



The Role of Data in Safety Risk Assessment

Safety risk assessment is a process that includes determining the likelihood and severity of a potential consequence of a hazard (PTASP, 49 CFR § [673.25\(c\)\(2\)](#)). A thorough risk assessment includes the ability for an agency to consider existing mitigations to ascertain if a safety risk is adequately addressed or if additional action is necessary. Safety risk assessment supports decision-making and helps an agency prioritize hazards and mitigations based on safety risk.¹

Likelihood is how often one might expect the potential consequence to happen. Depending on the availability of information, one can assess likelihood in multiple ways (e.g., per year, per vehicle revenue miles [service provided], per specific occurrence [e.g., wheelchair lift deployments, door openings, etc.], or per hours of operation).

Severity is how serious the effects of the potential consequence may be. Severity can be assessed in multiple ways (e.g., death; injury; illness; loss of service; damage to or loss of facilities, equipment, etc.; damage to the environment).

For example, when reviewing a near-side bus stop hazard, an agency may be interested in the potential consequence of a car colliding with a bus as it pulls out of the near-side bus stop. The agency could then use service data to determine the likelihood of this occurring. Data may be available to show how often buses use that stop and how often collisions occur at near-side bus stops with similar service characteristics. The last piece of information needed for the risk assessment would be to determine the **severity** of these incidents, perhaps using injury data from similar events.

Related Resources

- Safety Risk Assessment in Practice: [Presentation](#) | [Recording](#)
- Implementing Safety Risk Assessment Approaches: [Presentation](#) | [Recording](#)
- [Safety Risk Management for Bus Transit Providers](#)
- [Safety Risk Management for Rail Transit Providers](#)
- [PTASP Hazards and Consequences Self-Guided Learning Tool](#)

¹ 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.

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Data and Safety Risk Assessment

Data is a critical building block in a successful safety risk assessment process. Data helps determine which potential consequence(s) of a hazard to assess based on data trends and helps to determine likelihood and severity. In addition to the quantitative analysis described above, an agency may consider qualitative data in its risk assessment process.

Quantitative data refers to any information that can be quantified, counted, measured, and given a numerical value. **Qualitative** data is descriptive and expressed in terms of language rather than numerical values. Quantitative data can be used to narrow down severity or likelihood to percentage-point accuracy but doesn't necessarily reveal the context of the data. Qualitative data can leverage subject matter expertise to provide context from operations and maintenance perspectives, but it does not generally provide percentage-point accuracy.

One can strengthen the safety risk assessment process by: (1) combining quantitative data to narrow down severity and likelihood, and (2) using qualitative data to interpret how the quantitative data should be applied to the specific potential consequence. In the earlier example, the near-side bus stop hazard, an agency could determine likelihood by using service data to determine how often buses use that stop (quantitative data). The agency could also interview and observe operators who regularly service that location or interview road supervisors who are familiar with the bus stop in various conditions and times of day (qualitative data).

Through these two types of data, the agency has a more complete picture of the potential consequences and can better determine next steps.

Sources of Data for Safety Risk Assessment

- Sources of quantitative data include employee reports and maintenance or operations information systems.
- Sources of qualitative data include subject matter expertise (e.g., employees, industry association, etc.) and information provided by FTA.



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>