

# Identifying Causal Factors in Safety Event Investigations

March 29, 2023

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



# Objective

At the conclusion of the webinar, participants will be able to

1. Describe PTASP requirements for investigations
2. Define causal factors
3. Describe the purpose of assigning causal factors during a safety event investigation



# Agenda

1. PTASP Requirements for Causal Factor Identification
2. Defining Causal Factors
3. Assigning Causal Factors
4. Industry Speakers
5. Q&A



# Industry Speakers



**Rebecca Frankhouser**

Chief Safety Officer  
Director of Safety, Security, and  
Quality Assurance  
King County Metro



**Raymond Blethen**

Northeast Director of Operations  
First Transit

# Related Resources

Log onto FTA's PTASP TAC Resource Library for more webinars, tools, and fact sheets related to Safety Event Investigations

[www.transit.dot.gov/PTASP-TAC](http://www.transit.dot.gov/PTASP-TAC)

**For information related to the Bipartisan Infrastructure Law,  
visit [www.transit.dot.gov/BIL](http://www.transit.dot.gov/BIL)**



# Feedback

Your feedback helps us deliver the resources and tools that are most relevant to your needs. Based on feedback from the previous webinar surveys, this webinar features:

- Multiple speakers
- Speakers on video
- Expanded industry participation

Please stay tuned for another survey at the conclusion of this webinar!



# Audience Poll



**Do you have experience conducting any of the following activities (select all that apply)?**

- 65%** Determining causal factors
- 63%** Conducting on-scene safety investigations
- 60%** Conducting safety event investigation interviews
- 65%** Testing materials or reviewing data or video recording for safety event investigations
- 64%** Writing safety event investigation reports
- 21%** N/A or none of the above

# Introduction to Causal Factors

49 CFR Part 673 requires transit agencies to develop and implement safety performance monitoring and measurement activities as part of a Safety Assurance process, including:

Conduct[ing] investigations of safety events to identify causal factors  
(§ [673.27\(b\)\(3\)](#))





# Introduction to Causal Factors

49 CFR Part 673 requires transit agencies to develop and implement safety performance monitoring and measurement activities as part of a Safety Assurance process, including:

Conduct[ing] investigations of safety events to identify causal factors  
(§ [673.27\(b\)\(3\)](#))

For more information on safety events, visit the PTASP TAC Resource Library for resources, including a recording of the 2022 [Safety Event Investigation in an SMS](#) webinar



# DEFINING CAUSAL FACTORS



# What is a causal factor?

Although not defined by Part 673, agencies could define causal factors as **key actions, situations, or conditions** that directly led to the event



# Causal Factors vs. Contributing Factors

Although not defined by Part 673, agencies could define contributing factors as actions, situations, or conditions that made the event more likely to occur **or** made the outcome more severe

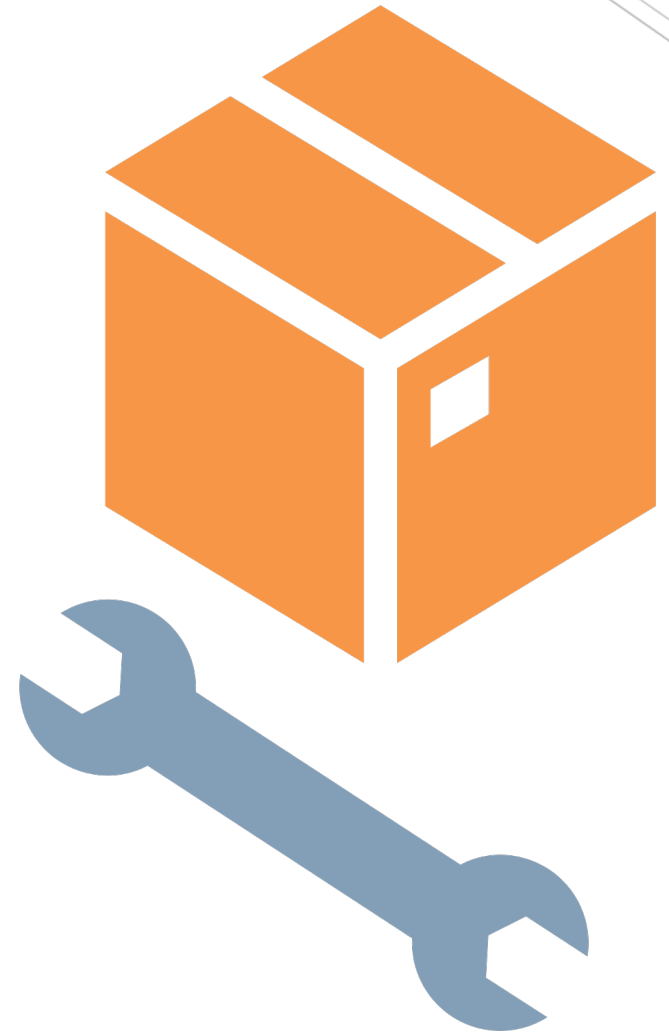
In general, without the **causal factor**,  
the event would not have happened

Without the **contributing factor**,  
the event would have been less likely to occur  
or its outcome would have been less severe



# Example: Causal and Contributing Factors

A worker trips and falls over a tool left on the shop floor while carrying a large box

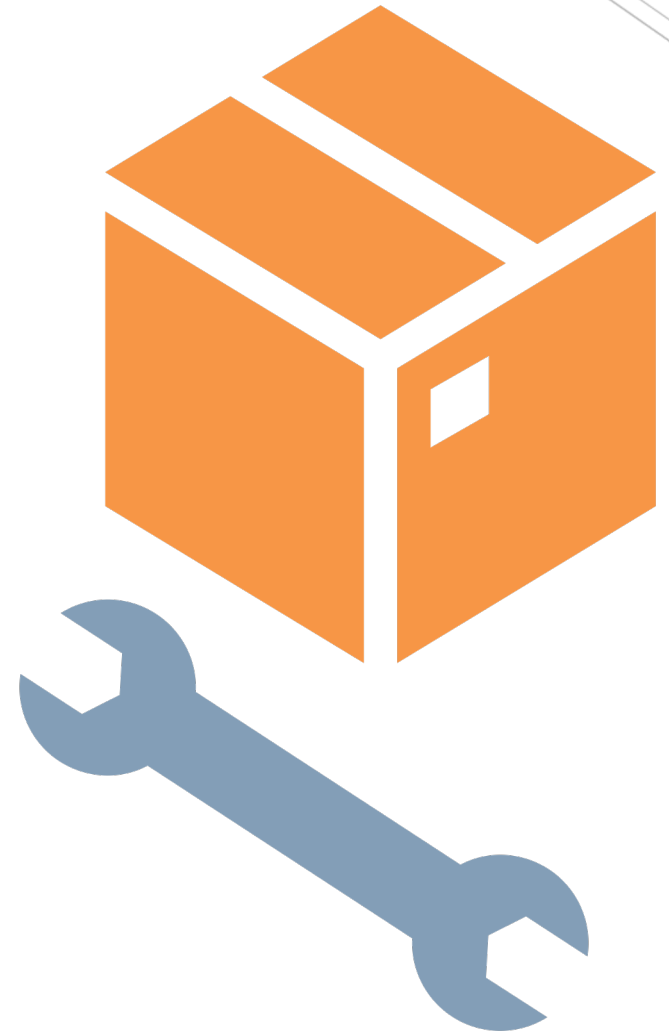


# Example: Causal and Contributing Factors

A worker trips and falls over a tool left on the shop floor while carrying a large box

## What are the factors in this example?

- Tool left on the shop floor
- Large box



# Example: Causal and Contributing Factors

A worker trips and falls over a tool left on the shop floor while carrying a large box

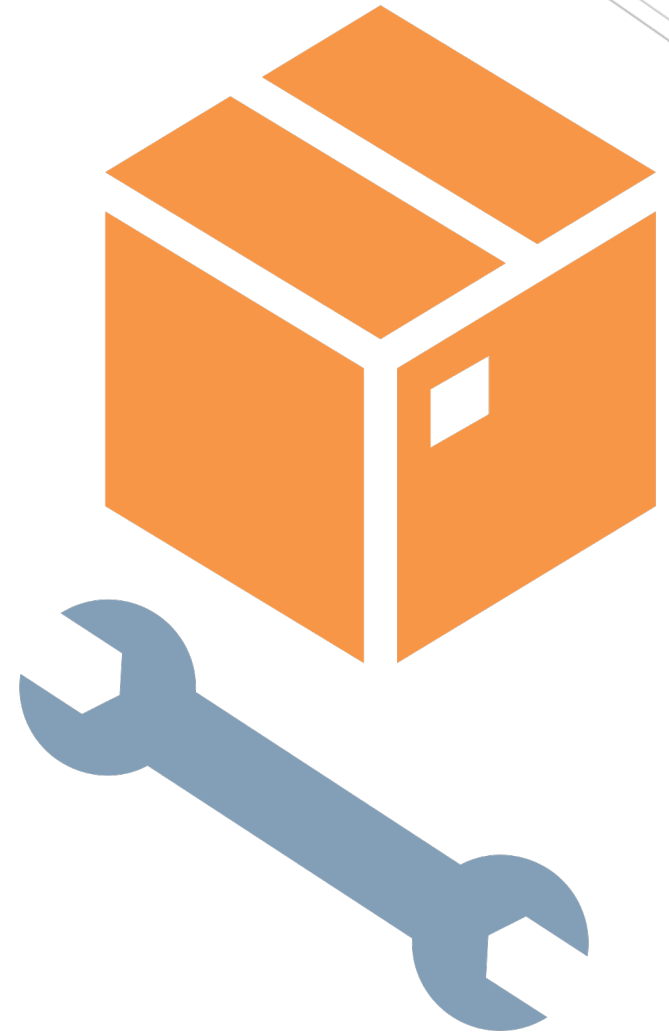
## What are the factors in this example?

- Tool left on the shop floor
- Large box

## How do we tell whether these are causal factors?

The causal factor will be the one that directly resulted in the trip and fall

- there could be more than one causal factor, but let's only consider one for this example





# Example: Causal and Contributing Factors

A worker trips and falls over a tool left on the shop floor while carrying a large box

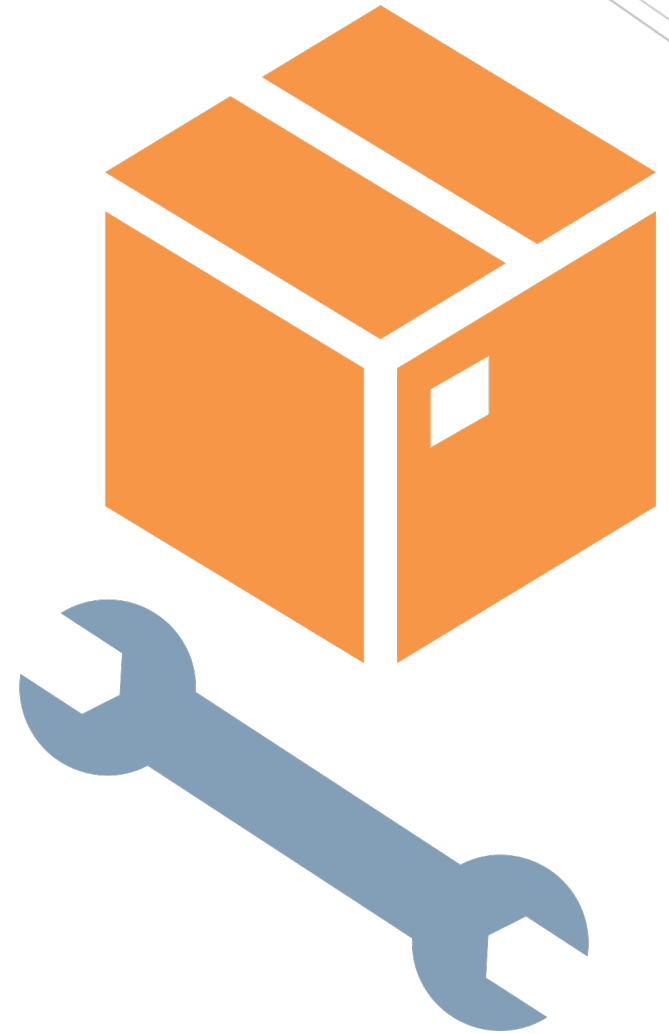
## What are the factors in this example?

- Tool left on the shop floor
- Large box

## How do we tell whether these are causal factors?

The causal factor will be the one that directly resulted in the trip and fall

**Consider the event without each of the factors**



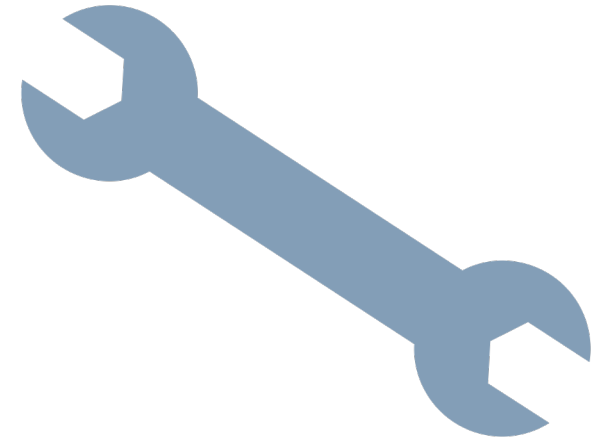


# Example: Causal and Contributing Factors

A worker trips and falls over a tool left on the shop floor while carrying a large box

**What would have happened if the worker was not carrying a large box?**

The worker may still have tripped and fallen over the tool left on the floor



# Example: Causal and Contributing Factors

A worker trips and falls over a tool left on the shop floor while carrying a large box

**What would have happened if tool was not left on the floor?**

The large box, which obscured their vision, made the worker **more likely** to trip, but did not cause them to trip



# Example: Causal and Contributing Factors

A worker trips and falls over a tool left on the shop floor while carrying a large box

**What would have happened if the tool was not left on the floor?**

If the tool was not left on the floor, the worker would not have tripped

The causal factor in this example is directly related to the tool on the floor – this led directly to the safety event



# Example: Causal and Contributing Factors

A worker trips and falls over a tool left on the shop floor while carrying a large box

**What would have happened if the tool was not left on the floor?**

If the tool was not left on the floor, the worker would not have tripped

The contributing factor in this example is related to carrying the large box – this made the safety event more likely to occur



# ASSIGNING CAUSAL FACTORS



# Why do causal factors matter?

Beyond providing information critical to preventing the same event from reoccurring, causal factors are powerful input for Safety Risk Management

Causal factors provide information on hazards, mitigations, etc.



# Causal Factor Categories

Although not required in Part 673, agencies may find it helpful to group their causal factors by broad categories, such as



## Human Factors

*Errors, violations, communication, condition, etc.*



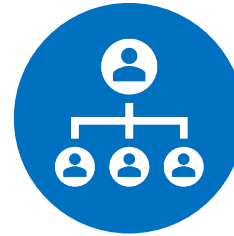
## Equipment and Infrastructure Factors

*Vehicle and infrastructure failures or issues*



## Environmental Factors

*Lighting, weather/visibility, surface conditions, obstructions, etc.*



## Organizational Factors

*Supervision, resource management, organizational processes, etc.*



## External Factors

*Regulatory environment, political/social environment, etc.*

# Audience Poll



## What kind of training have you received on identifying causal factors, if any?

- 41%** Mentioned as part of data collection/analysis/management training
- 53%** Mentioned as part of event investigation training
- 62%** Mentioned as part of Safety Management System training
- 30%** Specific training on identifying causal factors
- 19%** None
- 2%** N/A



# Industry Speakers



**Rebecca Frankhouser**

Chief Safety Officer  
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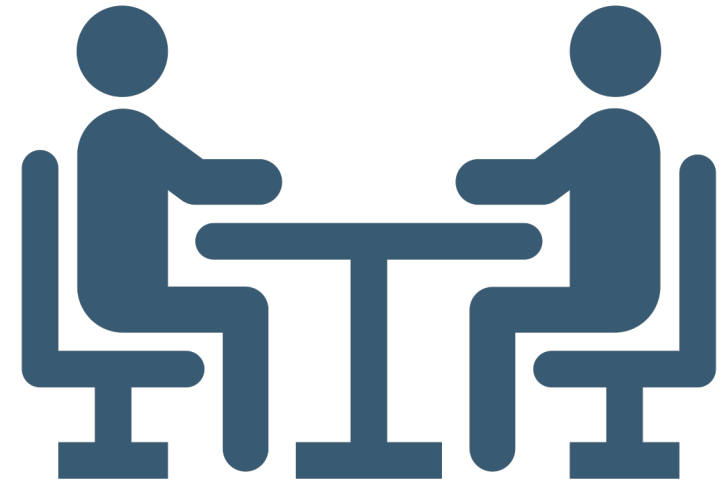
Northeast Director of Operations  
First Transit

# Technical Assistance

- **TAC Website** [transit.dot.gov/PTASP-TAC](https://transit.dot.gov/PTASP-TAC)
- **FAQs** [transit.dot.gov/PTASP-FAQs](https://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](mailto:PTASP-TAC@dot.gov)



# Questions and Answers

- Question and Answer session
- For information related to the Bipartisan Infrastructure Law
  - Please visit FTA's [Bipartisan Infrastructure Law](#) webpage
  - Review FTA's March 1, 2022 [Bipartisan Infrastructure Law webinar](#)
  - Contact [FTA-IIJA@dot.gov](mailto:FTA-IIJA@dot.gov) with your questions related to the Bipartisan Infrastructure Law







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