



Monitoring Operations and Maintenance Procedures

July 2022

Version 1

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Introduction

This guide provides examples of how transit agencies may meet the requirement to monitor compliance with operations and maintenance procedures and ensure their sufficiency as part of a Safety Management System (SMS) (Public Transportation Agency Safety Plans (Part 673), 49 CFR [§ 673.27\(b\)\(1\)](#)). The guide highlights key requirements in Part 673 and provides considerations for monitoring processes and activities.

Background

Monitoring operations and maintenance procedures is one of the Safety Performance Monitoring and Measurement activities required under Safety Assurance in SMS. The required activities in Safety Assurance help your agency ensure that Safety Risk Mitigations are implemented and effective and that your agency meets or exceeds its safety objectives by collecting, analyzing, and assessing information. Operations and maintenance procedures often include, or are informed by, mitigations for relevant safety risks.

These procedures also often include steps or actions required by Federal, State, and local regulations and laws.

Monitoring compliance with, and sufficiency of, operations and maintenance procedures provides reasonable assurance that your established procedures are being followed and are effective. It helps you verify that what you *expect* to happen based on your operations and maintenance procedures *does* actually happen. Moreover, monitoring can help you identify areas where refining your procedures could maximize their safety impact.

Monitoring compliance with operations and maintenance procedures can also help your agency identify instances of **practical drift** — situations where practice has uncoupled from procedure. This can happen when employees introduce shortcuts, make adaptations, or change how they implement rules and procedures over time.

Key Terms

Transit agencies may choose to use the following definitions when discussing the requirements in [§ 673.27\(b\)\(1\)](#):

- **Procedures:** Operating and maintenance rules, policies, standard operating procedures (SOPs), practices, and requirements used by your agency to provide and maintain passenger service.
- **Compliance:** Following procedures as written.
- **Sufficiency:** The procedures are adequate to achieve the outcome intended.



By identifying instances of practical drift, you can improve compliance with procedures. This may involve formally incorporating adaptations developed in practice that make your procedures more efficient, safer, and more effective.

Establishing Processes and Activities

When establishing your processes and activities related to monitoring operations and maintenance procedures, consider how this Safety Assurance activity interacts with other elements of your SMS:

1. **Safety Management Policy and Direction:** Establish specific authorities, accountabilities, and responsibilities.
 - This includes management commitment and direction: Who does what? Who makes sure things gets done?
2. **Safety Promotion and Communication:** Develop opportunities for communication.
 - This includes the means to communicate safety issues and concerns throughout your agency: What information do your workers need to carry out their SMS responsibilities? How do you give them this information?
3. **Safety Promotion and Training:** Implement training.
 - This includes training for the workers who will help carry out your monitoring process: What training do people need to do their jobs? How do you train them?

Practical drift can occur when:

- Technology does not operate as written in your procedures;
- Workers cannot execute your procedures as written under real-time conditions;
- Changes in operating characteristics are not reflected in your procedures;
- Your agency adds new components to its operations that are not reflected in your procedures; and
- Workers implement shortcuts or local adaptations.

Of course, as with any element of your SMS, you will want to document your key processes and procedures. This includes plans, policies, and procedures: How do you document procedures, roles, and responsibilities? How do you document relevant inputs and outputs?

When you establish and document how your agency monitors compliance with, and sufficiency of, operations and maintenance procedures, your agency may:

- Identify the operations and maintenance procedures you will monitor;
- Identify monitoring activities, including 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 compliance monitoring activities to support the SMS;
- Develop criteria for documenting, reporting, and resolving instances of noncompliance with operations and maintenance procedures;
- Develop guidance and/or thresholds for when noncompliance findings containing safety concerns or potential hazards must be evaluated through the Safety Risk Management process; and
- Establish processes for analyzing noncompliance and monitoring results to ensure the sufficiency of procedures.

How Agencies Monitor Operations and Maintenance Procedures

Transit agencies use many different techniques to monitor compliance with and sufficiency of operations and maintenance procedures. Common techniques agencies use to address the monitoring requirement in [§ 673.27\(b\)\(1\)](#), include the following:

- **Observations**, such as ride-alongs, posting observers at various locations (such as transfer centers), using mystery riders, and placing observers in separate vehicles.
- **Operational testing** or a formal process to test workers for compliance with operating and maintenance procedures while they perform their duties. Examples of operational testing include:
 - Speed checking vehicles using a radar or Lidar speed-measuring device or on-board vehicle data loggers;
 - Monitoring live or recorded radio transmissions for proper radio protocol; and
 - Reviewing video-data-recording systems, data loggers, and vehicle analytics to observe vehicle operation.
- **Audits, reviews, and special studies** include comprehensive and structured examinations of how your agency implements procedures. These are often focused on specific areas or disciplines, such as management of bus dispatch, operator training, or vehicle maintenance.
- **Inspections** include targeted observations to check or test how well workers comply with procedures, or to determine the condition of vehicles, equipment, or infrastructure.



Using Metrics to Monitor Compliance and Sufficiency

Monitoring operations and maintenance procedures can result in hundreds of individual data points. In order to turn those data points into a meaningful reflection of compliance and sufficiency, your agency may establish metrics. Metrics help you measure compliance and determine whether procedures carried out by your agency meet, come close to, or fail to meet your requirements. Metrics also can show you trends over time and document how your agency improves. They also provide data to support the development of corrective actions.

To integrate metrics into your monitoring activities, your agency may choose to establish Safety Performance Measures (SPMs) and Safety Performance Targets (SPTs)¹:

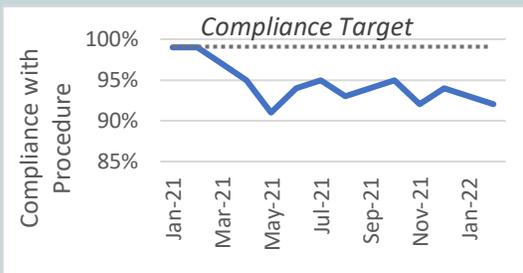
- **SPMs** are quantifiable performance or condition indicators used to establish targets and assess progress toward meeting established targets.
- **SPTs** are quantifiable levels of performance or conditions expressed as a value for a given performance measure and achieved over a specified time frame related to safety management activities.

For example, an SPM might be “rate of part failure,” and the associated SPT could be “no more than five-percent failure rate over the next calendar year.”

SPMs and SPTs for monitoring compliance with and sufficiency of operations and maintenance procedures link directly to safety performance. They can help your agency identify and monitor instances where noncompliance with operations and maintenance procedures may indicate issues that need to be addressed. SPMs and SPTs may focus on the following:

- Reports from day-to-day activities performed by supervisors and managers to monitor compliance with operations and maintenance procedures;
- Results of regular or daily inspections of safety-critical activities performed for operations and maintenance;

Example Metric for Monitoring Compliance



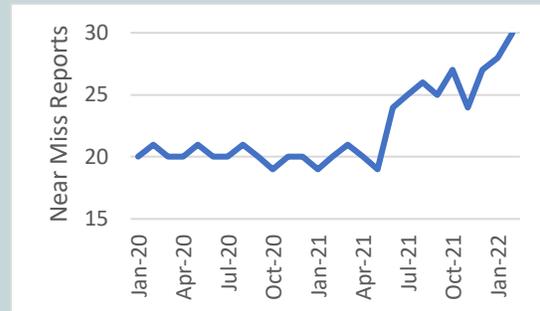
If the agency sets a Safety Performance Target for compliance target of 99% or greater, the agency may take action to determine why compliance fell after March 2021.

¹ Note that [49 CFR 673.11\(a\)\(3\)](#) requires Agency Safety Plans to include performance targets based on the SPMs established under FTA’s [National Public Transportation Safety Plan](#). A transit agency may choose to establish additional SPMs and SPTs for performance monitoring and measurement activities.



- Information from the Employee Safety Reporting Program or other worker communications related to compliance with operations and maintenance procedures;
- Reports from investigations into safety events where compliance or sufficiency of procedures contributed to the event;
- Outcomes, delays, or events in daily transit system performance attributed to noncompliance with procedures or insufficient procedures; and
- Findings from audits of normal operations.

Example Metric for Monitoring Sufficiency



An increase in near-miss reports may indicate that existing safety procedures are not sufficient to manage the associated safety risk.

Table 1: Monitoring Procedure Examples

Procedure Being Monitored	Monitoring Method	SPM	SPT
Passenger securement procedure	Daily supervisory ride checks	Percentage compliance with passenger securement procedures	Greater than 98% compliance on supervisory ride checks of passenger securement over the next three months
Traction power inspection and cleaning procedure	Event logs	Number of traction power insulators involved in fire/smoke conditions	Less than three per quarter
Radio maintenance and inspection procedure	Employee Safety Reporting Program	Rate of reports of faulty radios	Less than one report of faulty radios per 100,000 revenue vehicle hours



Procedure Being Monitored	Monitoring Method	SPM	SPT
Operator recertification procedure	Audit of compliance with the Agency Safety Plan	Number of operators out of compliance with recertification requirements	Decrease the number of operators out of compliance with recertification requirements by 5% each month until all operators are in compliance, then maintain compliance

These are just a few examples of how your agency can monitor compliance with operations and maintenance procedures and ensure their sufficiency as part of your SMS. Each agency’s monitoring processes will reflect their agency’s size and complexity.



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