RRD22FR006
BNSF Railway
February 9, 2022
Denver,
Colorado

National Transportation Safety Board

Operations and System Safety Factual Report

Accident

NTSB Accident Number:	RRD22FR006
Date of Accident:	February 9, 2022
Time of Accident:	10:57 a.m.
Type of Train and No:	Mixed Freight Train - YDEN1152-09i
Railroad Owner:	BNSF Railway
Train Operator:	BNSF Railway
Crew Members:	RCO Foreman, RCO Helper
Location of Accident:	Denver, Colorado

Group

Ryan Frigo
Investigator In Charge
National Transportation Safety Board

Patrick Scott
Operating Practices Inspector
Federal Railroad Administration

Ryan Ringelman
General Director of System Safety
BNSF Railway

Brian Fransen
Safety Task Force National Coordinator
BLET

Brad Warren
Accident Investigator
SMART-Transportation Division

Accident Summary

On February 9, 2022 at approximately 10:57 a.m. a BNSF Remote Control Operator (RCO) Helper with almost 17 years of railroad service was struck by the Remote Control Locomotive (RCL) he was operating in the BNSF Globeville Yard in Denver, Colorado. The helper was fatally injured in the accident. The helper was working with an RCO Foreman as a member of a 2-person crew assigned to Job No. YDEN1152-09i. The RCL, Locomotive No. BNSF 1961, was part of a consist of 2 SD40-2 six axle locomotives outfitted with Cattron on-board Remote-Control equipment which was being operated by the BNSF employees via two Operator Control Units (OCU). The units are designated as a "A" unit and a "B" unit. At the time of the accident the fatally injured RCO helper ("A" unit) was positioned on the front platform of the RCL and was controlling the movement from the OCU unit as the "A" operator, the locomotives were coupled to 21 freight cars, and the consist was operating westward from Track No. 16 and onto the "Teen Lead".[1] The first 9 cars behind the locomotives were empty box cars, followed by 7 loaded covered hopper cars, and 5 loaded tank cars. 3 out of the 5 tank cars had hand brakes applied[1]. The weather was mostly cloudy with a temperature of 45-degrees Fahrenheit with

[1](a) At this location the tracks are oriented geographically Northeast to Southwest. The BNSF Railway designates the direction as East-to-West, therefore, railroad directions will be used in this report. (b) A railroad lead is an extended track connecting the tracks on the end of a yard. At this location the lead connects tracks 15, 16, 17, 18, and 19; the "Teens".

[1] The 2nd, 3rd, and 4th tank cars, numbered from the rear of the train had hand brakes applied.

a south-by-southeast wind at 15 m.p.h. and no precipitation. An on-scene review of yard surveillance video indicated slack action in the train consist during the train's movement.

Figure 1: NTSB Investigator standing on the nose platform of the locomotive. The yellow arrow indicates the position of the continuous barrier chain. Source NTSB.

Figure 2: NTSB Investigator standing on the center of the nose platform of the locomotive facing forward. Source NTSB.

Figure 3: Cattron “A” Unit that was used by the fatally injured RCO Helper. Source NTSB.

Operating Crews

BNSF Train No. YDEN1152-09i

RCO Foreman (Operator ”B” Unit): Thomas Kennedy
On duty 02/9/22, 0701

- Original Hire Date 05/27/2002
- Transferred to Denver 08/12/2011
- On Medical Leave for COVID exposure 01/31/22 to 02/06/22
- Remote Control Operator certified 10/25/02
- RCO training for CANAC equipment (RCO box) 08/01/16
- Most recent Transportation Rules Exam 02/04/21

RCO Helper (Operator “A” Unit): Jeffrey Jones
On duty 02/9/22, 0701

- Original Hire Date 03/14/2005
- Returned to Denver from a year in Winslow, AZ 08/15/2020
- Remote Control Operator certified 07/08/05
- RCO recertification 04/28/09
- Most recent Annual Ride 05/11/2018
- Most recent Transportation Rules Exam 04/30/21

Train Consist

- Mixed Freight Train
- 21 Cars (12 loads, 9 empties)
- 2 SD40-2 six axle locomotives outfitted with Cattron on-board Remote-Control (BNSF 1961 RCL Pull Back Protection Equipped, BNSF 1601)
- 2,311 Tons – 1,321 Feet

Applicable Rules for RCO

R–2.0 Remote Control Train Handling

R-2.1 Controlling In-train Forces

- Excessive slack action can cause derailment or damage equipment and track structures. To minimize slack action:
- Change speeds gradually let the cars adjust to one speed before moving up or down to another.

- When sending movement commands to the locomotive, change Speed selector positions slowly. Moving the Speed selector between the settings too quickly causes erratic power and brake commands and results in erratic movements of the locomotive.
- When starting a remote-control movement at a location that requires an automatic train brake application to prevent undesired movement, do not exceed the MIN setting.
- Unless kicking, when initiating movement with cars attached to an RCL:
    - 1. Set the Speed selector to the COUPLE position (1 MPH).
    - 2. Once the cars are stretched (if pulling), or bunched (if shoving), move the Selector to the desired speed.
- When stopping with cars attached to an RCL:
    - 1. Adjust the Speed selector to a setting that allows the cars to bunch (or stretch if shoving).
    - 2. Once slack is gathered, continue decreasing speed until reaching the STOP position on the Speed selector.

Interviews:

The Group conducted 1 interview during the on-scene phase of the investigation. A summary of the interview conducted are described below:

Summary of the interview with the Foreman

- Foreman Tom Kennedy is a 20-year railroad employee with 6 years on the job.
- Mr. Kennedy and Mr. Jones worked together for approximately one year.
- Job and day were as normal as any other day.
- Problems with boxes is daily and crews learn to work with them.
- Mr. Kennedy described the safety culture and relationship between employees and management as not good in Denver.
- Crew feels pressured to complete work fast and not get overtime.
- Boxes were new to the yard (6-8 months).
- Tilt Time out was not taken seriously. It happens frequently and is mostly shrugged off as accidental.
- Employees have different styles of operating boxes. Mr. Kennedy would not answer question about how he would have operated box in the same position as Mr. Jones.
- Both employees were experienced and took pride in their work.
- Mr. Kennedy described the YDN1 1152 is the only job that must build its own train. He considered it to be the red head stepchild of the Denver yard.
- Next move was to double Track No. 16 to Track No. 18 and then have Carmen perform air test.
- Mr. Kennedy did not try and contact Mr. Jones on the radio because he assumed that the man down feature was on accident.

- Mr. Kennedy does not know if Mr. Jones went directly to 7 position on the box or not.
- Mr. Kennedy was located on the South side of train in Track No. 16 at the time of the incident.

Observations from FRA On-Scene at time of accident

- Inspector was at Denver Round House at 10:30 and was inspecting.
- Heard radio transmissions for "Tilt-Time Out", this was out of ordinary for this time of day, heard transmission 2 times. Then heard the foreman call "Emergency, Emergency, Emergency".
- Spoke to railroad officials about what was occurring, and heard radio communications of crews clearing the yard.
- Drove to the scene. Remembers seeing RCO Foreman and Superintendent.

YDEN1152-09i Radio Communication Summary[2]

Time Stamp (CST)	**Communication**
11:53:27	Foreman Kennedy tells Jones to get off the equipment "there" and Kennedy is going in between equipment.
11:56:09 (This group of messages is 21-seconds long)	Kennedy expresses that he "Can't believe he got them all" meaning all cars were coupled. Jones acknowledged. Kennedy pitches control to Jones. And says to pull cars forward out of the track.

[2] Summary was generated on scene by working group members.

	Jones says he will pull the consist forward and board the equipment.
11:57:14	Cattron belt back system talker message broadcast “Tilt Time Out From A” for Locomotive No. 1961. Which is the RCO down response feature.
11:58:18	Second broadcast from Cattron belt back system talker message broadcast “Tilt Time Out From A” for Locomotive No. 1961. (47-seconds after the start of the previous Cattron talker message, during this time, radio communications from other employees can be heard) Third broadcast from Cattron belt back system talker message broadcast “Tilt Time Out From A” for Locomotive No. 1961.
11:59:39	Kennedy calls “Emergency, Emergency, Emergency” and requests medical assistance on the “Teen Lead”. Yardmaster acknowledges.
11:59:59	Other employees start responding by clearing crossings for emergency response. Fourth broadcast from Cattron belt back system talker message broadcast “Tilt Time Out From A” for Locomotive No. 1961.

On-site Observations of the Group

See Appendix A.

Accident Reenactment (Conducted 2/10/22, at approximately 3:15 p.m.)

The Operating Group performed a reenactment of the accident and simulated the exact locations, speeds and RCO control commands that occurred during the accident. During the reenactment, the BLET Party Spokesman rode in the Engineer's seat, with the rest of the Operations Group observing from outside the locomotive. The intent was to feel the slack run-out from inside the cab of the locomotive, as well as visually observe it from the ground. The following observations were made:

- From a stopped position to where the RCO Helper stepped on the locomotive, both run-in and run-out of the slack was significant and throttle changes were rapid.
- From the location where the RCO Helper boarded the locomotive to where he was thrown from the locomotive the run-out of the slack was violent and nearly brought the locomotive's to a stop before continuing westbound. The amount of slack run-out was significant and was enough to propel the seated Engineer forward in the seat, from a braced position.
- The max speed reached as indicated in the cab during the reenactment was approx. 4.7 mph, which reduced to 2.2 mph when the slack ran out. These speeds are similar to what a preliminary review of the locomotive downloads show occurred during the incident.

Post-Accident Actions BNSF

After the accident, BNSF distributed a System Briefing entire railroad informing employees about the circumstances of the accident. BNSF also released a rule change briefing (with a new rule contained within prohibiting employees from riding locomotive

platforms and walkways during movements) regarding riding locomotive platforms. BNSF informed investigators that all active RCO jobs across the system received the briefing, this was then followed by all certified RCO operators and the remainder of all employees.

Safety Briefing

Transportation

Transportation Employee Fatally Injured in Denver Yard

SB-2021-03T
Feb. 11, 2022

On the morning of February 9, a BNSF RCO operator with over 16 years of service was fatally injured while conducting switching operations in Denver Yard on the Powder River Division. We extend our deepest sympathy and thoughts to his family and to those in our BNSF family who knew and worked with him. The investigation into this incident was initiated immediately and is on-going. We ask everyone to consider how they can take this information with them back to the work they perform every day.

As we continue to investigate the circumstances that led to this tragic incident, please take the opportunity to review several critical processes as follows to help ensure all switching operations performed by remote control operators are completed safely.

R-2.1 Controlling In-Train Forces

Excessive slack action can cause derailment or damage equipment and track structures.

To minimize slack action:

- Change speeds gradually — let the cars adjust to one speed before moving up or down to another.
- When sending movement commands to the locomotive, change Speed selector positions slowly. Moving the Speed selector between the settings too quickly causes erratic power and brake commands and results in erratic movements of the locomotive.
- When starting a remote control movement at a location that requires an automatic train brake application to prevent undesired movement, do not exceed the MIN setting.
- Unless kicking, when initiating movement with cars attached to a RCL:
  1. Set the Speed selector to the COUPLE position (1 mph).
  2. Once the cars are stretched (if pulling), or bunched (if shoving), move the Selector to the desired speed.
- When stopping with cars attached to a RCL:
  1. Adjust the Speed selector to a setting that allows the cars to bunch (or stretch if shoving).
  2. Once slack is gathered, continue decreasing speed until reaching the STOP position on the Speed selector.

If riding equipment, consider how your ability to control movement may be affected by any slack action, track grade or curve, train makeup or the weather.

S-1.4.6 Three-Point Contact

Maintain at least three-point contact when getting on or off vehicles, equipment and machinery, and when ascending or descending ladders or platforms. Three-point contact consists of both feet and one hand or both hands and one foot.

***S-13.1.5 Riding In or On Moving Equipment* (in part)**

- Consider your physical capabilities and limitations, ensuring that when riding you can maintain at least three-point contact at all times.

Start every task or activity by conducting a Job Safety Briefing and pause the work when conditions change. Please consider the information shared above and how you can personally ensure all work near tracks, including switching movements by remote control operators, are completed safely.

Rule Change Briefing

Transportation

TY&E Safety Rules S-13.1.5: Riding In or On Moving Equipment

February 22, 2022

Safety is more important than speed or convenience. The decision to ride on rail equipment must only occur after all options have been explored and you have determined it can be done safely.

Choosing Safety means we are taking the time to explore all options and choosing the safest course of action — such as walking, using a vehicle, repositioning the locomotive to pull instead of shove freight cars, or working with other employees to safely complete the task — to help eliminate the exposures related to riding on rail equipment.

Rule Change Effective March 1, 2022

S-13.1.5 Riding In or On Moving Equipment *(in part)*

Riding Engines

When necessary to ride engine exterior:

- Do not ride on platforms or walkways.
- Movement must not exceed 20 MPH.
- Do not ride steps to a coupling.

Exception:

- Platforms or walkways may only be used to move from one engine to another within a consist at speeds of 20 MPH or less. Do not extend any part of the body beyond the exterior edge on either side of the engine (for example, do not lean out to obtain fuel reading, inspect engine, etc.).

Questions for Discussion

- ☐ **When riding an engine, do I always need to safeguard against slack action?**

  Yes. Always safeguard against potential slack action within the train or switch cut. Slack action while riding must be considered, and proper safeguards always applied. Slack action is most likely to occur when movement begins, when reducing car counts in advance of a stop, etc. To avoid unnecessary slack action/in-train forces, verify the route to be taken to ensure switches/derails are lined for proper route and cars/equipment on adjacent tracks are in the clear, when possible before moving.

- ☐ **Is it acceptable to ride on platforms or walkways of the engine exterior?**

  No. Do not ride on platforms or walkways. Platforms or walkways may only be used to move from one engine to another within a consist at speeds of 20 mph or less.

- ☐ **Can I move from the cab to the steps while approaching a switch or crew change location and my engine is moving?**

  No. Platforms or walkways may only be used to move from one engine to another within a consist at speeds of 20 mph or less.

- ☐ **Can I ride the steps of an engine if I have determined that it is safe to do so?**

  Yes. It is acceptable to ride the steps; however, do not ride the steps to a coupling.

- ☐ **If I need to put another locomotive on line within my consist, am I allowed to traverse the platforms or walkways of the engine exterior?**

  Yes. Provided that your speed is 20 mph or less, the platforms or walkways may be used to move from one engine to another within a consist.

Parties to the Investigation - Acknowledgment Signatures

The undersigned designated *Party to the Investigation* representatives attest that the information contained in this Operations and System Safety Group Factual Report is a factually accurate representation of the information collected during the on-scene investigation, to the extent of their best knowledge and contribution in this investigation.

//s// Date 8/23/22
Ryan J. Frigo, NTSB

N/A Date N/A
Patrick Scott, FRA

//s// Date 8/24/22
Aaron Ratledge, BNSF

//s// Date 8/29/22
Brad Warren, SMART-TD

//s// Date 9/4/22
Brian Fransen, BLET

Appendix A: Boot Inspection

From: Manutes John
To: Frigo Ryan; [redacted] Dan K. Bonawitz Jr.; [redacted]
Baker, William (FRA)
Subject: Boot Inspection
Date: Wednesday, February 16, 2022 10:37:49 AM
Attachments: image001.png

Today representatives from BNSF, FRA, and NTSB jointly reviewed the condition of Mr. Jones' boots at the BNSF yard in Denver. Photographs are in Kiteworks (Link).

My notes are:

- One pair of Irish Setter 83850 Men's Size 10.5 boots
- Both boots had scuff marks in the leather, consistent with normal wear and tear
- The soles appeared in adequate condition, free from tears or any signs of separation, with appropriate tread
- The right boot, outside (lateral) rear-portion of the toe box, contained a tear in the leather which exposed the rear of the steel toe material. Investigators discussed, but were unable to determine, if this was present prior to the accident or as a result of the accident.
- The left boot had dirt caked in the tread (whereas the right boot didn't). The toe area showed signs of scraping, the heel area did not. Investigators discussed, but were unable to determine, if this was present prior to the accident or as a result of the accident.
- The style of boot appeared appropriate for the work and within BNSF rules.
- The laces appeared in good condition
- The heel appeared to be defined and in good condition.

The boots are being retained by BNSF who will return them to the family when NTSB and BNSF claims both agree that a release is acceptable.

Thank you to everyone for supporting this.

Thank you,
John