



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

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Railroad Accident Brief: RAB-21/06

Southeastern Pennsylvania Transportation Authority Roadway Worker Fatality

Philadelphia, PA
July 8, 2019

1. Factual Information

1.1 The Accident

On Monday, July 8, 2019, about 5:21 p.m. local time, northbound Southeastern Pennsylvania Transit Authority (SEPTA) train 46, struck two SEPTA roadway workers on express track 3 (track 3) on SEPTA's Broad Street Subway Line in Philadelphia, Pennsylvania.¹ One worker was killed, and the other was transported to a local hospital with non-life-threatening injuries. Prior to the accident, a southbound SEPTA train (train 41) was operating on express track 2 (track 2) just north of SEPTA's Erie interlocking and passed the workers. Simultaneously, northbound train 46 struck the roadway workers as it departed the Erie Station on track 3. (See figure.)

¹ (a) All times in this document are local times unless otherwise noted. (b) All tracks discussed in this report are part of the Broad Street subway line. (c) For more detailed information about this accident investigation, see the public docket at <https://data.nts.gov/Docket/Forms/searchdocket> and search for accident number RRD19FR009. Use the CAROL Query to search safety recommendations and investigations.

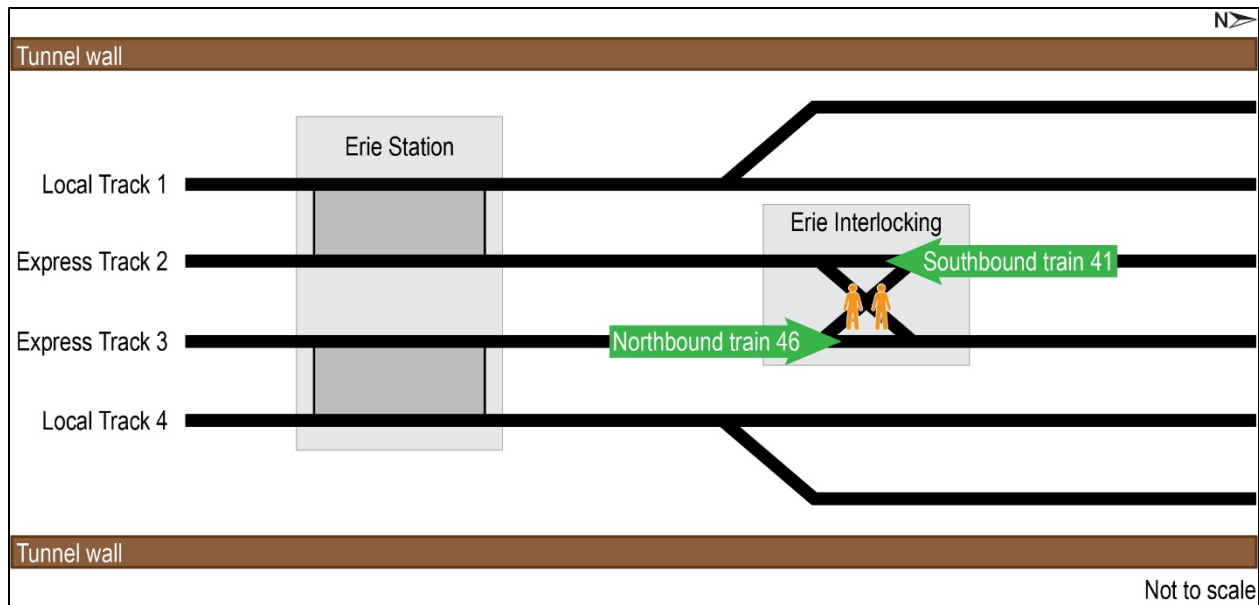


Figure. Diagram of accident location on Broad Street Subway Line.

Note: This diagram shows tracks 1, 2, 3, and 4 running through the Erie Station to the south. Train 41 is headed south through the Erie interlocking on track 2, and train 46 is headed north through the Erie interlocking on track 3. The accident site and the two roadway workers who were hit are shown in the Erie interlocking between tracks 2 and 3.

The accident occurred within the Erie interlocking.² Forward-facing image recordings from train 46 show that when it was stopped at the passenger platform on track 3 at the Erie Station, the track worker that would be fatally injured was about 300 feet away walking toward it waving a flashlight attempting to convey a “stop signal” to the operator.³ The track worker is then seen walking away, with his back to train 46. A review of in-cab image recordings from train 46 show that, at the time the track worker attempted to signal train 46 to stop, the train’s operator had his head outside of the operator’s cab window and was not looking in the direction of the track worker. The operator was looking toward the rear of train 46 as customers loaded and off-loaded the train. The in-cab image recording also shows that the operator of train 46 did not acknowledge or confirm the stop signal from the track worker. Forward-facing image recordings show train 46 departed the station and moved north on track 3 in the direction of the Erie interlocking toward the two roadway workers.

As train 46 entered the Erie interlocking, forward-facing image recordings show both roadway workers standing side-by-side in the middle of the interlocking, between the tracks, as the last cars of southbound train 41 move past them moments before being struck. The operator of train 46 told National Transportation Safety Board (NTSB) investigators that it was dark, and he saw bright headlights from the southbound train.

² An *interlocking* is an arrangement of switches and signal appliances that controls and directs train movements from one track to another track.

³ There are no circumstances or rules under train approach warning (TAW) that would allow a watchman to signal a train to stop.

Forward-facing image recordings show that about the time train 46 neared the interlocking, headlights from the approaching southbound train 41 on track 2 resulted in a bright light that likely blurred and diminished the operator's view of the workers. As the operator of train 46 proceeded, he told investigators he saw the reflection of two safety vests between tracks 2 and 3 and immediately heard a loud noise on the left side of his train (train operators are on the right side of the controlling cab). The operator then immediately applied the train's emergency brakes. Shortly after, the operator of train 46 heard a mayday call over the radio.⁴ He further said that the mayday call came from one of the roadway workers.

1.2 Before the Accident

The two roadway workers performing the routine track inspections on the Broad Street Subway Line were both trained as qualified protection employees.⁵ One of the roadway workers was the designated track inspector. The other roadway worker (the fatally injured worker) was the designated lookout, or watchperson. The workers were notified by a line supervisor to conduct a detailed switch inspection at Erie interlocking, and when they arrived, the track inspector elected to use train approach warning (TAW) as their form of on-track protection within the interlocking limits.⁶

The track inspector radioed the Broad Street Subway Line train dispatcher at about 4:15 p.m. for permission to enter the track and conduct the switch inspections. The train dispatcher granted permission and made an announcement over the radio to rail operators that personnel were in the interlocking at the Erie Station.

While the track inspector was performing inspections, he discovered indications of movement in a switch component on track 2 and decided to make minor repairs by adding track spikes to minimize the movement. After adding the spikes, the inspector said he noticed southbound train 41 approaching on track 2. Northbound train 46 remained stopped on the platform at the Erie Station on track 3 offloading and loading passengers. The track inspector directed the watchperson to hold the northbound train

⁴ *Mayday* is an international radio distress signal used to indicate a life-threatening emergency situation and to keep the radio channel clear for further emergency transmissions. SEPTA uses the Northeast Operating Rules Advisory Committee Operating Rules to govern radio communications. Rail Division Rule 707 Radio Messages: Content of Code Words specifies the use of "EMERGENCY" or "MAY DAY" transmitted three times to obtain immediate use of the radio channel for initial reporting of endangering conditions.

⁵ A *qualified protection employee* is a "SEPTA employee qualified on the operating rules, physical characteristics, and on-track protection procedures and is responsible for establishing on-track protection and safety." On-Track Safety rule No. 21 (OTS-21) from the SEPTA *Transit Rail On-Track Safety Manual* (4th ed. November 1, 2015) states that the qualified protection employee must determine the method of providing protection to be used according to the operating rules.

⁶ TAW is a method of establishing on-track safety to warn roadway workers of the approach of trains in time for them to move to or to remain in a safe place. It requires an assigned watchperson(s) who cannot allow anything to distract them from their duty to watch for trains, vehicles, and other equipment. (OTS 503)

on track 3 at the Erie Station while he monitored the southbound train moving over the track repairs on track 2. The watchperson then signaled northbound train 46 with a flashlight to remain stopped. This action by the watchperson was not in compliance with SEPTA's TAW rules, which, at the time of the accident, did not allow a watchperson to signal a train.⁷

The operator of train 41 reported seeing two track workers near the Erie Station. He said that everything appeared normal. According to the operator, one of the track workers signaled him with what appeared to be a flashlight using a proceed indication. He said he acknowledged with two short horn signals and safely passed the two workers.

1.3 Train Approach Warning

SEPTA's Roadway Worker Protection Program, including the SEPTA Wayside Safety Program, consisted of general safety practices intended to apply broadly to all roadway workers. One such practice, known as TAW, provides control center authorization for employees to enter the roadway with no additional protective measures or restrictions provided by the control center. When TAW is used, roadway workers are prohibited from performing work without a watchperson when they are close enough to a track to be struck by a moving train or other equipment. The watchperson's only responsibility is to watch for approaching trains or equipment on any track, at any time, and in any direction. Stopping or holding trains with use of flags or handheld lights is not part of the watchperson's duty under TAW. The control center reminds workers that they are required to provide their own protection, be aware of train and equipment movements, and not interfere with mainline or yard operations. SEPTA also requires that workers using TAW must have a predetermined location to clear an approaching train and must be able to do so 15 seconds before a train arrives.

1.4 Postaccident Actions

Use of Train Approach Warning - Immediately following the accident, SEPTA had stand-down meetings with its track department staff. SEPTA has resumed track inspection work but prohibits using TAW to perform any minor repairs to track components by track inspectors. Once a track worker identifies the need for a repair, the track will be taken out of service or speed restriction issued if conditions warrant until the repairs can be made. The repairs will be scheduled when train service has stopped, or a work zone or out-of-service track and associated protection can be established.

Prohibiting Fouling Work During Peak Service Hours - In September 2019, SEPTA's assistant general manager for operations and engineering maintenance and construction issued a notice to employees prohibiting nonemergency work from being

⁷ OTS 48 and OTS 503 specify the roles and responsibilities of watchpersons, which do not include signaling trains. Their responsibility is to ensure that workers don't foul the tracks of oncoming trains, and their only responsibility is to signal roadway workers when necessary.

performed between the hours of 6:30 a.m. to 9:00 a.m. and between 3:00 p.m. to 6:00 p.m.

Additional Manpower/Advance Mobile Watchperson - In July 2019, SEPTA started to assign qualified watchpersons to station platforms preceding the track inspection crews. In this role, the watchperson communicates with train operators to warn them of the track workers and warns track workers via radio communication of approaching trains. SEPTA will monitor the effectiveness of this practice and adjust as needed to further enhance the protection. SEPTA hired additional full-time positions to support this role.

Updated Hot Spot List - A "Hot Spot" list is a reference manual provided to all track workers that designates certain track segments where a greater level of on-track protection is required due to limited line of sight, difficult or nonexistent egress, loud noise, and close clearances. Since the accident, SEPTA has updated its Hot Spot list to include interlockings and provided the list to the training department to include as a reference in their track safety classes.

2. Probable Cause

The National Transportation Safety board determines the probable cause of this accident was Southeastern Pennsylvania Transit Authority's decision to use train approach warning for roadway worker protection while performing maintenance in an area with multiple main tracks where trains could approach from either direction at full track speed.

The National Transportation Safety Board (NTSB) is an independent federal agency dedicated to promoting aviation, railroad, highway, marine, and pipeline safety. Established in 1967, the agency is mandated by Congress through the Independent Safety Board Act of 1974, to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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 RRD20LR007. 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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