PRELIMINARY REPORT

RAILROAD

Head-on Collision Between Amtrak Passenger Train and CSX Freight Train

Cayce, South Carolina
February 4, 2018
RRD18MR003

The information in this report is preliminary and will be either supplemented or corrected during the course of the investigation.

On February 4, 2018, about 2:27 a.m. eastern standard time, southbound National Passenger Railroad Corporation (Amtrak) train 91, operating on a track warrant, diverted from the main track through a hand-thrown switch into a siding and collided head-on with stationary CSX Transportation local freight train F777 03.[1] The accident occurred on the CSX Columbia Subdivision in Cayce, South Carolina. At the time of the accident, the temperature was 40°F, and the wind was light. The figure shows the accident scene.

Figure. A view of the accident scene.

[1] *Track warrant* is a method of authorizing movements or protecting employees or on-track equipment in signaled or nonsignaled territory on controlled track within specified signals. These movements are under the jurisdiction of the train dispatcher.

The engineer and conductor of the Amtrak train died as a result of the collision. At least 92 passengers and crewmembers on the Amtrak train were transported to medical facilities. The engineer of the stopped CSX train had exited the lead locomotive before the Amtrak train entered the siding, ran to safety, and was not injured. The conductor of the CSX lead locomotive saw the Amtrak train approaching in the siding and ran to the back of locomotive. The conductor was thrown off the locomotive and sustained minor injuries. Accident damage was estimated at $25 million.

The normal method of train operation on the subdivision was a traffic control system with wayside signals. Signal indications authorize movement in either direction. On the day before the accident, February 3, 2018, CSX signal personnel suspended the traffic control signal system to install updated traffic control system components for implementing positive train control (PTC) on the subdivision. During the suspension, scheduled to last through February 4, 2018, dispatchers would use track warrants to move trains through absolute blocks in the work territory.[2] The signal personnel stopped work at the accident location at 7:00 p.m., and were scheduled to return on February 4 to complete the effort.

The NTSB formed the following technical investigative working groups:

- Operations
- Human Performance
- Crashworthiness
- Signal and Train Control
- Track and Engineering
- Mechanical/Equipment
- Event/Video Data Recorders

NTSB investigators inspected the track structure, signal system, and mechanical equipment; collected and are examining records for operations, signal systems, mechanical equipment, and track and engineering; and interviewed train crewmembers, train dispatchers, and other personnel from CSX and Amtrak. In addition, investigators are reviewing the emergency response to the accident. Members of the NTSB investigative team traveled to Jacksonville, Florida, to investigate the dispatching aspects of the accident, to test the CSX signal system, and to conduct additional interviews.

While on-scene, NTSB investigators located and removed the undamaged event data recorder from the destroyed Amtrak locomotive. The event data recorder was taken to Amtrak's

[2] (a) CSX used a mandatory directive, known as an EC-1 form, permitting passenger trains to proceed at speeds not to exceed 59 mph and for freight trains to proceed at speeds not to exceed 49 mph. (b) *Absolute block* means a block in which no train is permitted to enter while it is occupied by another train.

Raleigh, North Carolina facility, where it was successfully downloaded under the supervision of the NTSB recorder group chairman. An initial review of the data revealed the following information:

- From the train's last stop, the maximum speed reached 57 mph, which was below the 59 mph limit allowed under signal suspension rules.

- About 7 seconds before the end of the recording, the train was moving at 56 mph and the train's horn was activated for 3 seconds.

- The brake pipe pressure began decreasing 2 seconds later.

- The following second, the throttle transitioned from full throttle to idle, while the train was moving at 54 mph.

- The engineer induced emergency braking one second later, while the train was moving at a speed of 53 mph.

- The recording ended 2 seconds later, as the train's air braking system was approaching maximum braking effort and the train's speed was 50 mph.

The Amtrak locomotive's forward-facing video recorder hard drive was recovered and downloaded in NTSB's laboratory in Washington, D.C. The initial review of the recording indicated that it ended prior to the collision. NTSB engineers are attempting additional forensic efforts to determine if additional information can be recovered. Other investigative efforts included the download of information from the forward-facing video recorder and the extraction of the event recorder from the CSX lead locomotive.

Parties to the investigation include the Federal Railroad Administration, CSX, Amtrak, Brotherhood of Locomotive Engineers and Trainmen, International Sheet Metal, Air, Rail, and Transportation Workers-Transportation Division, Brotherhood of Railroad Signalmen, and the State of South Carolina Office of Regulatory Staff.

In response to this accident, on February 13, 2018, the NTSB issued an urgent recommendation requesting that the Federal Railroad Administration issue an emergency order providing instructions for railroads to follow when signal suspensions are in effect and a switch has been reported relined for a main track.