



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 5, 2003

**In reply refer to:** R-03-04

Honorable Allan Rutter  
Administrator  
Federal Railroad Administration  
1120 Vermont Avenue, N.W.  
Washington, D.C. 20590

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About 11:20 a.m. eastern daylight time on September 15, 2002, westbound Norfolk Southern Railway (NS) train 15T derailed in Farragut, Tennessee, while moving at 38 mph. The train was made up of 3 locomotives, 56 loads, and 86 empties; a total of 142 cars with a gross weight of 9,948 tons. Two locomotives and the first 25 cars derailed. A tank car containing sulfuric acid was punctured, releasing a cloud of toxic fumes that prompted local responders to evacuate about 2,600 people from a 4.4-square-mile area around the site. The evacuation lasted for about 2 1/2 days. Several local residents were treated for minor respiratory difficulties. There was no fire. Damages were estimated to be \$1.02 million.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of the September 15, 2002, derailment of Norfolk Southern Railway train 15T was (1) the decision by the train dispatcher and signal maintainer to allow the train to pass over the spring switch at maximum authorized speed before the switch had been adequately inspected or clamped closed and (2) the lack of company procedures requiring that train dispatchers, after receiving a report of a problem involving a main track switch, immediately stop trains or implement an appropriate speed restriction in the affected area.

At 8:30 a.m., about 2 hours 50 minutes before the derailment, eastbound NS train 721 moved through the spring switch from the Boyd siding onto the main track en route to Knoxville, Tennessee. About an hour later, the next train, eastbound train 703, received an unexpected *restricting* signal indication<sup>2</sup> at the west end of the Boyd siding, which is about 2 miles from the east Boyd siding switch. The train crew reduced train speed and reported the signal indication to the train dispatcher, as the operating rules required.

At the east end of the Boyd siding, the crew of train 703 stopped short of the spring switch so the conductor could look at the switch before proceeding. The conductor found that the

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<sup>1</sup> For additional information, see Railroad Accident Brief—*Derailed Norfolk Southern Railway Train 15T at Farragut, Tennessee, September 15, 2002*, Railroad Accident Brief NTSB/RAB-03/05 (Washington, D.C.: NTSB, 2003).

<sup>2</sup> With no traffic in the track blocks immediately ahead of train 703, the signal was expected to display a *clear* aspect.

left switch point (when facing west) was not seated tightly against the stock rail but instead had a 1/4-inch gap. After operating the spring switch through its motion several times, the conductor found that the left switch point was still failing to close completely, leaving about a 1/8-inch gap between the switch point and the stock rail. The engineer of train 703 radioed the train dispatcher and reported that the switch points had not lined “back all the way to line up for the main line; you might need somebody to look at it.” The dispatcher replied, “Alright, I’ll get somebody headed that way.” Because an eastbound train movement was a trailing movement that would tend to force the switch points back into the correct position, train 703 proceeded through the switch without incident.

About 9:45 a.m., just after train 703 had cleared the switch, the train dispatcher called a signal maintainer to inspect the spring switch. The dispatcher advised the signal maintainer that he did not have to hurry because no trains were due to arrive at the switch soon. The maintainer ate breakfast and departed his home at about 10:20 a.m., arriving at the switch at about 11:00 a.m. The signal maintainer said that as he approached the switch, he could see the signal controlling westbound train movements and noted that it was showing a *clear* aspect, indicating that the switch gap had closed after train 703’s movement over it.

The signal maintainer said when he arrived at the switch, he noted that the points appeared to be properly positioned. He said he visually inspected the switch and noticed that the plates, while not really dry, “looked like they could use a little oil.” He said he put oil on each plate. He said he went back to the heel block and then back to the switch point and did not see anything wrong.

In order to make an internal inspection of the switch to determine why the spring switch had gapped, the signal maintainer was required to get a track warrant to occupy the track and inspect the mechanical movement of the switch. The signal maintainer called the train dispatcher and told him that the switch appeared to be aligned properly and asked about a track warrant and any expected train traffic. The dispatcher told the signal maintainer that a freight train (train 15T) and a coal train were en route toward the switch. The signal maintainer replied, “Okay, all right, I will wait till these two [trains] get by [the switch] and holler at you.”

The signal maintainer, who was waiting on the north side of the main line adjacent to the switch, heard the train 15T crew call out the *clear* signal at east Boyd. According to event recorder data, train 15T approached the switch at about 38 mph. The engineer stated that as the locomotives moved over the switch, he felt a slight “tug,” and he, along with the conductor, looked back and saw the train starting to derail. The train went into emergency braking at that time. The engineer said he immediately saw what appeared to be a smoke cloud coming from the train. The engineer radioed the train dispatcher by using the emergency 911 radio tone and advised him of the derailment and of the smoke. The signal maintainer also called the dispatcher, at about 11:20 a.m., to report the derailment.

After the accident, a bolt was discovered missing from the No. 4 throw rod. A 2 7/8-inch-long piece of the head section of what was believed to be the missing bolt was found approximately 80 inches back from the switch point, lodged between the base flanges of the left switch point rail and the left stock rail. The investigation determined that this switch point likely gapped again when disturbed by the facing point movement of train 15T, causing the train to derail. Because the bolt section was lodged at the base of the closed rails, it was not visible with

the switch in the position that it was when the signal maintainer arrived. However, when the switch is operated and the rail sections separate, the switch point rail moves about 4 to 4 1/2 inches away from the stock rail. In this position, the heads of the throw rod bolts and the bases of the rails are visible. The location of the missing bolt would also have been visible.

NS has procedures for monthly and quarterly inspections of spring switches. The procedures for these periodic inspections required that switch points be opened and that the switch be operated in both directions. Had these procedures been followed by the signal maintainer when he responded to the trouble call, he likely would have found the obstruction or at least have encountered the gapping condition found by the conductor of train 703, and the derailment would not have occurred. The Federal Railroad Administration (FRA) minimum safety requirements for railroad track in 49 *Code of Federal Regulations* (CFR) 213.135(b) also specify that each switch point shall fit its stock rail properly. Only by actually operating the switch could the signal maintainer discover what prompted the trouble call and verify whether the switch was obstructed, binding, or otherwise defective. Because he did not operate the switch before the train passed over it, he did not perform an adequate inspection before train 15T's arrival. However, NS had no specific procedures that required a functional test of a spring switch after a trouble call.

The FRA requires that railroad employees immediately report potentially hazardous conditions,<sup>3</sup> and NS operating rules specify that trains must be fully protected against any known condition that may interfere with safe passage. NS also provides guidance that requires dispatchers to issue a slow order to trains after receiving a report of rough track. However, NS operating rules did not specify that, after a trouble call involving a switch, a complete inspection had to be performed before trains would be allowed to operate through the area. Nor did NS procedures address stopping trains or reducing train speeds after a trouble call involving the condition of a switch. In this accident, a slow order may not have prevented the derailment, but it almost certainly would have reduced its severity. Unfortunately, two trains were cleared to pass over the switch at maximum authorized speed before the switch point was clamped closed or an inspection was done to identify the cause of the reported gapping.

The automatic block signal system warned the crew of eastbound train 703 of a possible switch or track anomaly. But in the case of train 15T, the track misalignment occurred while the train was operating under a *clear* signal and most likely as a result of the combination of the switch obstruction and the train movement itself. Therefore, the signal system alone cannot be relied upon to protect trains against all switch defects.

This is not the first derailment the Safety Board has investigated that occurred because trains were allowed to run at inappropriate speeds where a potentially hazardous condition had been reported. As a result of its investigation of the 1998 derailment of Amtrak train 21 in Arlington, Texas,<sup>4</sup> the Safety Board made the following safety recommendation to the Association of American Railroads and the American Short Line and Regional Railroad Association:

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<sup>3</sup> Title 49 CFR 220.13(a).

<sup>4</sup> For more information, see National Transportation Safety Board, *Derailment of Amtrak Train 21 on the Union Pacific Railroad at Arlington, Texas, December 20, 1998*, Railroad Accident Report NTSB/RAR-01/02 (Washington, D.C.: NTSB, 2001).

R-01-13

Inform your member railroads of the circumstances of the December 20, 1998, derailment in Arlington, Texas, and urge them to ensure that their rules require train dispatchers, upon receiving reports of track problems, to immediately implement an appropriate speed restriction for the affected area and to immediately notify track maintenance personnel of the reported condition.<sup>5]</sup>

The Safety Board is concerned that railroad operating rules and practices may not address the findings of the investigations of the Arlington and Farragut accidents, which illustrate the importance of conducting an adequate inspection before resuming normal operations over a track segment or switch where a potentially hazardous condition has been reported.

The National Transportation Safety Board therefore makes the following safety recommendation to the Federal Railroad Administration:

Require that train dispatchers, upon receiving reports of potentially hazardous conditions involving a main track segment or switch, stop train movements or immediately implement an appropriate speed restriction for the affected area and remove the restriction only after the completion of those inspections and/or repairs that are essential for the safe movement of trains. (R-03-04)

The Safety Board also issued a safety recommendation to the Norfolk Southern Railway. In your response to the recommendation in this letter, please refer to R-03-04. If you need additional information, you may call (202) 314-6177.

Chairman ENGLEMAN, Vice Chairman ROSENKER, and Members GOGLIA, CARMODY, and HEALING concurred in this recommendation.

*Original Signed*

By: Ellen G. Engleman  
Chairman

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<sup>5</sup> Based on responses received from the recommendation recipients, Safety Recommendation R-01-13 to the Association of American Railroads was classified "Closed—Acceptable Action" on March 5, 2002. The same recommendation to the American Short Line and Regional Railroad Association was classified "Closed—Acceptable Action" on May 28, 2002.