



U.S. Department
of Transportation

**Federal Transit
Administration**

SA-24-2

Safety Advisory

11/25/2024

Office of Transit Safety and Oversight
Washington, DC

Subject: Street-Running Rail Vehicle Collisions

Purpose: The Federal Transit Administration (FTA) has determined that street-running rail operations pose a heightened risk of safety incidents, given that rail vehicles operate in and among other roadway users, including privately-owned vehicles (POV), pedestrians, and bicyclists. Accordingly, FTA is issuing Safety Advisory 24-2 (SA 24-2) to recommend that State Safety Oversight Agencies (SSOAs) direct Rail Transit Agencies (RTAs) operating street-running rail systems in their jurisdictions to incorporate analysis of collisions involving street-running rail vehicles with POVs or persons in shared rights-of-way (ROW) into their Safety Risk Management (SRM) processes. In addition, FTA recommends that SSOAs incorporate an evaluation of the RTAs' mitigation of street-running rail vehicle collisions into their oversight activities. FTA is issuing this Safety Advisory to address fatalities and injuries caused by street-running rail vehicle collisions.

Background: FTA conducted an industry-wide survey, which revealed that the number of incidents reported at street intersection grade crossings was about ten times higher than the number of incidents reported at conventional grade crossings.¹

For this safety advisory, street-running rail vehicle collisions include any collision between a light rail, streetcar, hybrid rail, or cable car vehicle and the following:

- POV at traditional rail grade crossings (RGXs) or within shared ROW street intersections; and
- Persons outside a motor vehicle, including pedestrians, bicyclists, and people using micro-mobility devices, at traditional RGXs, street intersections, crosswalks within stations, and rail ROWs in pedestrian malls.²

An FTA review of National Transit Database (NTD) data from 2015 through 2023 shows³ that there were 2,316 reported street-running rail vehicle collisions that met the above criteria, including:

¹ [FTA Standards Development Program: Rail Transit Roadway/ Pedestrian Grade Crossing Exploratory Report, May 2022.](#) (A total of 1,134 incidents were reported; of these, 137 were conventional grade crossings.)

² Persons trespassing on exclusive rail right-of-way are excluded from this safety advisory and analysis.

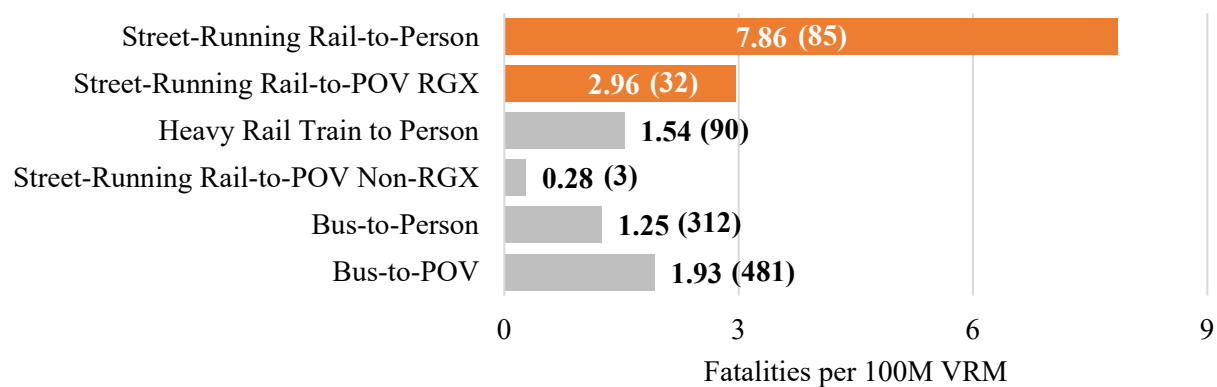
³ Fatality and injury numbers include all people associated with a collision, including those on the transit vehicle or elsewhere. These rail-to-person and rail-to-POV at RGX events do not include collisions where the probable cause was determined to be suicide or a rules violation or collisions that did not result in a fatality, injury or significant property damage but otherwise met NTD reporting requirements. Suicides, rules violations, and human factors were treated as separate topics with potential for future risk assessment.

- 581 reported rail-to-person collisions, resulting in 85 fatalities and 501 injuries
- 1,735 reported rail-to-POV collisions at RGX, resulting in 32 fatalities and 1,293 injuries

As shown in Figure 1 below, FTA identified that street-running rail vehicle collisions result in fatalities at a much higher rate than other frequently reported collision types across all modes included in NTD data. NTD data analysis from 2015 to 2023 of frequently-reported collision types shows the following rates of fatalities for street-running rail vehicle collisions:

- 7.86 fatalities per 100 million (100M) vehicle revenue miles (VRM) for street-running rail-to-person collisions (85 fatalities)
- 2.96 fatalities per 100M VRM for street-running rail-to-POV at RGX collisions (32 fatalities)

Figure 1: Rate of Resulting Fatalities for Frequently-Reported Collision Types, CY 2015–2023



Data as of: August 16, 2024

Source: NTD and State Safety Oversight Reporting (SSO)

2023 data is preliminary. Total fatalities included in parentheses.

The U.S. Department of Transportation adopted the [Safe System Approach](#), which emphasizes that transportation systems can and should be designed and operated to accommodate human mistakes. An analysis of the reports submitted to FTA following street-running rail grade crossing collisions shows that a significant percentage of collisions involve failures by POVs or persons to recognize, comprehend, or adhere to existing traffic signals and other roadway controls.

FTA reviewed 64 reports of rail-to-person and 214 reports of rail-to-POV collisions at rail grade crossings between 2020 and 2022.⁴ This review revealed that 97% of the rail-to-person and 90% of rail-to-POV collisions involved causal factors where POV or persons failed to adhere to the intended roadway design; specifically, 77% of the rail-to-POV collisions occurred at grade crossings with traffic signals as the sole control device. From 2015 to 2021, 47% of rail-to-person collisions at rail grade crossings occurred where traffic signals were the main traffic control device.

Additionally, FTA's review showed that fatalities resulting from street-running rail vehicle collisions greatly increase when the rail vehicle is traveling at a speed greater than 30 miles per

⁴ SSOA investigation reports

hour (MPH). NTD data from 2015 to 2023 show that collisions involving street-running rail vehicles traveling at speeds greater than 30 MPH resulted in 47% of fatalities in street-running rail-to-person collisions (40 fatalities) and 63% of fatalities in street-running rail-to-POV at RGX collisions (20 fatalities).

The Safe System Approach emphasizes that redundancy is critical. While RTAs cannot control the behavior of people and POVs, there are many factors that RTAs are able to influence to reduce collisions. Research indicates that street-running rail collisions may occur due to factors such as the perception of signage at complicated intersections, absence of barriers, or signal timing.⁵ RTAs can work within their right of way and with other governmental entities to mitigate these factors to reduce the frequency and severity of collisions in high-risk sections of the track.

Recommended Action: In order to mitigate the risk posed to public transportation by street-running rail systems, FTA recommends that SSOAs direct RTAs operating street-running rail systems in their jurisdictions to conduct an analysis of street-running rail collisions through the RTAs' Safety Risk Management processes and report completed safety risk assessments and proposed and implemented safety risk mitigations back to the SSOAs. Additionally, FTA recommends that SSOAs direct RTAs to conduct risk assessments of street-running rail collisions on a regularly scheduled and ongoing basis as part of their Safety Management System.

FTA requests that SSOAs that obtain such analyses from their RTAs upload completed safety risk assessments and associated safety risk mitigations from their RTAs to the [State Safety Oversight Reporting \(SSOR\)](#) system. FTA requests that any documents be uploaded within 180 days from the issuance of this Safety Advisory.

FTA is authorized to request this information in accordance with the clearance requirements of the Paperwork Reduction Act of 1995. The Office of Management and Budget Control Number for this collection is OMB #2132-0585.

FTA recommends that SSOAs directing their RTAs to develop safety risk assessments for street-running rail vehicle collisions suggest their RTAs consider the below factors:

1. Locations with higher risk for street-running and at-grade crossing rail vehicle collisions within the system
2. Roadway and intersection design, including:
 - a. Exclusive, semi-exclusive, and shared rights-of-way (ROWs),
 - b. Locations that allow turns through rail ROW,
 - c. Sight distances,
 - d. Speed limits; and
3. Queueing space for both POVs and persons
4. Roadway and intersection traffic control devices, including:
 - a. Roadway treatments,
 - b. Fixed signage,
 - c. Signals; and

⁵ [TCRP Synthesis 79: Light Rail Vehicle Collisions with Vehicles at Signalized Intersections \(2008\) Chapter 2](#)

- d. Active warning devices.
5. Factors that may cause signals and other warning methods to be ineffective in encouraging safe behavior around RGX, such as:
 - a. Distractions for POVs and others interacting with the ROW;
 - b. Inadequate placement of roadway markings, barriers, signage, and signals;
 - c. Signal timing that may be inadequate for drivers, pedestrians, bicyclists, or people using micro-mobility devices;
 - d. Signals and/or signage in the aggregate that may be confusing or too much to consider in the time available to comprehend their meaning; and
 - e. Information shared through navigation technologies.

Resources: FTA recommends that SSOAs share with their RTAs operating street-running-rail in their jurisdictions that FTA has developed and identified resources that may assist RTAs with identifying mitigations for street-running rail vehicle collisions. These resources are available on the [FTA Safety Risk Management website](#) and [Public Transportation Agency Safety Plan \(PTASP\) Technical Assistance Center](#).

Contact: Please direct questions or comments regarding this Safety Advisory to Ivey Glendon, Safety Assurance and Risk Management Division Chief, Office of Transit Safety and Oversight, FTA, 1200 New Jersey Avenue, SE, Washington, DC 20590, telephone (202) 366-3236, or Ivey.Glendon@dot.gov.