

NATIONAL TRANSPORTATION SAFETY BOARD
Public Meeting of June 18, 2013
(Information subject to editing)

**Head-On Collision of Two Union Pacific Railroad Company Freight Trains Near
Goodwell, OK
June 24, 2012
NTSB/RAR-13/02**

This is a synopsis from the Safety Board's report and does not include the Board's rationale for the conclusions, probable cause, and safety recommendations. Safety Board 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.

EXECUTIVE SUMMARY

On Sunday, June 24, 2012, at 10:02 a.m. central daylight time, eastbound Union Pacific Railroad (UP) freight train ZLAAH-22 and westbound UP freight train AAMMLX-22 collided head on while operating on straight track on the Union Pacific Pratt subdivision near Goodwell, Oklahoma. Skies were clear, the temperature was 89°F, and visibility was 10 miles.

The collision derailed 3 locomotives and 24 cars of the eastbound train and 2 locomotives and 8 cars of the westbound train. The engineer and the conductor of the eastbound train and the engineer of the westbound train were killed. The conductor of the westbound train jumped to safety. During the collision and derailment, several fuel tanks from the derailed locomotives were ruptured, releasing diesel fuel that ignited and burned. Damage was estimated at \$14.8 million.

The accident investigation focused on the following safety issues:

- **The actions and responsibilities of the train crews:** Crew conversations in the locomotive cab concerning signal aspects, radio transmissions, or any condition that can affect the safe operation of the train are important crew activities. In this accident, as the train passed signals for advance approach, approach, and stop, the engineer actively adjusted the throttle and dynamic brake as if all three signals were clear. The fact that the conductor was disengaged from his duties and did not appropriately intervene as the train proceeded through the signals demonstrates a serious failure of the UP's safety management system that allowed lagging implementation of crew resource management.

- **The medical examination process for railroad engineer certification:** The UP's medical records for the engineer of the eastbound train indicated that the engineer had passed his required vision test in 2009. However, the medical records from the engineer's personal physician, his ophthalmologist, and his optometrist documented that his vision could not be corrected with glasses and contact lenses to meet the Federal Railroad Administration's (FRA) visual acuity requirements. In 2009, for the first time, the engineer also failed the color vision test accepted by the FRA. Although he passed the UP's color vision field test for secondary testing, the validity and reliability of that test are unknown. Although the FRA regulations allow such secondary tests, they do not define the characteristics of such tests to assure they are valid and reliable. Finally, no attempt was made to increase the frequency of medical evaluation when the railroad was aware that the engineer's vision was deteriorating from a chronic, progressive condition.
- **The survivability of event recorder data:** The lead and trailing locomotives of both trains in this accident had event recorders to capture and preserve operational data that is important to accident investigation. However, most of the data could not be retrieved after the severe damage to the lead locomotives from the postaccident fire. What data were retrieved were downloaded from a trailing locomotive, but the amount of data relayed to the trailing locomotive was much less than the data captured by the recorders on the front of the train. And even though the event recorders on the lead locomotives had certified crashworthy memory modules, they did not survive the fire. If more of the locomotive operating data had been relayed to the recorder on the trailing locomotive or to another location, information critical to the investigation of the accident would likely have survived the accident.
- **The need for implementation of positive train control:** Before reaching the Goodwell siding, the eastbound train crew had passed three signals without appropriately responding by slowing and then stopping their train. Regardless of the reason for the crew's nonresponse, had a positive train control system been in place in the area of the accident, it would have slowed and stopped the train, avoiding the collision.

As a result of this investigation, the National Transportation Safety Board makes safety recommendations to the Federal Railroad Administration, the Brotherhood of Locomotive Engineers and Trainmen, the United Transportation Union, all Class I Railroads, the Union Pacific Railroad, and all railroads subject to the positive train control provisions of the Rail Safety Improvement Act of 2008. The National Transportation Safety Board also reiterates recommendations to the Federal Railroad Administration and the Association of American Railroads and reclassifies three recommendations to the Federal Railroad Administration.

FINDINGS

1. The following were not factors in the accident: the weather; the condition of the track, the locomotives, or the railcars; the signal system; cell phone use by any of the crewmembers; or drug or alcohol use by the conductor of the westbound train.

2. Both crewmembers of the eastbound train failed to maintain proper crew coordination and jointly failed to make proper decisions and actions to control the train safely.
3. There is an adequate foundation of guidance and opportunity for railroads to develop and deploy crew resource management programs.
4. Had crewmembers of the eastbound train received training in and practiced the principles of crew resource management, they likely would have demonstrated improved coordination, communication, and discipline while operating the train.
5. A nonpunitive peer audit program is an important element of an effective safety management system and would provide railroads with opportunities to better understand and address operational safety issues.
6. Had the UP established, maintained, and enforced a safety management system, it is likely that this accident may have been avoided.
7. Insufficient information was available to determine whether fatigue of the eastbound train crew was a factor in the accident.
8. For undetermined reasons the conductor of the eastbound train was disengaged from performing his duties as the train passed the advance approach, approach, and stop signals.
9. The results from required medical examinations and Union Pacific Railroad conversations with the engineer's health care providers demonstrated to the Union Pacific Railroad that the eastbound train engineer's vision had significantly deteriorated because of a chronic medical condition.
10. The engineer of the eastbound train was unable to visually detect and correctly interpret the signals and he operated the train as if the signal aspects were green.
11. The Union Pacific Railroad failed to adhere to its policy requiring written documentation from an outside source to verify visual acuity and failed to perform followup testing recommended by its own chief medical officer, either of which would have helped ensure that vision standards were continuously being met.
12. The Union Pacific Railroad relies on a color vision field test of unknown validity, reliability, and comparability for certification of employees in safety-sensitive positions.
13. The field test used by the Union Pacific Railroad fails to ensure that Union Pacific Railroad employees have adequate color perception to perform in safety-sensitive positions.
14. Color vision field tests used after standardized color vision tests have been failed are not defined in Federal Railroad Administration regulations to ensure valid, reliable, and comparable assessments.
15. Medical certification requirements identifying chronic conditions with the potential to deteriorate dangerously, such as glaucoma, and increased frequency of medical evaluation

for those conditions would very likely have identified the further decline in the eastbound engineer's vision and would have decertified him prior to this accident.

16. Upgrading Federal Railroad Administration medical certification procedures for employees in safety-sensitive positions to include comprehensive health examinations, standardized testing across the industry, and centralized oversight of certification decisions when initial testing is failed, as well as more frequent medical certification when an employee has a condition with the potential to deteriorate, would improve transportation safety.
17. Redundant storage of event data provided critical data to the accident investigation that would have been otherwise unavailable.
18. Because data from locomotive video cameras are typically not stored in crashworthy memory modules, important operational and safety data are at risk of being lost after an accident.
19. Had a positive train control system been installed and used on the Union Pacific Railroad's Pratt subdivision, this accident would have been prevented.
20. If all railroads required to implement positive train control provided frequent updates to the Federal Railroad Administration on the progress of positive train control implementation, the Federal Railroad Administration and the public would be better able to follow the progress and estimate when railroads will come into compliance with the mandates in the Rail Safety Improvement Act of 2008.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the eastbound Union Pacific Railroad train crew's lack of response to wayside signals because of the engineer's inability to see and correctly interpret the signals; the conductor's disengagement from his duties; and the lack of positive train control, which would have stopped the train and prevented the collision regardless of the crew's inaction. Contributing to the accident was a medical examination process that failed to decertify the engineer before his deteriorating vision adversely affected his ability to operate a train safely.

RECOMMENDATIONS

New Recommendations

As a result of this investigation, the National Transportation Safety Board makes the following new safety recommendations:

To the Federal Railroad Administration:

1. Determine what constitutes a reliable, valid, and comparable field test procedure for assessing the color discrimination capabilities of employees in safety-sensitive positions. (R-13-XX)
2. When you have made the determination in [the previous recommendation], require railroads to use a reliable, valid, and comparable field test procedure for assessing the color discrimination capabilities of employees in safety-sensitive positions. (R-13-XX)
3. Require more frequent medical certification exams for employees in safety-sensitive positions who have chronic conditions with the potential to deteriorate sufficiently to impair safe job performance. (R-13-XX)
4. Develop medical certification regulations for employees in safety-sensitive positions that include, at a minimum, (1) a complete medical history that includes specific screening for sleep disorders, a review of current medications, and a thorough physical examination, (2) standardization of testing protocols across the industry, and (3) centralized oversight of certification decisions for employees who fail initial testing; and consider requiring that medical examinations be performed by those with specific training and certification in evaluating medication use and health issues related to occupational safety on railroads. (R-13-XX)
5. Require all information captured by any required recorder to also be recorded in another location remote from the lead locomotive(s), to minimize the likelihood of the information's being unrecoverable as a result of an accident. (R-13-XX)
6. Publish the positive train control implementation update reports submitted by all railroads subject to the positive train control provisions of the Rail Safety Improvement Act of 2008 and make the reports available on your website within 30 days of report receipt. (R-13-XX)

To the Brotherhood of Locomotive Engineers and Trainmen:

7. Work with the Union Pacific Railroad and the United Transportation Union to develop and implement a nonpunitive peer audit program focused on rule compliance and operational safety for the Union Pacific Railroad. (R-13-XX)

To the United Transportation Union:

8. Work with the Union Pacific Railroad and the Brotherhood of Locomotive Engineers and Trainmen to develop and implement a nonpunitive peer audit program focused on rule compliance and operational safety for the Union Pacific Railroad. (R-13-XX)

To All Class I Railroads:

9. Install in all controlling locomotive cabs and cab car operating compartments crash- and fire-protected inward- and outward-facing audio and image recorders. The devices should have a minimum 12-hour continuous recording capability. (R-13-XX)
(R-13-XX)

To All Railroads Subject to the Positive Train Control Provisions of the Rail Safety Improvement Act of 2008:

10. Provide positive train control implementation update reports to the FRA every 6 months until positive train control implementation is complete. The update reports should consist of two sections: components and training. The components section should include a description of the positive train control component to be implemented, the number of components, the number of components completed on the report date, the number of components that remain to be completed, the overall completion percentage, and the estimated completion date. Components are defined as locomotives, wayside units, switches, base station radios, wayside radios, locomotive radios, and any new and novel technologies that are part of a positive train control system. The training section shall include the number of safety-related employees and equivalent railroad carrier contractors and subcontractors that need to be trained, by class and craft; minimum training standards for those employees and contractors, meaning the knowledge of and ability to comply with federal railroad safety laws and regulations and carrier rules and procedures to implement positive train control; the percentage of employees who have completed training; the percentage of employees who remain to be trained; and the estimated date that training will be completed. (R-13-XX)

To Union Pacific Railroad:

11. Work with the Brotherhood of Locomotive Engineers and Trainmen and the United Transportation Union to develop and implement a nonpunitive peer audit program focused on rule compliance and operational safety. (R-13-XX)
12. Develop and implement a plan to establish a safety management system that incorporates crew resource management. (R-13-XX)

13. Audit your medical records to ensure that all personnel in safety-sensitive positions have adequate documentation of appropriate medical testing. (R-13-XX)
14. Replace your color vision field test with a test that has established and acceptable levels of reliability, validity, and comparability to ensure that certified employees in safety-sensitive positions have sufficient color discrimination to perform safely. (R-13-XX)
15. Until you have implemented a validated, reliable, and comparable color vision field test, perform a safety analysis and undertake measures to manage the risk created by the use of an inadequate test. Such measures might include, but are not limited to, restricting crewmembers who have failed primary color vision testing to yard assignments or unsignaled territory. (R-13-XX)
16. Once your replacement color vision field test is implemented, retest all certified Union Pacific Railroad employees in safety-sensitive positions who failed the primary color vision testing on their last medical certification exam using the new procedure. (R-13-XX)

Previously Issued Recommendations Reiterated in This Report

As a result of this accident investigation, the National Transportation Safety Board reiterates the following previously issued safety recommendations:

To the Federal Railroad Administration:

Require the installation, in all controlling locomotive cabs and cab car operating compartments, of crash- and fire-protected inward- and outward-facing audio and image recorders capable of providing recordings to verify that train crew actions are in accordance with rules and procedures that are essential to safety as well as train operating conditions. The devices should have a minimum 12-hour continuous recording capability with recordings that are easily accessible for review, with appropriate limitations on public release, for the investigation of accidents or for use by management in carrying out efficiency testing and systemwide performance monitoring programs. (R-10-1)

Require that railroads regularly review and use in-cab audio and image recordings (with appropriate limitations on public release), in conjunction with other performance data, to verify that train crew actions are in accordance with rules and procedures that are essential to safety. (R-10-2)

To the Association of American Railroads:

Develop a standard that specifies the use of suitable crash-protected memory modules for all new and existing installations of onboard video and audio recorders. The memory modules should meet or exceed the survivability criteria specified in Title 49 *Code of Federal Regulations* Section 229.135 Appendix D, Table 2. (R-12-24)

Previously Issued Recommendations Reclassified in this Report

As a result of this accident investigation, the National Transportation Safety Board reclassifies the following previously issued safety recommendations:

To the Federal Railroad Administration:

R-02-24

Develop a standard medical examination form that includes questions regarding sleep problems and require that the form be used, pursuant to 49 CFR Part 240, to determine the medical fitness of locomotive engineers; the form should also be available for use to determine the medical fitness of other employees in safety-sensitive positions.

Safety Recommendation R-02-24, previously classified “Open—Acceptable Response” is now classified “Closed—Unacceptable Action, Superseded” by recommendation 4 in this report.

R-02-25

Require that any medical condition that could incapacitate, or seriously impair the performance of, an employee in a safety-sensitive position be reported to the railroad in a timely manner.

Safety Recommendation R-02-25, previously classified “Open—Acceptable Response” is now classified “Closed—Unacceptable Action, Superseded” by recommendation 4 in this report.

R-02-26

Require that, when a railroad becomes aware that an employee in a safety-sensitive position has a potentially incapacitating or performance-impairing medical condition, the railroad prohibit that employee from performing any safety-sensitive duties until the railroad’s designated physician determines that the employee can continue to work safely in a safety-sensitive position.

Safety Recommendation R-02-26, previously classified “Open—Acceptable Response” is now classified “Closed—Unacceptable Action, Superseded” by recommendation 4 in this report.