



National Transportation Safety Board
Washington, D.C. 20594

Railroad Accident Brief

Accident No.: DCA-07-FR-001
Location: Pajaro, California
Date: October 13, 2006
Time: 9:20 a.m., Pacific daylight time¹
Railroad: Union Pacific Railroad
Property Damage: None
Fatalities: 1
Injuries: None
Type of Accident: Yard switching operations

The Accident

On October 13, 2006, at 9:20 a.m., a Union Pacific Railroad (UP) switching brakeman was struck and killed by three coupled railroad cars at the UP's Watsonville Junction Yard in Pajaro, California. The brakeman had been assigned to a two-person crew (one brakeman, one conductor) designated as LRQ42R-13, which was a regular weekday assignment. Their assignment was to switch² railroad cars using a remote-controlled locomotive.

This crew was the only one working in the yard. The conductor was using an Operator Control Unit (OCU) to remotely control a locomotive that was used to switch railroad cars onto various yard tracks. (See figure 1.) The brakeman was to (1) ensure that the car couplings were successfully completed, (2) set the hand brakes, as needed, and (3) connect the air hoses.

The two men started switching cars about 8:00 a.m.; their first two switching operations of the day were uneventful. During the third switching operation, three railroad cars were to be switched on the south³ end of the yard. After the locomotive and the three coupled railroad cars were moving about 9 mph, the conductor lifted an uncoupling lever that uncoupled the cars from the locomotive and allowed the cars to roll freely onto track 4 at 9 mph, which was 6 mph faster than the maximum permissible speed for this release of free-rolling cars. The UP uses the terms "pinning" and "kicking" to classify the speed of free-rolling cars that are being released during switching operations. The term "pinning" is used for speeds of 3 mph or less; the term "kicking" is used for speeds greater than 3 mph.

¹ All times in this brief are Pacific daylight time.

² *Switch* means to move cars to other tracks based on their destinations.

³ The yard's designations do not always correspond with compass directions.

The locomotive's event recorder indicated that the brakeman's OCU transmitted a tilt warning⁴ at 9:20 a.m. One second later, the OCU transmitted an emergency brake command. The tilt warning continued for 4 more seconds, and then the OCU transmitted an automated "man down."

The conductor said that he and the brakeman had discussed the operation by radio before the accident. He said that he had last seen the brakeman standing on the access road between tracks 2 and 4 about 200 to 300 feet north of the lead car. (The yard did not have a track 3.)



Figure 1. Operator Control Unit.

Investigation

The brakeman's cap, earplugs, and OCU battery were found between the rails, about 239 feet from the track 4 switch. The brakeman's body was found about 39 feet from his belongings. During the investigation, blood was found on the leading wheels and the undercarriages of the trailing two railroad cars; however, no blood was found on the first car. The handbrakes for the

⁴ A *tilt warning* occurs when an OCU is tilted more than 45° for 1 second.

first car and the second car were located between the cars. The evidence indicates that the brakeman fell between the first and second cars that were still moving about 9 mph, and he was struck by the second and third cars.

The following three UP rules were applicable to this accident:

- Employees are prohibited from getting on or off moving equipment, except in an emergency, or in limited conditions when the equipment is moving 2 mph or less (UP safety rule 81.4.2)
- No kicking of cars in the yard; the maximum permissible speed for the pinning of cars on the lead track is 3 mph (Manager of Train Operation Circular No. 2)
- The speed limit in the yard is 5 mph (Roseville Area Timetable No. 4)

No witnesses saw the brakeman's final actions. The three railroad cars were found without their handbrakes applied and were coupled to the 20 cars that were already on the track. No mechanical defects were found on the three cars.

Personnel Information

Since October 6, 2006, the brakeman and the conductor had worked together on the LRQ42R-13 assignment.

Brakeman

The brakeman was 49 years old, and the UP had hired him on February 14, 2004. He had received his remote control operator's license on April 12, 2004. He passed his last rules exam on December 7, 2005. During the year preceding the accident, UP managers had observed him on 17 occasions; one exception was noted regarding a job briefing. On May 3, 2005, nearly 1 1/2 years before the accident, he was observed getting on and off of moving equipment on two separate occasions; he was disciplined accordingly (UP safety rule 81.4.2).

According to his personnel file, in September 2006, he had derailed a car after an overspeed-coupling attempt. As a result, he had agreed to participate in Continuing Operating Rules Education. Investigators established the brakeman's 72-hour history based on work records and family interviews; no evidence was found to indicate that he may have been fatigued at the time of the accident.

Conductor

The conductor was 25 years old. The UP had hired him on March 15, 2004. He was promoted to conductor on June 11, 2004. He received his remote control operator's license on July 17, 2004. He passed his last rules exam on November 29, 2005. During the year preceding the accident, UP managers had observed him on 22 occasions; one exception was noted about securing equipment against an undesired movement. Investigators established the conductor's

72-hour history based on work records and interviews with him; no evidence was found to indicate that he may have been fatigued at the time of the accident.

Postaccident Equipment Testing

During postaccident equipment testing, the three accident cars were re-coupled to the locomotive. The cars were then pulled onto the lead track in their original positions. During the test, the three cars were uncoupled at 4 mph at the same location where they had been uncoupled when the accident occurred. The cars were uncoupled at 1 mph more than the yard's maximum permissible speed for the pinning of cars; the cars rolled to a stop several hundred feet short of the stationary 20 cars. This test shows that a speed greater than the yard's maximum permissible speed was needed to couple the 3 cars with the stationary 20 cars, when the cars are released at the same point used by the accident crew.

Alcohol and Drug Testing

Before starting the day's work, both crewmembers—in accordance with 49 *Code of Federal Regulations* (CFR) 219 Subpart G—had been selected for random alcohol and drug testing. They provided urine and breath specimens shortly after they had reported for work, at 6:00 a.m. After providing their specimens, the crew was immediately released for duty. Later, the laboratory test results were found to be negative for both alcohol and tested drugs.⁵

After the accident, the postaccident blood and urine specimens from the conductor were negative for alcohol and drugs. The brakeman's blood and urine specimens were negative for alcohol, but were positive—3,910 nanograms per milliliter (ng/ml) in blood and 5,157 ng/ml in urine—for a prescription barbiturate, butalbital, at a therapeutic level. Additional postaccident toxicological tests performed in conjunction with the brakeman's autopsy identified 0.45 milligrams per liter (mg/l) of propoxyphene and 0.80 mg/l of norpropoxyphene in blood.

The brakeman had fractured his neck over 25 years earlier; he had a 7-year history of chronic neck pain and a 2-year history of frequent headaches. About 2 months before the accident, the brakeman's personal physician had prescribed new medications, which contained butalbital and propoxyphene, because of his headaches. Butalbital is a prescription barbiturate that is typically used for severe headaches. Although butalbital has not specifically been studied for impairing effects, barbiturates have been shown to impair the performance of pilots in flight;⁶ the impairment does not always correlate with subjective effects. In this accident, the levels found in the brakeman's blood suggest that he had likely used butalbital within the previous 12 hours. Propoxyphene is a prescription narcotic painkiller, used for the control of moderate pain, and norpropoxyphene is a metabolite of propoxyphene. Propoxyphene has been shown to adversely affect psychomotor performance within 6 hours of use.⁷ The blood levels in this case suggest that the brakeman had likely used the propoxyphene in the previous 6

⁵ Marijuana, cocaine, amphetamines, opiates, and phencyclidine (PCP) are the only drugs tested.

⁶ C.E. Billings, R.J. Gerke, and R.L. Wick Jr., "Comparisons of Pilot Performance in Simulated and Actual Flight," *Aviation, Space, and Environmental Medicine* March 1975, 46(3): 304-8.

⁷ R.C. Baselt, *Drug Effects on Psychomotor Performance* (Foster City, CA: Biomedical Publications, 2001).

hours or less.⁸ Given the circumstances, it seems likely that the brakeman was at least somewhat impaired by the recent use of two potentially impairing medications at the time of the accident.

Federal Regulation

According to 49 CFR Part 219.103(a)(1), an employee may not use prescribed and over-the-counter drugs unless the following is true:

The treating medical practitioner or a physician designated by the railroad has made a good faith judgment, with notice of the employee's assigned duties and on the basis of the available medical history, that use of the substance by the employee at the prescribed or authorized dosage level is consistent with the safe performance of the employee's duties.

The Federal Railroad Administration (FRA) has prepared a draft notice of proposed rulemaking (NPRM) in consultation with the Railroad Safety Advisory Committee to establish fitness-for-duty guidance for safety-critical employees regarding their use of prescription medications, over-the-counter drugs, dietary supplements, and herbal remedies. On December 1, 2008, the FRA announced at 73 *Federal Register* 72909 that the anticipated date for publishing the NPRM is May 2009.

Postaccident Actions Taken by UP

Following the accident, the UP reviewed its rules for several yards in California, including the Watsonville Junction Yard. On October 18, 2006, 5 days after this accident, the UP reiterated⁹ its prohibition of kicking cars in the Watsonville Junction Yard.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the Union Pacific Railroad brakeman being struck and killed on October 13, 2006, in Pajaro, California, was the brakeman's decision to board moving equipment. Contributing to the accident was the crew's failure to properly follow the Union Pacific Railroad's speed restrictions when switching cars.

Adopted: December 5, 2008

⁸ R.C. Baselt, *Disposition of Toxic Drugs and Chemicals in Man* (5th Ed.) (Foster City, CA: Chemical Toxicology Institute, 2000).

⁹ UP Circular 02, dated January 3, 2006, stated, "There will be no kicking on any job for any reason" at the Watsonville Junction Yard.