections

Procedure Monitoring

Training Records

Monitoring the Agency

- Activities for monitoring operations and maintenance procedures often involve observing an individual perform a job task

- Monitoring procedures is intended to confirm that existing procedures are being implemented and are sufficient – an organizational view of risk management to support organization-wide assessment

  - Single data points may come from observations of an individual, but the purpose of monitoring procedures is not to grade an individual

  - If an agency only considers individual performance, they may fail to identify the reason a procedure cannot be carried out as written or to identify other issues with the procedure, training program, or other element

  - This does not mean that agencies cannot take action if an individual's performance violates the agency's procedures

Example Elements of a Procedure Monitoring Program

- Establish monitoring activities such as observations, inspections, operational testing, and audits

- Establish monitoring frequencies and schedules

- Develop training for supervisors, managers, and others on how to conduct monitoring activities

- Identify methods for collecting and compiling information about monitoring activities to support the SMS

Example Elements of a Procedure Monitoring Program

Your agency may:

- Develop criteria for documenting, reporting, and resolving instances of noncompliance

- Develop criteria for when noncompliance findings containing safety concerns or potential hazards must be evaluated through the Safety Risk Management process

- Establish processes for analyzing noncompliance and monitoring results to ensure the sufficiency of procedures

Example: Monitoring Compliance with Bus Operations Procedures

Goal of Monitoring Compliance with Bus Operations Procedures

- Provide an understanding of how the agency operates service

- Identify and mitigate safety risk from non-compliance with procedures and insufficient procedures

Challenges of Monitoring Compliance with Bus Operations Procedures

- Bus operators usually work alone

- Most driving behaviors, including compliance with agency procedures, may not be directly observable to the agency

- Many agencies must use monitoring techniques that sample the operator's performance to try and understand compliance with and sufficiency of operating procedures

Common Monitoring Techniques

1. Supervisor Ride Evaluations

2. Rule Checks and Random Observations

3. Observations from Undercover Riders

4. Onboard Operator Monitoring Systems

1. Supervisor Ride Evaluations

Approach

- Transit supervisors observe bus operators performing their responsibilities
- Opportunity for coaching and feedback

Considerations

- Operator is aware of transit supervisor (may affect behavior)
- Limited frequency of ride-alongs (may just be a few times per year)

Example: Supervisor Ride Evaluations Supporting Other SMS Processes

Transit supervisors conduct ride evaluations and enter results in mobile application

Six-month data trending shows an increase in observed instances of improper radio use

Data shared with training department and a new training campaign is developed and executed

Subsequent data trending from transit supervisor ride evaluations show a reduction in observed instances of improper radio use

Training campaign incorporated into operator initial and refresher training

2. Rule Checks and Random Observations

Approach

Monitor compliance with specific rules or activities over a designated period

Considerations

These checks are limited to the rules under review or activities under observation

Example: Rule Checks and Random Observations Supporting Other SMS Processes

Agency notices increase in brake failures over the previous year

Transit supervisors conduct observations of bus brake tests and observe that operators were not fully following the procedure

Follow-up interviews with bus operators revealed that they did not have sufficient time to perform tests

Agency determined that the bus testing procedure (a critical mitigation) has inadequate compliance and takes action

3. Observations from Undercover Riders

Approach

Undercover riders observe the system and report on their experiences

Considerations

- Undercover riders cannot observe all aspects of operations and rules compliance
- Time and resource intensive

Example: Observations from Undercover Riders Supporting Other SMS Processes

Annual observation conducted by undercover riders

Observations identify accessibility concerns

Safety Department assesses information

Safety risk assessment conducted

Safety risk mitigation adopted and implemented

4. Onboard Operator Monitoring System

Approach

- Integrates cameras, event data recording, and telemetry technology into transit operations
- Provides opportunity for frequent and specific feedback for operators

Considerations

- Cost of technology, maintenance, and support
- Customization may be required

Example: Onboard Monitoring System Data

Example Agency Data

Most common non-compliant or concerning behaviors during previous year:

- Late Response to Traffic Conditions (hard braking, swerving): 26%
- Incomplete Stop: 15%
- Following Distance: 9%
- Failed to Stop: 6%
- Seat Belt: 6%

Example: Onboard Monitoring System Data Supporting Other SMS Processes

Agency identifies most common non-compliant or concerning behaviors over previous year

Coach operators using reports from the onboard monitoring system, including video

New refresher training campaigns

Ongoing monitoring through weekly, monthly and annual reports

Examples from Other Industries

- Non-punitive self-reporting of errors
    - Encourages open communication throughout the agency
    - Agencies may choose to also allow reporters to provide suggestions for preventing errors in the future
    - See the Federal Aviation Administration's (FAA) Aviation Safety Reporting System
- Peer inspections and observations
    - Inspections and observations carried out by peers leverages an agency's own subject matter experts – the individuals who carry out these tasks every day
    - See FAA's Line Operations Safety Assessments

Key Takeaways

- Monitor the system, not just individuals

- Using multiple monitoring techniques can support robust assessments of compliance and sufficiency

- Agencies may not need to collect more data to better understand procedure compliance and sufficiency, they may choose to just analyze the data in new or different ways

- Data collected from compliance and performance monitoring can support other SMS processes and activities

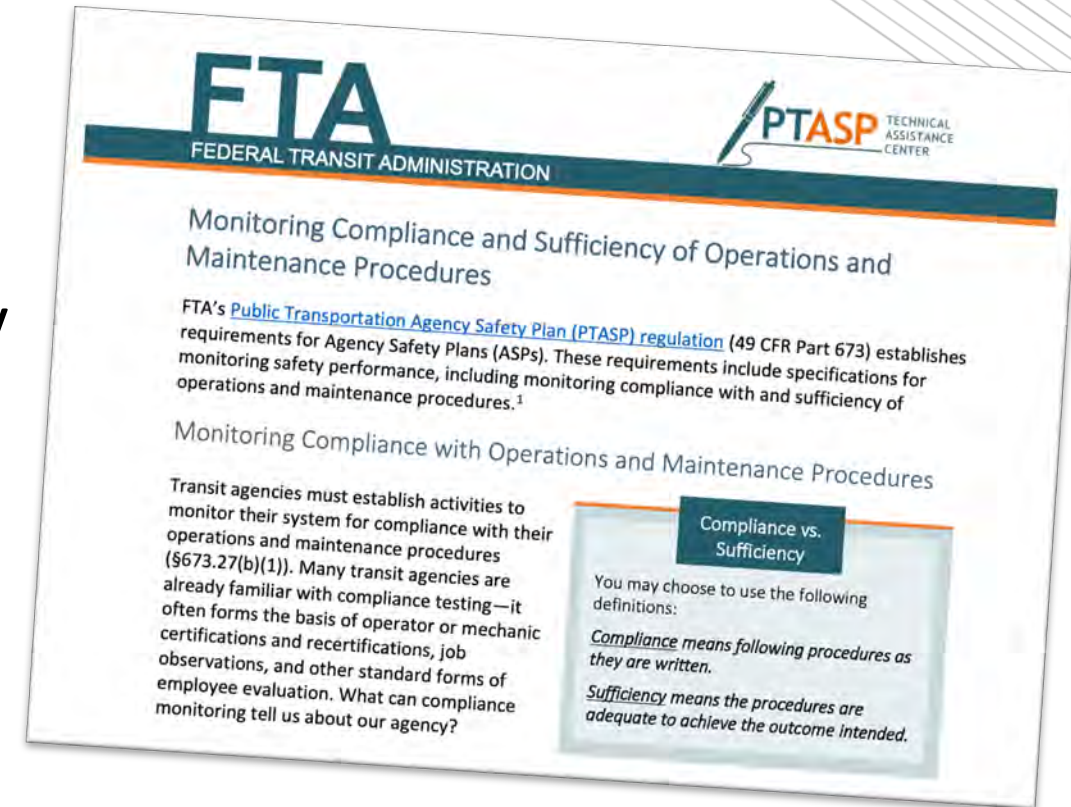- Monitoring procedures helps agencies monitor the overall safety risk of the system

Related PTASP Resources

Additional examples of activities for monitoring compliance with and sufficiency of operations and maintenance procedures in the PTASP TAC Resource Library:

- Spotlight Article

- Compliance Monitoring Webinar

Related Industry Resources

Agencies may also find the following industry resources useful*:

- [Improving Safety-Related Rules Compliance in the Public Transportation Industry](#) (Transportation Research Board)

- [Successful Practices and Training Initiatives to Reduce Accidents and Incidents at Transit Agencies](#) (Transportation Research Board)

- [Rule-Compliance Program Requirements, APTA RT-OP-S-011-10, Rev. 2](#) (American Public Transportation Association)

** These resources are provided for general information purposes **only**. Agencies are not required to implement any programs or activities discussed in these resources that go beyond FTA's PTASP requirements.*

Guest Speaker

Shauna Miller
Grants and Contracts Officer
Public Transportation Office
Idaho Transportation Department

Idaho Landscape

- Bus-Only State
- Characteristics
  - Mostly Rural
  - 1 Large Urban
  - 4 Small Urban

- Service Modes

Impact of Rule Making

- 9 Agencies
  - 2 – Opted Out
  - 7 – State Sponsored Plan

ASP Development

- Outreach
- ITD's Mission

   "Your Safety. Your Mobility. Your Economic Opportunity."

- ITD's ASP Template
- Individualized Plans

Operations and Maintenance Monitoring: Responsibility and Structure

- Oversight Responsibility

- Structure

  - Quarterly Reporting

  - Site Review Program

    - Desk Audit

    - On-Site Review

Operations and Maintenance Monitoring: Responsibility and Structure

- Desk Review

  - ASP

  - Support Documents

  - Board Approval

  - Communication Efforts

- On-Site Review

  - Sample Records

  - Employee Interviews

Operations and Maintenance Monitoring: Process and Tools

- Standard Checklists
- Agency Specific Checklists
- Follow Up Reviews

Operations and Maintenance Monitoring: Results

- Data Collection

- Trends

- Resource Sharing

- Lessons Learned

Operations and Maintenance Monitoring: Tips

- Constructively Leverage Results

    "We do better when we know better."

- Safety should never be stagnant

- Trust your providers and their experience

- Collaborate

Contact Information

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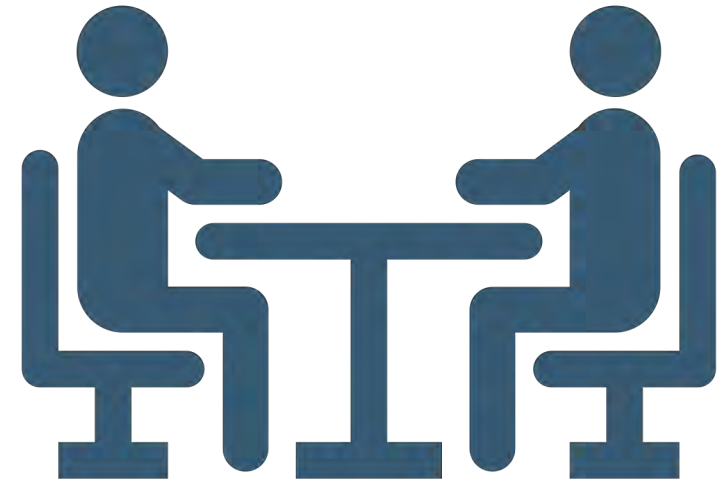
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Technical Assistance

- **TAC Website** transit.dot.gov/PTASP-TAC

- **FAQs** transit.dot.gov/PTASP-FAQs

The TAC help desk is available to assist the transit industry with PTASP questions, including questions about ASP development and implementation:

- **Email** PTASP-TAC@dot.gov

Questions and Answers

- Question and Answer session on monitoring operations and maintenance procedures

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