



Issued: February 28, 2023

Railroad Investigation Report: RIR-23/02

Passenger Fatality

Bay Area Rapid Transit

San Francisco, California
September 13, 2021

1. Factual Information

1.1 Accident Description

On September 13, 2021, about 3:13 p.m. local time, a Bay Area Rapid Transit (BART) passenger was dragged and killed as BART train 511 was departing the Powell St. Station in San Francisco, California.¹ About 3:12 p.m., the passenger and a leashed canine boarded railcar 1599, the ninth railcar of the 10-railcar train, at the Powell St. Station. The canine's leash was attached to a backpack the passenger was wearing. Seconds before the train's departure, the passenger exited the railcar onto the platform while the leashed canine remained on the train. The side passenger train doors (doors) closed on and pinched the canine's leash.² The train then departed the Powell St. Station. Surveillance video reviewed by National Transportation Safety Board (NTSB) investigators showed that the accident passenger attempted to open the railcar door and then attempted to free herself from the leash. Both attempts were unsuccessful, and the passenger, still attached to the leash, was dragged along the platform by the train

¹ (a) For more detailed information about this investigation, see the public docket at <https://data.nts.gov/Docket/Forms/searchdocket> and search for number RRD21LR015. Use the [CAROL Query](#) to search safety recommendations and investigations. (b) All times in this report are local time unless otherwise noted.

² (a) The accident door numbers of railcar 1599 were #5/7. (b) The railcar doors are designed to automatically reopen if the door circuitry detects obstructions of 0.75 inches or greater. The canine's leash was thinner than 0.75 inches.

and collided with the gate at the end of the platform. (See figure 1.) The canine was not injured.

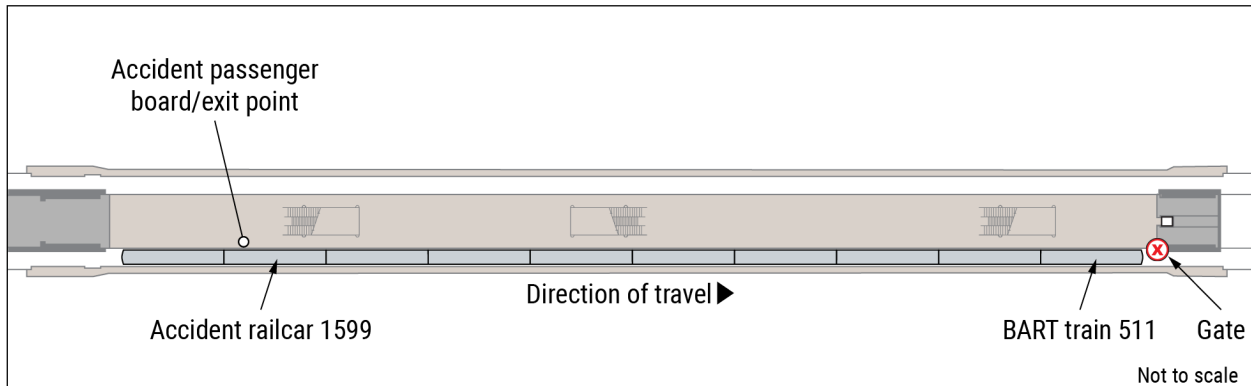


Figure 1. Diagram of BART Powell St. Station platform at the time of the accident.

1.2 Before the Accident

The operator of BART train 511 went on duty about 6:45 a.m. on September 13, 2021. In interviews with NTSB investigators, the train operator stated that he boarded his train at the 24th Street Station that afternoon. The operator told investigators he conducted a standard train and equipment check before taking control of the train and found no issues.³ The train left 24th Street Station about 3:06 p.m. in the direction of the Powell St. Station.

The Powell St. Station manager told NTSB investigators that at the time of the accident she was able to view closed-circuit video of the station's elevator and parts of the platform but that she did not see the accident happen. The station manager stated that the Powell St. Station was usually busy because it was downtown near a shopping mall and added that the day of the accident was a normal, busy day.

NTSB investigators' examination of surveillance video from the Powell St. Station shows the train operator performing the required look-back procedure from the side operating cab window while closing the doors on the train.⁴ (See section 1.6 for more details on the look-back procedure.) The video further shows that, as the train operator pulled his head back into the operating compartment through the side window, the accident passenger began to struggle with a door on the ninth railcar of the train.

³ BART standard equipment checks include tests of door operation, brakes, and communications equipment, as detailed in the *BART Train Operator Manual*.

⁴ In a *look-back procedure*, the train operator conducts a visual check of the station platform and train car doors before departing the station.

1.3 Train Operator

The train operator underwent a pre-employment physical evaluation in June 2019 and was hired in July 2019. He completed train operator certification in November 2019. BART training records indicated that the operator completed refresher operator skills training in March 2020 and recertification in July 2021.

In an interview with NTSB investigators, the train operator stated he was well-rested on the day of the accident. He stated that, before BART train 511's departure from the Powell St. Station, the "yellow strip" (the yellow tactile safety strip at the edge of the train platform) appeared to be clear of passengers. The operator also stated that the train's external trouble lights were not on when he departed the station.⁵

The NTSB's examination of BART operational efficiency testing records for the train operator did not identify any history of rule violations or disciplinary actions.⁶

1.4 Toxicology and Autopsy Results

1.4.1 Train Operator

Postaccident toxicological testing of the train operator for alcohol and other drugs did not identify any tested-for substances.⁷

1.4.2 Accident Passenger

Peripheral blood testing of the accident passenger was conducted by the City and County of San Francisco Office of the Chief Medical Examiner and was positive for methamphetamine, cocaine, and fentanyl. Those substances were also detected in urine, and metabolites of those substances were detected in blood and urine.

⁵ *External trouble lights* are door indicator lights in the operating cab that illuminate when doors are open.

⁶ BART's efficiency testing program is detailed in its *Operations Safety Compliance Plan: Transportation Department*, March 2018.

⁷ In accordance with 49 *CFR* 40.85, and as detailed in 49 *CFR* 40.87, the train operator underwent a postaccident urine drug test for marijuana metabolites, cocaine metabolites, amphetamines, opioids, and phencyclidine, as well as a postaccident alcohol breath test.

An autopsy of the passenger was conducted by the City and County of San Francisco Office of the Chief Medical Examiner. According to the autopsy report, the cause of death was multiple blunt force injuries, and the manner of death was accidental.

1.5 Cell Phone Usage

NTSB investigators reviewed video of the train operator and accident passenger at the time of the accident. Neither was using a cell phone.

1.6 Look-Back Procedure

According to BART's operating rules, operators are directed to make sure the platform is clear and that all passengers have boarded and off-boarded safely. Operators must check that the trackway and platform in front of the train are clear before closing the doors, still watching the platform. Then, operators must ensure that the trouble lights go out and must continue to watch the platform as the train begins to move to verify all passengers are clear of the doors and side of the train. Operators must also recheck in front of and alongside the train for obstacles or unusual conditions before bringing their heads inside the operating compartment and returning to their seats.⁸

1.7 Postaccident Examinations, Observations, and Tests

1.7.1 On-Site Examinations and Observations

On September 15, 2021, NTSB investigators examined the Powell St. Station and nearby stations and an exemplar train at the Powell St. Station. During these examinations, investigators measured the distance from the operator's window to the accident doors of railcar 1599 as 611 feet.

NTSB investigators completed sight distance observations from the exemplar train and observed unobstructed sight lines of the yellow tactile strip on both platform edges along the entire length of the train at the Powell St. Station. Walking conditions on the platform were regular, even, and free of obstructions. During these observations, the operator of the exemplar train said that he used the yellow tactile strip as a visual aid to determine whether passengers were too close to the train.

⁸ BART Operating Rule 215, 310.

NTSB investigators also observed that ambient lighting conditions at the Powell St. Station at the time of the accident reduced the conspicuity of activity toward the far end of the platform.

1.7.2 Mechanical Tests

Railcar 1599 was removed from service and taken to the BART mechanical facility in Concord, California, for postaccident tests. NTSB investigators observed that functional tests of doors #5/7 on railcar 1599 showed proper operation and that the operating cab controls of the door open and close systems also operated as designed.⁹

NTSB investigators also conducted postaccident tests of the external trouble lights on BART train 511. The trouble lights functioned properly.

1.8 Postaccident Actions

At the time of the accident, BART was in the process of replacing the platform lighting at the Embarcadero, Montgomery, Civic Center, and Powell St. stations with LED lighting, an upgrade from the original lighting. BART was also in the process of repainting the walls of the station platform areas a brighter color. The lighting and painting improvements at the Powell St. Station were completed in July 2022. These actions increased the illumination of the environment, improving visibility for operators performing the look-back procedure at their stations. (See figures 2 and 3.) BART is procuring more replacement lights and expects to complete lighting improvements at the 16th St. and 24th St. stations by spring 2023.

⁹ (a) The door test procedures observed by NTSB investigators included a door 0.75-inch rod safety check; side door operation, loose, chattering, biding open/close timing; and a side door preload check. (b) The operating cab door control tests included the operation of the "close door" button from the lead control cab, the "door closed" indicator from the operator's control stand, and that the door circuit bypass switch was in the proper position, sealed, and untampered with.



Figure 2. Powell St. Station platform before completion of lighting improvements.



Figure 3. Powell St. Station platform after completion of lighting improvements.

Starting in November 2021, BART placed 200 posters in train railcars describing their rules for passengers traveling with service animals and pets and added details to the BART webpage that communicates these rules.¹⁰ A safety advisory message communicating the information also appears on platform digital signs at all 50 BART stations during operating hours.

¹⁰ See www.bart.gov/pets.

2. Analysis

In this accident, a BART passenger connected to her canine by a leash attached to her backpack was dragged and killed as BART train 511 was leaving the Powell St. Station in San Francisco, California. Seconds before the train's departure, the passenger exited the railcar onto the station platform while the leashed canine remained on the train. The passenger doors closed onto the leash, and as the train departed, the passenger was dragged along the station platform and collided with a gate at the end of the platform.

2.1 Passenger

Based on postmortem toxicology results, it is likely that the passenger was experiencing at least some impairing effects of substance use at the time of the accident. However, NTSB investigators found no clear evidence that impairment played a role in the circumstances of the accident. Thus, the NTSB did not determine whether the impairing effects of substance use contributed to the accident.

2.2 Train Operator and the Powell St. Station

Examination of surveillance video shows the train operator followed BART's operating procedures requiring him to look for passengers before departing a station. The operator did not see the passenger, who was struggling with the railcar doors 611 feet away, or the canine's leash trapped between the doors.

Postaccident sight distance observations conducted by NTSB investigators at the Powell St. Station revealed that dim ambient lighting conditions present in the station platform area at the time of the accident reduced the conspicuity of passenger activities toward the far end of the station platform. Specifically, the lighting conditions likely made it difficult for the train operator to reliably monitor and evaluate passengers exiting and entering the rear of the train at the platform when the operator performed his look-back procedure. BART has since completed lighting and painting improvements at the Powell St. Station and other nearby stations, increasing visibility for train operators. BART also has widely distributed an awareness campaign to educate passengers on safe travel practices with service animals and pets.

3. Probable Cause

The National Transportation Safety Board determines that the probable cause of the September 13, 2021, passenger fatality was the closure of the side passenger doors of the ninth railcar from BART train 511 onto a canine leash attached to the passenger's backpack, leaving her tethered to the train as it departed the Powell St. Station and

dragging her along the station platform, resulting in her collision with a gate at the end of the platform.

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)).

For more detailed background information on this report, visit the NTSB investigations website and search for NTSB accident ID RRD21LR015. Recent publications are available in their entirety on the NTSB website. Other information about available publications also may be obtained from the website or by contacting—

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