



# Causal Factors in Safety Investigations (Part 1): Causal Factors and Safety Management Systems

## Overview

The Public Transportation Agency Safety Plan (PTASP) regulation (49 CFR part 673) states that each transit agency must establish activities to “conduct investigations of safety events to identify causal factors” ([§ 673.27\(b\)\(3\)](#)). As defined in the PTASP regulation, an investigation is “the process of determining the causal and contributing factors of an accident, incident or hazard, for the purpose of preventing recurrence and mitigating risk” ([§ 673.5](#)). Investigations are an essential part of an agency’s Safety Management System (SMS), particularly for Safety Risk Management (SRM), Safety Assurance (SA), and Safety Promotion processes.<sup>1</sup>

### Resources

- [Safety Event Investigation in SMS webinar](#)
- [Sample Hazard Classification System](#)

The PTASP regulation defines [events](#) to include [accidents](#), [incidents](#), and [occurrences](#). By investigating all these events – not just the most serious ones – agencies can learn valuable information and implement safety risk mitigations before severe consequences occur. Identifying causal and contributing factors during investigations allows an agency to determine *why* a safety event happened in addition to *what* caused the event and *how* it occurred. Identifying causal factors can highlight deficiencies that the agency can then address to improve safety performance.

## What Are Causal and Contributing Factors?

Causal and contributing factors include key actions, situations, or conditions that led to an event’s occurrence or that increased an event’s effects. Determining causal factors is about more than “at-fault” determinations or establishing whether a safety event was “preventable” or “non-preventable.” In addition to looking at those actions immediately preceding the event, the investigation should examine organizational factors that could have contributed to the event, such as procedures, training, supervision, or resourcing. It may also include analyzing factors related to the operating environment, the natural environment (snow, ice, rain, etc.), or

---

<sup>1</sup> The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies. Grantees and subgrantees should refer to FTA’s statutes and regulations for applicable requirements.

This article was originally published in the [February 2023 issue of the Transit Safety & Oversight Spotlight](#) newsletter.



the condition of infrastructure or equipment. Determination of causal factors will allow the agency to identify actions that can help prevent reoccurrence.

## Causal Factors and SRM

As defined in Part 673, [SRM](#) is the process of “identifying hazards and analyzing, assessing, and mitigating safety risk.” The results of an investigation feed into an agency’s SRM, providing valuable information about both new and known hazards. This information can help prioritize hazards, for example, by showing the increased likelihood of a consequence for a hazard the agency was previously tracking, thus prioritizing the mitigation of the hazard.

## Causal Factors and SA

The identification of causal factors provides an agency with valuable information to support SA activities. The data supports safety performance monitoring and measurement, allowing an agency to determine where issues with compliance or the sufficiency of current operating and maintenance procedures may exist. (See the [SMS Techniques for Monitoring Operations and Maintenance Procedures](#) for more information.) It may also reveal whether and how a recent change in operations may have created a new safety hazard.

## Causal Factors and Safety Promotion

Communicating the causal factors identified during a safety event investigation throughout the agency may help increase awareness of the safety event and promote safety policies or rules that may help prevent or mitigate future events. Furthermore, these communications can highlight the importance of policies and rules and encourage compliance.

An investigation may also identify gaps in training. Depending on identified gaps, the agency may find it necessary to clarify roles and responsibilities or develop training that targets the areas of deficiency that the agency identifies as a causal factor in a safety event.

In Part 2 of this series, we will examine methods for determining causal factors.



### PTASP Technical Assistance Available Now

- Access one-on-one Agency Safety Plan support
- Learn and share through the PTASP Community of Practice
- Explore the PTASP Resource Library

<https://www.transit.dot.gov/PTASP-TAC>