U.S. Department of Transportation
Federal Railroad Administration

Federal Railroad Administration, Office of Railroad Safety

Accident Investigation Summary Report HQ-2023-1843

BNSF Railway
De Soto, Wisconsin
April 27, 2023

1. Executive Summary

On April 27, 2023, at approximately 12:01 pm CDT, BNSF intermodal Train-25 derailed at Milepost (MP) 268.8 on BNSF's Chicago Division, Aurora Subdivision in De Soto, Wisconsin. The train was 5,060 feet, weighing 3,809 tons, and was conventionally configured with three headend locomotives and 26 loaded intermodal railcars. It derailed all 3 locomotives and 9 intermodal cars, totaling 21 platforms.[1]

Four crew members were on the train at the time of derailment. All four experienced non-life-threatening injuries, with two being transported to the hospital for evaluation and later released. There were no fatalities and no release of hazardous materials.

At the time of the derailment, the surrounding area was experiencing significant flooding and BNSF track inspections had previously identified significant embankment scouring and erosion. Although the responsible BNSF employees had developed a plan to repair the scouring and erosion, and at the time of the derailment, a work group (WG) was working to repair the embankment, the roadway worker in charge of the WG authorized train movements through the WG's limits without conducting a visual inspection of the area.

The Federal Railroad Administration's (FRA) investigation and analysis concluded that the probable cause of the derailment was a washout of the track. The primary contributing factor leading to the derailment was a failure to comply with BNSF's rules requiring the inspection and remediation of track potentially damaged by flooding or other weather events. An additional contributing factor was ineffective communication among railroad employees responsible for inspecting, repairing, and authorizing movements over the track and non-compliance with Federal track inspection regulations.

2. Accident Description

Circumstances Prior to the Accident
There are two main tracks through the derailment site: Main-1 and Main-2. Both tracks are owned, inspected, maintained, and operated by BNSF and comprised of traditional wood crosstie and cut spike construction. Both tracks are operated in an east-west direction and run parallel to the Mississippi River from La Crosse, Wisconsin, to Dubuque, Illinois. Main-2 is the track closest to the Mississippi River, with Main-1 approximately 15 feet inland from Main-2.

[1] The derailed intermodal cars consisted of six cars with three platforms each and three cars with a single platform.

The method of train operation on this territory is by signal indication with a traffic control system and positive train control (PTC) overlay.[2] The timetable speed was 60 mph.

For some time before the derailment, the area surrounding the derailment location was experiencing significant flooding. During track inspections the week of April 17, 2023, a BNSF track inspector identified embankment scouring and erosion at the derailment location. Additionally, on Friday, April 21, 2023, the section foreman (RW1) hi-railed over the territory and identified several locations where the embankment needed to be reinforced with riprap (large stone). One of the locations noted was MP 268.8.

On Monday, April 24, 2023, working with his roadmaster (RW2), RW1 devised a plan to make repairs at the specified locations along the embankment. No slow orders were applied, or special inspections conducted after RW1 identified these locations or after RW1 and RW2 developed a plan to make repairs. As such, no General Track Bulletin was issued identifying any track condition requiring the alteration of train movements through this area of the Aurora Subdivision.

The Accident

On the morning of April 27, 2023, consistent with the plan developed by RW1 and RW2, the WG was repairing the embankment at several locations, including the location at which the derailment occurred. The WG consisted of six individuals: RW1 (who was serving as the roadway worker in charge);[3] two additional BNSF employees (a driver and a laborer); and three contractors (one excavator operator (RW3) and two dump truck drivers). The WG was dumping ballast (granite rock and stone) to support the track.

The WG established working limits between MP 267.0 and MP 270.2 and at 10:30 am, RW1 contacted RW3 to clear the track for train traffic. RW3 then sent RW1 a photograph of the area (Figure 1) and advised him that additional ballast would be needed because the river was washing it away as they dumped. When interviewed, RW1 indicated that after receiving the photo he walked 7/10th of a mile to within 50-100 yards of the derailment site and assessed that its condition had not changed, and it was safe for traffic.

Figure 1: Photo from April 27, 2023, of the derailment area taken by RW3 who was placing stone to stabilize the bank of the river before the derailment. RW1 received the photo at approximately 10:30 am.

[2] This means that the tracks are dispatcher controlled using wayside signals to authorize train movements and equipped locomotives use PTC technology, including wayside devices and a back office, to prevent train-to-train collisions, over-speed derailments, incursions into established work zones, and movements of trains through switches left in the wrong position.

[3] As the roadway worker in charge of the WG, RW1 was generally responsible for directing the WG repairing the track structure.

At approximately 11:00 am, RW1 gave permission for BNSF Train-53, to enter and proceed through the entirety of the WG's limits on Main-1. At 11:13 am, the crew of that train informed RW1 there was ballast falling into the river at MP 268.8 on Main-2, with the scour only two feet away from the ends of the crossties. (Figure 2). RW1 informed Train-53 that they were currently dumping riprap to fix the problem at that location.

Figure 2: Photo from the rear Distributed Power Unit on Train-53 at MP 268.8. Note the two areas of erosion adjacent to Main-2 (arrows).

At 11:18 am, the crew of Train-53 informed the train dispatcher of the scouring ballast. The dispatcher placed a "service interruption on Main-2" tag in the system. This tag requires an inspection by maintenance-of-way personnel before operations may continue.

At 11:20 am, RW2 contacted RW1 via text message to inform him that the BNSF maintenance desk had a report of a possible washout near MP 268.8. In response, RW1 and RW2 exchanged text messages confirming that MP 268.8 was the spot where the WG was currently dumping ballast and riprap and RW1 sent RW2 the photo taken by RW3 (Figure 1). At 11:23 am, RW2 removed the service interruption tag on the Main-2 with the chief dispatcher.

At 11:55 am, RW1 then gave permission to a second train, Train-25, to enter and proceed through the entirety of the WG's limits on Main-1. At 12:01 pm, the crew of Train-25 notified the dispatcher that they experienced an undesired emergency brake application and derailed near MP 268.8. Train-25 derailed at 52 miles per hour and the crew observed a large void under the tracks of Main-2. The subgrade was completely missing under Main-2, with a noticeable dip in the unsupported area under the track and a clear indication that the void had progressed to the end of the crossties of Main-1 as evidenced by a large hole visible from the lead locomotive's camera of Train-25. See Figure 3.

Figure 3: A photo from Train-25 locomotive camera recording shows the degradation of the track structure under Main-2 as it approaches the area of concern.

Four crew members were on the train at the time of derailment. All four experienced non-life threatening injuries, with two being transported to the hospital for evaluation and subsequently released.

3. INVESTIGATION AND ANALYSIS

FRA conducted interviews with crew members of Train-53 and Train-25, the dispatchers involved, the track inspector who initially identified the scouring and erosion of the track, RW1, and RW2. FRA also analyzed the relevant dispatcher recordings and reviewed all pertinent track inspection records. Based on this review and analysis, FRA concluded that the probable cause of this accident was saturation of the subgrade under the track (a washout of the track).

The primary contributing factor underlying this accident was RW1's failure to inspect the track or take other appropriate remedial action to ensure safe operations over the track prior to authorizing Train-25 to proceed through the WG's limits. These actions constitute failure to comply with: (1) 49 CFR §§ 213.5 and 213.239 (requiring special inspections of track in the event of flood or other occurrences that might have damaged track structure); (2) BNSF's Chicago Division System Special Instruction 33 (SSI 33) which requires special weather inspections in the event of sudden natural events, such as flooding; and (3) BNSF's on-track protection (Form-B) rules by not verifying track conditions were safe before permitting a train to proceed through the WG's limits without additional instructions.

Also contributing to this accident was ineffective communication among railroad employees responsible for inspecting, repairing, and authorizing movements over the track. RW1, RW2, and the dispatcher were all notified of the condition of the track and communicated about the condition of the track, yet no one responsible for the inspection, repair, or authorization of movements over the track effectively communicated the severity of the track conditions. If the severity of the track conditions were properly communicated, this accident could have been avoided by not releasing the protected track.

4. CONCLUSION

FRA's investigation and analysis concluded that the probable cause of the derailment was the subgrade saturation (washout) of the track. Contributing factors leading to the derailment involved a general lack of effective communication among railroad employees responsible for inspecting, repairing, and authorizing movements over the track and non-compliance with Federal track inspection regulations and BNSF's own rules requiring the inspection and remediation of track potentially damaged by flooding or other weather events.

In response to this accident, BNSF reinforced and retrained employees on the requirements of SSI 33 and revised that rule to include specific procedures to ensure concerns about track communicated by train crews are adequately investigated and evaluated before train traffic is allowed to continue over the subject track. Additionally, FRA is pursuing appropriate enforcement action. Additionally, although not specifically in response to this accident, FRA issued Safety Advisory 2023-07, recommending that railroads review existing policies, procedures, and operating rules related to predicting, monitoring, communicating, and operating during severe weather conditions or subsequent to extreme weather conditions.[4]

[4] 88 FR 82500 (Nov. 24, 2023) (available at https://railroads.dot.gov/regulations/federal-register-documents/2023-25924).