Issued: October 9, 2025 Railroad Investigation Report: RIR-25-14

Massachusetts Bay Transportation Authority Train Derailment

Location	Somerville, Massachusetts
Date	October 1, 2024
Accident type	Derailment
Train	Green Line train 3874-3718 2 crew members (1 operator in each railcar) About 50 passengers
Track	Signalized
Hazardous materials	None
Fatalities	None
Injuries	7
Property Damage	$1,500,000

Summary

On October 1, 2024, about 4:46 p.m., eastbound Massachusetts Bay Transportation Authority (MBTA) Green Line train 3874-3718 derailed its leading railcar at MBTA's Red Bridge interlocking in Somerville, Massachusetts.[1] Train 3874-3718 was a light rail vehicle composed of two railcars. About 50 passengers and 2 crew members were on board. The crew member in the lead railcar was operating the train (the operator); the crew member in the second railcar was operating that railcar's doors (the second operator). Less than a minute before the derailment, the train departed Lechmere Station in Cambridge, Massachusetts, and headed east along the MBTA Green Line. The train entered a 10-mph zone while traveling about 36 mph, passed through a double red signal (which requires a stop) west of the Red Bridge interlocking, and reached a track switch that was still in the process of moving to direct the train into the diverging track as required by its route. When the train passed over the switch, the lead truck of its leading railcar continued straight, while the railcar's second and third

[1] (a) Visit ntsb.gov to find additional information in the public docket for this NTSB accident investigation (case number RRD24FR017), including detailed factual reports about the circumstances of the accident. (b) All times in this report are local. (c) An *interlocking* is an arrangement of signal equipment and switches designed to prevent conflicting movements through turnouts, crossings, and other places where tracks converge.

trucks took the diverging track and then derailed.[2] The second operator initiated an emergency braking application, and the train came to a stop.[3] (See figure 1.) Seven passengers were transported to a local hospital with minor injuries. Visibility conditions at the time of the accident were clear. The weather was about 62°F with no precipitation.

Figure 1. Derailed lead railcar of train 3874-3718.

Speed limits near the accident location were indicated by signs posted to the right of the tracks. Signals and speed limits were not enforced automatically by positive or automatic train control (ATC) systems; MBTA relied on operators observing and obeying signals and posted speed limits.[4] For eastbound train traffic departing Lechmere Station, the speed limit rose in steps from 10 to 30 mph before decreasing back to 10 mph ahead of the Red Bridge interlocking. (See figure 2.) A sign warning of the upcoming 10-mph speed limit was positioned 286 feet ahead of the sign indicating

[2] Railcar *trucks* are assemblies that hold wheels and axles.

[3] An *emergency braking application* uses all available braking authority to stop a train as quickly as possible.

[4] *Positive train control* systems are designed to prevent train-to-train collisions, overspeed derailments, incursions into established working limits, and movement through switches left in the wrong position. These systems are required on commuter railroads and some tracks used by freight railroads. *Automatic train control,* or ATC, is a term sometimes used to described similar systems designed for rail transit operations.

the start of the reduced speed area (signs 1 and 2 in figure 2).[5] The speed limit sign was 223 feet west of the point of derailment. During on-scene observations, National Transportation Safety Board (NTSB) investigators did not identify obstructions or other visibility issues that could have affected the operator's ability to view these signs.

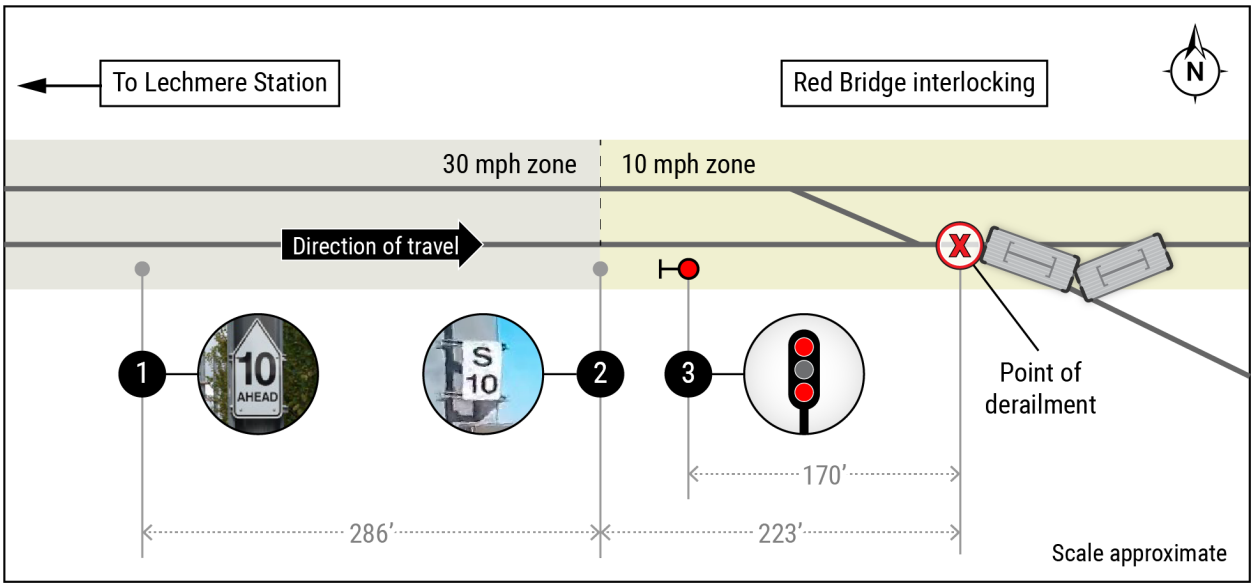

Figure 2. Track, signs, and signals near derailment.

The signal at the Red Bridge interlocking displayed aspects (the visual cues for operators that govern train movements) on a two-light aspect about 170 feet west of the point of derailment (sign 3 in figure 2). The signal logs for the day of the accident showed that the signal was displaying the correct indication (a stop signal) and that the switch was being lined for the correct route when the derailment occurred. The NTSB's examination of the signal found both lights functioning as designed, and there was no evidence of limits on sight distance or visibility.

A review of event recorder data from the lead railcar showed a gradual increase in speed over the 1,270 feet (or 28 seconds) before the derailment; the train reached 37 mph immediately before the derailment. No braking applications occurred before the derailment. When interviewed by the NTSB, the operator did not recall how fast the train was traveling and said that "to the best of my knowledge, I had proper routing signal."

[5] MBTA rules require advance warning signs for reduced speed zones to precede the zone by 400 feet. If the spacing of catenary poles interferes with this placement, the signs can be positioned as close as 350 feet from the zone.

The operator was hired by MBTA in May 2022, certified as an operator in July 2022, and passed their last rules examination in July 2023. MBTA provided the NTSB with documentation for five speed alerts (potential speed rule violations) for the operator in 2022. These alerts were automatically generated by MBTA's speed monitoring system based on global positioning system (GPS) data.[6] One alert led to a formal finding that the operator had exceeded a speed restriction. In that case, the operator was traveling 26 mph in 10-mph zone, and MBTA sent the operator to its training school for non-disciplinary reinstruction on January 13, 2023. None of the other alerts were verified as rule violations, and none resulted in disciplinary action. The documentation provided by MBTA did not include any history of signal violations.

The NTSB's review of mobile phone records for the operator found incoming and outgoing calls and text messages while the operator was on duty on the day of the accident. No outgoing calls or text messages occurred between the train's departure from Lechmere Station and the derailment. One incoming text message was received at 4:45:55 p.m., a few seconds before the derailment. The records did not include internet connection activity, meaning they did not indicate whether the phone was being used to access the internet.

Analysis

This derailment resulted from the train passing through a stop signal and then encountering a switch that was partially out of position because it was still moving to direct the train as required by its designated route. The train was also being operated in excess of the posted speed limit for the area. The investigation did not identify issues with sight distances or the visibility of signals or speed limit signs, the railcars did not have mechanical defects, and the interlocking was functioning properly. Postaccident toxicology tests for both crew members were negative for all tested-for substances.[7] Measurements taken at the scene showed that an advance speed limit warning sign was positioned nearer the reduced speed zone than required by MBTA rules, but this was not causal to the accident because there is no evidence, as discussed below, that the operator attempted to respond to the signage at all.

[6] In the years leading up to the accident, MBTA used real-time GPS data to generate automatic speed alerts. A triennial audit by MBTA's state safety oversight organization completed in 2024 found that 82% of speed alerts from this system were false positives.

[7] Federal Transit Administration regulations in Title 49 *Code of Federal Regulations* Part 655 require vehicle operators to undergo drug and alcohol tests following nonfatal accidents unless the employer (usually a transit agency) determines that the operator's performance can be completely discounted as a factor in the accident.

Event recorder data showed that the train accelerated continuously away from Lechmere Station even after entering a reduced speed zone, and the operator made no attempt to slow or stop the train as it approached and traversed the red signal at the Red Bridge interlocking. The operator's lack of reaction to reduced speed signs and a stop signal indicates that the operator was not engaged in at least one task necessary for the safe operation of the train, such as monitoring the forward roadway. Further, the operator did not initiate the emergency braking application—the second operator did—which further suggests that the operator was disengaged from their work.

The operator's failure to obey signage and signals is consistent with distraction, but there is not enough evidence to identify a potential cause. The operator also had a history of speed alerts, but at the time of the accident, the low quality of MBTA's oversight program prevented a confident assessment of whether the operator had a history of habitual speeding; the GPS-based system in use at the time tended to produce false positives, and only one of the operator's five alerts was confirmed as a speeding incident by MBTA. The operator did not have a documented history of signal violations.

The NTSB's review of mobile phone records indicated call and text message activity associated with the operator's phone, including outgoing calls and messages while the operator was on duty and an incoming text message in the seconds before the derailment. However, the records alone did not include enough information to determine whether the operator was in possession of or using a mobile phone while operating the train.

Had an inward-facing image or audio recorder been present in the train it likely would have provided additional evidence as to why the operator did not comply with the speed limit or stop signal.[8] These recorders could have also provided information to support MBTA's oversight program, improving its ability to identify and correct unsafe behaviors before accidents occur. The NTSB previously recommended that the Federal Transit Administration 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.[9]

Regardless of the exact reason the operator did not comply with the posted speed limit and signal indication, this accident would have been prevented by an ATC system—a family of technologies that enforces signals and speed limits to protect against

[8] Inward-facing image and audio recorders capture information about train operators' activities, similar to the cockpit voice recorders required on many aircraft.

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

collisions and derailments. The NTSB previously recommended that transit agencies install ATC, most recently in a recommendation to the Sacramento Regional Transit District following a train-to-train collision.[10]

The NTSB is investigating another ATC-relevant MBTA Green Line accident in Somerville, a train-to-train collision on February 9, 2025, that occurred after the striking train passed through a signal requiring a stop.[11] The investigation into the Somerville train-to-train collision is ongoing.

Probable Cause

The NTSB determines that the probable cause of the Massachusetts Bay Transportation Authority train derailment was the operator failing for unknown reasons to obey a stop signal and proceeding through an interlocking while the track switch was still in motion. Contributing to the accident was the train's excessive speed, which increased the likelihood of the train reaching the interlocking while the switch was still in motion.

[10] For additional information, see the investigation page and report for this accident (RRD19FR011). Safety Recommendation R-22-7 is currently classified Open—Unacceptable Response.

[11] For additional information, see the investigation page for this accident (RRD25FR007).

Lessons Learned

In response to this accident, MBTA published a safety alert for all employees on October 24, 2024, addressing speed requirements and the hazards of failing to obey speed limits.

MBTA changed the speed limits on the eastbound approach to the Red Bridge interlocking, reducing the maximum speed in the area from 30 mph to 25 mph. This is intended to decrease how much an operator accelerates and decelerates between Lechmere Station and Red Bridge and to provide more time to see and react to a signal requiring a stop.

MBTA also concluded that its operational testing (audit) program was inadequate to identify noncompliance with speed limits and signal indications. MBTA has since revised its program to include more accurate GPS-based speed monitoring, retargeted its speed audits to focus on locations where speeding is more likely, and installed inward- and outward-facing cameras on all equipment. MBTA has also begun installation of systems to alert operators when they exceed speed restrictions. Further, MBTA has described plans to install an ATC system by June 2028.

This investigation and MBTA's response highlight the importance of deploying and maintaining effective systems to manage human error. These systems include robust oversight technologies and practices to identify and correct unsafe behaviors, and safety technologies like ATC to reduce or eliminate the consequences of mistakes.

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For more detailed background information on this report, visit the NTSB Case Analysis and Reporting Online (CAROL) website and search for NTSB accident ID RRD24FR017. 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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