



National Transportation Safety Board

Washington, D.C. 20594

Railroad Accident Brief

Accident No.: DCA-10-FR-002
Location: Minneapolis, Minnesota
Date: December 29, 2009
Time: 11:22 a.m. central standard time¹
Railroad: BNSF Railway Company
Property Damage: None
Injuries: 0
Fatalities: 1
Type of Accident: Derailment resulting in employee fatality

Synopsis

On December 29, 2009, about 11:22 a.m., a BNSF Railway Company (BNSF) switching crew was shoving railcars into an industrial track on the west side of Northtown Yard in Minneapolis, Minnesota. The switch helper was riding on the lead railcar, which derailed and pinned him against the wall of a building, fatally injuring him.

At the time of the accident, the switch helper was operating one locomotive and five railcars by remote control. He was on the north side of the leading end of the railcar furthest from the locomotive, using an operating control unit connected to a harness worn on the front of his body, just above his waist, to remotely operate the movement. The weather at the time of the accident was clear, with a temperature of approximately 17° F. There was an accumulation of snow and ice on and around the tracks.

The Accident

The switch crew the switch assignment went on duty at 7:30 a.m. and consisted of a foreman and a switch helper. At 7:40 a.m., the crew met in the switchman's room for the daily briefing on safety and work assignments.² After obtaining their work orders, the two men, who had previously worked together with this same assignment, agreed on the method and movements to be used. After putting on their personal protective equipment and winter clothing, they were transported to their locomotive at the east end of the yard. Once there, the crew boarded the locomotive and performed time-out and tilt tests with their remote control units to verify that the individual remote control functions of each unit were operating properly. After

¹ All times in this report are recorded in central standard time.

² The briefing was conducted by a trainmaster, who was this crew's assigned supervisor.

successful testing of the remote control equipment, the crew proceeded to begin its work assignment to switch railcars for the industries in the Grove Yard.

The crew moved the locomotive out of the yard, crossed over the main tracks, and proceeded to Grove Yard to service the industries during its shift. During these movements, both the switch helper and foreman took turns remotely controlling the locomotive. The technique used by the crew is known as “pitch and catch,” which means that the crewmembers exchange control of the locomotive. One may “pitch” control of the locomotive to the other crewmember, which “catches” control via radio commands between the two employees. Only one employee can control the movements of the locomotive at a time.

The train crew switched two industry tracks before proceeding on the May Brothers switch lead³ to the track at Metro Hardwoods. The switch helper was controlling all of the movements at the time. According to the foreman, who was on the locomotive, the switch helper stopped the movement before entering the Metro Hardwoods track and uncoupled the caboose. The switch helper then moved the locomotive and five boxcars past the Metro track switch, repositioned the switch, and then backed into the Metro Hardwoods track. The foreman changed sides in the locomotive cab and could see two railcars they intended to couple onto sitting at door numbers 3 and 4 on the Metro Hardwoods track. The foreman expected the switch helper to make a safety stop one car length before coupling to the standing railcars to check for misaligned couplers.

The foreman was not in a position within the locomotive to observe the switch helper during the movement, but he could see the movement of the railcars. As the movement approached the loading/unloading area, the foreman saw the railcars rock and shift toward the building. The foreman saw the railcars move forward about one-half of a car length and come to a stop. (See Figure 1.) The foreman tried to contact the switch helper by radio, but was unsuccessful. At that time, the foreman initiated an emergency radio transmission to the yardmaster and left the locomotive in an attempt to locate the switch helper.

³ This lead parallels the main track and provides access to all industries in the Grove Yard.



Figure 1. This photograph shows the final position of the boxcar on which the switch helper was riding. The photograph also shows the accumulation of snow.

As the foreman approached the railcars involved in the switching movement, he realized that the lead railcar (a boxcar) had pinned the switch helper against the building. The foreman said that the switch helper did not respond to his voice and there appeared to be no signs of life. He again radioed the yardmaster for emergency assistance.

The Investigation

National Transportation Safety Board (NTSB) investigators determined that no mechanical or equipment malfunctions contributed to the accident. A review of the switch helper's work history and an interview with his spouse determined that he had obtained an adequate amount of rest before going on duty the day of the accident. She said that he had not suffered from sleep apnea or any other chronic disorder that may have prevented him from obtaining adequate rest at night.

Operations

The foreman stated in an interview after the accident that it was normal practice when servicing Metro Hardwoods to have one member of the crew ride the shoving movement on the north side of the railcars (closest to the building), past the sign displaying "No Clearance." When the foreman was asked for more detail, he explained, "...at that point [the location of the sign], there's approximately 8 to 10 feet from the building wall to the track. As you go further in, I believe the distance is still 4 feet at a minimum." Further, the foreman explained, "...you ride that side so that you can spot the doors up."

The foreman also mentioned that it was uncomfortable to ride railcars on the side away from the building (south side of the railcars) because the railcars lean toward that side. He explained that when the locomotive is controlled with the remote control unit, the operator must use one hand to operate the engine and hold on to the railcar's side ladder with the other hand. If the railcar leans, it makes riding the railcar more difficult and "uncomfortable." The foreman explained that the walkway away from the building on the south side of the track is often overgrown with weeds and brush during the summer months. He also said the location has poor drainage which results in the area opposite the building filling with water during periods of rain. The crews refer to it as "Lake Metro."

The foreman explained that crews typically ride the railcars at most locations when snow and ice are alongside the tracks, as on the day of the accident. The accident photographs, in addition to interviews with the track inspector and the foreman, revealed that the Metro Hardwoods track was covered with snow on the day of the accident and could not be observed by the switch helper from his position on the side of the railcar. Therefore, train crews could not clearly observe the condition of the track because of the snow.

Weather

The weather at the time of the accident was clear with a temperature of approximately 17° F. Snow had fallen for most of the month preceding the accident. On December 25, 4 days before the accident, the temperature was well above freezing, contributing to the accumulation of ice from melted snow at the derailment site. The ground in the vicinity of the accident was covered with 9 inches of snow. The foreman said the accumulation of snow against the building had been about 3 feet deep. A BNSF track inspector said that soon after the derailment he observed that about 4 inches of ice and snow had accumulated above the top of the rail where wheel marks indicated that the car had derailed.

The Derailment

During the shoving movement, the lead railcar encountered accumulated ice between the gage of the rail where the flange of the wheels ride against the rail. The ice was solid enough to allow the wheels to climb over the top of the rail, lifting the empty boxcar and derailing toward the building. The track inspector said, "...there was ice buildup of approximately 2 inches above the ball [top]..." of the rail. The track inspector said that at the point of derailment, "...we could see the marks where it appeared that the lead set of wheels had climbed."

BNSF Requirements

BNSF Safety Rule S-13.1.5: "Riding In or On Moving Equipment," effective October 30, 2005, was in effect at the time of the accident and required employees "ride cars or equipment only if necessary and if you have determined that you can do so safely." Sections of this rule also stated the following:

A. Determining Whether to Ride

If you are entering or working in an area with a limited side clearance and cannot clearly observe the track condition because of debris, snow, ice, water, grain, or mud, do not ride on the side of the car or engine exterior. Do not position yourself between or adjacent to the structure and a moving car or engine. When determining whether cars or equipment should be ridden, consider:

- Alternatives such as repositioning locomotive to pull instead of shove freight cars, vehicle transportation, repositioning of crew members or utilizing other employees to complete the task without having to ride moving equipment.

F. Close Clearance Restrictions

Do not ride on the side of a moving car, engine or other equipment under any of the following conditions:

- Through gates or doorways.
- Into, out of, or within enclosed buildings. (Employees must precede the movement, if safe to do so, before entering enclosed buildings. Movements must only be made on that employee's signal within a building).
- On industry tracks at locations where signs may be placed, advising of close clearances.
- When it cannot be visually determined that equipment on an adjacent track is in the clear or behind the clearance point.
- Locations that have been identified by timetable or special instructions as having a close clearance restriction.

BNSF Job Aids

BNSF has internal documents called “storybooks” that provide crews at particular locations with specific information for performing tasks, guidance on where to position equipment, and describing unique risks identification,⁴ such as close clearances. Storybooks are considered job aids and are not necessarily helpful to experienced employees, but can be a useful tool for new employees who are unfamiliar with a switching location. At the time of the accident, the storybook for Northtown Terminal warned about close clearance at this particular location.

⁴ Each terminal on BNSF creates its own specific risk identification document, based on a standard template. This document is developed in conjunction with site safety team risk assessors and local union representatives. The switch helper who was fatally injured in this accident was a member of this team. The storybook was issued to all Northtown Terminal employees prior to the accident. However, no record of distribution was kept and employees were not periodically tested for proficiency with this job aid, as they are for official operating rules. Additionally, because BNSF does not consider material in storybooks to be operating rules, the information is not included in the operational program of tests, effective May 1, 2010. Therefore, disciplinary or other corrective action is not an option for noncompliance with these guidelines, as is done for noncompliance with official operating rules.

Included in this storybook is a photograph with an arrow that appears to point toward a close clearance location. (See Figure 2.)

The local trainmaster updated the storybook prior to this accident and explained that he had reviewed the draft version with the switch crews that operated on the tracks described in the storybook, including the crew involved in this accident. There were no requirements for the crews to comply with, or even carry the document. The foreman was aware of the storybook, but did not carry it with him.



Figure 2. “No Clearance” warning for Metro Hardwoods in the BNSF *Northtown Terminal Spotting Profiles and Risk Identification Storybook*, which was in effect at the time of the accident.



Figure 3. The "No Clearance" sign at Metro Hardwoods.

BNSF Managerial Oversight

BNSF uses an established operational testing program to determine whether its employees are complying with its operating rules. In a 3-year period prior to the accident, BNSF supervisors conducted 183 operational tests on the foreman, with no failures recorded. During this same period, 164 operational tests were conducted on the switch helper, with one failure recorded.⁵

The terminal trainmaster responsible for this train crew had only recently been assigned to this location and had not yet conducted operational testing on this crew. When asked in an interview if he had ever observed a train crew switch this assignment, he replied, "No, I have not." Furthermore, he stated, "I have never visually witnessed a crew going down there."

⁵ The operational test failure was for an incomplete switch awareness/position form and was not related to remote control locomotive operations. The form that BNSF calls a switch awareness/position form is more commonly known in the industry as a switch position awareness form.

Postaccident Actions

BNSF issued an incident briefing dated January 4, 2010, which described the operating and safety rules that were applicable to the accident. It also described preventive actions that, had they been taken, might have prevented the accident. On April 1, 2010, BNSF revised section A of its Safety Rule S-13.1.5: “Riding In or On Moving Equipment.”

A. Determining Whether to Ride

When determining whether cars or equipment should be ridden, consider:

- Alternatives such as repositioning locomotive to pull instead of shove freight cars, vehicle transportation, repositioning of crew members or utilizing other employees to complete the task without having to ride moving equipment.
- Designs and configurations of freight cars and equipment that may make them unsuitable to ride.
- Your physical capabilities and limitations.
- The amount of slack in the train or switch cut.
- Applicable operating and safety rules.

When equipment will be ridden:

- Notify the engineer.
- Proceed only after the engineer has acknowledged that you are going to ride.
- Complete any couplings from the ground after the movement is stopped.

If track condition cannot clearly be observed because of debris (e.g., snow, ice, water, grain, mud, etc.) do not ride or knowingly allow others to ride on either side of equipment or engine exterior.

When snow and ice are observed building up on portion of tracks to be used, particularly at road crossings, locomotive(s) must precede movement on that portion of track before cars can be ridden into those tracks.

Close/No Clearance and Close Track Center Restrictions

Employees must not ride or knowingly allow others to ride the close/no clearance side of equipment or engine exterior at the location where close/no clearance exists, under any of the following conditions:

- Between a structure and a moving car or engine.
- Through gates or doorways (Gates or doors must be secured in the open position).
- Into, out-of (*sic.*), or within enclosed buildings. (Employees must precede the movement, if safe to do so, before entering enclosed buildings. Movements must only be made on that employee’s signal within a building).

- When it cannot be visually determined that equipment on an adjacent track is in the clear or behind the clearance point.
- On industry tracks at locations where signs may be placed, advising of close/no clearance.
- At locations that have been identified by timetable or special instructions as having a close/no clearance condition.
- At locations that have been identified by timetable or special instructions as having close track centers unless that portion of adjacent track is known to be clear.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the accident was a buildup of ice and snow that derailed a boxcar on which an employee was riding, crushing the employee between the boxcar and an adjacent building. Contributing to the accident was the decision to ride the boxcar when conditions were not determined to be safe.

Adopted: March 31, 2012