



National Transportation Safety Board

Railroad Accident Brief

Amtrak Train Derailment on BNSF Railway Tracks

Cimarron, Kansas

The Accident

On March 13, 2016, about 9:30 a.m. central daylight time, an unattended two-axle agricultural truck loaded with cattle feed rolled away from the Cimarron Crossing Feeders feedlot, in Cimarron, Kansas.¹ The truck rolled down a hill, across a highway, and collided with the BNSF Railway (BNSF) railroad tracks. The collision caused a lateral shift in the tracks at milepost (MP) 372.09. At 12:02 a.m. the next day, an eastbound Amtrak (National Railroad Passenger Corporation) passenger train derailed while crossing the misaligned tracks.

The Los Angeles-to-Chicago train, which had two locomotives and 10 cars, was operating on the La Junta Subdivision. The last four cars derailed on their sides, and two other cars derailed upright. (See figure 1.) Of the 130 passengers and 14 Amtrak employees on board, 28 were injured. Amtrak and the BNSF estimated the damages to be more than \$1.4 million.



Figure 1. Accident site. (Photo: Kansas Highway Patrol.)

¹ Unless otherwise noted, all times in this report are central daylight time.

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The Investigation

The crew included a locomotive engineer, an engineer trainee, a conductor, an assistant conductor, and 10 service attendants. They went on duty on March 13, 2016, at 7:11 p.m. mountain daylight time, in La Junta, Colorado.

The engineer said that they had an uneventful trip from La Junta to Garden City, Kansas, with the student engineer operating the train. The engineer took over the controls in Garden City and was operating the train at the time of the accident. The train was traveling at the maximum authorized speed of 60 miles per hour (mph) as it approached MP 372.09.

The curvature of the track and the nighttime conditions limited the engineer's view; however, both the engineer and engineer trainee saw the misaligned track as soon as it came into view. They independently initiated an emergency airbrake application and braced for a derailment. The train traveled about 1,000 feet before it stopped.

The conductor radioed the engineer and asked whether the train had struck a vehicle at the highway-rail grade crossing. The engineer responded that the track was misaligned, and she had made an emergency airbrake application. The conductor inspected the train and discovered that the train had derailed; the rear four cars were on their sides. The conductor instructed the engineer to radio the train dispatcher and request emergency assistance. Initially, the crew had difficulty contacting the dispatcher, but eventually made contact.

Cimarron Crossing Feeders

Cimarron Crossing Feeders, a feedlot supplier, was across a highway that was adjacent to the BNSF tracks. During an interview, a Cimarron Crossing employee said he was on a ladder about 9:30 a.m. when he saw the loaded feed truck roll downhill from the feedlot. He yelled to the truck driver that the truck was rolling down the hill; the truck driver tried unsuccessfully to catch it. The Cimarron Crossing employee watched the truck gain speed as it approached the highway. As it picked up speed, the truck rolled through a field, across a highway, and struck the railroad track, which stopped the forward movement of the truck. (See figure 2.)

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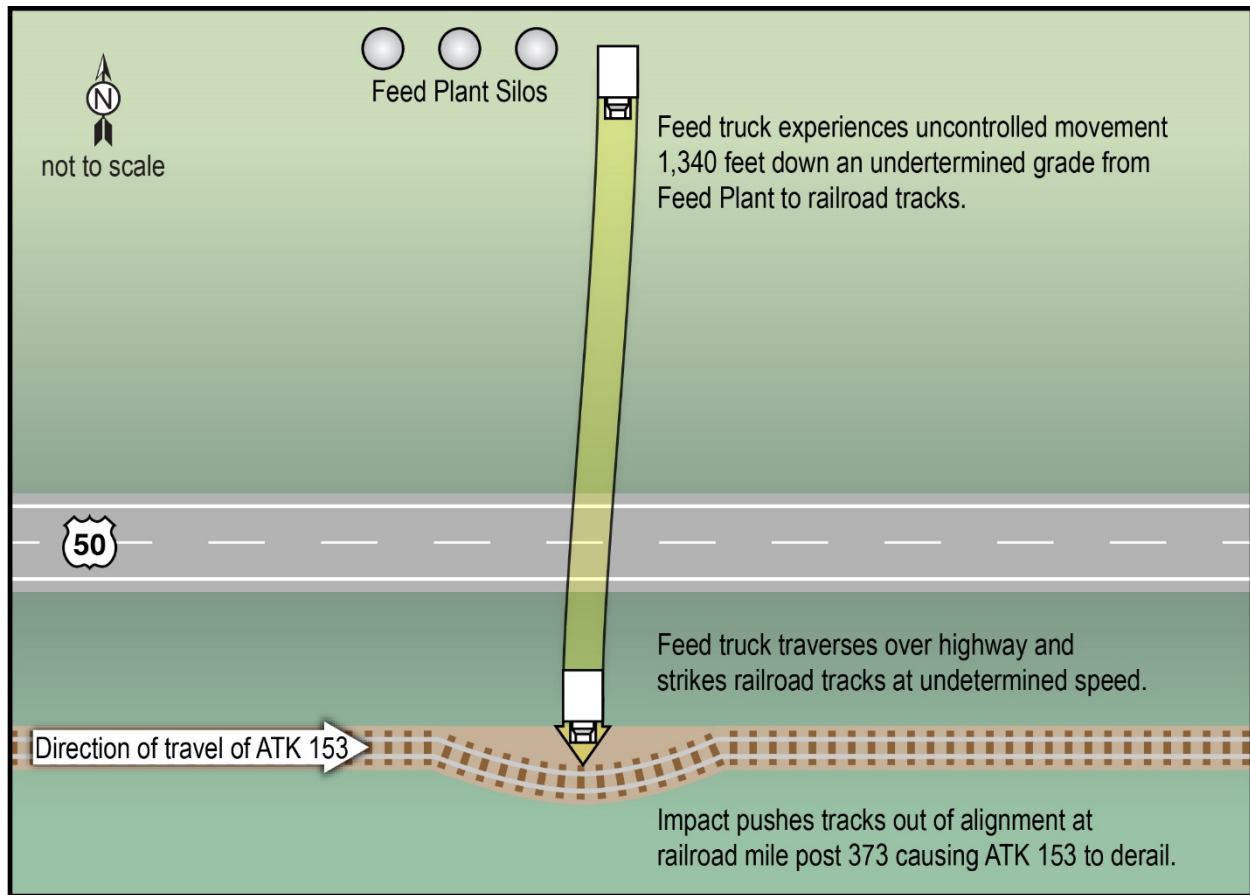


Figure 2. The truck's path from the feedlot into the railroad tracks.

Unable to stop the runaway feed truck, the truck driver said he immediately followed it to the railroad tracks and retrieved it. He said he was not aware the railroad tracks had been damaged.

The employee who first saw the feed truck roll away from the feedlot reported the incident to a Cimarron Crossing supervisor, but no one reported the incident to local officials or the railroad. The supervisor said the truck had already been taken back to Cimarron Crossing when he arrived at the scene. He said no one told him the truck had made contact with the railroad tracks, only that it had rolled down the hill. He said he did not inspect the tracks.

After the derailment, investigators and local police agencies documented the set of wheel marks and the path of the truck from the feedlot silos to the track. The tire tracks led directly back to the feedlot silos.

Emergency Response

After the derailment, the engineer radioed the BNSF train dispatcher three times, but he did not reach the dispatcher.² After the third attempt, the student engineer used his personal cell phone to call 911 to report the derailment and to ask for emergency assistance.

² Investigators learned that the engineer was not using the emergency call feature on the radio, which delayed the dispatcher's response.

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As the conductor and assistant conductor moved through the passenger cars, they distributed glow sticks to the passengers and escorted the passengers to safety in the darkness. Emergency medical personnel arrived at 12:12 a.m.

Postaccident Toxicological Testing

Federal law requires postaccident toxicological testing of the operating employees (the engineer, the student engineer, the conductor, and the assistant conductor).³ The four employees tested negative for a battery of impairing substances.⁴

Mechanical

Extensive postaccident inspections of the derailed equipment failed to disclose any defective condition that could have caused the accident. The postaccident tests performed on the air brake systems on each car showed that each system functioned as designed.

Method of Operation

The BNSF's La Junta Subdivision extends west from MP 124.7 near Ellinor, Kansas, to MP 533.6 near Las Animas, Colorado. The maximum authorized speed on the subdivision is 79 mph for passenger trains.⁵ Track warrant control (TWC), an automatic block signal system, an automatic train stop system, operating rules, and timetable instructions governed train movements.⁶

Track Description

Amtrak operated one train a day in each direction, and the BNSF operated two trains a day over this subdivision. The La Junta Subdivision consists of primarily a single main track and sidings with multiple main tracks between control points 1846 and 1900.

³ Title 49 *Code of Federal Regulations (CFR)* Part 219, Subpart C, Postaccident Toxicological Testing.

⁴ FRA postaccident toxicology testing was conducted by Quest Laboratory. Urine specimens were tested for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, MDMA/MDA, methadone, opiates / opioids, phencyclidine, tramadol, brompheniramine, chlorpheniramine, diphenhydramine, doxylamine, and pheniramine. Blood specimens were tested for alcohol. (MDMA and MDA are psychostimulants. MDMA is 3,4-methylenedioxymethamphetamine—commonly called “ecstasy” or “molly;” MDA is 3,4-methylenedioxyamphetamine—commonly called “sally.”)

⁵ A permanent speed restriction on the subdivision brought the maximum authorized speed from 79 to 60 mph.

⁶ TWC is a method to authorize train movements or protect men or machines on a main track within specified limits in a territory designated by the timetable. An automatic train stop system is a system on a train that will automatically stop a train if certain situations occur.

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Figure 3. Looking west from the point of derailment at the misalignment (or lateral shift) of the track after the train moved over the shifted track. (Photo: FRA)

Postaccident Signal System Examination and Testing

The postaccident inspection found all signal equipment secured with no indications of either tampering or vandalism. Investigators examined signals and downloaded data, verified signal aspects, conducted ground testing, and recorded signal lamp voltage measurements. Investigators found no defects in the signal system or other signal equipment.

Event and Onboard Image Recorder Data

When the derailment occurred, the accident train's lead locomotive transmitted a short video and an e-mail notification to supervisors at Amtrak headquarters. Investigators downloaded 1 hour of forward-facing video from the lead locomotive and event recorder data from both locomotives.

The forward-facing camera recorded the train as it approached the displaced rails. The video showed a distortion where the truck had hit the track immediately before the derailment. The event recorder records an emergency brake application immediately after the distortion comes into view. The derailment occurred 25 feet beyond where the truck hit the track.

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Scene Investigation

At the scene, investigators found recent damage to the north ends of the ties at MP 373.07, recent tire marks perpendicular to the point of impact, and some cattle feed on the ground. (See figure 4.)



Figure 4. A red circle marks the impression from the truck's tire in the rock at the side of the tracks. The yellow circle marks the spot where the truck hit the railroad tracks.

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Figure 5. The 2004 Kenworth International agricultural truck that struck the BNSF track is shown parked at Cimarron Crossing Feeders.

Investigators traced the tire tracks to a 2004 Kenworth International truck at Cimarron Crossing Feeders. The truck hauled flaked corn for distribution to feed bins. (See figure 5.) They observed recent damage to the truck's front bumper that was consistent with the striking of railroad ties. The front-left and front-right bumper mounting brackets were broken. The fracture faces were clean and showed no sign of oxidation, indicating a recent break. Fresh scratches and rocks consistent with the track ballast were on the bumper. Investigators examined the tire treads of the truck and matched it with the patterns observed and photographed at MP 373.07. (See figure 6.)



Figure 6. Tread pattern adjacent to MP 373.07; the right rear tires of the agricultural truck.

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Reporting Issues Involving Railroad Equipment

All railroads were required to establish an Emergency Notification System by July 2015 to assist the public in reporting unsafe situations at grade crossings, such as malfunctioning warning signals or vehicles stalled on the tracks. Signs at highway-rail grade crossings must display a unique crossing number and a toll-free telephone number to a 24-hour call center, automated answering system, or third-party telephone service. In this accident, the truck struck the tracks in rural Kansas; the closest grade crossing with posted emergency telephone numbers was 4.4 miles away and not readily accessible to the truck driver.

Railroads are not required to post emergency contact numbers other than at grade crossings. In situations such as this one, the correct approach is to call 911 and report the concern. Using this approach, local emergency officials can notify the railroad about any potential issue with its equipment.

Occupant Protection

Investigators conducted postaccident examinations of the derailed equipment. The four rear coach cars came to rest on their left sides. In coach 34042 (ninth in consist), investigators found 10 coach seats that were unlocked and partially rotated.⁷ In coach 31013 (10th in consist), three coach seats were unlocked and partially rotated. In coach 34056 (11th in consist), one seat was separated from its wall and floor attachments. In coach 34046 (12th in consist), seven coach seats were unlocked and partially rotated.

The NTSB has addressed seat securement in previous investigations. On August 8, 1997, an Amtrak train, the *Southwest Chief*, derailed on the BNSF track about 5 miles northeast of Kingman, Arizona. The train was traveling about 89 mph on the eastbound track when both the engineer and the assistant engineer saw a “hump” in the track as they approached a bridge. They applied the train’s emergency brakes, but the train derailed as it crossed the bridge. Investigators determined that the ground under the bridge’s supporting structure had been washed away by a flash flood. Of the 294 passengers and 18 Amtrak employees on the train, 173 passengers and 10 Amtrak employees were injured. There were no fatalities; damages were estimated at \$7.2 million.

In the Kingman accident, 18 seat assemblies were found with the rotating-locking mechanisms not engaged. A disengaged seat lock can result in an uncontrolled rotation of the seat assembly that may result in serious injuries even in a minor derailment.

As a result of the Kingman investigation, on September 16, 1998, the NTSB issued safety recommendations about seat securement to the Federal Railroad Administration (FRA) and Amtrak. In Safety Recommendation R-98-056, the NTSB recommended that the FRA include a requirement for positive seat securement systems in the passenger car safety standards to protect against the disengagement and undesired rotation of seats in all new passenger cars purchased after January 1, 2000. In addition, the NTSB recommended the system be incorporated into existing passenger cars when the cars are scheduled for overhaul.

In response, the John A. Volpe National Transportation Systems Center (Volpe Center) tested the seat securement systems on behalf of the FRA and determined them to be strong enough

⁷ The seats are designed so they can be moved and rotated to the opposite direction.

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to withstand the occupant loads. The injury criteria that were measured and calculated (using test dummies) for all dynamic tests were found to be within the acceptable human tolerance levels as specified in the standards established by the National Highway Traffic Safety Administration and the Federal Aviation Administration.⁸ On July 29, 2012, the NTSB classified this safety recommendation as “Closed—Acceptable Alternate Action.”

The NTSB issued Safety Recommendation R-98-061 to Amtrak to install a positive seat securement system to prevent the disengagement and undesired rotation in all new cars purchased after January 1, 2000, and incorporate the system into existing passenger cars when scheduled for overhaul. On December 5, 2000, this safety recommendation was classified as “Closed—Acceptable Alternate Action,” based on Amtrak’s efforts to establish standard procedures to ensure that all seat assemblies are secured and have redundant checks in place prior to departure and in operation. Coach cleaners, mechanics, and all staff members who reposition seats as part of their duties must ensure that all seats are returned to the proper positions, and the seats are in the “locked” position. Employees inspecting a train before departure are required to check and ensure that all seat assemblies are secured. Additionally, all crew members have the responsibility to periodically inspect seats during operation.

Although 20 seats in three of the derailed and overturned cars were found unlocked and rotated in the Cimarron accident, the investigation found no evidence to indicate how or when the seats became unsecured. However, the seat rotations were unlikely the sole cause of passenger and crew injuries. When the train derailed, the rear coach cars overturned and struck the ground. As a result, people were injured when they were thrown across the width of the car. Since the seats on the train did not have effective passenger restraints for overturn events, the injuries likely were caused by uncontrolled displacement of the passengers from their seats. The NTSB has investigated other accidents in which this injury mechanism has occurred.

On May 12, 2015, eastbound Amtrak passenger train 188 derailed in Philadelphia, Pennsylvania. As the train entered a curve, the train derailed, and its passenger cars overturned. Eight passengers were killed, and 185 others were transported to area hospitals. The NTSB concluded that passengers were seriously injured by being thrown from their seats when the passenger cars overturned. As a result, the NTSB made the following safety recommendation—classified as “Open—Initial Response Received”—to the FRA:

Conduct research to evaluate the causes of passenger injuries in passenger railcar derailments and overturns and evaluate potential methods for mitigating those injuries, such as installing seat belts in railcars and securing potential projectiles.
(R-16-35)

Probable Cause

The National Transportation Safety Board determines that the probable cause of the derailment was the agriculture truck driver’s failure to properly secure his unattended truck, which rolled downhill and struck the BNSF railroad tracks causing them to misalign. Contributing to the accident was the failure of the truck’s driver and his supervisor to report the incident to the local authorities.

⁸ D. Tyrell, K. Severson. *Crashworthiness Testing of Amtrak’s Traditional Coach Set* (Washington, DC: Department of Transportation, 1996).

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For more details about this accident, visit www.nts.gov/investigations/dms.html and search for NTSB accident ID DCA16MR003.

Adopted: November 16, 2017

The NTSB has authority to investigate and establish the facts, circumstances, and cause or probable cause of a railroad accident in which there is a fatality or substantial property damage, or that involves a passenger train. (49 U.S. Code § 1131 - *General authority*)

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person.” 49 *Code of Federal Regulations*, Section 831.4. Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. 49 *United States Code*, Section 1154(b).
