



National Transportation Safety Board
Washington, DC 20594

Safety Recommendation Report
Train Operation During Signal Suspension

Accident/Incident Number:	RRD18MR003
Operator:	CSX Transportation
Accident:	Amtrak/CSX Train Collision
Location:	Cayce, South Carolina
Date:	February 4, 2018
Recommendation Number:	R-18-005
Adopted:	February 13, 2018

The National Transportation Safety Board (NTSB) is investigating a head-on collision that occurred on February 4, 2018, about 2:27 a.m. eastern standard time on the CSX Transportation (CSX) Columbia Subdivision in Cayce, South Carolina. Southbound Amtrak train 91, operating on a track warrant, diverted from the main track through a reversed hand-thrown switch into a siding and collided head-on with stationary CSX local freight train F777 03.¹

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.

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 this time, scheduled to last through February 4, 2018, the signals would not operate and dispatchers would use track warrants to move trains through absolute blocks in the

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.

work territory.² Although the installation was only partially complete, the signal personnel stopped work at the accident location at 7:00 p.m., and the signal suspension remained in place.

Previous Investigation

On March 14, 2016, NTSB investigated a similar collision, which involved two Union Pacific Railroad (UP) freight trains in Granger, Wyoming. Westbound UP freight train KG1LAC-13 (5718 West) traveled from the main track through a switch into a controlled siding and collided head on with stopped eastbound UP local freight train LCK41-14 (5155 East). At the time, UP was installing and testing PTC on the main track. While this work was in progress, UP employees suspended signals and established absolute blocks to ensure that trains could move safely through the areas without signals (the suspension).

When 5718 West entered the limits of the suspension on main track 1, it was traveling about 46 mph. The crew saw that the switch at CP G844 was lined so that their train would enter a siding instead of continuing on main track 1. Typically, switches were not lined until the dispatcher had decided the next movement through the switch; therefore, the switch was still lined for the previous train movement. The engineer immediately applied the emergency brakes, and the train slowed to about 30 mph and collided with the stopped 5155 East.

The NTSB determined that the probable cause of the accident was that the employee-in-charge incorrectly used information from a conversation with the train dispatcher as authorization to send a train into the signal suspension territory. Contributing to the accident was the failure of the conductor pilot at CP G844 to check the switch position before authorizing the train to enter the signal suspension territory.³

Previous Recommendation to Federal Railroad Administration

On July 14, 2009, a Dakota, Minnesota & Eastern Railroad (DME) freight train was operating under track warrant authority in nonsignaled territory on the main track when it went into Bettendorf Yard in Bettendorf, Iowa, via a misaligned hand-operated switch and struck 19 loaded railcars on a yard track. The hand-operated switch had been left incorrectly lined from the main track onto the yard track by the crew of a BNSF Railway local train. The engineer and the conductor on the DME train sustained fatal injuries. The NTSB determined that the probable cause of the accident was, in part, the BNSF Railway local train crew releasing track warrant authority before returning the hand-operated switch to the correct position.⁴

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.

³ National Transportation Safety Board, *Collision of Two Union Pacific Railroad Freight Trains, Granger, Wyoming, March 14, 2016*, RAB-17/10 (Washington, DC: National Transportation Safety Board, 2017).

⁴ National Transportation Safety Board, *Collision of Dakota, Minnesota & Eastern Railroad Freight Train and 19 Stationary Railcars, Bettendorf, Iowa, July 14, 2009*, RAR-12/03 (Washington, DC: National Transportation Safety Board, 2012).

As a result of the Bettendorf, Iowa, accident, the NTSB issued the following recommendation to the Federal Railroad Administration (FRA):

R-12-29

Require that until appropriate switch position warning technology is installed on main track switches (in non-signaled territory not equipped with positive train control), when a main track switch has been reported relined for a main track, the next train to pass the location approach the switch location at restricted speed. That train crew should then report to the dispatcher that the switch is correctly lined for the main track before trains are allowed to operate at maximum authorized speed.

On April 18, 2013, NTSB classified Safety Recommendation R-12-29 *Closed—Reconsidered* because the FRA argued that implementing this recommendation, which would apply to 52% of US railroad route miles, would be too disruptive to transportation.⁵

Ongoing Investigation

In the current accident in Cayce, South Carolina, as well as in the Granger accident, the evidence indicates that human decision making and actions likely played key roles in the accident scenarios. In both accidents, safe movement of the trains through the signal suspension depended on proper switch alignment, which, in turn, relied on error-free manual work. The risk of error in the manual work was not safeguarded, either by technology or supervision. Thus, the reliance on error-free human performance for safe train movement created a single point-of-failure in the operating practices currently used and in compliance with extant regulations.⁶ The NTSB concludes that additional measures are needed, such as restricted speed, to ensure safe operations during signal suspensions, especially during the movement of passenger trains, due to the likelihood of harm to the traveling public.⁷

Therefore, the NTSB recommends that the Federal Railroad Administration (FRA) issue an Emergency Order directing railroads to require that when signal suspensions are in effect and a switch has been reported relined for a main track, the next train or locomotive to pass the location must approach the switch location at restricted speed. After the switch position is verified, require the train crew to report to the dispatcher that the switch is correctly lined for the main track before trains are permitted to operate at maximum-authorized speed.

⁵ *Dark Territory Working Group Update*, presentation to the 44th Railroad Safety Advisory Committee Meeting, May 20, 2011.

⁶ Technical studies on human performance have established that people are prone to committing errors of omission and commission and, therefore, safety-critical tasks must be designed with safeguards and fail-safe mechanisms to avoid system failures and catastrophic consequences (J. Reason, *Human Error* (Cambridge, U.K.: Cambridge University Press, 1990)).

⁷ According to Title 49 *Code of Federal Regulations (CFR)* 236.812, *restricted speed* is a speed that will permit stopping within one-half the range of vision, but not exceeding 20 miles per hour.

This recommendation would apply only to areas subject to a signal suspension—a minute portion of the United States’ rail network, whereas Safety Recommendation R-12-29 applied to all railroad dark territory.

Recommendation

As a result of this report, the National Transportation Safety Board makes the following urgent safety recommendation:

To the Federal Railroad Administration:

Issue an Emergency Order directing railroads to require that when signal suspensions are in effect and a switch has been reported relined for a main track, the next train or locomotive to pass the location must approach the switch location at restricted speed. After the switch position is verified, the train crew must report to the dispatcher that the switch is correctly lined for the main track before trains are permitted to operate at maximum-authorized speed. (R-18-005) (**Urgent**)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

ROBERT L. SUMWALT, III
Chairman

EARL F. WEENER
Member

T. BELLA DINH-ZARR
Member

Adopted: February 13, 2018