

NATIONAL TRANSPORTATION SAFETY BOARD
Public Meeting of November 14, 2017
(Information subject to editing)

Amtrak Train Collision with
Maintenance-of-Way Equipment
Chester, Pennsylvania
April 3, 2016
NTSB/RAR-17/02

This is a synopsis from the NTSB's report and does not include the Board's rationale for the conclusions, probable cause, and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing to reflect changes adopted during the Board meeting.

Executive Summary

On April 3, 2016, about 7:50 a.m. eastern daylight time, southbound Amtrak train 89 (train 89) struck a backhoe with a worker inside at milepost 15.7 near Chester, Pennsylvania. The train was authorized to operate on main track 3 (track 3) at the maximum authorized speed of 110 mph. Beginning on the morning of April 1, Amtrak had scheduled track-bed restoration—ballast vacuuming—at milepost 15.7 on track 2 on the Philadelphia to Washington Line. Track 2 had to be taken out of service between control points Baldwin (milepost 11.7) and Hook (milepost 16.8) for the 55 hour duration of the project. As train 89 approached milepost 15.7, the locomotive engineer saw equipment and workers on and near track 3 and initiated an emergency brake application. The train speed was 106 mph before the emergency brake application and 99 mph when it struck the backhoe. Two roadway workers were killed, and 39 other people were injured. Amtrak estimated property damages to be \$2.5 million.

The accident investigation focused on the following safety issues:

- **Roadway Worker Protection:** Amtrak and the North American Operating Rules Advisory Committee have many rules for ways to protecting workers on maintenance of way projects. These include positive train control, which is designed, in part, to prevent incursions into work zones; using Form D and foul time to prevent train incursions into the work zone; supplemental shunting devices that activate track occupancy detection within the signal system and create a track occupancy light on the dispatcher's board, thus serving as an independent layer of safety; site-specific work plans that assess the risk of worksites to guide choices like the number of watchmen needed; and a job briefing conducted before each shift that includes the type of worker protection to be used.

- **Communication Between Dispatchers and Foremen:** This accident included several actions by dispatchers and foremen that affected the performance of their jobs and ultimately the safety of the work on the day of the accident. Most of the communications were made over cell phones instead of the radio. Because of this, no one else at Amtrak was able to hear the content of the conversations. Another listener may have been able to identify errors or incorrect decisions or assumptions made during these conversations.
- **Lack of Job Briefing:** The day foreman did not conduct a job briefing for the roadway workers and contractors before the shift began. A job briefing is required and includes the form(s) of protection from intrusions onto out of service tracks that will be used during the upcoming shift. The track protection information included in the job briefing makes workers aware of the presence or absence of track protection and enables them to question the absence of that protection if the protection plan has not been followed.
- **Safety Management:** The Chester accident investigation revealed 20 active failures of more than 2 dozen unsafe conditions—many involving safety rule violations and risky behaviors by workers. These safety shortcomings occurred across several levels of the Amtrak organization—maintenance of way, dispatchers, management—and reveal Amtrak’s weak safety management. An inconsistent vision of safety throughout the organization, hostile attitudes between labor and management about no-tolerance rule violations, and ill-equipped work crews were among the observed safety culture. Moreover, it is disconcerting that three of the Amtrak employees involved in the accident tested positive for potentially impairing drugs. at more than one level of management. The company’s safety program and its implementation at all levels of the company were found to be weak and focused on only the lowest level of employees: the roadway workers.

Findings

1. The track structure, signals, and mechanical equipment did not contribute to the accident.
2. The track supervisor had used two different opioids at some point before the accident, but based on behavioral evidence, drug-induced impairment of his job performance could not be determined.
3. The Amtrak engineer took timely and appropriate actions to stop the train and to warn the roadway workers about the train approaching their work area.
4. Although there was no operational evidence of impaired performance by the engineer, his use of marijuana was illicit and had not been deterred by his participation in the US Department of Transportation drug testing program, and any previous marijuana use had not been detected by random drug testing.
5. Amtrak did not effectively assure that its employees, especially those in safety-sensitive positions, were drug-free while performing their public transportation duties.

6. Had the two roadway workers used cocaine, codeine, or morphine with some regularity, been subject to random urine drug screening, and been selected for testing, their use of cocaine and opiates may have been detected before the accident.
7. The absence of a random drug testing program for maintenance-of-way employees at the time of the accident meant there was no effective program to deter the maintenance of way employees from using drugs.
8. The participation of the two roadway workers in the pool for random testing might have deterred them from using cocaine and opiates.
9. The result of the night foreman's actions and the day foreman's inactions based on their conversation was that tracks 1, 3, and 4 were not protected with foul time from about 7:30 a.m. until 7:50 a.m. when the accident occurred.
10. Had the two foremen communicated with the train dispatcher jointly about the transfer of fouls from one foreman to the other, it is likely that on-track safety and protection would not have lapsed and the accident would not have happened.
11. The inadequate and inconsistent use of supplemental shunting devices by Amtrak engineering personnel effectively defeated the roadway worker protection component of Amtrak's Advanced Civil Speed Enforcement System and thereby placed maintenance-of-way employees, equipment, and the traveling public at greater risk of harm.
12. Had the foremen ensured supplemental shunting devices were in place, the accident would not have occurred.
13. There was wide acceptance at Amtrak of not using supplemental shunting devices.
14. A specific efficiency test code for the foul time process that assesses supplemental shunting device use would give Amtrak the ability to monitor and improve supplemental shunting device compliance and change the culture of noncompliance.
15. Had the Federal Railroad Administration required shunting as recommended by the National Transportation Safety Board in Safety Recommendation R-08-06, the accident would not have occurred.
16. Amtrak management should have recognized that the project rose to a heightened level of hazard that required a detailed review or site-specific work plan before it began.
17. Safety hazards exist at complex smaller projects, and these hazards should be assessed and addressed with site-specific work plans.
18. Disengagement by a supervisor from a critical and regulated safety communication process reduces safety layering and at a minimum encourages other lax safety habits.

19. Had the supervisor been engaged with his duties and responsibilities, a proper and thorough job briefing would likely have been conducted and the employees would have had an opportunity to ask the day foreman how on-track safety was to be provided.
20. Had the day foreman conducted a thorough job briefing for all workers on the day shift, including the supervisor, before the work began, foul time protection or the lack thereof and which foreman had the foul time likely would have been discussed and then rectified or mitigated by removal of the backhoe from track 3.
21. Each employee present at the work site had the obligation to demand that a proper job briefing be conducted before they signed the safety briefing sheet.
22. The supervisory oversight in Amtrak's dispatcher center did not adequately monitor dispatcher responsibilities to ensure that supplemental shunting devices were used.
23. The personal phone calls made by the day train dispatcher while he was on duty distracted him from performing his job.
24. Amtrak's ongoing infrastructure work creates an increased exposure of roadway workers to incidents like the one at Chester.
25. Had Amtrak instructed dispatchers to operate trains at significantly slower speeds through the Chester work zone, the severity of the accident would have been diminished.
26. Amtrak's rules and supervisor expectations for dispatchers did not adequately emphasize safety.
27. These 29 active failures and latent conditions indicate a systemic problem with Amtrak's safety culture.
28. Amtrak's safety programs were deficient and failed to provide effective first-line safety oversight.
29. Amtrak did not have a viable reporting system in place to collect safety critical information.
30. The lack of consistent knowledge and vision for safety across Amtrak's management created a culture that facilitated and enabled unsafe work practices by employees.
31. Amtrak did not have an effective safety management system program.
32. By delaying progressive system safety regulation, the Federal Railroad Administration has failed to maximize safety for the passenger rail industry and the traveling public.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the unprotected fouled track that was used to route a passenger train at maximum authorized speed; the absence of supplemental shunting devices, which Amtrak required but the foreman could not apply because he had none; and the inadequate transfer of job site responsibilities between foremen during the shift change that resulted in failure to clear the track, to transfer foul time, and to conduct a job briefing. Allowing these unsafe actions to occur were the inconsistent views of safety and safety management throughout Amtrak's corporate structure that led to the company's deficient system safety program that resulted in part from Amtrak's inadequate collaboration with its unions and from its failure to prioritize safety. Also contributing to the accident was the Federal Railroad Administration's failure to require redundant signal protection, such as shunting, for maintenance-of-way work crews who depend on the train dispatcher to provide signal protection, prior to the accident.

RECOMMENDATIONS

New Recommendations

As a result of this investigation, the National Transportation Safety Board makes safety recommendations to the Federal Railroad Administration, Amtrak, Brotherhood of Maintenance of Way Employees Division, American Railway and Airway Supervisors Association, Brotherhood of Locomotive Engineers and Trainmen, and Brotherhood of Railroad Signalmen. The National Transportation Safety Board also reiterates a recommendation to the Federal Railroad Administration.

To the Federal Railroad Administration:

1. Enact Title 49 *Code of Federal Regulations* Part 270, System Safety Program, without further delay.
2. Require railroads to install technology on hi-rail, backhoes, other independently operating pieces of maintenance-of-way equipment and on the leading and trailing units of sets of maintenance-of-way equipment operated by maintenance workers to provide dispatchers and the dispatch system an independent source of information on the locations of this equipment to prevent unauthorized incursions by trains onto sections of track where maintenance activities are taking place in accordance with the Congressional mandate under the Rail Safety Improvement Act of 2008.

To Amtrak:

3. Establish a method to ensure that on-track protection in an active work zone is not lost during shift transfer.
4. Develop and implement an engineering safety procedure for preparing site-specific work plans for maintenance projects on the Northeast Corridor main line tracks spanning multiple shifts or multiple workdays to reduce or mitigate the inherent risks of maintenance-of-way work in a high-speed train operations environment.
5. Require supervisors to review train dispatchers' foul time log sheets to verify whether supplemental shunting devices are being adequately applied.
6. Revise its train dispatcher rules so that potentially distracting activities, such as making personal telephone calls, are not allowed while dispatchers are on duty and responsible for safe train operations.
7. Conduct a risk assessment for all engineering projects; use the results to issue significant speed restrictions for trains passing any engineering project that involves safety risks for workers, equipment, or the traveling public, such as ballast vacuuming, as part of a risk-mitigation policy.
8. Work with labor to achieve full participation in all applicable safety programs.
9. Work collaboratively with labor to develop and implement a viable safety reporting system (for example, C³RS); ensure that employees do not experience reprisal for using the system; respond quickly on the data collected; and communicate any resulting safety improvements to all employees.
10. Work collaboratively with labor in an effort to develop a comprehensive safety management system program that complies with pending Federal Railroad Administration regulation Title 49 *Code of Federal Regulations* Part 270, System Safety Program, and that vitalizes safety goals and programs with executive management accountability; incorporates risk management controls for all operations affecting employees, contractors, and the traveling public; improves continually through safety data monitoring and feedback; and is promoted at all levels of the company.
11. Once [the previous safety recommendation] is completed, implement the safety management system program throughout the company with resources sufficient to ensure that all levels of management and all labor unions involved with Amtrak operations accept and comply with the system.

To Brotherhood of Maintenance of Way Employees Division, American Railway and Airway Supervisors Association, Brotherhood of Locomotive Engineers and Trainmen, and Brotherhood of Railroad Signalmen:

12. Work with Amtrak to improve the effectiveness of all applicable safety programs.
13. Work collaboratively with Amtrak to develop and implement a viable safety reporting system (for example, C³RS).
14. Work collaboratively with Amtrak in an effort to develop a comprehensive safety management system program that complies with pending Federal Railroad Administration regulation Title 49 *Code of Federal Regulations* Part 270, System Safety Program, and that vitalizes safety goals and programs with executive management accountability; incorporates risk management controls for all operations affecting employees, contractors, and the traveling public; improves continually through safety data monitoring and feedback; and is promoted at all levels of the company.

**Previously Issued Recommendation Reiterated in This Report
To the Federal Railroad Administration:**

Require redundant signal protection, such as shunting, for maintenance-of-way work crews who depend on the train dispatcher to provide signal protection.
(R-08-6)