NATIONAL TRANSPORTATION SAFETY BOARD

Office of Railroad, Pipeline and Hazardous Materials Investigations

Washington, DC

Collision of Two Trolleys
Southeastern Pennsylvania Transportation Authority
January 4, 2017
Philadelphia, PA

NTSB Accident No. DCA17FR003

Operations Factual Report
Ryan Frigo – Group Chairman

Accident

NTSB Accident Number:	DCA17FR003
Date of Accident:	January 4, 2017
Time of Accident:	Approximately 12:47 Eastern Standard Time (EST)
Type of Train and No:	Trolley # 9101 and # 9085
Railroad Owner:	Southeastern Pennsylvania Transportation Authority
Crew Members:	2; one on each trolley
Location of Accident:	Philadelphia, Pennsylvania

SEPTA
Trolley Collision
Philadelphia, Pa
January 4, 2017

Operations Group Members

Ryan Frigo
Operations Group Chairman
National Transportation Safety Board

Troy Lloyd
Lead Accident Investigator
Federal Transit Administration

Elizabeth Bonini
State Safety Oversight Program Manager
Pennsylvania Department of Transportation

Michael Lyles
Director of Street Supervision, Surface Lines
SEPTA

Will Vera
Vice President
Transportation Workers Union

Accident Summary

For a summary of the accident, refer to the *Accident Summary Report* in the docket for this investigation.

Operating Crew Information

Table 1. SEPTA Crewmembers.

Position	Trolley No.	Age	Employment Date	Date of Initial Certification
Car Operator	Trolley No. 9101	44	6/23/2014	6/29/2016
Car Operator	Trolley No. 9085	62	1/27/2014	4/29/2016

The trolley operator of the Southeastern Pennsylvania Transportation Authority (SEPTA) trolley number 9085 (trolley 9085) began as a trolley operator at SEPTA in 2014 and has worked in that capacity since that time. At the time of the accident, he was working a voluntary overtime shift on his day off.

The trolley 9101 car operator went through SEPTA's new hire training program for bus and rail operations and received his trolley operator certification on July 10, 2015.

Crew On-Duty Times

SEPTA Trolley 9101, 6:54 a.m. at the Callowhill depot

SEPTA Trolley 9085, 11:30 a.m. at the Callowhill depot

Method of Operation and Location

SEPTA's operations division consists of four transportation departments; surface transportation, railroad transportation, subway/elevated transportation and CCT[1].

Surface transportation consists of all bus, trolley, trackless trolley and Norristown High Speed Line operation in both the city transit division (CTD) and the suburban transit division (STD). Within the CTD are the city trolley routes 10, 11, 13, 15, 34 and 36. The Route 10 operates out of the Callowhill district at 59th/Callowhill in West Philadelphia. The Route 10 operates from 63rd Street/Malvern in Philadelphia to 13th Street/Market in center city Philadelphia. The route operates on street rail from 63rd Street/Malvern Loop to 36th Street Street Portal between Sansom and Market, then in the subway surface tunnel from the 36th Street/Portal to 13th Street and Market.

Trolley operations are governed under SEPTA's Operating Rules Manual and the Pennsylvania Motor Vehicle code. While operating on tracks embedded in public streets and roads, SEPTA rules and the Commonwealth of Pennsylvania Motor Vehicle Code governs train movement. While operating in the subway surface tunnel the operator is governed by SEPTA rules and a communication based train control system, CBTC.

Federal Oversight

The Federal Transit Administration (FTA) is responsible for state safety oversight

[1] Customized Community Transport is SEPTA's Para-transit Department.

(SSO) of rail transit systems as authorized by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation Act (FAST Act). The designated state safety oversight agency (SSOA) in Pennsylvania is the Pennsylvania Department of Transportation Rail Transportation (PennDOT). PennDOT developed its Safety Review Program as required by federal regulation. The FTA conducts triennial audits of all designated state safety oversight agencies to determine compliance with 49 *Code of Federal Regulations* (CFR) 659. The FTA attends PennDOT SSOA quarterly meetings and site visits as appropriate.

State Safety Oversight

The Rail Transit Safety Review Program (RTSRP) is a statewide rail fixed guideway safety and security oversight program established by the Pennsylvania Legislature through House Bill 840 (as reauthorized by Act 44 and Act 89). This program is funded and operated by PennDOT to provide ongoing safety and security oversight of SEPTA, Port Authority of Alleghany County (PAAC), and the Cambria County Transit (CamTran) rail fixed guideway transit systems within the Commonwealth. PennDOT is tasked with fulfilling Federal SSO regulations under 49 CFR Part 659, and modified by 49 CFR Part 674. PennDOT is responsible for establishing the standards for safety and security programs at SEPTA, as well as enforcing the requirements through ongoing evaluation and audits. PennDOT's primary areas of ongoing responsibility include oversight and investigating or delegation investigation of accidents/incidents, hazard management, safety and security program plans, emergency preparedness compliance auditing, corrective action plans (CAPs), and other

oversight activities.

PennDOT reviews and approves transit agency developed system safety program plans and security & emergency preparedness plans to ensure compliance with 49 CFR Part 659 and oversight program standards and policies. On an on-going basis, PennDOT conducts external audits of transit agency procedures and practices to ensure compliance with requirements. Additionally, PennDOT regularly monitors and participates in SEPTA internal safety and security audits. PennDOT also provides technical assistance in in developing and compliance with state and industry best practices in safety and security.

PennDOT personnel perform regular rules efficiency compliance and spot checks of SEPTA operations and provide detailed memos of results to SEPTA. PennDOT maintains working relationships with SEPTA safety and security points of contact, as well as engages in regular update and communication with the FTA.

As part of the PennDOT's on-going oversight, SEPTA is required to report accidents/incidents within two hours and hazards within one business day. PennDOT also requires SEPTA to establish formal accident investigation plans, as well as provide preliminary reports for accidents and hazards, and collect and analyze accident/incident and hazard data. Upon completion of the investigation, SEPTA is required to submit the final report to PennDOT for final review and adoption.

SEPTA Office of System Safety

The system safety division facilitates and coordinates implementation of SEPTA

safety, health, and environmental programs (SH&E) – including the Multi-Modal System Safety Program Plan. Accordingly, system safety develops and manages SEPTA's plenary corporate safety, health, and environmental (SH&E) programs and protocols.

System safety performs independent, corporate consultative evaluation of SEPTA's SH&E programs and their respective effectiveness. The assistant general manager system safety (AGM) reports directly to the general manager, and advises the general manager and executive staff of SH&E issues affecting SEPTA. The AGM system safety is responsible to coordinate and facilitate executive staff participation in the SEPTA corporate SH&E and risk management functions as delegated by, and on behalf of, the General Manager

The System Safety Division develops goals, directives, policies, plans and procedures regarding safety, health, and environmental compliance; provides oversight, coordination, and independent appraisal of safety activity for all departments; coordinates, collects and assesses safety data; provides in-house consultation services for injury prevention; revises the Multi-Modal System Safety Program Plan ensuring regulatory conformance and compliance with appropriate industry standards; ensures SEPTA complies with all federal, state, and local safety and environmental laws and regulations; enhances employee awareness of safety; establishes proactive approach to decrease hazards and assure optimum safety; supervises and conducts audits, inspections and assessments; ensures accidents are properly investigated; establishes and maintains liaison with external agencies as required.

Drug and Alcohol Testing of Crew

Please refer to the *Medical Factual Report* in the docket.

Interviews:

The Operations Group conducted seven interviews during the on-scene phase of the investigation. These interviews are summarized in the following subsections.

Trolley 9085 Operator

The trolley operator said that he started work as both a trolley/bus operator on December 27, 2013. His primary routes included the Route 10 on the weekends and the Route 15 on weekdays. On Wednesday January 4, 2017, the trolley operator was working an additional shift for overtime. He had called the previous day to see if extra work was available. His regular days off were Tuesday and Wednesday. His work assignment on the day of the accident was to relive the trolley operator of the Route 10 at 63rd Street and Malvern. He drove to work that day and took some cold medicine in tea at about 9:00 a.m. that morning to address a residual cold and a persistent cough. The trolley operator told investigators that he felt “pretty good” and confirmed with the transitioning operator that the trolley was in good condition. The trolley operator arrived at work at about 11:30 a.m. and left the trolley depot at 11:54 a.m. after checking in with the dispatcher. The trolley route travels both on the street and in a tunnel. The trolley operator remembered as he was exiting the tunnel onto 36th street when he saw another Route 10 trolley ahead of him. Prior to that time there was no unusual activity, and light passenger traffic with little to no stops

along his route. When the trolley operator saw the trolley ahead of him, waiting at a red traffic signal at the intersection of 36th and Market Street, he stated that he made the decision to hang back and increase the space between him the trolley ahead since he knew that the lead trolley would pick up all the passengers.

The trolley operator continued along the trolley route and stated to investigators that he noticed that the trolley was about a block in front of him as he approached 37th street. Then he stated that the trolley in front of him approached 38th street. The trolley operator stated to investigators that at this point he felt groggy, he blinked his eyes saw the trolley immediately in front of him and slammed on his brakes.

Trolley 9101 Operator

The trolley operator described the accident day as a normal day with outside conditions as wet in the early morning when he started his shift, and then dry as the sun came out. On his second run things dried up and street and route was clear. He recalled the sequence of events prior to the accident, stating that when leaving the loop everything was clear, and the run coming out of tunnel was heavy (indicating multiple passengers had boarded his trolley). He recalled that he picked up passengers in the tunnel, and outside the tunnel. The trolley operator then turned at 36th and Lancaster. At 36th and Powelton St., the operator noticed another operator following him. Upon arrival to 38th Street, the trolley operator remembered that a UPS truck was present and passengers were waiting to board the trolley. While stopped waiting on UPS truck to clear the route, the following trolley collided with the rear of his trolley. The trolley operator immediately knew people were

hurt, and noticed dust was all over vehicle. The trolley operator contacted control for assistance.

Callowhill Dispatcher

The dispatcher stated the he started work as a trackless trolley[2] operator out of Frankford District starting July 1991 and did this job for one year. He subsequently transferred to bus operations out of Frankford District for approximately 15 years and then has been a dispatcher for the past ten years.

Dispatching of both bus and trolley occur at Callowhill district and it is typical to dispatch both modes during a shift. The dispatcher reports to both a director and an assistant director. The dispatcher stated to investigators that training is very involved because each dispatcher's shift has different responsibilities.

He explained that trolley operators are normally dispatched according to a schedule but at times may be asked to work a different run. Both the 10 and 15 lines operate out of Callowhill district. There are about 300 bus and 80 rail operators out of Callowhill. During any given hour, there are about 20 bus and rail operators that report or check-in to the dispatcher.

On a normal day, the dispatcher will come in and relieve the current dispatcher on duty by transferring pertinent information such as staffing needs. Once the transfer of information is completed the dispatcher then begins checking-in operators for their shift and

[2] A Rubber tire vehicle that resembles a bus. This vehicle receives its electrical power from an overhead trolley wire.

ensuring operator fitness for duty begins. The check for fitness for duty normally consists of uniform code compliance, observations of behavior/conversation/movement that is abnormal, if a conversation occurs then any detection of differences in speech (such as a slur), or eyes that appear blood-shot or "different" or general observation of anything "strange" about the operator. The dispatcher stated that this observation is done by looking at the operator in the eye or exchange brief conversational pleasantries through a glass window that has three holes.

The dispatcher stated that his work load was manageable and he is able to do appropriate fitness for duty checks while managing other duties.

On the day of the trolley collision, the dispatcher recalled that there was a typical transfer of information when he arrived on duty at 8:00 a.m. The striking trolley's operator checked-in with the dispatcher as a regular operator for his assigned 10 run at approximately 10:00 a.m. The striking trolley's operator checked-in at the window by saying, "I'm here for my run". The dispatcher acknowledged him by looking at him and saying, "Thank you". The dispatcher then deemed the trolley operator fit for duty before marking him present for work.

Transportation Manager (First On-Scene)

A transcript of this interview can be found in the docket.

Transportation Manager

A transcript of this interview can be found in the docket.

Senior Director of the Northern Division

A transcript of this interview can be found in the docket.

Summary of the interview with the Chief Safety Officer

A transcript of this interview can be found in the docket.

Sight Distance Observations

Sight Distance Observations

On Sunday, January 8, 2017, after job safety briefings for each group of investigators, investigators conducted sight distance tests from a test trolley to determine the advanced preview of the struck trolley from an exemplar operator. Investigators also collected video image data from various locations at the test site.

Additionally, the Mechanical Group conducted four brake tests using the striking trolley at the accident location. All tests were initiated from the 37th St. transit stop, the same location that the accident train departed from prior to the accident.

A detailed description of the brake tests can be found in the *Mechanical Factual Report* in the docket for this accident.

Operational Observations:

The following are operational observations by investigators riding the test equipment for the various test locations conducted with sight distance tests:

- The exemplar trolley operator was able to identify the stationary trolley at 38th St. about 965 ft. from the rear of the struck trolley, while negotiating through the 36th St. wye[3].
- Investigators noted that there were clear lines of sight in the direction of travel on Lancaster Ave.

[3] A wye is a triangular shaped arrangement of rail tracks with a switch or set of points at each corner.

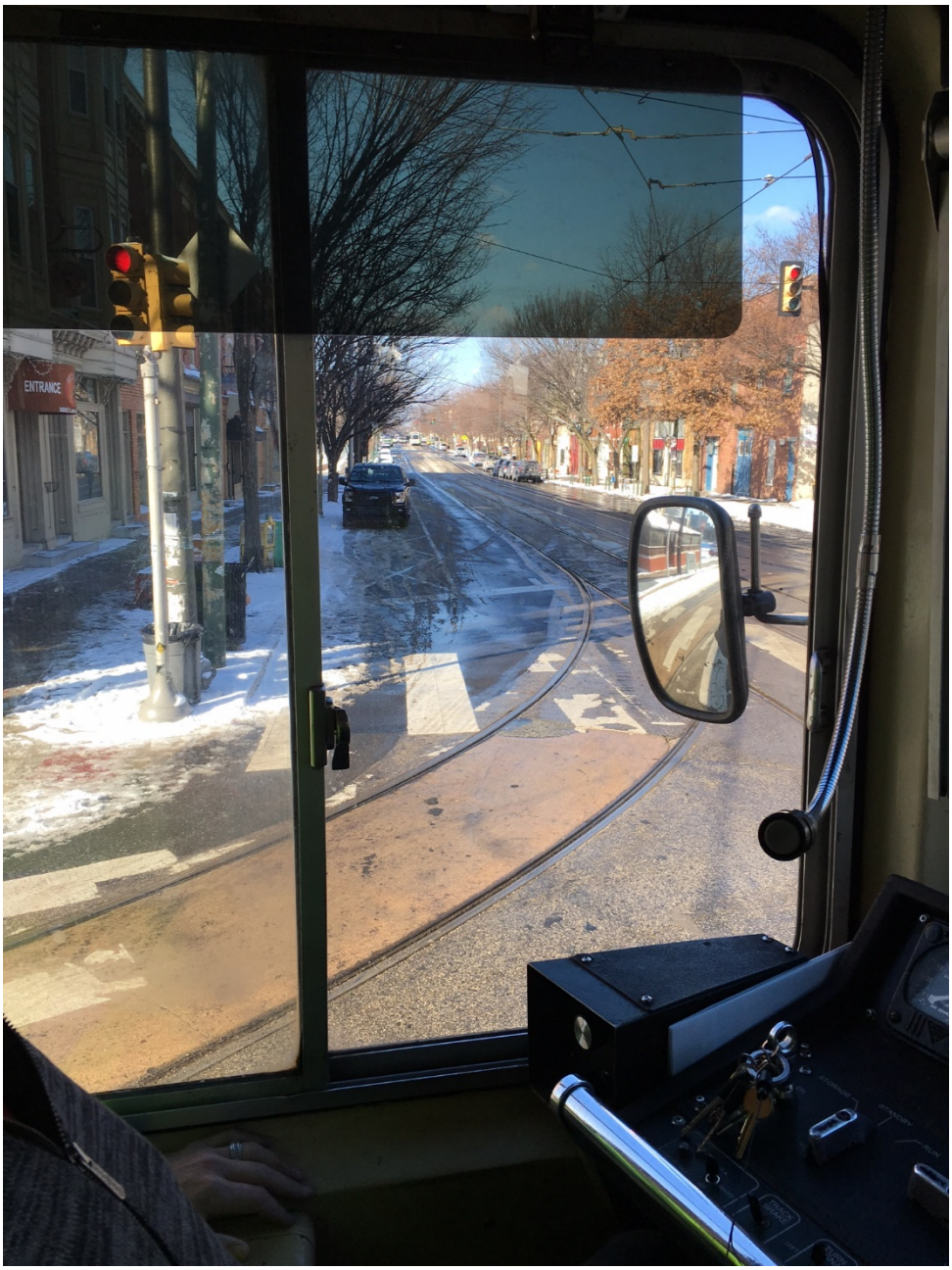

Figure 1: Photo taken by NTSB investigator of when an exemplar operator has advanced preview of standing Trolley at accident site.

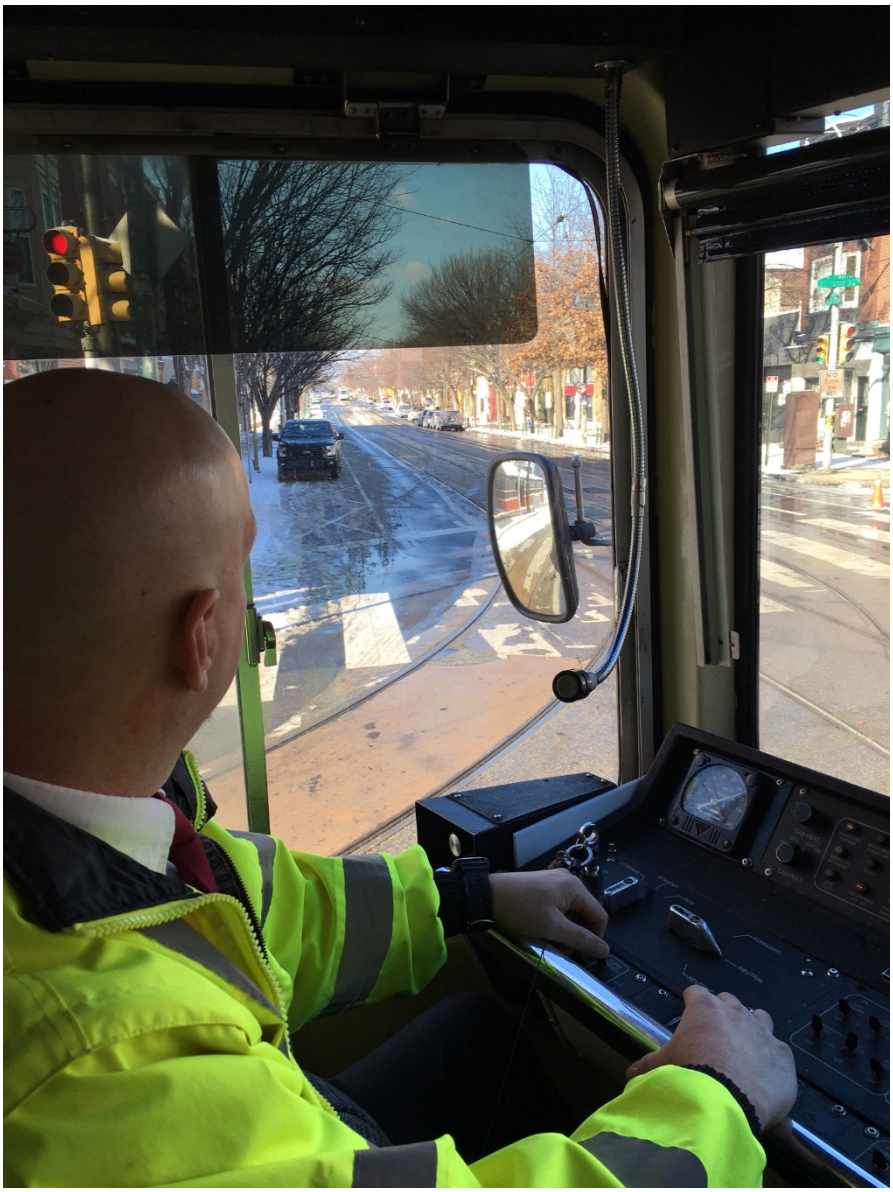

Figure 2: Photo taken by NTSB investigator of an exemplar operator negotiating the 36th St. to Lancaster Ave. wye.

Operations Group - Acknowledgment Signatures

The undersigned designated *Party to the Investigation* representatives attest that the information contained in this Operations Group Factual Report of a Trolley Collision on January 4, 2017, in Philadelphia, Pennsylvania, is a factually accurate representation of the information collected during the on-scene investigation, to the extent of their best knowledge and contribution in this investigation.

_____//s//_____ Date ___6/13/17___
Ryan J. Frigo, NTSB

_____//s//_____ Date ___6/13/17___
Troy Lloyd, FTA

_____//s//_____ Date ____6/13/17___
Elizabeth Bonini, PennDOT

_____//s//_____ Date ___6/13/17_____
Michael Lyles, SEPTA

_____//s//_____ Date ___6/13/17____
Will Vera, TWU