Issued: August 20, 2026 Railroad Investigation Report: RIR-26-12

# Canadian National Railway Derailment and Hazardous Materials Release

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| Location | Sardis, Mississippi |
| Date | July 6, 2025 |
| Accident type | Derailment and hazardous materials release |
| Train | Canadian National Railway train A48871-06<br>3 locomotives and 114 mixed-freight railcars |
| Crew | Engineer, engineer pilot, and conductor |
| Track | Single main track |
| Fatalities | 0 |
| Hazardous materials | 10,500 gallons of sodium hydroxide released |
| Injuries | 0 |
| Property damage | $2 million |

## Factual Information

On July 6, 2025, about 3:19 p.m. local time, southbound Canadian National Railway (CN) train A48871-06 derailed 21 mixed-freight railcars on the Grenada Railroad (GRYR), a Pinsly Railroad Company subsidiary, near Sardis, Mississippi.[1] (See figure 1.) The derailed equipment included four tank cars carrying hazardous materials: two containing sulfuric acid and two containing sodium hydroxide. One of these tank cars (a DOT-111 tank car) breached, releasing about 10,500 gallons of sodium hydroxide.[2] CN and GRYR estimated damages to be about $2 million. No injuries were reported. Visibility conditions at the time of the derailment were partly cloudy with no precipitation; the temperature was 93°F.

[1] (a) Visit ntsb.gov to find additional information in the public docket for this National Transportation Safety Board (NTSB) accident investigation (case number RRD25FR018), including detailed factual reports about the circumstances of the derailment. (b) In the United States, CN operations are consolidated under subsidiaries. In Mississippi, CN operates through the Illinois Central Railroad Company, a wholly owned indirect subsidiary. (c) GRYR and CN are not affiliated.

[2] The NTSB has long expressed concerns about the continued use of DOT-111 tank cars given their well-documented susceptibility to mechanical damage. See NTSB investigation reports on accidents in East Palestine, Ohio, and Bordulac, North Dakota.

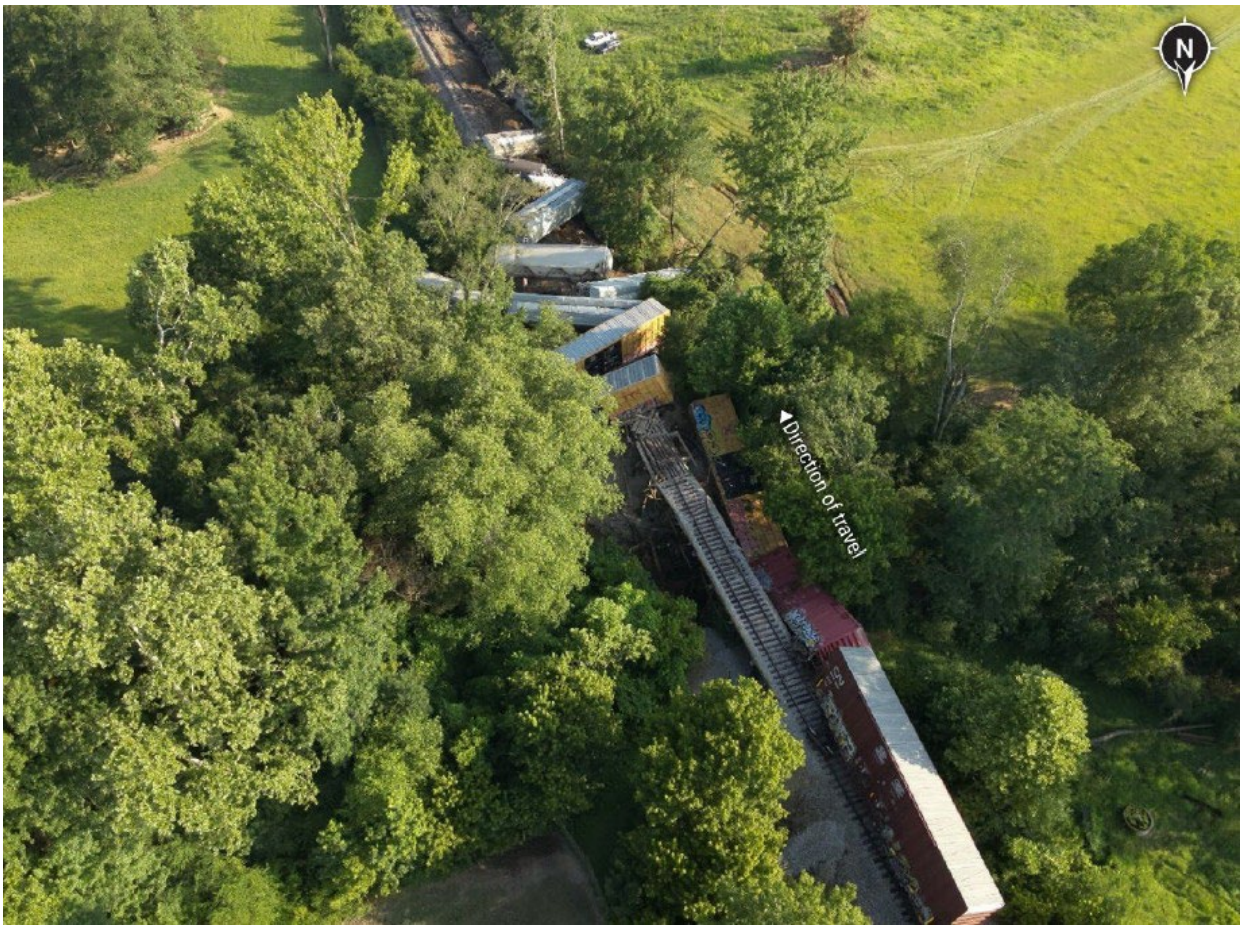


**Figure 1.** Aerial view of the derailment location. (Courtesy of Panola County Emergency Operations.)

The accident train, train A48871-06, was traveling southbound from Memphis, Tennessee, to Mobile, Alabama, and consisted of 3 head-end locomotives, 114 railcars, including 8 loaded hazardous materials tank cars and 3 residue tank cars.[3] The train was 7,002 feet long and weighed 12,311 tons (with locomotives). Based on industry norms, this was a relatively long and heavy train.[4] The train crew consisted of three workers: a CN engineer, a CN conductor, and a GRYR engineer pilot.[5]

[3] A *residue tank car* is empty of product but still contains a small amount of hazardous material.

[4] According to the Association of American Railroads, the average train is about 5,200 feet long (see https://www.aar.org/issue/freight-train-length); in 2023, the average weight of a freight train was about 3,948 tons (see https://www.aar.org/freight-rail-facts-figures).

[5] An *engineer pilot* guides another engineer over a section of track that the engineer may not be familiar with or qualified on.

GRYR owned the track in the derailment area, which included track on a bridge deck. The track had a maximum authorized speed of 25 mph, which required GRYR to maintain it to Federal Railroad Administration (FRA) standards for Class 2 track.[6] The rail at the derailment location was continuous welded rail (CWR) supported with granite-rock ballast. (CWR is rail welded together into lengths exceeding 400 feet.)[7] At the time of the derailment, GRYR had about 15 miles of CWR, out of about 200 total miles of track.[8]

From May 1, 2025, through May 9, 2025, a GRYR contractor replaced the accident bridge deck.[9] About a month and a half later, on June 26, 2025, about 8:08 a.m., 10 days before the derailment, a GRYR train crew reported to a GRYR assistant roadmaster that there was "rough track" on the accident bridge. ("Rough track" is often associated with misaligned track.) On the same day, a GRYR employee and a GRYR contractor employee investigated the condition of the track on the bridge. These employees told the National Transportation Safety Board (NTSB) that they identified a "heat kink" on the bridge and reported it to the GRYR assistant roadmaster. A "heat kink"—which the industry also refers to as a "track buckle" or a "thermal misalignment"—is a type of track misalignment that occurs, typically during hot weather, when the track structure cannot restrain compressive-longitudinal forces and moves, or kinks, laterally into an "S" or "C" shape, which allows the rail to expand and relieves compressive forces. Track buckles indicate tight-rail conditions, such as lateral-rail movement, and extreme internal-compressive forces in the CWR. In response to the track misalignment, GRYR placed a 10-mph slow order on the track.[10] Figure 2 shows an image from a train's lead locomotive outward-facing camera as it approached the accident bridge on June 26, 2025, with the track misalignment visible. The video timestamp reads 13:08:25 Greenwich Mean Time, which

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[6] Title 49 *Code of Federal Regulations* 213.9 describes *Class 2 track* as track with a structural quality that permits a maximum allowable operating speed of 25 mph for freight trains and 30 mph for passenger trains.

[7] (a) Title 49 *Code of Federal Regulations* 213.119 defines continuous welded rail. (b) Rail installed as CWR remains CWR even if it is later cut into smaller lengths.

[8] CWR comprised about 7.5% of GRYR's total-rail trackage.

[9] The timber-trestle ballast deck bridge measured about 130 feet long with a maximum height of about 26.5 feet. The bridge deck construction included replacing the timber deck, ballast retainers, hardwood crossties, and rail anchors. *Ballast retainers* are structural borders placed at the edges of bridges to prevent the ballast from sliding off the deck. *Crossties* are the rectangular support for the rails. *Rail anchors* attach to the rail and bear against the side of the crosstie to control longitudinal movement.

[10] A *slow order* is a temporary speed restriction on a section of railroad track where trains must operate below the normal authorized speed for safety reasons.

is 5 hours ahead of the local time in Sardis, Mississippi, which was 08:08:25 (8:08:25 a.m.).

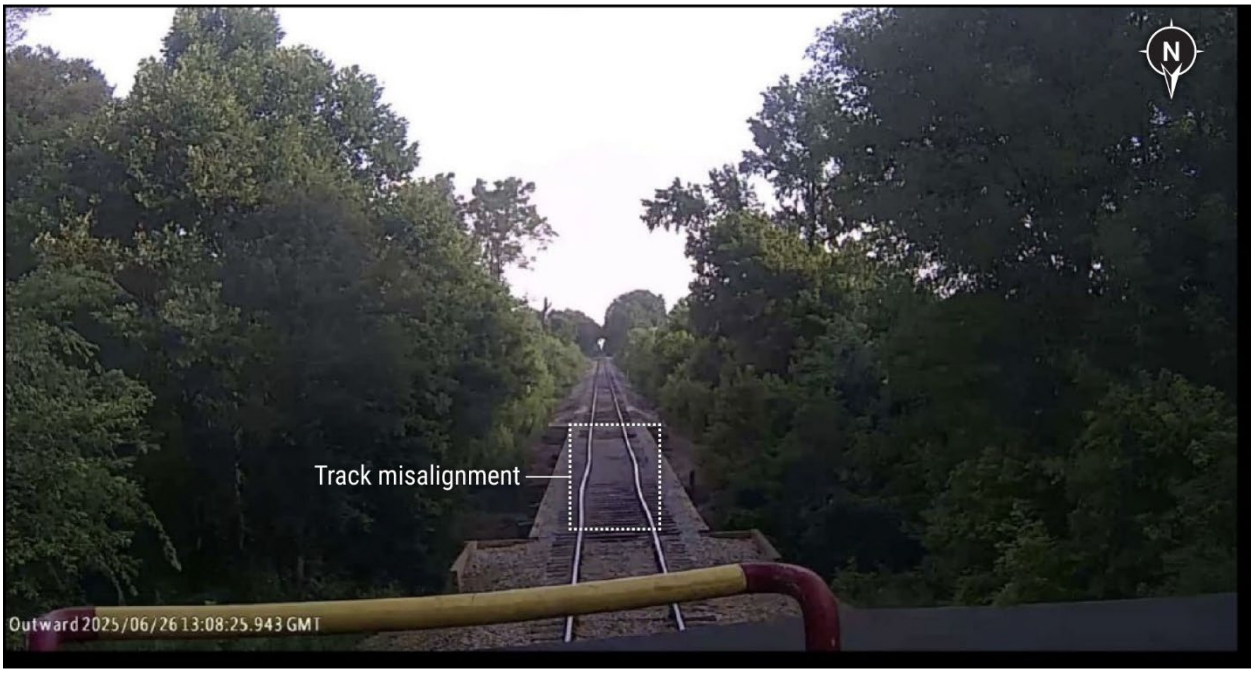


**Figure 2.** June 26, 2025, outward-facing camera view of derailment location. (Courtesy of GRYR.)

On July 1, 2025, between 9 a.m. and 11 a.m., 5 days before the derailment, a GRYR track foreman used a backhoe to straighten the track misalignment and tamp the ballast in the surrounding area.[11] After the track foreman completed this work, he removed the 10-mph slow order on the track. GRYR did not destress (cut and remove) a portion of the rail during its July 1 repair of the June 26 track buckle. The FRA recommends that railroads destress rail to repair track buckles.[12]

On July 3, 2025, 3 days before the derailment, GRYR performed its FRA-required weekly inspection of the track in the derailment area and did not report any issues with the track. Three days later, on July 6, 2025, about 11 a.m., on the day of the derailment, a GRYR regional roadmaster inspected the track in the derailment area; he also did not report any issues with the track.

[11] *Tamping* is a mechanical process in which ballast rock is forced under crossties to provide track support.

[12] For more information on destressing rail to repair track buckles, see the FRA's 2013 report "Track Buckling Prevention: Theory, Safety Concepts, and Applications."

At the time of the derailment, the ambient temperature was recorded as 93.2°F at the Panola County Airport, about 6 miles south of the accident location. GRYR's CWR plan, which the FRA required and approved, directed hot-weather track inspections to be performed between noon and 6:00 p.m. on days when the ambient temperature was forecast to be 85°F or higher, to look for evidence of track buckles. In the 2 months preceding the derailment, ambient temperatures exceeded 85°F on 38 days. GRYR did not perform hot-weather track inspections on 26 of the 38 days that the temperature was 85°F or higher.

The accident train engineer and conductor recalled that they did not feel anything unusual with the movement or handling of their train on July 6, 2025, as they approached the derailment location. About 3:19 p.m., the accident train had an undesired emergency-brake application, meaning the crew did not initiate the emergency-brake application.[13] After the train stopped, the conductor walked the train and found railcars derailed, starting with the 44th railcar. Figure 3 shows an image from the accident train's lead locomotive outward-facing camera as it approached the accident bridge on July 6, 2025, moments before the derailment. A track misalignment is visible at the same location where GRYR identified a track buckle on June 26. The video timestamp reads 20:17:30 Greenwich Mean Time, which is 5 hours ahead of the local time in Sardis, Mississippi, which was 15:17:30 (3:17:30 p.m.).

[13] An *emergency-brake application* uses the maximum braking force available and is designed to stop a train as quickly as possible. In this accident, an emergency-brake application in-line train separation occurred, a specific event that results when the brake pipe running through the train becomes physically separated, as can happen during a derailment.

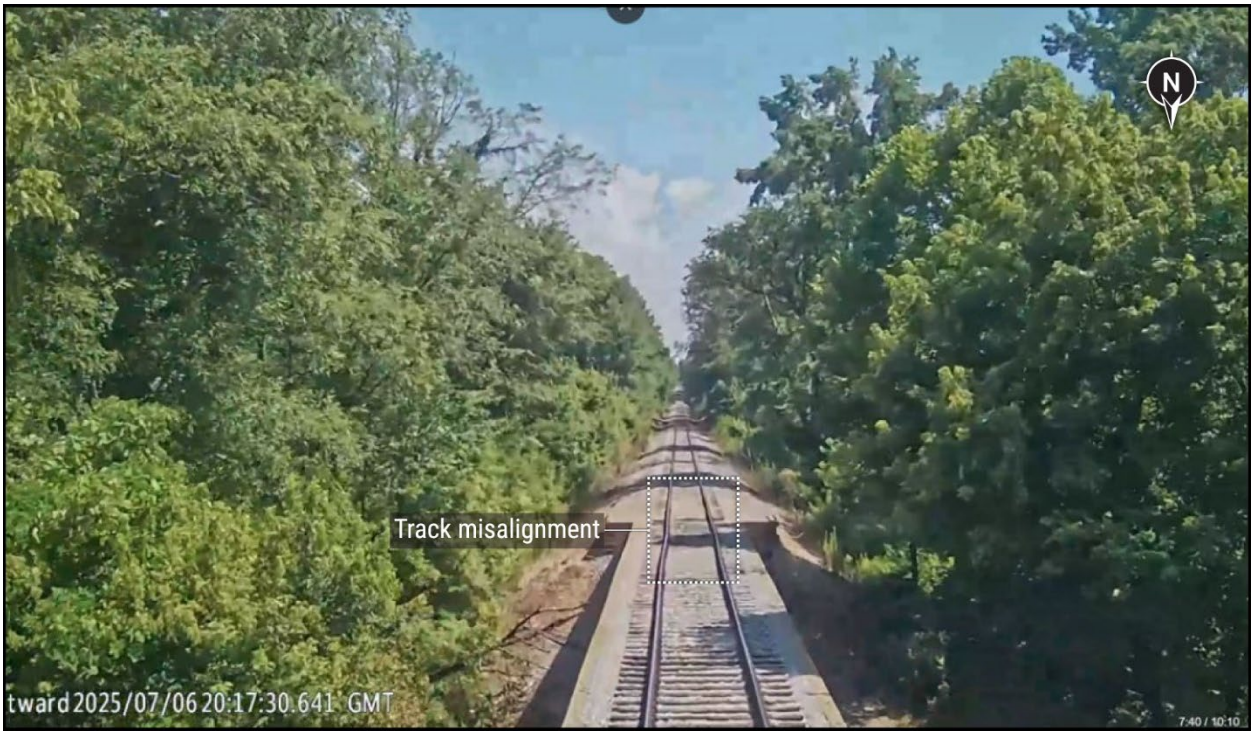


**Figure 3.** July 6, 2025, outward-facing camera view of derailment location. (Courtesy of CN.)

While on the scene, the NTSB identified a fractured-coupler shank on the lead end of the 45th railcar behind the locomotive and determined it was the point where railcars separated during the derailment.[14] After the derailment, the NTSB Materials Laboratory examination identified an internal shrinkage void (an internal cavity in the material formed during the manufacturing process) at the coupler shank fracture. Figure 4 shows on-scene photographs of the opposite ends of the coupler-shank fracture, highlighting the internal void.

[14] (a) A *coupler* connects one piece of railroad equipment (such as a railcar) to another. (b) A *coupler shank* is located between the coupler head and the other coupler components.

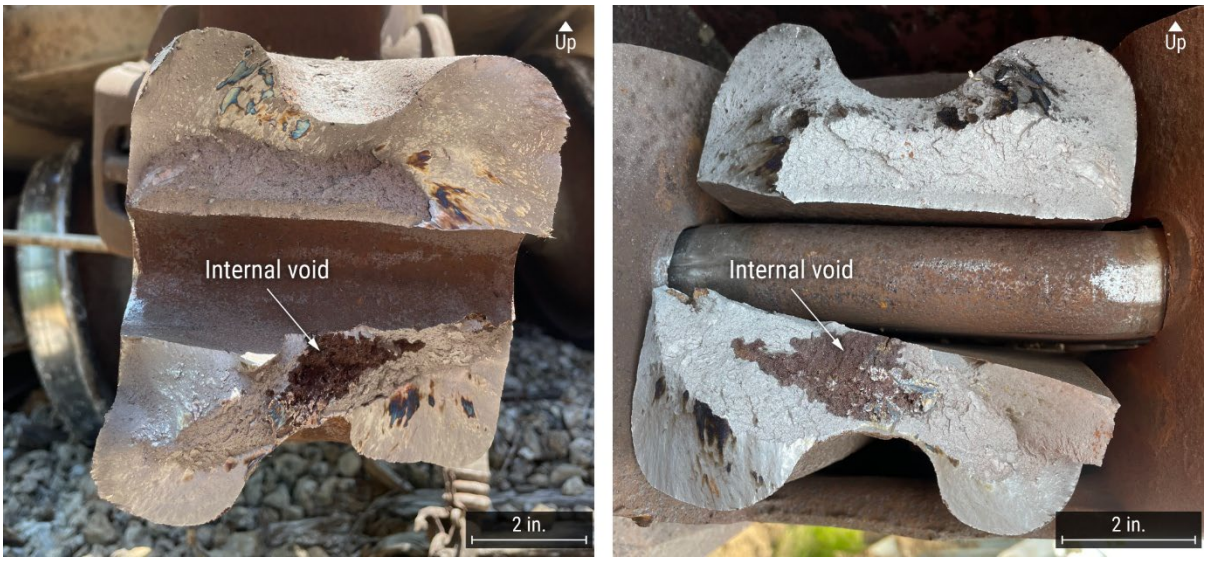


**Figure 4**. Opposite ends of fractured coupler shank with internal void visible.

## Analysis

CN train A48871-06 derailed when it traversed a misaligned section of track (a track buckle).[15] Ten days before the derailment, on June 26, a train crew reported rough track at the derailment location; the two track workers (a GRYR employee and a GRYR contractor) who inspected the track identified a track buckle. Five days later, on July 1, GRYR attempted to repair the track buckle by straightening the track and tamping the ballast; GRYR did not destress the rail. The FRA recommends that railroads destress rail to repair track buckles. Had GRYR destressed the rail to repair the June 26 track buckle, the July 6 track-buckle induced derailment likely would not have occurred. After the derailment, GRYR updated its CWR plan to require (1) employees to destress tight-rail conditions, which include track buckles, within 24 hours of discovery and (2) a qualified employee to supervise train movements over locations with tight-rail conditions. GRYR retrained its employees on the updated CWR plan.

Three days before the derailment, on July 3, GRYR conducted a weekly track inspection that did not identify any concerns with the track. In addition, about 4 hours before the derailment, on July 6, a GRYR regional roadmaster inspected the track in the derailment area, and he did not identify any concerns with the track. Further, although GRYR's continuous welded rail (CWR) plan required employees to conduct hot-weather track inspections on CWR between noon and 6 p.m. when ambient temperatures were 85°F or higher, around the time of the derailment, GRYR's hot-weather track inspection activity did not comply with its CWR plan. At that time, GRYR did not conduct track

[15] The NTSB did not find evidence that train handling played a role in the derailment.

inspections on most of the days (nearly 70%) that the ambient temperature was high enough to require a hot-weather track inspection. (It was 93°F on the day of the derailment, which required a hot-weather track inspection before 6 p.m. that day. At the time the derailment occurred, about 3:19 p.m., GRYR had not yet performed a hot-weather track inspection.) Consequently, in failing to follow its CWR plan, GRYR missed opportunities to identify track irregularities, including the track buckle that caused the accident train to derail.[16] After the derailment, GRYR reinforced its requirement for employees to regularly conduct hot-weather track inspections on days when ambient temperatures were 85°F or higher.

Moments before the derailment, the accident train's outward-facing locomotive camera captured an image of a slight track misalignment at the derailment location (see figure 3), the same location where GRYR had identified a track buckle on June 26 (10 days earlier). Track buckles typically occur under trains, with the load of the train being a factor. Thus, the image of the track misalignment captured moments before the derailment was likely a precursor to a more pronounced track buckle that would occur as the accident train, which was relatively long and carrying a heavy load, traversed over the misaligned tracks.[17]

Postaccident, the NTSB Materials Laboratory identified an internal void in the coupler shank of the 45th railcar (see figure 4) consistent with a manufacturing defect. The void created an area of higher stress concentration, increasing the probability that the coupler shank would fracture during a high-load event, such as a derailment, as it did in this accident. Thus, the coupler shank fracture separated the train, which removed the mechanical support that maintained the alignment and stability of the trailing railcars.

## Probable Cause

The NTSB determines that the probable cause of the July 6, 2025, train derailment in Sardis, Mississippi, was Grenada Railroad's inadequate repair of a track buckle that occurred 10 days before the derailment at the same location, which resulted in the track buckling again under the accident train. Contributing to the severity of the derailment was a manufacturing defect in a coupler shank on the lead end of the 45th

[16] Because GRYR did not adequately repair the June 26 track buckle by destressing the rail, the NTSB could not determine whether GRYR would have made the appropriate track-buckle repair if it had inspected the track in the derailment location as often as its CWR plan required.

[17] For more information on track-misalignment growth occurring under trains, see the FRA's 2013 report "Track Buckling Prevention: Theory, Safety Concepts, and Applications."

railcar, which caused the coupler shank to break, removing mechanical support for the trailing railcars.

## Lessons Learned

The Sardis derailment demonstrates the importance of proper track-repair practices, particularly the need to promptly destress CWR in response to tight-rail conditions, including track buckles. By destressing rail that exhibits tight-rail conditions, railroads treat the underlying cause of track buckles rather than the symptoms. Railroads should remain vigilant to the dangers of track buckles even if CWR represents only a small percentage of their total-rail trackage.

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For more detailed background information on this report, visit the NTSB Case Analysis and Reporting Online (CAROL) website and search for NTSB accident ID RRD25FR018. Recent publications are available in their entirety on the NTSB website. Other information about available publications also may be obtained from the website or by contacting—

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