



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Issued: April 3, 2024

Railroad Investigation Report: RIR-24-02

Norfolk Southern Railway Employee Fatality

Bessemer, Alabama

December 13, 2022

1 Factual Information

1.1 Accident Description

On December 13, 2022, about 12:01 a.m. local time, the lead locomotive of Norfolk Southern Railway (NS) freight train A55-12 (train A55) struck a length of steel angle iron protruding from a gondola car on stationary NS freight train 340-12 (train 340) on the Alabama Great Southern South Subdivision in Bessemer, Alabama.¹ Train A55 was traveling northbound about 54 mph on main track 2; train 340 was stopped on main track 1. The gondola car, SSEX 100843 (hereafter the gondola car), was part of a block of 21 railcars recently added to train 340 from a yard track near a U.S. Pipe recycling facility. The section of angle iron was protruding from the top edge of the gondola car on its east side, fouling main track 2 at milepost 153.5.² (See figure 1.) As the lead locomotive of train A55 passed the gondola car on the adjacent track, the section of angle iron penetrated the locomotive's left-front door window, continued into the operating cab, and struck the conductor trainee. The conductor trainee was killed, and the conductor was transported to a local hospital for minor injuries. Visibility conditions at the time of the accident were dark and clear; the weather was 50°F with no precipitation.

¹ (a) Visit www.nts.gov to find additional information in the [public docket](#) for this National Transportation Safety Board (NTSB) accident investigation (case number RRD23LR003). Use the [CAROL Query](#) to search safety recommendations and investigations. (b) All times in this report are local. (c) An *angle iron* is a piece of rolled steel with an L-shaped cross section.

² (a) The side of the gondola car with the protruding section of angle iron is referred to as the *east side* throughout this report based on the gondola car's orientation at the time of the accident. (b) *Fouling* refers to a person or object being in proximity to a track such that the person or object could be struck by a moving train.

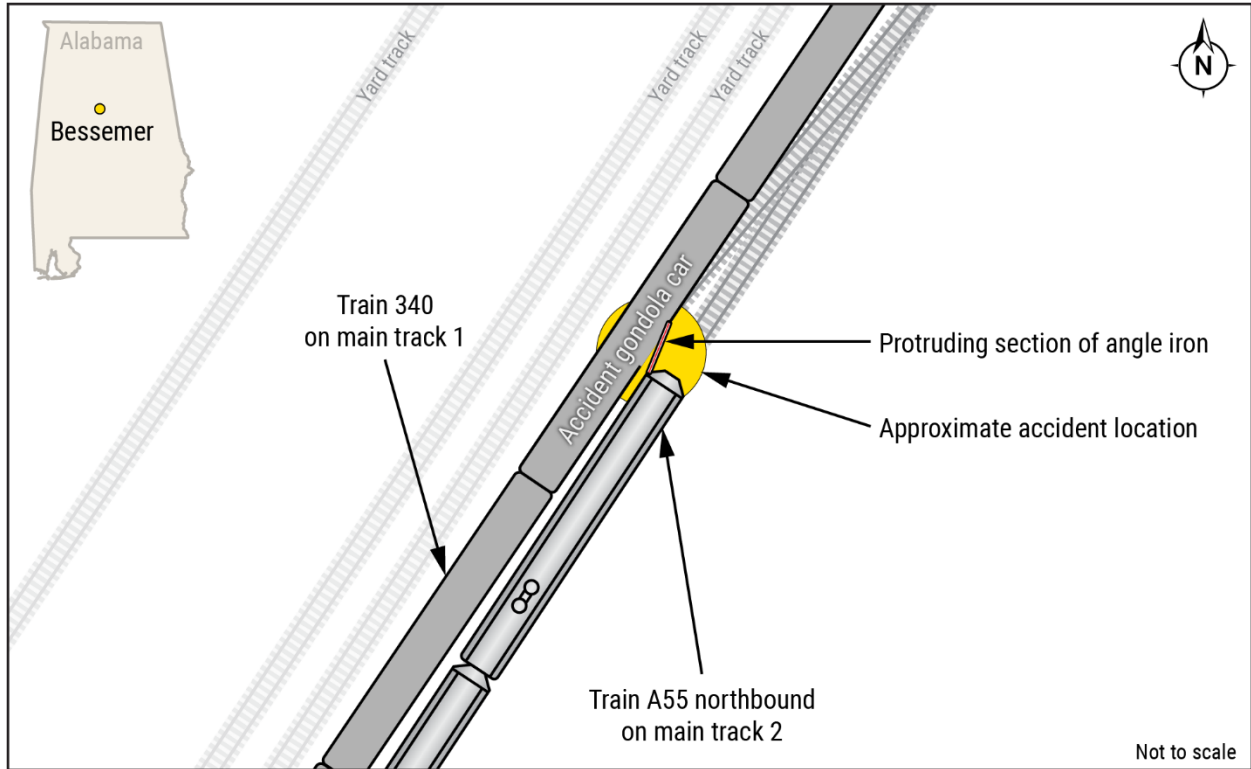


Figure 1. Diagram of accident scene.

The Alabama Great Southern South Subdivision extends from Birmingham, Alabama, to Meridian, Mississippi, and includes both single and double main track. The track near the accident was double main track with a maximum authorized speed of 79 mph for passenger trains and 60 mph for freight trains. Train movements in the area were authorized by wayside signal indications with an overlaid positive train control system and coordinated by the NS dispatcher center in Atlanta, Georgia.³

Train A55 was bound for Birmingham, Alabama, from Tuscaloosa, Alabama. The train consisted of 2 locomotives and 70 railcars. The train crew, which included an engineer, a conductor, and a conductor trainee, went on duty at 4:30 p.m. on December 12, 2023.

When interviewed by the National Transportation Safety Board (NTSB), the engineer said that train A55 was traveling northbound about 55-60 mph as it approached the stationary train 340 about midnight on the day of the accident. He saw a piece of steel protruding from the side of train 340 immediately before the accident. Images from the lead locomotive's outward-facing image recorder show two sections of

³ A *positive train control* system enforces speed limits and prevents a train from passing through a signal that requires it to stop.

angle iron protruding from the top cord of the gondola car.⁴ (See figure 2.) The section of angle iron that was protruding toward train A55 entered the cab of the locomotive, propelling broken glass into the cab and striking the conductor trainee. Immediately after the section of angle iron struck the locomotive, the engineer initiated an emergency application of the train's brakes and called his dispatcher for assistance. According to event recorder data reviewed by the NTSB, train A55 was traveling 54 mph at the time of the emergency brake application. After bringing the train to a stop, the engineer asked the dispatcher for permission to reverse to a nearby highway-railroad grade crossing to await emergency responders. He repositioned the train so that the lead locomotive occupied the crossing, allowing emergency responders access when they arrived about 12:13 a.m. on December 13, 2022. The conductor trainee died at the scene.



Figure 2. Gondola car and protruding angle iron section immediately before impact. (Source: NS.)

1.2 Before the Accident

⁴ The *top cord* (also spelled *top chord*) of a gondola car is one of the upper edges that provides structural rigidity to the gondola itself.

1.2.1 U.S. Pipe

An NS train delivered the gondola car to the U.S. Pipe facility on December 4, 2022. U.S. Pipe surveillance camera images reviewed by the NTSB did not show sections of angle iron protruding from the gondola when the railcar was delivered.⁵ Surveillance camera images from the morning of December 7, 2022, taken after U.S. Pipe personnel had unloaded the gondola car with a crane, show angle iron sections protruding from the side of the gondola. An environmental contractor working in the facility observed the protruding angle iron sections and affixed caution tape to the gondola car about 6:20 a.m. on December 7, 2022.

Later that morning, shortly after the caution tape had been affixed, a U.S. Pipe engineer needed to move the gondola car to continue plant operations. The NTSB interviewed a U.S. Pipe supervisor, who said that the engineer called him to report that the gondola car had been “taped off,” and that the engineer knew not to move equipment that had been taped. The supervisor arrived at the facility and observed “problems...at the top of the railcar,” consulted his own superior, and gave the engineer permission to move the gondola car about 10 feet to allow the facility to continue operating. Surveillance camera images from about 7:48 a.m. show the resulting movement, which broke the caution tape. Two hours later, about 9:53 a.m., the environmental contractor removed the tape.

U.S. Pipe personnel on the December 7, 2022, night shift later moved the accident gondola car to the scale track, weighed it, and staged it on an industry track outside the scale area for pickup by NS.⁶ No U.S. Pipe employees or contractor personnel communicated a problem with the gondola car to NS.

1.2.2 NS Trains A39A712 and 340

On December 12, 2022, two different NS trains and crews handled the gondola car involved in the accident: train A39A712 (train A39) and train 340.

The crew of train A39, which included an engineer, a conductor, and a conductor trainee, went on duty on December 12, 2022, at 9:01 a.m. Train A39 picked up railcars, including the accident gondola car, from the U.S. Pipe facility and positioned them on the “hill track.”⁷ Images from a U.S. Pipe surveillance camera show angle iron sections protruding from the accident gondola car as it departed the U.S. Pipe facility. (See figure

⁵ Refer to the docket for images from U.S. Pipe facility surveillance cameras.

⁶ *Scale track* is track with an integrated scale for weighing railcars.

⁷ NS refers to this yard track as the *hill track* because of its position on the slope of a hill.

3.) When interviewed by the NTSB, the conductor of train A39 reported inspecting both sides of the railcars before moving them, as required by NS operating rule C-100, and did not report any defects.⁸ When interviewed by the NTSB, the conductor noted the presence of scrap metal on the ground and the need to pay attention to where he was walking to avoid injury; his line of sight was mostly directed downward toward the ground, brake equipment, and wheelsets. The inspection and movement occurred during daylight hours.



Figure 3. Accident gondola car departing U.S. Pipe facility. (Source: U.S. Pipe.)

Train 340 was bound for Birmingham, Alabama, from Meridian, Mississippi, with stops in-between to conduct switching operations. The crew—an engineer, a conductor, and a conductor trainee—went on duty at 5:30 p.m. on December 12, 2022.

Train 340 approached the NS yard in Bessemer about 11:15 p.m. on December 12, 2022. The crew was assigned to pick up railcars, including the accident gondola car, from the hill track, which was accessible only by main track 1. When interviewed by the NTSB, the conductor said that the crew decided to start the pre-departure inspection in the yard on the west side of the railcars because of unsafe walking conditions on the east side of the hill track, which consisted of an incline slope adjacent the track and what the conductor described as insufficient walking space and “bad footing.” (See figure 4.) The crew planned to complete the remaining pre-departure inspection of the east side of the train on main track 1.⁹

⁸ See section 1.5 for more information about NS operating rules.

⁹ (a) Inspecting railcars normally involves walking along both sides of railcars placed on a track, but crews are not required to inspect both sides at a single location. See sections 1.4 and 1.5 for inspection regulations and procedures related to pre-departure inspection of freight cars. (b) The protruding section of angle iron was on the east side of the accident gondola car.



Figure 4. North-facing view of the hill track with exemplar gondola cars. (Source: Federal Railroad Administration (FRA).)

The conductor and conductor trainee performed a brake test and inspected the west side of the block of railcars within the yard, then coupled the railcars to the rest of the train on main track 1. At this time, train 340 consisted of 3 locomotives and 85 railcars positioned on main track 1. The crew did not inspect the east side immediately after moving the railcars to main track 1 because of a train approaching on main track 2, which ran parallel to main track 1 on the east side. The conductor and conductor trainee returned to the lead locomotive of train 340 to conduct a job briefing about inspecting the east side of the newly added railcars after train A55 had passed by.

1.3 Personnel

The conductor of train A39 was hired by NS in 2008 as a conductor and worked as both a conductor and engineer. He had been working as a conductor on train A39 since 2020.

The conductor of train 340 was hired by NS in 2014 as a conductor trainee and was promoted to conductor later that year. His conductor trainee had been hired by NS in 2022 and had about 6 weeks of experience. The engineer of train 340 was hired by NS in 2005 and certified as an engineer in 2008.

The engineer of A55 was hired by NS in 1997 as a conductor and certified as an engineer in 2000.

1.4 Regulations

Federal Railroad Administration (FRA) regulations at 49 *Code of Federal Regulations (CFR)* 215.13 require that each freight car being added to a train be inspected before the train departs. This inspection can be performed before or after the freight car is added to the train. Appendix D of 49 *CFR* 215 describes “imminently hazardous conditions...readily identifiable by a train crew member in the course of a customary inspection.” These conditions include an object extending from the side of a freight car’s body.

1.5 Procedures

NS procedures for pre-departure inspection of freight cars are documented in rule C-100 in *NS-1 Rules* (effective January 1, 2019). The rule requires train crews to inspect freight cars for the conditions described in Appendix D of 49 *CFR* 215, including an object extending from the side of the freight car body. C-100 requires train crewmembers to inspect both sides of each freight car unless the inspection cannot be made safely, in which case the crew must perform a single-side inspection, move the train to the nearest available safe location, and inspect the opposite side. These inspections must be made from the ground, not while riding on equipment.

U.S. Pipe did not have procedures in place to identify hazardous conditions involving freight cars and communicate these conditions to railroads servicing the facility.

1.6 Postaccident Examinations

NTSB investigators completed postaccident examinations of the accident gondola car on December 14-15, 2022. The section of angle iron from the gondola car fully separated after the collision and was embedded in the electrical cabinet in the lead locomotive.

Investigators observed broken welds at intervals along the top edge of the gondola's east side where the section of angle iron had been attached. The individual welds were small and not part of the gondola’s original construction, consistent with a previous repair. A second angle iron section along the top edge of the east side was partially attached and protruding from the gondola car near its B end (the end with the brake wheel). (See figure 3.)

1.7 Postaccident Actions

On December 20, 2022, the FRA issued Safety Bulletin 2022-01 to increase awareness of a hazardous condition (the protruding angle iron section) that led to a fatal injury.¹⁰ The alert reminded train crews of the pre-departure inspection requirements in Appendix D of 49 *CFR* 215, emphasizing the importance of performing a proper visual inspection of freight cars for any protruding objects that may foul an adjacent track. If such a condition is observed, it should be immediately reported. During the 6 months following the accident, the NTSB received reports from U.S. Pipe and the FRA of three additional gondola cars with sections of angle iron protruding from their top edges. These reports preceded an industry-led awareness campaign described below.

By January 7, 2023, U.S. Pipe had conducted safety trainings in response to the accident, briefing employees on the requirement to report unsafe conditions related to railcars in the facility. The trainings laid out the reporting process, including the instruction that any damaged railcar be removed from service and the owner of the railcar notified. U.S. Pipe incorporated this content into its regular training sessions.

On March 14, 2023, the NTSB contacted the Institute of Scrap Recycling Industries, Inc. (ISRI) to request its assistance in highlighting the investigation with member recycling companies. ISRI is an association of scrap metal and recycling companies. Its 1,300 member companies employ about 200,000 people. On April 10, 2023, ISRI began an industry-led campaign by circulating a safety alert within the recycling industry regarding objects protruding from railcars.

ISRI also offered presentations on the Bessemer accident to members at regional safety meetings and conferences in April, May, and July of 2023; about 8,000 industry professionals attended these meetings and conferences. ISRI has reported positive feedback, greater awareness, and wider understanding regarding single-point failure hazards in the American and international scrap metal recycling industry.

On June 5, 2023, the Association of American Railroads issued safety alert SA-02-2023 to its subscribers, informing them of the accident and warning rail employees to watch for hazards, such as dislodged sections of angle iron, extending from the top edge of gondola cars.

2 Analysis

In this accident, northbound NS train A55 struck a section of angle iron protruding from the east side of a gondola car in stationary NS train 340, which was positioned on

¹⁰ The full text of Safety Bulletin 2022-01 is available at <https://railroads.dot.gov/sites/fra.dot.gov/files/2022-12/Safety%20Bulletin%202022-1.pdf>

an adjacent main track near a U.S. Pipe facility. The conductor trainee of train A55 was killed, and a conductor was injured.

Based on the NTSB's review of surveillance camera images from the U.S. Pipe facility, the accident gondola car was undamaged when it was delivered to the facility on December 4, 2022. However, images captured on December 7, 2022, after U.S. Pipe employees unloaded the gondola car with a crane, show two angle iron sections protruding from the top edge of one side of the gondola. These images confirm that the gondola was damaged at the U.S. Pipe facility during unloading.

The NTSB's postaccident examination of the accident gondola car identified failed welds along the top edge on the east side. Further examination showed the welds were not part of the gondola's original construction and had been added later, consistent with an attempt to repair the top cord of the gondola car at an undetermined time before the gondola car was delivered to the U.S. Pipe facility. The welds failed during unloading and caused the angle iron sections to partially separate and protrude from the gondola car. As a result, one end of an angle iron section protruded enough to foul main track 2 when the gondola car was positioned on main track 1.

Surveillance camera images from the U.S. Pipe facility, along with interviews with U.S. Pipe and contractor personnel, show that various personnel working in the U.S. Pipe facility were aware of the damage to the gondola car. Caution tape was affixed to the gondola car to show that it was identified as a hazardous condition, and an engineer requested supervisor approval before moving the car within the facility. These actions indicate that personnel, including U.S. Pipe supervisors, were aware that the damaged gondola car could present a hazard, and initially exercised care when moving the gondola car within the facility. U.S. Pipe did not inform NS or the crew of train A39 that the gondola car had been damaged. In response to the accident, U.S. Pipe re-trained its personnel on procedures that require personnel to report railcar hazards to railcar owners and remove affected railcars from service. This topic is now covered during regular safety trainings. This training change is intended to prevent unsafe railcars from leaving the facility. The ISRI issued a bulletin to its members and discussed the Bessemer accident at industry events to raise awareness of the dangers posed by damaged railcars. These events reached about 8,000 scrap metal recycling industry professionals.

On December 12, 2022, train A39 moved the damaged accident gondola car to the hill track. In interviews with the NTSB, the conductor of train A39 reported performing a rule C-100 inspection on the railcars involved in the movement. The inspection occurred in daylight but did not identify the protruding section of angle iron, a hazardous condition that train crews are required to identify during pre-departure inspections. The conductor noted in interviews with the NTSB that he was often looking down to avoid scrap metal and to inspect brakes and wheelsets, which suggests that the conductor was not consistently looking for defects at eye level or higher. Had the

inspection been performed in a way that checked for objects protruding from the side of each railcar, the damaged gondola car would have been identified and either repaired or removed from the train.

Later, about 11:15 p.m. on December 12, 2022, train 340 approached the Bessemer yard to pick up railcars from the hill track. The conductor assessed the walking conditions on the east side of the hill track as unsafe and decided to perform the pre-departure inspection in two parts: the west side of the train on the hill track, and the east side of the train on main track 1. NS rule C-100 allows this division of pre-departure inspections when necessary for crew safety. Based on the NTSB's review of images and on-site observations of the hill track, walking conditions on the east side of the hill track were unsafe because of a steep incline and limited level ground near the track. Train A55 struck the protruding section of angle iron from the gondola car after the crew moved train 340 to main track 1 but before they had an opportunity to inspect the east side and identify the defective condition.

The second pre-departure inspection was planned and partially completed in compliance with NS operating rules under the conditions present in the yard. The first pre-departure inspection should have identified the defective condition but did not. As a result of the accident, the FRA issued a safety bulletin emphasizing the importance of performing proper visual inspections to identify objects fouling adjacent tracks and, if such a condition is observed, the need to immediately report it. The Association of American Railroads issued a circular letter warning members of the danger posed by objects extending from railcars and reminding them of the importance of identifying and mitigating the hazard.

About midnight on December 13, 2022, train A55 began passing train 340. The engineer of train A55 saw one of the angle iron sections immediately before impact. Outward-facing image recorder data confirmed that the protruding section of angle iron presented a small, difficult-to-see profile under night-time visibility conditions. Because the section of angle iron became visible from the locomotive cab immediately before impact, the engineer of train A55 could not have prevented or mitigated the accident.

3 Probable Cause

The National Transportation Safety Board determines that the probable cause of the December 13, 2022, Norfolk Southern Railway employee fatality was the hazardous condition of a gondola car that was identified by personnel within a U.S. Pipe facility but not communicated to Norfolk Southern Railway or identified by Norfolk Southern Railway personnel during required pre-departure inspections.

The NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in the other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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” (Title 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 (Title 49 *United States Code* section 1154(b)).

For more detailed background information on this report, visit the [NTSB Case Analysis and Reporting Online \(CAROL\) website](#) and search for NTSB accident ID RRD23LR003. 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 –

National Transportation Safety Board
Records Management Division, CIO-40
490 L’Enfant Plaza, SW
Washington, DC 20594
(800) 877-6799 or (202) 314-6551