U.S. Department of Transportation
Federal Railroad Administration

Federal Railroad Administration, Office of Railroad Safety

Accident Investigation Summary Report HQ-2021-1437

Norfolk Southern Railway Company - Employee Injury (Amputation)
Burns Harbor, Indiana
July 13, 2021

1. Executive Summary

On July 13, 2021, at approximately 10:35 p.m., CDT, a Norfolk Southern Railway Company (NS) conductor suffered a left arm amputation while attempting to mount moving equipment. The accident happened during a switching move in Burns Harbor Yard, on NS's Toledo East Subdivision, in Burns Harbor, Indiana. The conductor was attempting to mount a moving car to ride it out of the track. As the conductor attempted to mount the car, he struck a stationary air hose stand and fell to the ground with his left arm in the foul of the track. As a result, his left arm was severed by the wheels of the car behind the one he was attempting to mount.

All three crewmembers assigned to the train involved in this accident, including the injured conductor, were experienced and qualified NS employees. All three employees were current on their rules and safety training and had received periodic efficiency tests with results that did not identify any non-compliance with the rules.

The Federal Railroad Administration (FRA) conducted an on-scene investigation of the accident and determined that the cause of the accident was the conductor's failure to comply with carrier safety rules for mounting and dismounting moving equipment.

2. Accident Description

On July 13, 2021, at 8 p.m., the conductor reported for duty at NS's Burns Harbor Yard as part of a three-person crew assigned to yard job NS B03B313. The crew consisted of the conductor, an engineer, and a switchman. All crewmembers had received their statutory off-duty period prior to reporting for duty. After reporting for duty, the crew conducted a job briefing with the Burns Harbor Yard Master that included a switch list and a safety briefing.

The crew was tasked with pulling all the cars out of track 15 and sorting the cars between various other yard tracks. Following the briefing, the engineer departed the yard office for the locomotives the crew would be using to make the required switching moves – locomotive NS 7146 (east-facing locomotive) and NS 7148 (west-facing locomotive), which were coupled together. After inspecting each locomotive, the engineer pulled the locomotives to the yard lead in front of the NS yard office to meet the conductor and switchman.

Yard video surveillance showed the crew's actions.

- First, at approximately 10:30 p.m., the conductor departed the yard office and walked over to the waiting locomotives.
- The conductor then mounted the rear, west-facing locomotive and instructed the engineer to back up while he protected the shove as they moved west to couple the cars on the east end of track 15.
- After coupling to the cars on track 15, the conductor dismounted the rear locomotive to the southside and began walking west several cars and releasing their handbrakes.
- The conductor then crossed over near the second or third car and reemerged on the north side of the cars in track 15.
- Next, the conductor walked east back to the west-facing locomotive, mounted the locomotive, and instructed the engineer to begin pulling east out of track 15.
- As the train began to move east, the conductor dismounted the locomotive and moved to the north side of track 16 and looked west towards his train.
- Next, the conductor moved south and positioned himself next to the train and attempted to mount the west end of the fourth car from the east end of the train. The train was traveling at 9 mph.
- As the conductor grabbed the ladder on the west end of the car and placed his foot in the ladder stirrup to pull himself up, the movement of the train carried him east where he struck a stationary hose stand[1] positioned on the center line between tracks 15 and 16 (see *Figure 1*).

The strike from the air hose stand knocked the conductor to the ground where his left arm landed in the foul of track 15 and was severed by the leading wheels of the car behind the car he was attempting to mount.

[1] Air hose stands are metal posts approximately 3.5 feet tall that provide mounting and support for compressed air lines used to connect rail cars to an air source for testing and inspections of rail equipment. These air lines are mounted above ground and were placed between tracks at the east end of the yard to provide access to the air lines during snow accumulation during winter.

Figure 1: Air Hose Stand

3. INVESTIGATION AND ANALYSIS

Investigation Overview

On July 14, 2021, FRA began the investigation of the accident. After conducting an investigation of the accident site and equipment involved, FRA investigators reviewed event recorder data from the controlling locomotive, audio recordings of the radio channel the crew was using to communicate at the time of the accident, video footage from a stationary yard video surveillance camera, and the records of each crewmember's training and qualification. FRA also interviewed the engineer involved in the accident and reviewed all applicable railroad operating rules, safety rules, special instructions, and Federal regulations.

Analysis

Investigation of the accident site, including the track and equipment involved, as well as the walking path in the immediate area of the conductor's injury, revealed no defects or other exceptions. This accident did not meet the requirements for FRA post-accident toxicological testing contained in 49 CFR Part 219; therefore, no such FRA testing was required, authorized, or performed. FRA's investigation is similarly unaware of any alcohol or drug testing that was conducted by either local law enforcement, a medical professional providing treatment, or by NS pursuant to its own authority, as applicable. FRA analyzed the work schedules of all

crewmembers using the biomathematical model known as Fatigue Audit InterDyne (FAID)[2] and found that excessive fatigue risk was present for the engineer, but not for the conductor or the switchman. Further, FRA found that given the engineer's actions and position at the time of the accident, fatigue was not a likely contributing factor to the cause or severity of the accident.

I. Employee Training, Experience, and Qualification

FRA reviewed the training and qualification records of each crewmember assigned to the train involved in this accident. FRA found that both the conductor and the switchman had 10 years of experience, while the locomotive engineer had 22 years of experience. FRA also found that each crewmember was regularly assigned to yard job NS B03B313 and that all three employees had received periodic efficiency testing, with no results identifying a pattern of non-compliance with the rules.

II. Event Recorder Downloads and Video Footage Analysis

The event recorder downloads from locomotive NS 7146 between 10:25 and 10:40 p.m. indicated throttle positions between run 1 and 4 with a speed not greater than 10 mph. FRA analyzed video footage from a stationary yard surveillance camera and, based on the speed at which the train was shown to be passing fixed objects, concluded that the train was moving at approximately 9 mph at the time of the accident. Additionally, FRA listened to the audio recordings for the radio channel the crew was using to communicate with each other. Those recordings demonstrate the conductor failed to notify the locomotive engineer that he was mounting the moving equipment. In his interview, the locomotive engineer confirmed the conductor did not notify him that he was mounting the moving equipment.

III. Applicable Operating Rules

NS Safety Rule 1071 addresses mounting and dismounting moving equipment. Among other things, that rule requires employees to: (1) ensure conditions are safe prior to mounting or dismounting moving equipment, and (2) prior to mounting the equipment, notify the engineer of the mounting or dismounting location so that the engineer can reduce the speed of the movement as necessary. NS Safety Rule 1071 also prohibits an employee from mounting moving equipment under certain circumstances, including when equipment is "moving in excess of a safe walking speed (approximately 2-3 MPH)." As noted above, FRA concluded that the train was moving at approximately 9 mph at the time of the accident, which is in excess of walking speed, and that the conductor did not notify the engineer that he was mounting the moving equipment. Accordingly, FRA concluded that the conductor's actions were in violation of NS Safety Rule 1071.

[2] FAID predicts the effect of different work schedules on fatigue and provides a representative score of the fatigue exposure of a worker. That score indicates the likely sleep opportunity that a work patten allows. As the relative sleep opportunity associated with a work pattern decreases, the FAID score increases.

4. CONCLUSION

FRA's investigation and analysis concluded that this accident was caused by human error. The conductor's failure to comply with the NS Safety Rule for mounting moving equipment led to the employee striking a stationary air hose stand and falling to the ground where his arm landed in the foul of the moving equipment.