Issued: April 22, 2026 Railroad Investigation Report: RIR-26-05

Southeastern Pennsylvania Transportation Authority End-of-Track Collision

Location	Norristown, Pennsylvania
Date	May 11, 2025
Accident type	End-of-track bumping post collision
Train	Single railcar light rail vehicle 153
Crew and passengers	1 operator 15 passengers
Track	Transit track, signalized
Fatalities	0
Injuries	10 minor, including the operator; 2 serious
Property damage	$920,000

1 Factual Information

1.1 The Accident

On May 11, 2025, at 9:45:15 a.m., northbound Southeastern Pennsylvania Transportation Authority (SEPTA) light rail vehicle (LRV) 153 operating on the M Line collided with an end-of-track bumping post on track 1 at the Norristown Transportation Center Station (Norristown Station) in Norristown, Pennsylvania.[1] (See figure 1.) LRV 153 consisted of a single powered railcar. There were 15 passengers and 1 operator on board at the time of the accident. Nine passengers and the operator sustained minor injuries; two passengers were seriously injured. SEPTA estimated damage to equipment to be about $920,000. At the time of the accident, visibility conditions were clear and sunny; the weather was 68°F with no precipitation.

[1] (a) Visit ntsb.gov to find additional information in the public docket for this National Transportation Safety Board (NTSB) accident investigation (case number RRD25FR012), including detailed factual reports about the circumstances of the accident. (b) All times in this report are local.

Figure 1. Damaged end of LRV 153 (left) and aerial view of accident scene (right).

The operator of LRV 153 reported for duty at 4:56 a.m. at the 69th Street Transportation Center (69th Street Station) on the day of the accident and began his first trip of the day at 5:03 a.m. on the M Line. The operator completed two round trips on the M Line between 69th Street Station and Norristown Station before the accident. When interviewed by the National Transportation Safety Board (NTSB), the operator did not report anything unusual about these trips. Based on event recorder data, both times LRV 153 approached Norristown Station, the operator applied brakes 12–15 seconds before the desired stop, reduced speed to below 5 mph, and stopped the LRV short of the bumping post at the end of the track.

SEPTA's timetable instructions for the area require northbound operators to stop on the bridge at the end of a track circuit about 1,100 feet from the end of track 1 and obtain permission from the dispatcher in the Operations Control Center before proceeding.[2] Once operators have obtained permission to proceed, they must press an override button before the automatic train control (ATC) system will allow the LRV to

[2] A *track circuit* is an electrical circuit created, in part, by the running rails. Track circuits are used to detect trains and control signals.

continue toward the turnout and signal 1N, the northmost signal on the M Line.[3] This signal is about 380 feet from the end of track 1 as shown in figure 2.

Figure 2. Signal 1N and final approach to Norristown Station platform.

Shortly before the accident, the LRV 153 operator stopped on the bridge and obtained dispatcher permission to proceed. He began his approach to the station at 9:43:44 a.m. During this movement, LRV 153 reached a maximum speed of 13 mph, and the event recorder showed the operator using master controller positions P1 and P2.[4] When the LRV passed the departure signals south of the platform, its speed remained steady at 11 mph with the event recorder showing the master controller in position P2.

[3] (a) *Automatic train control*, or ATC, refers to a family of technologies that transit operators use to supplement human operation of rail vehicles. ATC systems vary widely in design and capability, but they typically enforce signal indications and speed limits to maintain train separation. The ATC system used by SEPTA on the M Line is discussed below in section 1.4.2. (b) This procedure follows rule RDR-353 from SEPTA Rail Operation Division Rules Manual, 4th Edition, effective November 4, 2018.

[4] (a) The maximum authorized speed in the area was set by timetable at 15 mph. (b) A *master controller* is a combined throttle and brake control. On the type of LRV involved in this accident, the master controller is a lever with throttle positions P1–4 and brake positions B1–7 plus Emergency (maximum braking effort). (c) Postaccident tests of the event recorder on LRV 153 found that the master controller's positions P3 and P4 were being recorded as P2.

The event recorder did not record a brake application or other control manipulations before the collision with the bumping post at 9:45:15 a.m. The LRV's final movement is summarized in figure 3.

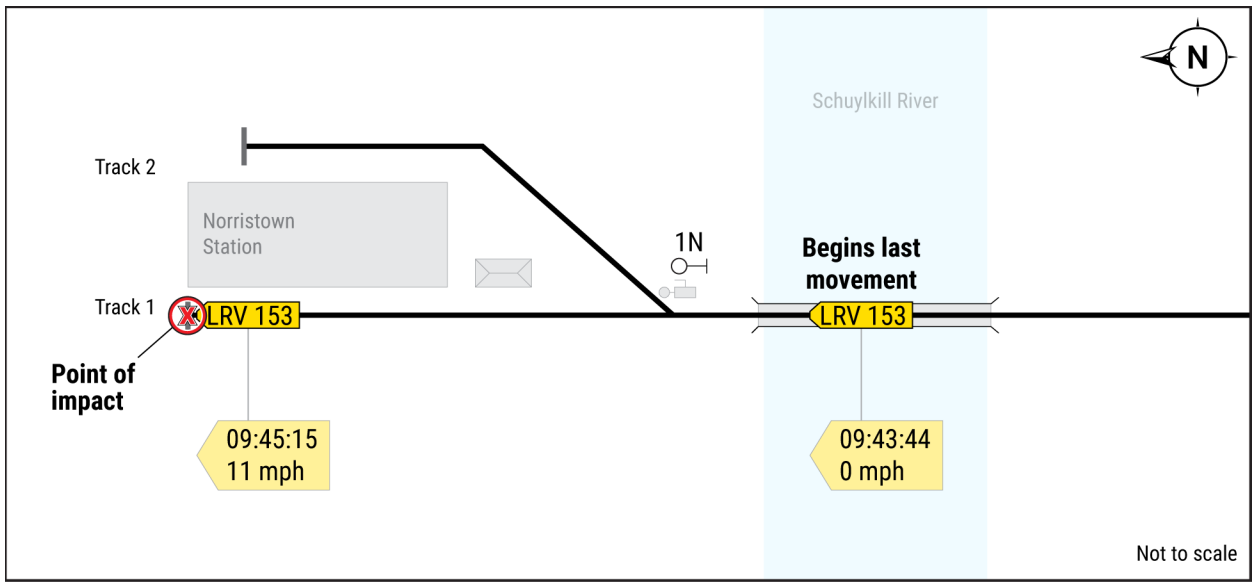

Figure 3. Diagram of LRV153's final movement.

Immediately after the collision, LRV 153 went into emergency and began to move backward from the bumping post.[5] The operator then put the master controller in the B7 position, the maximum service brake setting, and the LRV came to a complete stop at 9:45:18 a.m.

The first reports of the collision went to the Montgomery County Emergency Communications Center and SEPTA dispatch 3 minutes after the collision. Montgomery County received the first 9-1-1 call from an unknown person on the train or platform at 9:48 a.m. and several additional calls over the next few minutes. Montgomery County did not receive detailed information about the emergency from the 9-1-1 calls or SEPTA before personnel from the Norristown Fire Department reached the scene at 9:54 a.m. The firefighters requested additional resources because of the number and severity of injuries at 9:57 a.m. Medical transportation for injured victims began at 10:23 a.m. Emergency responders' initial contact with SEPTA at the scene occurred when they

[5] An *emergency braking application* uses all available braking force to stop a train as quickly as possible. An emergency brake application can occur for several reasons, including accidental movement of the master controller, deliberate control inputs, or automatic protective systems. The event recorder did not indicate how the emergency brake application occurred in this collision.

sought out the operator to confirm that the LRV was stationary and would not pose a hazard. A station manager was not present on the day of the accident.

The first communication to SEPTA about the collision was a phone call to SEPTA dispatch from an off-duty SEPTA maintenance manager; the manager said that another SEPTA maintenance employee had seen LRV 153 collide with the bumping post. The call did not report injuries. The LRV 153 operator called SEPTA dispatch about 9:50 a.m., reported passenger injuries, and requested an ambulance. The operator did not clearly specify a number of injuries. Train service in the area continued during the initial response, with another LRV pulling into Norristown Station and offloading passengers at 10:03 a.m. The Norristown Fire Department contacted SEPTA to request discontinuation of train service when that LRV arrived. The Norristown Police Department made the same request at 10:20 a.m. SEPTA internally confirmed discontinuation of train service at 10:29 a.m.

1.2 SEPTA and the M Line

SEPTA is a public transit agency serving the greater Philadelphia area with bus and fixed guideway transportation modes. Its fixed guideway operations include various trolley and light rail services regulated by the Federal Transit Administration (FTA) and commuter rail operations regulated by the Federal Railroad Administration.

SEPTA's M Line, where the collision occurred, is regulated by the FTA and overseen by the Pennsylvania Department of Transportation State Safety Oversight Program, a state safety oversight agency whose role is defined in Title 49 *Code of Federal Regulations* Part 674. Formerly known as the Norristown High Speed Line, the M Line is a 13.4-mile light rail line on a separate grade operated by SEPTA's Suburban Division as part of the SEPTA Metro brand. It originally opened in 1907, operated under several names, and underwent its last major modernization in the 1980s and early 1990s, including deployment of N-5 LRVs, the type involved in this collision, and installation of ATC technology.[6]

[6] J. William Vigrass. "Modernization of SEPTA's Norristown High-Speed Line." *Transportation Research Record* 1266 (1990): 247–258, https://onlinepubs.trb.org/Onlinepubs/trr/1990/1266/1266-026.pdf.

1.3 LRV153

1.3.1 Type Information

LRV 153 was an electric N-5 unit, part of an order of 26 LRVs originally delivered in 1993. N-5s can operate singly or in pairs and have a maximum capacity of 155 occupants. N-5 LRVs are equipped with air brakes (that use air pressure to create friction between brake calipers and rotors) and dynamic brakes (that use the LRV's traction motors to convert kinetic energy into electrical energy, which is dissipated as heat through rooftop resistors). Braking systems are controlled from the cab with the master controller, an emergency stop plunger (often called the mushroom), and a dead man's switch that will initiate an emergency braking application if the operator releases the master controller.

1.3.2 Inspections and Maintenance

The last preventative maintenance activity for LRV 153 was a 60-day mechanical inspection completed on May 1, 2025, at a SEPTA facility in Upper Darby, Pennsylvania. The inspection included tests and examinations of propulsion, braking, and train control systems. It did not identify any defects.

The last inspection of LRV 153 was a pre-trip inspection completed in Upper Darby, Pennsylvania, at 6:20 a.m. on May 10, 2025. This was a visual inspection performed by an operator. It did not identify any defects.

1.3.3 Postaccident Tests and Examinations

NTSB investigators examined LRV 153 at the accident scene on May 12, 2025, and continued examinations and event and image recorder data recovery on May 13–14 at the P&W Car Shop in Upper Darby. Data from one inward-facing image recorder, the one located in the operator cab, was corrupted and could not be recovered. Testing of the event recorder found that it was accurately recording all brake settings (B1–7 and Emergency) but that the highest power settings (P3–4) were being recorded as P2.

Examination of the wheels found marks consistent with sliding along the rails with brakes applied. Tests of the air brakes, dynamic brakes, and brake control unit did not identify defects.

Visual examination of LRV 153 found body deformation to the lead end of the LRV from the impact with the bumping post (see figure 1 above), but the vehicle was operable. On May 15, investigators performed a series of four stopping distance tests from 15 mph using LRV 153. No adjustments were made to the LRV's braking or propulsion systems before the tests. The brakes applied normally during each test.

Observers did not see signs of wheel slip during braking applications. The results are summarized in table 1.

Table 1. Brake test results.

Method of brake application	Stopping distance (feet)	Stopping time (seconds)
Master controller in B4 position (normal service braking)	81	7.63
Master controller in emergency position (operator-initiated emergency braking)	32	3.78
Emergency stop plunger (operator-initiated emergency braking)	23	3.45
Released master controller (automatic "dead man" emergency braking)	48	5.46

1.4 Track and Signals

1.4.1 Track Characteristics

The track where the collision occurred was signalized main track. At Norristown Station itself, the station platform is between two tracks; these tracks converge at a turnout south of the station at the 1N signal as shown in figure 3 above. The turnout facilitates northbound and southbound traffic on a single main track. The maximum authorized speed through the area was 15 mph as set by timetable.

The NTSB's postaccident examination of the track near the accident found no indications that the track had deviated from SEPTA's standards.

The ends of both tracks at Norristown Station, and their counterparts at 69th Street Station, are equipped with hydro-style bumping posts, which use hydraulic mechanisms to control the collapse of a piston and absorb energy during collisions. The bumping posts at Norristown Station normally extend 2 feet, 8.5 inches from their housings. Postaccident examination found that the bumping post involved in the collision had collapsed about 2 feet, as shown in figure 4.

Figure 4. Norristown Station bumping post after collision with the piston driven into the housing.

1.4.2 Signals and Train Control

Train movement on SEPTA's M Line is authorized by cab and wayside signals. The M Line's wayside signals, like the 1N signal encountered by LRV 153 shortly before the collision, use colored lights to display signal aspects. Investigators' postaccident examinations of the signal data logs did not identify defects or signs that the system was not functioning as designed.

The ATC system on SEPTA's M Line is based on track circuits. It enforces signal indications and limits speeds by transmitting codes on the track circuit, each of which specifies a maximum authorized speed for that section of track; if no code is being transmitted, the system interprets this as a "zero-speed code." If an operator exceeds the authorized speed or enters a track with a zero-speed code and is not already braking, the ATC system will apply the brakes; this is called a penalty brake application and is intended to fully stop the train. The system enforces most signals and other locations

requiring a stop with a zero-speed code.[7] The lowest non-zero speed code sets a maximum speed of 15 mph.

The ATC system does not proactively calculate and enforce braking applications to stop a train short of a location requiring a stop. A zero-speed code can be overridden with an in-cab "stop-and-proceed" button. The ATC system enforces a 15-mph maximum speed when trains operate on this override in zero-speed zones, including the roughly 1,100 feet of track immediately south of Norristown Station platform. Overriding the zero-speed code on the bridge before the 1N signal after obtaining dispatch permission to proceed was part of SEPTA's normal operating procedure. The system was not designed to enforce a stop at the platform itself or near the ends of tracks 1 and 2.

1.5 Personnel

1.5.1 Work History

The operator was hired in October 2021 and worked as a bus and trolley operator before SEPTA qualified him for light rail service on the M Line on August 15, 2023. After qualification, he continued to work as a bus and trolley operator in addition to operating on the M Line.

During the operator's service as a bus and trolley operator, he was involved in three collisions that SEPTA assessed as preventable, meaning that the operator either contributed to the accident or failed to act to prevent it. He was involved in three additional bus collisions in which SEPTA determined he was solely responsible. He also violated a stop signal on April 23, 2024, while operating a train. These infractions resulted in disciplinary actions ranging from interviews and written warnings to suspensions. In December 2024, under the terms of a collective bargaining agreement, he was subjected to a "discharge with dignity" and rehired with the understanding that further infractions would result in permanent dismissal.

SEPTA recertifies its light rail operators annually. The operator was last recertified by SEPTA on May 29, 2024, following a ride-along evaluation. The operator's light rail observational tests for the year before the accident included 9 tests over 61 rules. The tests identified one violation of a rule involving movement through switches.

[7] The last signals on approach to the end-of-line stations on the M Line are not enforced by the ATC system.

1.5.2 Hours of Service

When interviewed by the NTSB, the operator reported getting his usual amount of sleep the night before the accident, 6–8 hours. Based on SEPTA service records, the operator worked for 10 hours and 18 minutes the day before the accident after about 33 hours off-duty. The operator had been working the same route and schedule since February 2025 (about 3 months).

1.5.3 Toxicology Testing

The operator was tested for drugs and alcohol after the collision under Title 49 *Code of Federal Regulations* Part 655. The results were negative for all tested-for substances.[8]

1.6 Cell Phone Records

The NTSB reviewed phone records for the operator from the day of the collision. The review did not identify incoming or outgoing phone calls before the collision. The operator made a 4-minute, 25-second phone call starting at 9:47:32 a.m., about 2 minutes after the collision and 3 minutes before he contacted SEPTA dispatch. The operator also carried on a concurrent real-time text conversation over about the same period.

The operator received two SMS (short messages service) texts before the collision, both at 9:32:09 a.m. The records did not show any outgoing SMS activity during the period reviewed.

The review of internet connection activity showed numerous uploads and downloads in the hours before the collision; however, internet activity data generally do not confirm whether a person is using a phone because they do not distinguish user-initiated activity from background applications, updates, and other sources of uploads and downloads.

1.7 Emergency Response

The Norristown Fire Department led the emergency response with support from the Norristown Police Department. One firefighter had received training from SEPTA on transportation emergencies, but SEPTA had not recently conducted trainings with the

[8] Federal regulations at 49 *CFR* 655.21 require testing for marijuana, cocaine, opioids, amphetamines, and phencyclidine.

Norristown Fire Department itself. The firefighters interviewed after the accident reported that the last joint exercise with SEPTA had occurred more than 10 years earlier.

Emergency procedures for SEPTA dispatchers in effect at the time of the collision are documented in SEPTA's Emergency Operating Procedures for Control Center Light Rail Division, revised May 2025. The procedures provide step-by-step guides for various types of emergencies, including passenger injuries, the type of emergency reported by the LRV 153 operator. The guides generally begin with a reminder to the dispatcher to gather information by requesting it from the SEPTA employee calling in the emergency. At the time of the collision, SEPTA dispatchers did not have access to cameras or other sources of information about accidents other than through radio and phone calls, and Norristown Station did not always have a station manager present. No station manager was present at the time of the collision.

1.8 Postaccident Actions

On May 22, 2025, in response to the collision, SEPTA issued an operations bulletin imposing a speed restriction near Norristown Station, reducing the maximum authorized speed from 15 mph to 5 mph between the 1N signal and the end of the track. SEPTA did not reconfigure its ATC system to enforce this limit but installed trip stops near the end of the tracks at Norristown Station about 1 foot past the trains' normal berthing positions as shown in figure 5.[9] On track 1, the trips stops are positioned to activate with 5.5 feet between an N-5 LRV coupler and the bumping post; on track 2, this distance is 1.75 feet. SEPTA did not install trip stops at 69th Street Station which is at the other end of the M Line, citing space and access limitations.

[9] *Trip stops* are track-mounted devices that open valves on a passing train to apply its air brakes. On N-5 LRVs, this results in an emergency brake application.

Figure 5. Trip stop on track 1.

SEPTA made a system-wide broadcast to all SEPTA employees on June 4, describing the accident and emphasizing the importance of rules compliance, focusing on tasks, and maintaining situational awareness to prevent accidents.

Following the discovery of corrupt data on an inward-facing image recorder and issues with the LRV 153 event recorder, SEPTA added camera and event recorder systems to its inspection program for its light rail vehicles, requiring inspections every 15 days.

SEPTA also revised its communication policy to share estimated SEPTA personnel arrival times with emergency responders. SEPTA also revised its Operations Control Center dispatch emergency communication policy to require collection of information from the SEPTA Police Department's live surveillance camera feeds from stations, platforms, and train cars. This change is intended to provide more complete information to emergency responders and identify situations in which train service should be discontinued. SEPTA has also begun hiring additional staff to train local emergency response agencies on safely managing emergencies involving SEPTA equipment and properties. SEPTA started a multi-part training program with the Norristown Fire Department in October 2025.

2 Analysis

2.1 Summary and Exclusions

LRV 153 collided with the track 1 bumping post at Norristown Station after the operator did not apply the brakes to bring the LRV to a stop at its usual position at the platform. The following factors did not contribute to the collision:

- Visibility—weather conditions on the day of the accident were clear and sunny, and there are no obstructions between the 1N signal the track 1 bumping post.
- Track defects—examinations found no deviations from SEPTA's standards.
- Mechanical condition of LRV 153—tests confirmed that the air and dynamic brakes applied and released as designed, and the marks on the wheels showed that the brakes applied after the collision as indicated by the event recorder.
- Drugs and alcohol—postaccident testing of the operator was negative for all tested-for substances.

2.2 Train Operation

A review of event recorder data, radio communications, and image recorder data showed that the operator was engaged in operating the LRV and performing normally while advancing toward signal 1N about 1 minute before the collision. The operator followed train operating procedures on the bridge south of the station by stopping, obtaining dispatcher permission to proceed, and not exceeding the maximum authorized speed for the track. However, in the seconds before the collision, the event recorder did not capture any control manipulations as the LRV passed the point at which the operator would normally apply the brakes and as it approached the clearly visible bumping post. The train's speed remained steady during this movement. The absence of action indicates that sometime between the operator's last communication with the dispatcher and the collision, he disengaged from the safe operation of the LRV and did not re-engage until impact.

Common reasons for operator disengagement include fatigue and distraction. In this collision, the investigation did not identify risk factors for fatigue: the operator reported normal sleep the night before the accident, he had not worked multiple long shifts without time to recover, and his schedule had not changed for about 3 months before the collision. While the absence of these risk factors does not definitively exclude fatigue, it is unlikely that fatigue played a role in the accident.

Inward-facing image recorders are the best means of determining whether and how an operator was distracted before an accident, but the data from the image recorder in the cab of LRV 153 was corrupt and could not be recovered. A review of cell phone records showed that the operator was not on a phone call or texting while operating LRV 153. Internet activity records for his cell phone are ambiguous because the available data does not distinguish automatic background uploads and downloads from user activity. The available evidence suggests that the operator became distracted from his duties between signal 1N and the collision, but it does not indicate why or how.

Usable image recorder data from the cab would have been invaluable in understanding this accident, including why and how the operator became distracted. Inward-facing image recorders also enable rail transit agencies to review operator performance and rules compliance, creating opportunities to identify safety risks before they lead to accidents. The NTSB has recommended that the FTA require the installation of inward-facing audio and image recorders on rail equipment to verify train crew actions and train operating conditions in support of operational safety and accident investigations.[10]

SEPTA had equipped its LRVs with inward-facing image recorders, but it did not have established procedures to verify that the recorders were functioning properly. SEPTA has since added camera systems to its light rail vehicle inspections, a change intended to improve camera system reliability. SEPTA added a similar procedure for event recorders.

2.3 ATC Design and Configuration

The ATC system functioned as designed, but it was not designed or configured to prevent an end-of-track collision. Because trains approaching Norristown Station used a stop-and-proceed button to enter section of track with a zero-speed code, the last location where the ATC system would enforce a stop rather than a 15-mph maximum speed was on the bridge south of signal 1N, more than 1,000 feet from the end of the track. The distance between the last system-enforced stop and the track 1 bumping post allowed LRV 153 to reach and maintain a speed of 11 mph—and would have allowed a speed of up to 15 mph—with the operator as the sole means of stopping the train short of the bumping post.

The design and configuration of the ATC system created a single point of failure at Norristown Station: the operator's compliance with rules and vigilance during train

[10] For additional information, see the investigation page and reports for this accident (DCA17FR006). Safety Recommendation R-17-13 is currently classified Open—Acceptable Response.

operations. Operator errors are foreseeable events in rail transit operations, and the operator in this collision had a history of errors and rules violations. However, SEPTA's ATC protected only against speeding and advancing a significant distance past a red signal, a narrow subset of operator errors. As a result, the only safety benefit provided by ATC at the Norristown Station platform was an upper bound on collision speed through enforcement of the 15-mph maximum authorized speed. A collision speed of 11 mph resulted in injuries to three-quarters of the train's 16 occupants, including two serious injuries. This high injury rate indicates that limiting collision speeds to 15 mph is insufficient to protect SEPTA employees and the public.

In response to this collision, SEPTA lowered the maximum authorized speed near Norristown Station to 5 mph but did not reconfigure its ATC to enforce the new speed. In the absence of a system to prevent operators from exceeding the new maximum authorized speed, operator performance remains a single point of failure. The rule change will therefore not prevent future collisions involving operator error.

SEPTA has installed trip stops at Norristown Station ahead of the bumping posts to automatically apply a train's air brakes before a collision. However, the available braking distance is limited by the trip stops' position: less than 6 feet for track 1 and less than 2 feet for track 2. Both intervals fall far short of an N-5 LRV's 23-foot minimum braking distance from 15 mph, as established by postaccident testing of LRV 153. The trip stops are therefore unlikely to mitigate bumping post collisions when a train is moving at or near the maximum ATC-enforced speed at Norristown Station. SEPTA did not install trip stops at 69th Street Station, an operating environment similar to Norristown Station. This postaccident action therefore does not address the lack of ATC protection against operator error.

This collision could have been prevented by transmission-based train control (TBTC), a family of systems that use continuous communication between trains and trackside equipment to precisely monitor train positions, authorize train movements, and intervene to prevent unsafe movements, such as an operator failing to brake while nearing a location requiring a stop.

The NTSB has recently investigated or is investigating two other recent transit rail accidents in which the absence of safeguards against operator error or incapacitation is a subject of interest. In the NTSB's final report on the October 1, 2024, Massachusetts Bay Transportation Authority transit train derailment in Somerville, Massachusetts, we found that the operator exceeded the maximum operating speed, advanced past a signal requiring a stop, and proceeded through an interlocking before a switch was fully

aligned, resulting in a derailment.[11] The track in the area was not equipped with ATC or TBTC. A TBTC system would have prevented the derailment by stopping the train short of the signal.

The NTSB is currently investigating a Massachusetts Bay Transportation Authority transit train collision that occurred in Somerville, Massachusetts, on February 9, 2025.[12] While the investigation is ongoing, preliminary findings suggest that the operator exceeded the area's maximum authorized speed and operated into a stationary, out-of-service train without braking. The track was not equipped with ATC or TBTC.

Neither ATC nor TBTC are required by the FTA. The NTSB recommended that the FTA require positive train control (in this context, another term for TBTC) for rail transit systems in 2008 following a fatal collision.[13] In 2015, the NTSB superseded this recommendation with Safety Recommendation R-15-22, this time requesting that the FTA require TBTC.[14]

2.4 Emergency Response

In the Norristown collision, emergency responders did not have accurate account of the number and severity of injuries when they reached the scene, and they had to request additional resources a few minutes after arriving. The request for resources occurred about 9 minutes after Montgomery County and SEPTA became aware of an emergency at Norristown Station, and during this interval, neither SEPTA nor the local response agencies had access to accurate, complete information about the severity of the collision. This lack of knowledge delayed the arrival of sufficient emergency resources, such as medical transportation, by several minutes.

SEPTA has since revised its policies to use information from station, platform, and train cameras to provide emergency responders with a more complete account of an emergency before the first personnel arrive on scene. SEPTA has also begun hiring more

[11] Massachusetts Bay Transportation Authority Train Derailment, Somerville, Massachusetts, October 1, 2024. RIR-25-14. Washington, DC: NTSB.

[12] The public docket for this investigation has been released. Further information is available on the NTSB's website (case number RRD25FR007).

[13] Collision Between Two Massachusetts Bay Transportation Authority Green Line Trains, Newton, Massachusetts, May 28, 2008. NTSB/RAR-09/02. Washington, DC: NTSB.

[14] (a) Chicago Transit Authority Train Collides with Bumping Post and Escalator at O'Hare Station, Chicago, Illinois, March 24, 2014. NTSB/RAR-15-01. Washington, DC: NTSB. (b) This recommendation is currently classified Open—Acceptable Response. See CAROL for this recommendation's complete history.

personnel to train emergency responders on transit emergencies and added estimated times of arrival for SEPTA personnel to the information it provides emergency responders. Both changes are intended to support quickly and effectively securing an accident scene.

3 Probable Cause

The National Transportation Safety Board determines that the probable cause of the Norristown, Pennsylvania, end-of-track collision was the single point of failure created by the Southeastern Pennsylvania Transportation Authority's train control system's design and configuration, which relied on operator engagement to stop trains at platforms and signals; when the operator of light rail vehicle 153 became disengaged from his duties for unknown reasons and failed to apply the vehicle's brakes, the automatic train control system was unable to detect the imminent collision and intervene.

4 Lessons Learned

This collision could have been prevented by a train control system that did not depend solely on operator vigilance. A system that leaves the operator as a single point of failure is vulnerable to safety risks such as operator fatigue, distraction, or incapacitation. Requiring TBTC on rail transit systems, as the NTSB has recommended, would eliminate that single point of failure.

The emergency response to this collision illustrates the importance of timely, complete information gathering and sharing in the opening minutes of an emergency. SEPTA had only fragmentary information to share with emergency responders, who did not know the extent or severity of the accident until after they reached the scene. Tools like live camera feeds can provide train dispatchers with better information to help emergency responders quickly determine which resources they need to treat injuries and secure a scene.

The NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in the other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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 Case Analysis and Reporting Online (CAROL) website and search for NTSB accident ID RRD25FR012. 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—

National Transportation Safety Board
Records Management Division, CIO-40
490 L'Enfant Plaza, SW
Washington, DC 20594
(800) 877-6799 or (202) 314-6551