NATIONAL TRANSPORTATION SAFETY BOARD

Office of Railroad, Pipeline and Hazardous Materials Investigations

Washington, DC

RRD21LR002

Housatonic Railroad Employee Fatality

North Canaan, Connecticut

IIC Factual Report

October 14, 2020

Accident Information

Date of Accident:	October 14, 2020
Time of Accident:	2:50 p.m. local time
Railroad Owner:	Housatonic Railroad
Involved Equipment:	Rail Mounted Track Excavator
Fatalities:	1
Injuries:	0
Type of Accident:	Roadway Worker Fatality
Location of Accident:	North Canaan, Connecticut

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Accident Summary

On October 14, 2020, about 2:50 p.m. local time in North Canaan, Connecticut, a Housatonic Railroad employee with 21 years of railroad service was struck and killed by a rail-mounted track excavator traveling in an out-of-service track.[1,2] At the time of the accident, the employee (deceased) was serving as the roadway worker in-charge (RWIC) of the out-of-service track. The RWIC and a trackman had just completed taking measurements of a new switch panel (scheduled for installation on October 15, 2020), which was located along the left (north) ballast shoulder of the out-of-service track.

The excavator operator sought the measurements from the RWIC to determine if more digging was required. He pulled the excavator up near the RWIC's location, who at the time was standing clear of the track at the west end of the new switch panel, taking a measurement. The operator and RWIC had a discussion regarding the digging measurements, and after both the operator and the RWIC concurred with the measurements, the operator then moved the excavator forward (east) to pick up a set of rail tongs.[3] As the excavator was moving forward, the RWIC started to roll-up his measuring tape and started walking along the left (north) side of the out-of-service track (between the new switch panel and the moving excavator). As the two continued east, the clearance between the new switch panel and the excavator gradually narrowed. At a location where the clearance between the excavator's rear rubber tire and the new switch panel was about 2 feet, the RWIC was impacted by the rear left rubber tire of excavator, causing fatal injuries.

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[1] Rail-mounted means that the machine was mounted and traveling on railroad tracks.
[2] Track excavator machine is a machine equipment with a digging bucket used to move and grade earth material.
[3] Rail tongs (rail dogs) are tools used to lift rails.

Emergency responders from North Cannan and Litchfield County responded to the accident and transported the employee to a local hospital where he died from his injuries. The Connecticut State Police also responded to the accident and assisted with the investigation. Weather at the time of the accident, was clear skies with few clouds, the temperature was 67°F.

Housatonic Railroad

The Housatonic Railroad Corporation (HRRC) is a Class III railroad that operates in southwestern New England. The railroad is headquartered in Canaan, Connecticut, with its main yards located in North Canaan, Connecticut. It has been operating as a regional railroad since 1836. The railroad was chartered in 1983 to operate a short section of track in northwestern Connecticut, and has since expanded north and south, as well as west into New York State. The railroad currently employs 30 people and maintains approximately 125 miles of track. Employees described the railroad as small and indicated that most personnel were required to perform multiple operational duties.

Accident Site Description

At the time of the accident, the site was described as an active construction work zone, due to a switch and crossing replacement project. The accident occurred in Canaan Yard, which is described as a "wye" track (see figure 1). The accident site was clear from the mainline and away from active freight train movements. Replacement switch components, and other track materials had been assembled adjacent to the north side (track left) of the track about 3-4 feet away from the running rail. However, at the location of the accident, the clearance between the materials and the

outside of the excavator's rubber tire was only about 2 feet. This created a close clearance situation for roadway workers when the equipment traveled past the materials in order to perform work. The accident site was described as having level ground, with little to no ballast shoulder.

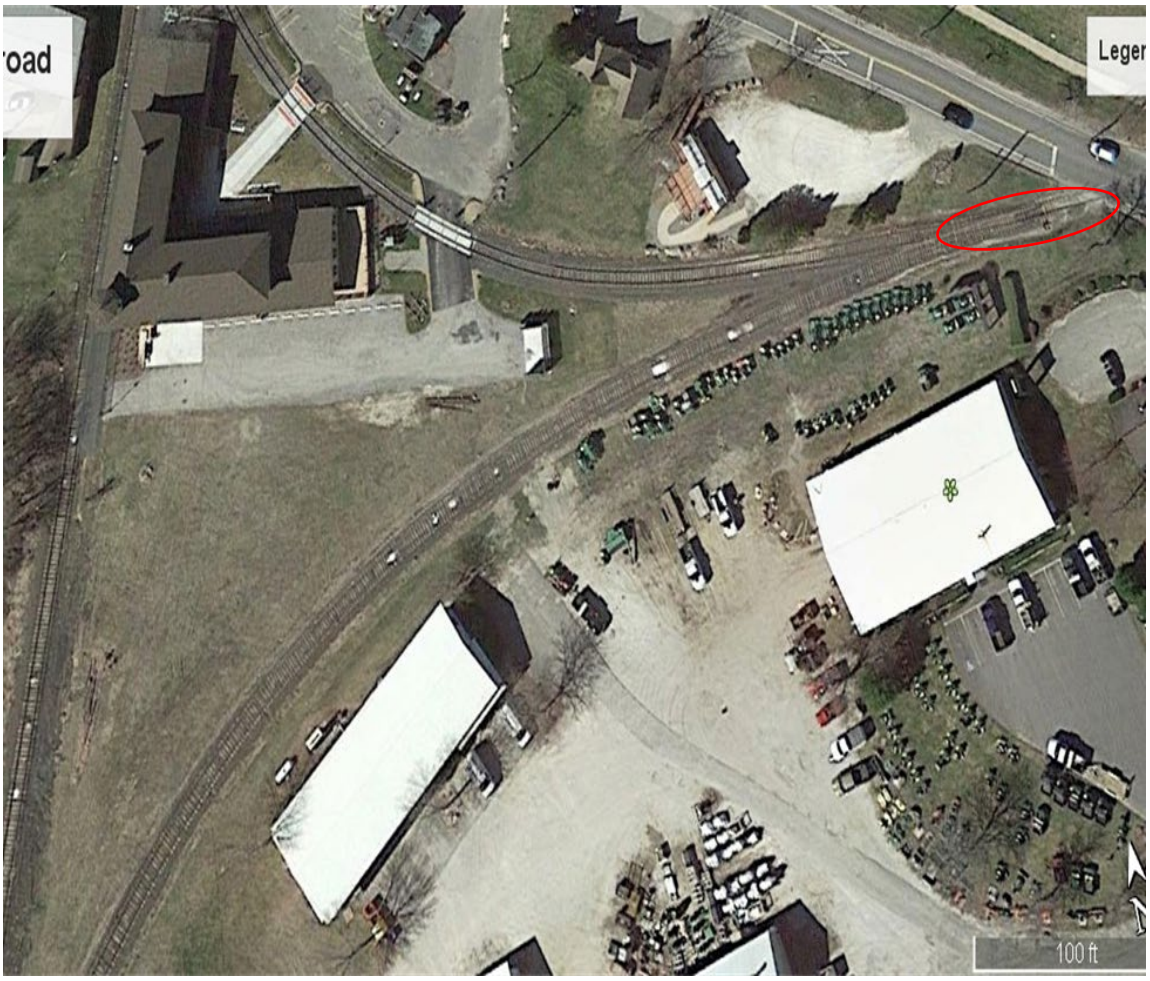

Figure 1- Google Earth view of the accident site.

Figure 2- Excavator sitting on the tracks at the accident site.

Method of Operation

A review of the NORAC Movement Permit Form D shows that the accident track was removed from service on October 14, 2020, at 8:01 a.m., via Form D, line 4, and assigned to Trackman [RWIC] Thompson. The Form D states that the *"CR track is out of service between/at Canaan and End of Track"*. The track excavator was operating under the following authority:

- NORAC rule 133(d)- governs movement and operations within out of service limits, and under the sole authority of the RWIC. Such movements are made at restricted speed.
- HRRC rule RW-26; Operating Self-Propelled Equipment- The following rules must be followed while operating roadway maintenance machines and when clearing the tracks.
    1. The employee must be qualified or must be a trainee under the supervision of a qualified employee.
    2. Keep the "operators manual" available on the equipment to determine safe operating procedures.
    3. Communicate with any employee(s) who are near the equipment regarding:
        a. Normal equipment operating procedures
        b. Location of employees working around or observing the equipment
        c. Operator blind spots
        d. Signals warning that the equipment will move
    4. Do not get closer than 15 feet to employees working on the track in front of or behind the equipment unless:
        a. The operator requires employees to be closer; and
        b. You have communicated with the affected employees.

CT 1401 R6 1-93

NORAC MOVEMENT PERMIT FORM D

FORM D No. H7

FORM D NO.(S) _____
DELIVERED TO _____

DATE 10/14/2020

	FORM D CANCELLED TIME	DATE	DSPR
TO M of W TRKM THOMPSON AT CANAAN			

1. TEMPORARY SPEED RESTRICTIONS

LINE	TRK(S)	BETWEEN/AT	SPEED PSGR/FRT		SPEED SIGNS DISPLAYED YES	NO

2. OPERATE IN ____ DIRECTION(S) ON ____ TRK BETWEEN _____ AND _____
ON ____ TRK BETWEEN _____ AND _____ DSPR ____ TIME _____
ON ____ TRK BETWEEN _____ AND _____ DSPR ____ TIME _____
ON ____ TRK BETWEEN _____ AND _____ DSPR ____ TIME _____

3. TRAINS OR TRACK CARS AHEAD _____
TC PROCEED PAST STOP SIGNAL(S) AT _____
4. CR TRK OUT OF SERVICE BETWEEN/AT Canaan and End of Track
IN CHARGE OF TRKM THOMPSON
____ TRK OUT OF SERVICE BETWEEN/AT _____
IN CHARGE OF _____

5. ____ LINE ____ TRK OBSTRUCTED FOR MAINTENANCE BETWEEN _____
AND _____
6. NON-SIGNALLED DCS RULES IN EFFECT ON ____ TRK(S) BETWEEN _____ AND _____
7. INT AND CP SIGNALS OUT OF SERVICE ON ____ TRK(S) AT _____
8. REMAIN AT _____ ON _____ TRK UNTIL ENGINE ARRIVES TO ASSIST
9. OPERATE AT RESTRICTED SPEED ON ____ TRK TO _____ WHERE TRAIN IS DISABLED
10. TBS IN SERVICE AT _____
11. CSS RULES OUT OF SERVICE ON ____ TRK(S) BETWEEN _____ AND _____
12. PROTECT CROSSINGS(S) _____
13. OTHER INSTRUCTIONS/INFORMATION _____

DISPATCHER LEWIS TIME EFFECTIVE 08:01

Figure 3- copy of the Form D

HRRC's On-Track Safety Program

Manual Development

Per FRA Part 214.307; "On-track safety programs", each railroad subject to FRA's Railroad Workplace Safety regulations shall maintain and have in effect, an FRA approved on-track safety program which complies with FRA on-track safety requirements. A railroads on-track safety program shall be retained at a railroads system headquarters, and division headquarters, and shall be available for review and inspection by FRA representatives.

The HRRC maintains and utilizes an FRA approved on-track safety program. HRRC's program was issued to and approved by the FRA on July 1, 2014. The on-track safety program was developed around FRA's Part 214, Railroad Workplace Safety rules and regulations, and Northeast Operating Railroad Advisory Committee (NORAC) rules and procedures. Records show that HRRC has an approved training and efficiency testing program that determines compliance with the on-track safety rules and procedures.

HRRC's on-track safety program manual contains 28 different sections that pertain to roadway worker protection, and worker compliance with the rules and instructions contained within the manual. Sections include, responsibilities of roadway workers, employee in-charge, lone worker safety, and types of on-track safety. The manual also contains a "good faith challenge" process for when roadway workers challenge or question on-track safety, or operations. The manual also contains 10 different sections that pertain to bridge worker safety requirements including responsibility of roadway workers, fall protection, below water hazards, and protective equipment.

On-Track Job Safety Briefings

On-track job safety briefings are specifically discussed within the on-track safety program, All Roadway Workers whose duties require the coordination between two or more workers must perform a job briefing prior to starting their job. The roadway worker must acknowledge that they have a clear understanding of the task, how it is to be accomplished and the on-track protection procedure to be used. On-track job safety briefings shall cover the following:

1. The specific job to be performed for the day. (Example: Installing ties at new interlocking under construction).
2. What type of protection the employee-in-charge intends to use. (Example: Depending on the nature of the work, the affected track will be taken out of service, slow-ordered, or foul time will be requested).
3. Responsibilities of each employee. (Example: Which foreman will be in charge of the Work Group).
4. Any known hazards or situations that could jeopardize personal safety. (Example: The adjacent track is in service and trains will be passing work site at Normal Speed).
5. How equipment is to be operated, and which communication method will be used. (Example: Who will give the crane operator hand signals).
6. Any requirements that will affect their job, such as orders to clear the track by a certain time.
7. All known unusual conditions or situations that may affect their job assignment.
8. If necessary, to work under traffic, where the Predetermined Place of Safety (PPOS)

location will be to clear the track. Employees must not clear the track by occupying another track unless that track is out of service.

Job Briefing should be updated regularly. When there is more than one foreman on the jobsite only one foreman can be in charge of the worksite. The foremen in charge must keep all other foreman up-to-date and must have a clear understanding as to how the job is to be conducted.

Roadway Maintenance Machine Rules

The Federal Railroad Administration (FRA), under *49 CFR Part 214.7*; defines a "roadway maintenance machine (RMM)" as a device powered by any means of energy other than hand power, which is being used on or near railroad track for maintenance, repair, construction, or inspection of track, bridges, roadway, signal, or communications. At the time of the accident, the excavator was operating on railroad tracks performing track construction work, classifying the equipment as a roadway maintenance machine or RMM.

The FRA defines the "minimum training and qualification requirements for RMM operators" under *49 CFR Part 214.355*; as the following:

- The training and qualification of roadway workers who operate roadway maintenance machines shall include, as a minimum:

  (1) Procedures to prevent a person from being struck by the machine when the machine is in motion or operation.

  (2) Procedures to prevent any part of the machine from being struck by a train or other equipment on another track.

  (3) Procedures to provide for stopping the machine short of other machines or obstructions on the track.

(4) Methods to determine safe operating procedures for each machine that the operator is expected to operate.

Excavator Description

The accident RMM is a 2002 Volvo/model EW170 dual-rubber tire excavator, that is equipped with retractable front and rear railroad wheel assemblies. This allows the equipment to operate via land/road, or via railroad tracks. The operating cab is single occupant designed and is off-set to the left (looking from the rear) of the machine. The equipment is mounted with a 2- piece folding/extendable boom, with a quick-attachment assembly for various implement usage. The equipment can rotate/spin 180 degrees. The equipment was rail mounted, track traveling, and was being utilized for its excavating and materials lifting purposes (see figure 2). FRA conducted an inspection of the equipment and found no safety or mechanical defects.

- Overall width- 8 feet
- Overall length- 30 feet
- Clearance between outside rubber tire and ballast- 3”-4”
- Operator height vision when mounted on rails- average 9 feet

Human Performance

Excavator Operator Interview

The excavator operator was interviewed because he had firsthand knowledge of the accident. The operator stated in his interview:

“I had moved back to the east, and [the RWIC] was on the extreme west end of the turnout, and I rolled up to him and I said, are we good? And he said, we've got two

feet. And I didn't understand what he said -- what he meant by two feet. I didn't know if we had two feet extra or we needed two more feet. And at this time, when I rolled up to him, I was a little bit east [in front] of him, so I was, I was leaning out of the excavator door, which was open on my extreme left. He was further left, further to my left at the end of the turnout. I would describe him as being at my seven o'clock".[4]

After the conversation, the operator asked the RWIC where he had placed the rail tongs. The RWIC informed the operator that the rail tongs were located at the front (east end) of the switch panel. The operator stated in his interview:

"Where did I leave my rail tongs? Rail tongs are up at the end of the panels up there by [RWIC answer]. There was another trackman further east, because he was holding the east end of the tape measure, so he was already at the east end of the turnout. So okay. Once I had confirmed where my rail tongs were, I immediately looked [in the direction of the trackman], could see that [the trackman] was in front of me. [A second trackman] was further up from that, probably at the far end of those panels, maybe a little bit further, and [the RWIC] was still at my seven o'clock."[5]

As the work equipment was moving slowly in the forward direction (eastward), the RWIC started rolling up his tape measure, and walked forward (eastward) in-between the switch panel and the moving equipment. The operator stated during his interview; "*I proceeded to move slowly*

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[4] Boardman interview; page 17, line 25, and page 18, lines 1-10.
[5] Boardman interview; page 18, lines 15-23

to the east. My concentration was where I was going. I was just traveling the machine on the tracks, and I caught a glimpse of motion to my extreme periphery in the left, and I knew that there shouldn't have been anything there, so I immediately stopped."[6] The RWIC was struck and ran-over by the track excavator as it was moving forward, causing fatal injuries.

Employee History

RWIC

The deceased employee was a 59-year-old male with 21 years of railroad service with the Housatonic Railroad. At the time of the accident, the employee was serving as the roadway worker in-charge (RWIC) for the work site. A review of the employee's training records showed that he was currently trained and qualified on the Housatonic Railroad Timetables, NORAC operating rules, RWP, and physical characteristics.

A review of the employee's prior work hours are as follows:

Date	Start/End Times	Total Hours	Date	Start/End Times	Total Hours
10/5/20	06:30-17:30	11	10/12/20	06:30-18:00	11.5
10/6/20	06:30-17:30	11	10/13/20	06:30-17:00	10.5
10/7/20	06:30-21:30	15	10/14/20	06:30-14:45	8.15
10/8/20	06:30-18:30	12			
10/9/20	07:00-12:00	5			
10/10/20	RDO	0			
10/11/20	RDO	0			
54 total hours for the week			**30.15 total hours for the week**		

[6] Boardman interview; page 18, lines 24-25 and page 19, lines 1-3

Excavator Operator

The excavator operator started with the Housatonic Railroad in 1994 as a part-time employee while he attended college in Massachusetts. He graduated from the University of Massachusetts with a civil and environmental degree in engineering. In 1997, he became a full-time employee with the railroad with the job title "project engineer", though he continued to perform multiple operational duties, including operating the excavator.

A review of the operator's training records showed that he was trained and qualified on the Housatonic Railroad Timetables, NORAC operating rules, RWP, and physical characteristics. When asked about his RMM qualifications, the operator stated that he had a lot of people show him how to operate equipment and felt that he had adequate training to operate the excavator. HRRC could not produce training records showing employee RMM certifications and qualifications per *49 CFR Part 214.341(a)(1)*.

A review of the employee's prior work hours are as follows:

Date	Start/End Times	Total Hours	Date	Start/End Times	Total Hours
10/5/20	07:00-16:00	9	10/12/20	07:00-16:00	9
10/6/20	07:00-16:00	9	10/13/20	07:00-16:00	9
10/7/20	07:00-22:00	15	10/14/20	07:00-14:45	7.45
10/8/20	07:00-17:00	10			
10/9/20	08:00-14:00	6			
10/10/20	RDO	0			
10/11/20	RDO	0			
49 total hours for the week			**25.45 total hours for the week**		

Postaccident Toxicology and Medical

RWIC

FRA post-accident toxicology testing was conducted for the deceased employee. Substances screened for included amphetamines, barbiturates, benzodiazepines, cocaine, alcohol, marijuana, metabolites, methadone, methaqualone, MDA-analogues, opiates, 6-acetylmorphine, oxycodone's, opiates, phencyclidine and propoxyphene. The results were negative for the presence of the aforementioned drugs.

The autopsy report from State Medical Examiner's office identified no evidence of any natural disease, drugs, or alcohol that would have impaired the RWIC around the time of the accident. Cause of death was determined to be blunt force trauma.

Excavator Operator

FRA post-accident toxicology testing was conducted on the excavator operator. Substances screened for included amphetamines, barbiturates, benzodiazepines, cocaine, alcohol, marijuana, metabolites, methadone, methaqualone, MDA-analogues, opiates, 6-acetylmorphine, oxycodone's, opiates, phencyclidine, propoxyphene, and ethanol alcohol. The results were negative for the presence of the aforementioned drugs and ethanol alcohol.

Postaccident Inspections

FRA

FRA performed a postaccident inspection of the track excavator and found no mechanical or safety appliance issues with the machine. FRA did take note that the machine did not clearly display the known weight of the machine.

FRA performed a postaccident inspection of book of rules compliance, including NORAC, roadway worker protection, physical characteristics, and general orders/special instructions. FRA found all employee training to be consistent with FRA and Housatonic Railroad requirements.

Acknowledgment Signatures

No parties were assigned to this accident, and the NTSB did not launch to the accident site. All investigative and informative materials were assigned/received remotely to, or through the Housatonic Railroad Corporation, the Federal Railroad Administration, the Connecticut State Police, and the State of Connecticut Medical Examiner. The undersigned assisted the NTSB with this investigation, and the below investigation representatives attest that the information contained in this report is a factually accurate representation of the information collected during the investigation, to the extent of their best knowledge and contribution in this investigation.

_____/s/_____ Date 03/12/2021

Troy A. Lloyd, NTSB

_____/s/_____ Date 03/12/2021

Michael Hoepf, NTSB

_____/s/_____ Date 03/12/2021

Owen Smith, FRA

_____/s/_____ Date 03/12/2021

Eric Boardman, Housatonic Railroad