

Metro Transit Hazard Identification and Risk Assessment Log

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Metro Transit Prioritized Safety Risk Log

HAZARD

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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

ELEMENT
Hazard
Type of Hazard
Identification date
Identification source
Date of analysis
Worst credible potential consequence(s)
Existing mitigations (hard or soft)
Severity of consequences
Likelihood of consequences
Safety risk index
Further Mitigation action
Revised safety risk index

Revised safety risk index date
Department responsbile for mitigation
Estimated implementation date
Contact person
Consequence
Safety performance indicator (SPI)
Safety performance indicator (SPI) value
Safety performance target
Timeframe
Monitoring means
Department responsbile for monitoring mitigation effectiveness

GUIDE TO TERMS

DESCRIPTION

Any real or potential condition that can cause injury, illness, or death; damage to or loss of the facilities, equipment, rolling stock, or infrastructure of a public transportation system; or damage to the environment.

Classification used to help organize identified hazards to support an agency's data management and hazard prioritization activities. The three (3) main types of hazards include: Organizational (shortcomings in the organizational processes), Technical (the condition of the equipment, facilities, and infrastructure), and Environmental (the natural environment).

The date the hazard was identified through agency means. This information can be used for evaluating the effectiveness of safety risk management activities by providing a starting point to see how long the agency takes to analyze and mitigate the hazard.

How the hazard was identified. This information can provide insight into the effectiveness of the safety data sources available to the agency and can help identify items for improvement.

The date the hazard was analyzed. This information can be used for evaluating the efficiency of the analysis process and determine if certain hazards are more challenging to analyze than others.

The effect of a hazard involving injury, illness, or death; damage to or loss of the facilities, equipment, rolling stock, or infrastructure of a public transportation system; or damage to the environment.

The controls already existing within the agency to mitigate the potential consequence(s) of the hazard.

Quantified effect of the potential consequence(s) of the hazard in the delivery of transit services and/or supporting activities, taking into account existing mitigations.

Quantified probability that the potential consequence(s) of the hazard materialize, taking into account existing mitigations. Calendar days, weeks, months, years, or decades are often used as time periods to support assessments of likelihood in safety risk assessment.

Tolerability of the potential consequence(s) of the hazard, taking into account existing mitigations. It is the primary parameter for deciding priorities in the allocation of resources.

Additional controls that the agency needs to incorporate to mitigate the potential consequence(s) of the hazard if the safety risk exceeds tolerability criteria.

Safety risk index that meets the tolerability criteria, following incorporation of additional controls to mitigate the potential consequence(s) of the hazard.

The date the revised safety index was determined. This information can be used to evaluate the efficiency of the analysis process and determine if certain hazards are more challenging to analyze than others.
Agency department (or other subdivision) tasked with the implementation of the additional controls to mitigate the potential consequence(s) of the hazard.
The date the mitigation(s) are expected to be implemented. This information is used to track the completion of mitigations and identify any potential resources or other concerns.
Primary point of contact within the department responsible for mitigation with other departments involved in safety risk management.
Effect of the hazard in the delivery of transit services and/or supporting activities, carried over from safety risk management section.
Parameter selected to monitor and measure the effectiveness of the additional controls incorporated to mitigate the potential consequence(s) of the hazard.
Quantification of the parameter selected to monitor and measure the effectiveness of the additional controls incorporated to mitigate the potential consequence(s) of the hazard.
Projected improvement over the SPI value resulting from the additional controls incorporated to mitigate the potential consequence(s) of the hazard.
Information for evaluating the effectiveness of safety performance monitoring and measurement activities.
Resources and activities to monitor and measure the effectiveness of the additional controls incorporated to mitigate the potential consequence(s) of the hazard.
Agency function primarily tasked with monitoring and measuring the effectiveness of the additional controls incorporated to mitigate the potential consequence(s) of the hazard.

EXAMPLE	
The hazard in FTA's participant guide scenario is the out of calibration wheel balancer.	
FTA's example hazard in the scenario is a technical hazard, as it pertains to an agency's equipment, rolling stock, infrastrucure, and facilities.	
In FTA's scenario, the hazard was identified by a safety specialist upon reviewing the Safety Event Investigation Report.	
The worst credible potential consequence for the hazard in FTA's scenario is a collision resulting in death, permanent injury, or destruction of property, with damage (losses over \$1,000,000).	
Pre-Trip Inspection: Bus operators are required to check tires for excessive wear as part of their pre-trip inspection.	
Routine Bus Maintenance and Inspections: Tires are inspected and replaced as part of the agency's regular maintenance and inspection program.	
Wheel Balancer Calibration: SOP governs the calibration of the wheel balancer.	
In FTA's scenario, the severity was identified by looking at historical data from the agency.	
Combining the likelihood and severity of the potential consequence results in a risk rating.	

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Risk Assessment Matrix (RAM)

Identified Hazard:

Consequences					
Severity	People	Assets	Environment	Reputation	1
					Practically impossible (never heard of in the industry)
1	First aid or no injury	No/Slight damage	No/Slight effect	No/Slight impact	Low
2	Slight injury, medical treatment	Minor damage	Minor effect	Limited impact	Low
3	Serious injury, hospitalization more than 7 days	Moderate damage	Moderate effect	Local area impact	Low
4	Permanent total disability, or one fatality	Major damage, unit level	Major effect	Major statewide impact	Low
5	Multiple fatalities	Major damage, multiple units	Massive effect	Major national impact	Medium
Risk Value:					

	Low Risk, continuous improvement	Assessed Risk Level
	Medium Risk, monitor and control	
	High Risk, unacceptable/intolerable, immediately introduce further control measures	

Instructions

1. Estimate potential consequences and severity (thought of as what could happen if hazard actually occurred)
2. Estimate likelihood of such consequences occurring (using historical evidence, data and experience)
3. Multiply the severity for each consequence by the likelihood of that consequence occurring. This is the risk value.
4. Sum the risk values for a total assessed risk level (out of 100)



Likelihood			
2	3	4	5
Remote, not likely to occur	Could occur, or heard of it happening	Likely, known to occur or has happened before	Common, or occurs frequently
Low	Low	Low	Medium
Low	Medium	Medium	High
Low	Medium	High	High
Medium	High	High	High
Medium	High	High	High

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Safety Risk Assessment Matrix

Severity Categories

Description	Severity Category	Criteria
Catastrophic	1	Could result in one or more of the following: Death Multiple serious injuries requiring hospitalization Irreversible environmental impact Monetary loss equal to or exceeding \$1,000,000
Critical	2	Could result in one or more of the following: Serious injury requiring hospitalization Reversible significant environmental impact Monetary loss equal to or exceeding \$250,000 but less than \$1,000,000
Marginal	3	Could result in one or more of the following: Injury requiring medical treatment beyond first aid that may result in one (1) or more lost work day(s) Reversible moderate environmental impact Monetary loss equal to or exceeding \$10,000 but less than \$250,000
Negligible	4	Could result in one or more of the following: Injury requiring first aid Minimal environmental impact Monetary loss less than \$10,000

Safety Risk Assessment

Likelihood Levels

Description	Level	Individual item
Frequent	A	Likely to occur often in the life of an item.
Probable	B	Will occur several times in the life of an item.
Occasional	C	Likely to occur sometime in the life of an item.
Remote	D	Unlikely, but possible to occur in the life of an item.
Improbable	E	So unlikely, it can be assumed occurrences may not be experienced in the life of an item.

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System or Vehicle Fleet
Continuously experienced. Potential consequence may be experienced more than once in 40,000 vehicle revenue miles (VRM).
Will occur frequently. Potential consequence may be experienced once per 40,000 to 480,000 VRM.
Will occur several times. Potential consequence may be experienced once per 480,000 to 4,800,000 VRM.
Unlikely but can reasonably be expected to occur. Potential consequence may be experienced once per 4,800,000 to 14,400,000 VRM.
Unlikely to occur, but possible. Potential consequence may be experienced less than once per 14,400,000 VRM.