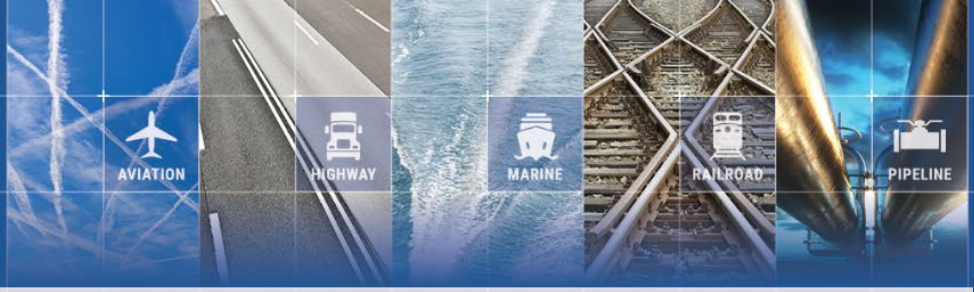


April 8, 2022 NTSB/RIR-22/06

# Norfolk Southern Corporation Employee Fatality

Baltimore, Maryland

February 7, 2019

Abstract: This report discusses the February 7, 2019, death of a Norfolk Southern Corporation (NS) railroad conductor at the Bayview Yard of the Baltimore Consolidated Terminal, Baltimore, Maryland. While performing switching operations at the President Street intermodal tracks section of the yard, the conductor chose for unknown reasons to ride on the side of the leading railcar. He was killed when he became pinned between the leading railcar and a stationary railcar on an adjacent track. Safety issues identified in this report include inconsistent wording in NS's terminal instructions regarding close-clearance work practices, and the lack of emphasis in NS's conductor training program on safety in close-clearance restriction locations, including locations specific to the Baltimore Consolidated Terminal. Two recommendations were made to the Norfolk Southern Corporation.

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# Abbreviations and Acronyms

| | |
|---|---|
| Amtrak | National Railroad Passenger Corporation |
| *CFR* | *Code of Federal Regulations* |
| FRA | Federal Railroad Administration |
| NS | Norfolk Southern Corporation |
| NTSB | National Transportation Safety Board |

# Executive Summary

## What Happened

On February 7, 2019, about 7:00 a.m. local time, a Norfolk Southern Corporation railroad conductor was fatally injured while performing switching operations at the President Street intermodal tracks section of the Bayview Yard of the Baltimore Consolidated Terminal, Baltimore, Maryland. The conductor was riding on the side of the leading railcar of train 38A during a reverse movement when he was pinned between the railcar he was riding and a stationary railcar on an adjacent track.

On the morning of the accident, after uncoupling all but four railcars, the train's engineer notified the yardmaster by radio that the train was secured and asked to move the train to its next switching location. The yardmaster reminded the engineer that the conductor was not allowed to ride on the side of railcars within the intermodal facility tracks and subsequently approved the train's movement. As the train reversed north, the lead railcar, on which the conductor was riding, approached a slight right curve where three railcars had been stored on an adjacent track. When the train entered the curve, the distance between the train and stored railcars decreased to 9 inches. As the train continued to reverse, the engineer passed the conductor lying between both tracks. The engineer stopped the train and radioed the yardmaster to report that the conductor was down and that emergency assistance was needed.

## What We Found

Despite Norfolk Southern Corporation's rules prohibiting employees from riding on the side or end of equipment in close-clearance locations, we found that, for unknown reasons, the conductor chose to ride on the side of the railcar in a close-clearance location, which resulted in his death. While close-clearance restriction locations for the Baltimore Consolidated Terminal were identified in the *Harrisburg Division Timetable Number 1* terminal instructions, that information was inconsistent and lacked clear messaging, which could lead an employee to misinterpret the instruction and ride on the side of railcars where these restrictions apply. We also found that the Norfolk Southern training program did not emphasize and test on the close-clearance restriction locations and location-specific hazards within the Baltimore Consolidated Terminal, which could lead to employees having inadequate knowledge to safely work in these areas.

We determined that the probable cause of the fatality was the conductor riding on the side of a railcar for unknown reasons as the moving train approached stored railcars on an adjacent track, which resulted in decreased clearance, in a section of the Bayview Yard where Norfolk Southern Corporation's terminal instructions and operating rules specifically prohibited riding railcars in the close-clearance restriction areas.

## What We Recommended

As a result of this investigation, we made a recommendation to Norfolk Southern Corporation to review and revise the terminal instructions in the *Harrisburg Division Timetable 1* that govern the close-clearance restriction locations within the Baltimore Consolidated Terminal and ensure the instructions contain consistent language related to close-clearance locations. We also recommended that Norfolk Southern Corporation revise the Baltimore Consolidated Terminal training and testing program to emphasize close-clearance restriction locations and location-specific hazards.

# 1. Factual Information

## 1.1 Accident Description

On February 7, 2019, about 7:00 a.m. local time, a Norfolk Southern Corporation (NS) railroad conductor was killed while performing switching operations at the President Street intermodal tracks section of the Bayview Yard of the Baltimore Consolidated Terminal, Baltimore, Maryland.[1] The conductor was riding on the side of the lead railcar of train 38A during a reverse movement when he was pinned between the railcar he was riding and a stationary railcar on an adjacent track. Figure 1 shows where the conductor was riding when the accident occurred. At the time of the accident, it was twilight and visibility was clear.


**Figure 1.** Accident railcar with the stationary railcar on adjacent track. (Photo courtesy of the Federal Railroad Administration (FRA).)

[1] (a) All times in this report are in local time unless otherwise noted. (b) Visit ntsb.gov to find additional information in the public docket for this NTSB investigation (case number RRD19FR004). Use the CAROL Query to search safety recommendations and investigations.

## 1.2 Events Before the Accident

The engineer and conductor reported for duty at 6:00 a.m. on February 7, 2019, at NS's Bayview Yard and held a job safety briefing at the yard office.[2] About 6:15 a.m., the engineer and conductor met with the yardmaster to obtain their assignments.[3] The yardmaster informed the engineer and conductor that they were to relieve the crew of train 38A, which had just arrived in the yard. The yardmaster instructed the engineer to take over the locomotive and told the conductor to align the switches from another part of the yard to intermodal facility track 543. Once these tasks were completed, the yardmaster instructed the crew to uncouple train 38A between railcars eight and nine and deliver the last four railcars to track 543.[4]

## 1.3 The Accident

After uncoupling eight railcars from train 38A, the train crew proceeded south with one locomotive and eight railcars to its authorized destination. Once the train arrived at intermodal facility track 543, the conductor secured the rear four railcars by applying the hand brakes and then instructed the engineer to pull the train forward to uncouple the four railcars from the train. After the uncoupling operation was complete, the engineer notified the yardmaster by radio that the four railcars were secured and uncoupled and asked if the crew could proceed back through track 543.[5] The yardmaster denied the request and reminded the engineer that the conductor was not allowed to ride on the side of railcars on the intermodal facility tracks (also known as pad tracks).[6] When interviewed after the accident, the engineer stated that he told the conductor not to ride on that side of the train. The National Transportation Safety Board (NTSB) was not able to verify the conversation between the engineer and conductor occurred after the reminder from the yardmaster.

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[2] NS records indicate that the engineer and conductor had worked together in Bayview Yard six times before the accident.

[3] A *yardmaster* is the railroad employee designated as being in charge of all operations in a yard.

[4] The intermodal facility tracks are located at the President Street intermodal section of Bayview Yard. This area of the yard is configured with a large concrete pad and is used to unload intermodal containers (shipping containers) from a train for placement onto a tractor-trailer for over-the-road deliveries.

[5] The accident sequence is based on radio communications.

[6] (a) Typically, when a train is reversing, a conductor would ride on the rear of the train to ensure the track was clear. Since this was prohibited within the intermodal facility, the yardmaster gave the engineer this reminder. (b) The conductor also had a radio to enable communications, and the reminder would have been broadcast on his radio.

After the train movement request was denied, the engineer informed the yardmaster that they would use the Bank track (track 258). This meant they would depart from the south end of intermodal facility track 543, clear the Bank track switch, and reverse north through the Bank track. Three railcars were stored on track 259, which was adjacent to and west of track 258. (See figure 2.) After the yardmaster authorized that train movement, the conductor walked south and aligned the switches for the train's movement. Once the conductor finished aligning the switches, he radioed the engineer to proceed south with the train, clearing the Bank track switch.

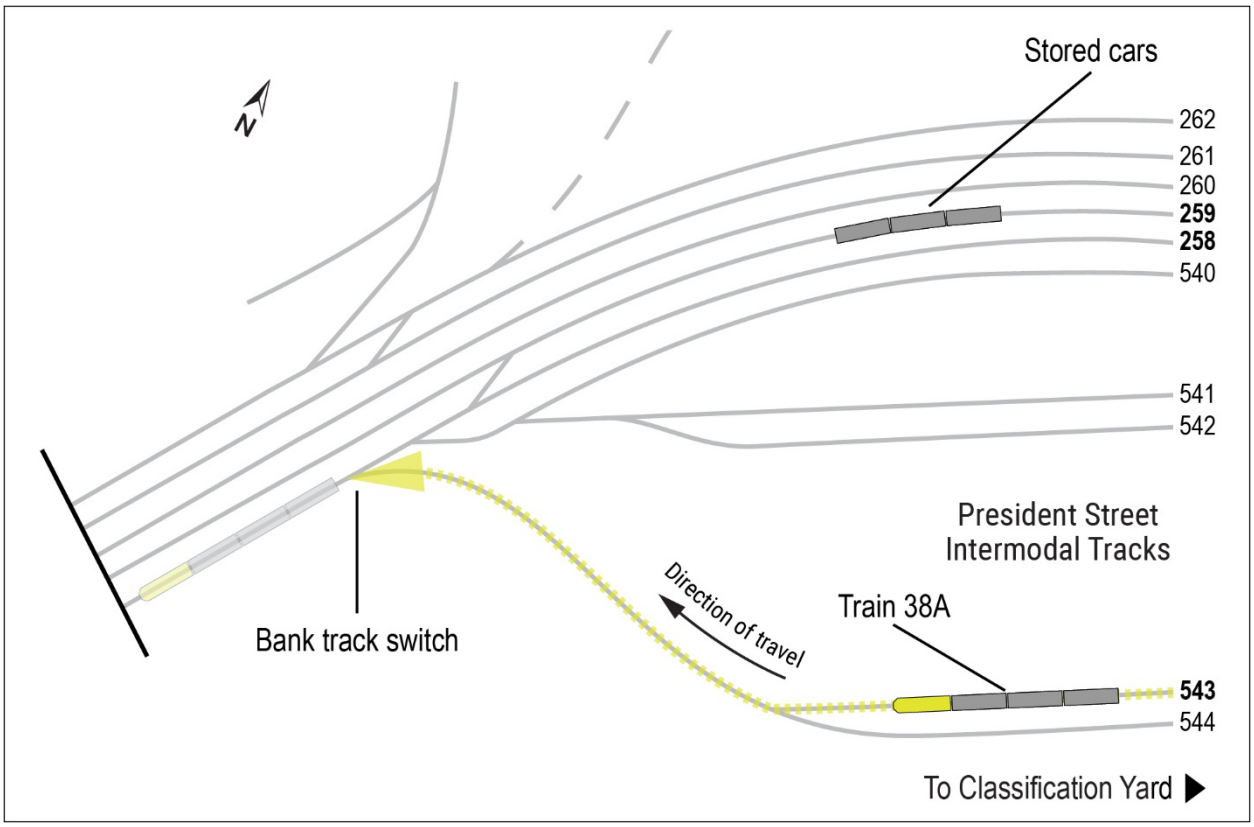


**Figure 2.** Train 38A movement south through President Street intermodal tracks.

Note: The yellow line and arrow at the bottom of the graphic show the movement of train 38A south after it aligned with track 543 and headed toward the Bank track switch to drop off four railcars and continue south.

The train, which at the time consisted of a locomotive and four railcars, moved west then south toward the conductor who stood near the switch as the train moved through it. As the last railcar cleared to the south of the Bank track switch, the conductor radioed for the engineer to stop the train. The conductor then realigned the Bank track switch for the train's reverse movement and climbed on the rear of the

last railcar. The conductor radioed the engineer to reverse the train north 12 railcar lengths.[7]

As the train reversed north, the lead railcar, on which the conductor was riding, approached a slight right curve.[8] When train 38A entered the curve, the distance between the stored railcars on track 259 and train 38A (on track 258) decreased to 9 inches. (See figure 3.) The decreased clearance occurred when the carbody swung to the outside of a curve because of the track geometry.

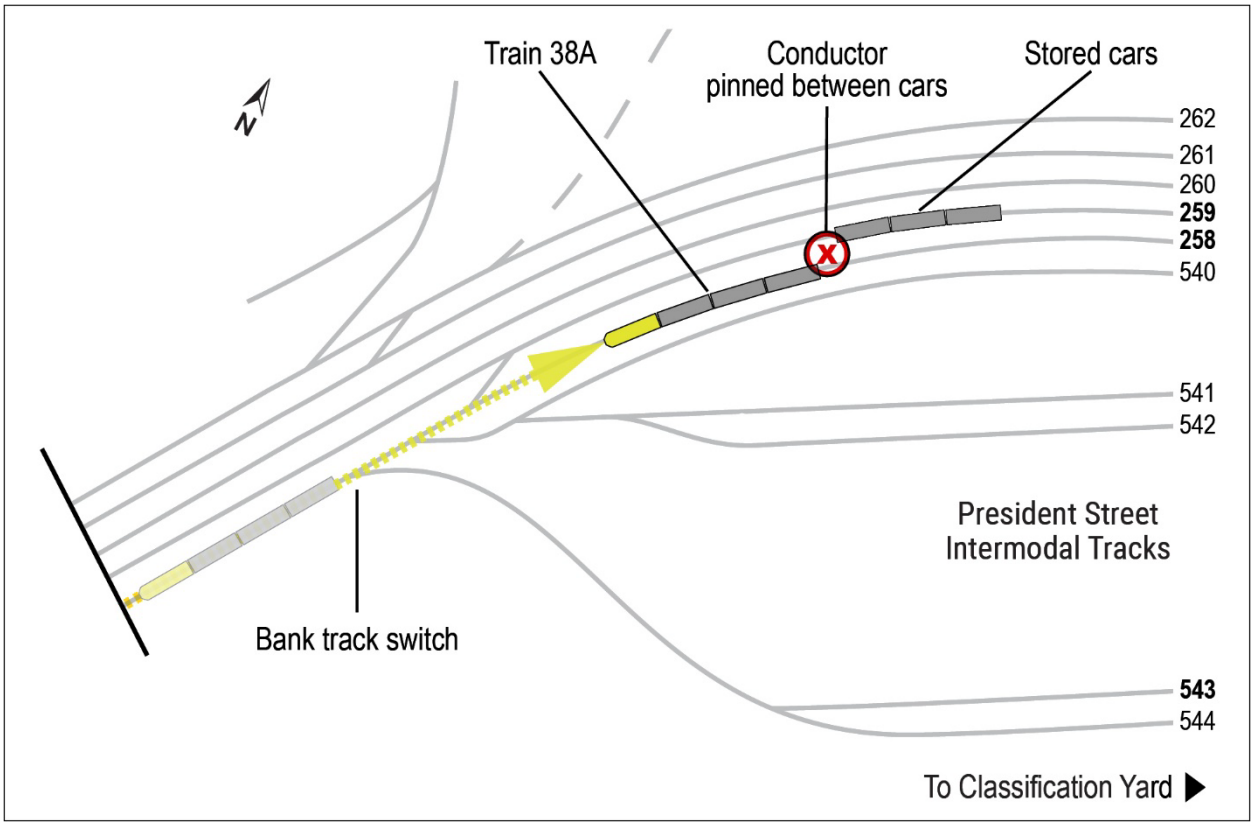


**Figure 3.** Train 38A movement north on track 258 and accident site.

Note: A yellow arrow on track 258 shows the reverse movement north of train 38A, starting at the Bank track switch, to the stored railcars on track 259 and the accident site.

[7] One railcar length equals 50 feet.

[8] Based on an accident sequence re-enactment, conducted at twilight (6:40 a.m.), about the same time as the actual accident, the railcars on track 259 were visible from the Bank track switch, and the sun was 4° above the horizon.

As the train continued to reverse into track 258, the engineer noticed an illuminated lantern lying between tracks 258 and 259. He radioed the conductor, asking him if he had dropped his lantern. Receiving no response from the conductor, the engineer applied the train brake to stop the train. As the engineer was applying the brakes, he passed the conductor lying between both tracks. The engineer stopped the train and radioed the yardmaster to report that the conductor was down and that emergency assistance was needed.

## 1.4 Bayview Yard Description

Bayview Yard is in southeast Baltimore, Maryland, and is part of the NS Baltimore Consolidated Terminal, Baltimore District, in the Harrisburg Division.[9] The yard is oriented in a north-south geographical direction. The south end of Bayview Yard has 22 tracks and is divided into two sections: the President Street intermodal tracks and Classification Yard. Figure 4 provides an overview of the Bayview Yard.

NS operates an average of five daily northbound freight trains out of Bayview Yard for main line service. Train movements within the yard are controlled by the southend yardmaster.

[9] A *district* is a portion of the railroad that lies within a larger division; for example, the NS Baltimore District is within the NS Harrisburg Division. The conductor was hired to work in the Baltimore District.

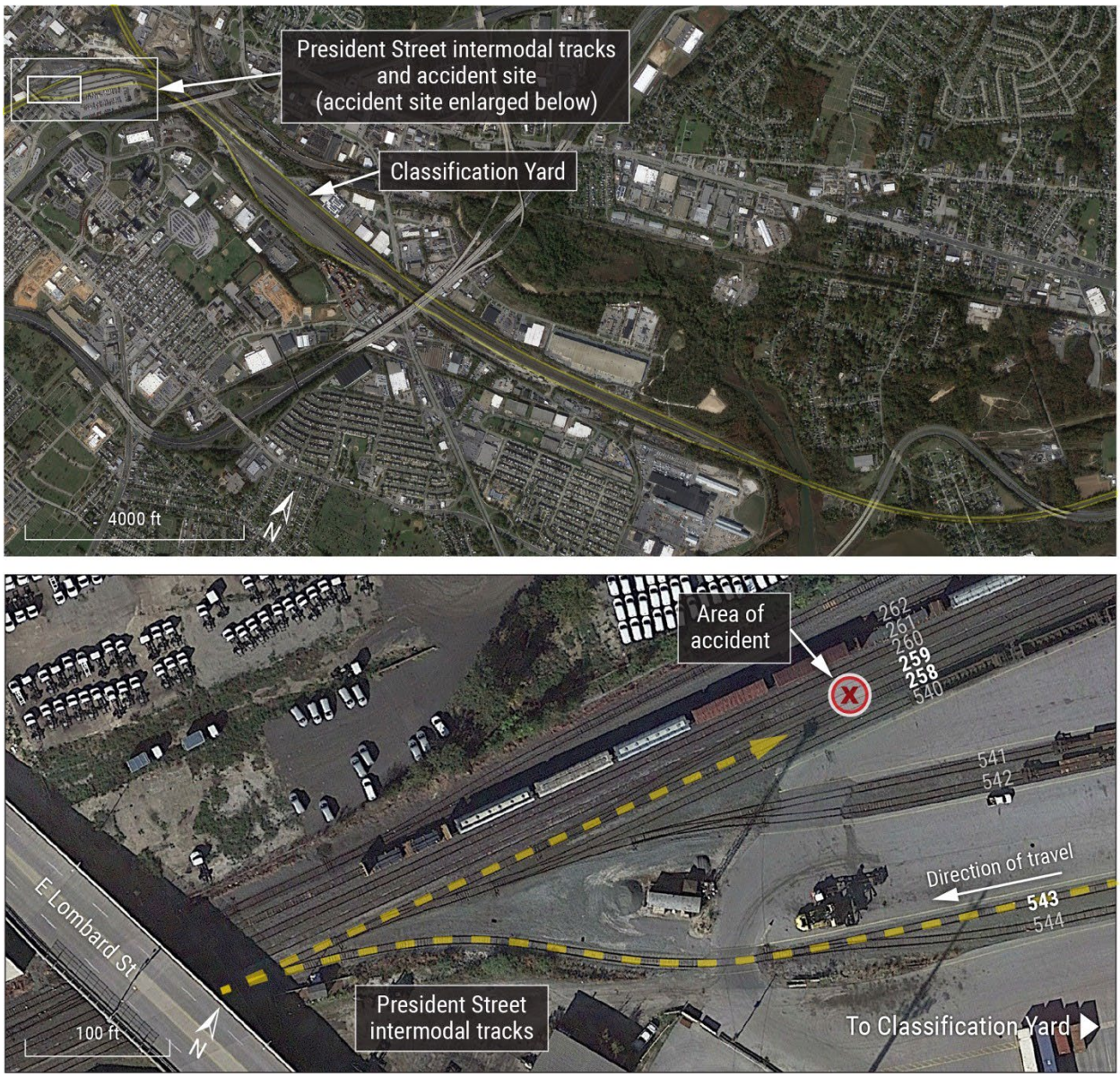


**Figure 4.** Google satellite photographs of Bayview Yard.

Note: The upper graphic is a map showing the President Street intermodal tracks, accident site, and the Classification Yard within the Bayview Yard. The lower map provides a yellow line and directional arrows showing train 38A's movement before the accident. The red X shows the accident location between tracks 258 and 259.

## 1.5 Accident Site Description

At the accident location, six tracks are in a right-hand curve used for railcar storage. These tracks have close-clearance restrictions due to the limited space between the tracks. The track centers measured at the accident location were between 11 feet 9 inches and 12 feet 1 inch. *NS Maintenance-of-Way Standard*

*Procedure No. 040* describes minimal track center distances of 13 to 14 feet between main track and adjacent main track, sidings, and industry track (NS 2006). When the distance between tracks is less than specified, a close-clearance restriction is required. (See section 1.6 for further information.)

NS maintains the tracks in the area to Federal Railroad Administration (FRA) Class 1 standards defined in Title 49 *Code of Federal Regulations* (*CFR*) Part 213, Track Safety Standards. The NTSB confirmed the track at the accident site met the standards.

## 1.6 Terminal Instructions and Operating Rules

The terminal instructions for operating within the Baltimore Consolidated Terminal are found in the *Harrisburg Division Timetable Number 1*, effective September 19, 2015 (NS 2015). Terminal instructions identify and define the special safety-critical rules, unique hazards, work procedures, responsibilities, and operating instructions for the safe movement of trains and employee safety for specific terminals or yards. Each terminal or yard will have safety-specific rules and instructions and employees train on these during physical characteristics training.

The Baltimore Consolidated Terminal instructions list different track locations where safety-critical permanent close-clearance restrictions exist. The terminal instructions state that employees are prohibited from riding the sides or end of equipment in the intermodal facility tracks in the two following locations:

- Baltimore, Maryland, Terminal Instruction 2 (President Street intermodal tracks) – Close clearance exists on the Incline track, Bank track, or Perryville track when cars are on adjacent tracks.

- Baltimore, Maryland, Terminal Instruction 3 (President Street intermodal tracks) – Close clearance exists on all tracks except the North track on the Eastern Avenue undergrade bridge due to girders adjacent to the tracks.

NS's January 1, 2019, *Operating Rules* describe the safety-critical rules and operating instructions when performing work in close-clearance restriction locations. Rule 20 Prohibited Acts states that employees are prohibited from riding: on equipment on tracks designated by terminal instructions as having close-clearance restriction; on the close-clearance side, between, or on the leading end (front) of equipment moving adjacent to the platform, building, or close-clearance structure; or on the side of equipment in intermodal yards. Rule 20 further defines "pinch-point" as any point at which it is possible to be caught between the moving parts of

equipment, between moving and stationary parts of equipment, or between the material being worked and the moving parts of equipment (NS 2019).

## 1.7 NS Conductor Certification Training

NS provides conductor certification training in accordance with 49 *CFR* 242.119(d). The conductor certification program, which includes training, testing, and evaluation of new-hire conductors, has two training categories: one for conductors with previous certifications/experience and one for those without. NS hired the accident conductor with no previous conductor certifications/experience.

NS's conductor certification program, which was approved by the FRA on May 22, 2018, stated that individuals not previously certified as conductors were required to attend certification and qualification phases of the conductor training program during which they were evaluated and tested on relevant knowledge and skills. The training was designed to convey and document understanding of and ability to comply with applicable federal railroad safety laws, regulations, and orders, as well as relevant railroad rules and procedures that implement them. Depending on the employee's hiring district, conductors with no previous certifications or experiences were allotted either 70, 90, or 150 days to complete the training program.

NS divided its conductor certification program for those with no previous experience into two phases. Phase one training consisted of knowledge and skills testing in general railroad safety rules, switching techniques, safe movement of trains, air brake systems, fouling tracks, close-clearance situations, and FRA safety regulations.[10] Phase one training was completed at the McDonough, Georgia, training facility. After successfully completing phase one training, a conductor-trainee attended phase two training at their district. The accident conductor reported to the Harrisburg Division, Baltimore District for phase two training.

The NS phase one training program contained (1) hands-on training; (2) written testing requirements; and (3) supervised evaluations on railroad operating rules, timetables and special instructions, critical safety rules, and prohibited acts. A conductor-trainee must successfully complete all sections. An NS training supervisor evaluated, approved, and signed off on all knowledge and skills tests.

[10] *Fouling a track* means the placement of an individual or an item of equipment in such proximity to a track that the individual or equipment could be struck by a moving train or on-track equipment, or in any case is within 4 feet of the field side of the near running rail as defined in 49 *CFR* 214.7. The *field side* of a rail is the side that lies outside the track gage.

Phase two (qualification) training was on-the-job training, where a conductor-trainee worked with district-certified conductor trainers on additional hands-on field and classroom training on terminal-specific knowledge and skills, including terminal instructions, close-clearance restriction locations and hazards, prohibited acts, operating rules, and district physical characteristics. During phase two, training evaluations and field observations were approved and signed off by NS district management. After successfully completing this phase, a conductor-trainee could be promoted to certified conductor in accordance with 49 *CFR* Part 242. At any time, if a conductor-trainee failed any portion of the knowledge and skills testing twice during phase one or phase two of the training program, the conductor-trainee was terminated.

## 1.8 Conductor Training History

NS hired the conductor on May 24, 2018, as a conductor-trainee and assigned him to the NS Baltimore District, Harrisburg Division. The employee attended phase one conductor certification training from August 6 to August 24, 2018, at the NS training facility in McDonough, Georgia, which he completed. During phase one training, the conductor was given computer-aided training on close-clearance situations on three different occasions.

The conductor-trainee then reported to the NS Baltimore District on August 27, 2018, where he began 10 weeks of phase two conductor qualification training. The conductor passed phase two conductor training, and on November 2, 2018, NS promoted him to a certified conductor. After his promotion to conductor, he worked a total of 67 days on various main line and yard jobs within the Baltimore District until the accident on February 7, 2019.

Phase two training records show that the conductor took a total of 5 written physical characteristics examinations totaling 38 questions as a conductor-trainee. None of the examination questions referenced the permanent close-clearance restrictions within the Baltimore Consolidated Terminal. The conductor, as a trainee, also took the 134-question 2018 T&E (train and engine) Operating Rules Exam, which covered NS and Amtrak operating rules. In that exam, two questions referenced the safety of operating within close-clearance restriction locations.

While interviewing a conductor training mentor for the Baltimore District, the NTSB asked about the physical characteristics training and the knowledge of areas where employees were not allowed to ride the side of railcars in the yard due to close-clearance restrictions. The mentor answered, “I can tell you that I did not

specifically mention the Perryville and Bank track locations, where the accident took place."

## 1.9 Electronic Device Usage

The conductor was using an NS-supplied portable radio before the accident to communicate with the engineer and yardmaster and to direct the train's movements on the yard tracks. The conductor's personal cell phone was found stowed inside the locomotive cab.

## 1.10 Postaccident Toxicology Testing

The Federal Aviation Administration Forensic Sciences Laboratory conducted toxicology testing on specimens from the conductor. The results were negative for all substances tested, including ethanol.[11]

The engineer submitted to an FRA postaccident drug and alcohol test following the accident, as required under 49 *CFR* Part 219. The results were negative for all substances tested, including ethanol.[12]

## 1.11 Postaccident Examination

FRA mechanical inspectors performed a postaccident inspection of train 38A's locomotive and the railcars, braking system, and other safety equipment and noted no exceptions to the mechanical condition of the train at the accident site. After a comprehensive review that included the braking system and other safety equipment, the FRA inspectors determined that no mechanical conditions related to this accident were present.

[11] The Federal Aviation Administration Forensic Sciences Laboratory has the capability to test for more than 1,300 substances including toxins, common prescriptions, and over-the-counter medications, as well as illicit drugs.

[12] FRA postaccident toxicology testing tests urine specimens for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, MDMA/MDA (Molly/Sally), methadone, opiates/opioids, phencyclidine, tramadol, brompheniramine, chlorpheniramine, diphenhydramine, doxylamine, pheniramine, and blood alcohol level.

## 1.12 Postaccident Actions

### 1.12.1 NS Safety Alert

Four days after the accident, NS's safety department released a systemwide safety alert to all employees to increase awareness of safe work procedures in the railroad environment. The safety alert described the incident, highlighted safety considerations, and provided information on specific job briefing topics and applicable safety and operating rules for crew and employee discussion (NS 2019).

### 1.12.2 FRA Training Review

On September 9, 2021, FRA informed NS by letter that it had conducted a review of NS's approved training program. The review was prompted by FRA's growing concerns regarding engineer and conductor training programs and recommendations from the Department of Transportation's Office of Inspector General audit of FRA's Conductor Certification Program.[13] Upon this review, FRA found the NS training program "was not in conformance with 49 *CFR* Part 242." FRA's letter stated that, in part, the NS training program lacked sufficient detail to permit effective evaluation of the railroad's training program. Specifically, the program review noted deficiencies in the NS knowledge testing procedures to determine whether individuals had the necessary knowledge and skills to safely discharge their duties as conductors. FRA also requested information regarding NS's oversight of its phase two on-the-job training. FRA instructed NS to resubmit its training program with the identified deficiencies addressed within 30 days. On November 12, 2021, NS submitted its updated conductor certification program to FRA for review.[14] As of the date of this report, FRA was evaluating the submission.

In addition, on November 12, 2021, FRA's deputy administrator sent a letter to the Association of American Railroads, American Public Transportation Association, and the American Short Line and Regional Railroad Association citing the FRA's concern about two conductor fatalities between March and August 2021, along with other serious nonfatal injuries during this time.[15] The deputy administrator also shared

[13] Letter from FRA Director of Railroad Systems and Technology to NS, September 9, 2021.

[14] NS requested an extension of 30 days, which FRA granted.

[15] (a) Letter from Administrator of the FRA to the Association of American Railroads, the American Short Line and Regional Railroad Association, and the American Public Transportation Association, November 12, 2021. (b) The letter did not specify the particular accidents. The NTSB is currently investigating two conductor fatality accidents that occurred during that period: RRD21FR008 on March 3, 2021, in LaMirada, California, and RRD21LR009 on April 7, 2021, in Louisiana, Missouri.

his concern about the quality and sufficiency of conductor training, based on their review of conductor certification training (as referenced above). As a result, the deputy administrator informed the recipients that the FRA's Operating Practices Division of FRA's Office of Railroad Safety will:

> immediately commence comprehensive reviews of all railroads' conductor certification programs and perform audits of those programs to confirm compliance. A central purpose of FRA's conductor certification regulation (49 *CFR* Part 242), and the required certification program, is to ensure that new-hire employees being considered for the position of a certified conductor are adequately prepared to safely perform their duties in the dangerous railroad environment. Accordingly, if any railroad's conductor certification program, or the implementation of that program, is found to be deficient after FRA's review and audit, FRA will direct the railroad to correct the deficiencies.

# 2. Analysis

## 2.1 Introduction

On February 7, 2019, about 7:00 a.m. local time, an NS railroad conductor, working with an engineer, was killed while performing switching operations in the Bayview Yard of the Baltimore Consolidated Terminal, Baltimore, Maryland. The conductor was riding on the side of the lead railcar of train 38A during a reverse movement when he was pinned between the railcar he was riding and a stationary railcar on an adjacent track.

This analysis discusses the accident and the following safety issues:

- Poorly written terminal instructions. (See section 2.3.)
- Training and testing gaps on close-clearance areas and location-specific hazards. (See section 2.4.)

The NTSB found no evidence that any of the following contributed to the cause of the accident:

- *Engineer and conductor drug or alcohol use*. Testing was negative for all substances tested, including ethanol.
- *Conductor cell phone use*. The conductor's personal cell phone was discovered stowed inside the locomotive cab.
- *Track or train conditions*. Postaccident inspections of the tracks at the accident site and of the train did not identify any deficiencies.

Therefore, the NTSB concludes that none of the following contributed to the accident: engineer or conductor use of alcohol or other drugs, conductor cell phone use, condition of the tracks, or the mechanical condition of the train.

## 2.2 Accident Sequence

On the day of the accident, train 38A was conducting a reverse movement on track 258 through the intermodal yard. The yardmaster reminded the engineer over the radio of the prohibition of riding on the side of railcars on the intermodal facility tracks; although the conductor had a radio and may have heard this reminder, the NTSB was unable to determine if he did. For unknown reasons, he subsequently positioned himself on the side of the railcar during its movement. Further, terminal instructions prohibited this action within most of the intermodal facility, and railcars

on an adjacent track (track 259) were visible from the switch where the conductor would have gotten on the side of the train. As the train proceeded on track 258, it entered a close-clearance restriction location, where the clearance between train 38A and the stored railcars was reduced to 9 inches. The conductor was pinched between the side of the railcar he was riding and stationary railcars on the adjacent track, resulting in his fatal injuries. The NTSB concludes that the conductor's decision to ride on the side of the railcar for unknown reasons, in violation of NS's rules prohibiting employees from riding the side or end of equipment in the intermodal yard, resulted in his death.

## 2.3 Terminal Instructions

Although the conductor's decision to ride on the side of the train violated the terminal instructions, the NTSB examined the language within the terminal instructions.[16] As shown in section 1.6, there are two rules in the terminal instructions that prohibit employees from riding on the sides of railcars in close-clearance restriction locations, but the two rules use different language. Specifically, terminal instruction 2 states that within the President Street intermodal tracks, close clearance exists on the Incline (track 540), Bank (track 258), or Perryville (track 259) tracks when railcars are on the adjacent track. Terminal instruction 3, however, states that within the President Street intermodal tracks, close-clearance restrictions exist on all tracks, with the exception of the North track, but it does not reference railcars stored on adjacent tracks. These rules could lead to different interpretations, such as only thinking that close clearance exists when railcars are on adjacent tracks (as explicitly stated in terminal instruction 2); thus employees may ride the side of railcars in those locations if they are not aware of other railcars. The NTSB concludes that NS's terminal instructions in the *Harrisburg Division Timetable Number 1* regarding close-clearance restriction locations are inconsistent and lack clear messaging, which could lead an employee to misinterpret the instruction and ride on the side of railcars, placing the employee in danger. The NTSB recommends that NS review and revise the terminal instructions in the *Harrisburg Division Timetable Number 1* that govern the close-clearance restriction locations within the Baltimore Consolidated Terminal, and ensure the instructions contain consistent language related to close-clearance locations.

[16] The NTSB was unable to determine to what extent the wording of the terminal instructions played a role in the conductor's decision to ride on the railcar.

## 2.4 Close-Clearance Knowledge Testing

In September 2021, the FRA conducted a program review of all railroad conductor training programs, including NS's training, due to a growing concern about such programs and recommendations from the Department of Transportation's Office of Inspector General audit of FRA's Conductor Certification Program. The FRA found that the NS training program lacked the detail to permit effective evaluation of the program and assure that conductors demonstrate their knowledge concerning the safe discharge of their responsibilities. The FRA also identified that NS conductor examinations lacked detailed testing procedures to ensure adequate knowledge transfer and found deficiencies in NS oversight of its phase two on-the-job training.

Although the reasons for the conductor's decision to ride the lead railcar during the reverse movement are unknown, the NTSB examined the conductor's training and testing. The conductor was hired on August 6, 2018, with no previous railroad experience. During his phase one training (August 6-24, 2018), the conductor was given computer-aided training on close-clearance situations on three different occasions. After phase one training was complete, the conductor spent 10 weeks in phase two conductor qualification training at the Baltimore District.[17] During this time, he was assigned to work various yard and main line jobs with certified conductor trainers. One trainer stated that he did not discuss the close-clearance restriction locations within the Baltimore Consolidated Terminal with the conductor. The conductor also took additional classroom training and examinations; while the conductor took five physical characteristics examinations, none of the questions addressed the close-clearance restriction locations. Further, although the rules examination taken by the conductor had two questions on close-clearance restriction locations, these were not specific to the Baltimore Consolidated Terminal. The NTSB concludes that the NS conductor phase two training program did not emphasize and test on the close-clearance restriction locations and location-specific hazards within the Baltimore Consolidated Terminal, which could lead to employees having inadequate knowledge to safely work in these areas. Therefore, the NTSB recommends that NS revise the Baltimore Consolidated Terminal training and testing program to emphasize the close-clearance restriction locations and location-specific hazards.

[17] Complete details of what content phase two training covered were unavailable because phase two was on-the-job training.

# 3. Conclusions

## 3.1 Findings

- None of the following contributed to the accident: engineer or conductor use of alcohol or other drugs, conductor cell phone use, condition of the tracks, or the mechanical condition of the train.
- The conductor's decision to ride on the side of the railcar for unknown reasons, in violation of Norfolk Southern Corporation's rules prohibiting employees from riding the side or end of equipment in the intermodal yard, resulted in his death.
- Norfolk Southern Corporation's terminal instructions in the *Harrisburg Division Timetable Number 1* regarding close-clearance restriction locations are inconsistent and lack clear messaging, which could lead an employee to misinterpret the instruction and ride on the side of railcars, placing the employee in danger.
- The Norfolk Southern Corporation conductor phase two training program did not emphasize and test on the close-clearance restriction locations and location-specific hazards within the Baltimore Consolidated Terminal, which could lead to employees having inadequate knowledge to safely work in these areas.

## 3.2 Probable Cause

The National Transportation Safety Board determines that the probable cause of the fatality was the conductor riding on the side of a railcar for unknown reasons as the moving train approached stored railcars on an adjacent track, which resulted in decreased clearance, in a section of the Bayview Yard where Norfolk Southern Corporation's terminal instructions and operating rules specifically prohibited riding railcars in the close-clearance restriction areas.

# 4. Recommendations

As a result of this investigation, the National Transportation Safety Board makes the following new safety recommendations:

**To the Norfolk Southern Corporation:**

Review and revise the terminal instructions in the *Harrisburg Division Timetable Number 1* that govern the close-clearance restriction locations within the Baltimore Consolidated Terminal, and ensure the instructions contain consistent language related to close-clearance locations. (R-22-1)

Revise the Baltimore Consolidated Terminal training and testing program to emphasize the close-clearance restriction locations and location-specific hazards. (R-22-2)

**BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

**JENNIFER HOMENDY**
Chair

**MICHAEL GRAHAM**
Member

**BRUCE LANDSBERG**
Vice Chairman

**THOMAS CHAPMAN**
Member

**Report Date: April 8, 2022**

# Appendix A: Investigation

The National Transportation Safety Board was notified on February 7, 2019, that a Norfolk Southern Corporation conductor was killed at the Bayview Yard, in Baltimore, Maryland. The National Transportation Safety Board launched an investigator-in-charge and two investigative team members to investigate on February 7, 2019.

Parties to the investigation included the Norfolk Southern Corporation; the Federal Railroad Administration; the Brotherhood of Locomotive Engineers and Trainmen; and the International Association of Sheet Metal, Air, Rail and Transportation Workers–Transportation Division.

# Appendix B: Consolidated Recommendation Information

Title 49 United States Code (U.S.C.) 1117(b) requires the following information on the recommendations in this report.

For each recommendation—

(1) a brief summary of the NTSB's collection and analysis of the specific accident investigation information most relevant to the recommendation;

(2) a description of the NTSB's use of external information, including studies, reports, and experts, other than the findings of a specific accident investigation, if any were used to inform or support the recommendation, including a brief summary of the specific safety benefits and other effects identified by each study, report, or expert; and

(3) a brief summary of any examples of actions taken by regulated entities before the publication of the safety recommendation, to the extent such actions are known to the Board, that were consistent with the recommendation.

**To the Norfolk Southern Corporation**

**R-22-1**

Review and revise the terminal instructions in the *Harrisburg Division Timetable Number 1* that govern the close-clearance restriction locations within the Baltimore Consolidated Terminal, and ensure the instructions contain consistent language related to close-clearance locations.

Information that addresses the requirements of 49 *U.S.C.* 1117(b), as applicable, can be found in section 2.3 Terminal Instructions. Information supporting (b)(1) can be found ins section 2.3 Terminal Instructions; (b)(2) is not applicable; and information supporting (b)(3) can be found in section 1.12 Postaccident Actions.

**R-22-2**

Revise the Baltimore Consolidated Terminal training and testing program to emphasize the close-clearance restriction areas and location-specific hazards.

Information that addresses the requirements of 49 *U.S.C.* 1117(b), as applicable, can be found in section 2.4 Close-Clearance Knowledge Testing. Information supporting (b)(1) can be found in section 2.4 Close-Clearance

Knowledge Testing; (b)(2) is not applicable; and information supporting (b)(3) can be found in section 1.12 Postaccident Actions.

# References

NS (Norfolk Southern Corporation). 2006. Maintenance-of-Way Standard Procedure No. 40. Clearances: Vertical and Horizontal. Issued January 9, 2006.

———. 2015. *Harrisburg Division Timetable No.1*, Effective September 19, 2015.

———. 2019. *Norfolk Southern Operating Rules*. Effective January 1, 2019.

———. *Safety Alert*. Effective February 11, 2019.

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