

National Transportation Safety Board

Office of Research and Engineering

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ONBOARD IMAGE RECORDER

Group Chair's Factual Report

May 31, 2023

WARNING

The reader of this report is cautioned that the transcript of an onboard image recorder is not a precise science but is the best product possible from a National Transportation Safety Board group investigative effort. The transcript or parts thereof, if taken out of context, could be misleading. The transcript should be viewed as an accident investigation tool to be used in conjunction with other evidence gathered during the investigation. Conclusions or interpretations should not be made using the transcript as the sole source of information.

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A. ACCIDENT

Location: East Palestine, Ohio
Date: February 3, 2023
Time: 2054 eastern standard time (EST)
February 4, 2023 0154 coordinated universal time (UTC)
Train: Norfolk Southern Railway 32N

B. ONBOARD IMAGE RECORDER GROUP

Group Chair	Michael Portman Aerospace Engineer - Recorder Specialist National Transportation Safety Board (NTSB)
Group Member	Sheryl Harley Railroad Accident Investigator NTSB
Group Member	David Graubard Accident Chief - Motive Power & Equipment Federal Railroad Administration
Group Member	Shannon Mason Manager of Train Operating Practices and Certification Norfolk Southern Railway
Group Member	Jared Cassity National Safety Team Coordinator International Association of Sheet Metal, Air, Rail and Transportation Workers, Transportation Division

C. DETAILS OF THE INVESTIGATION

In agreement with the Investigator-In-Charge, an Onboard Image Recorder group was convened on March 28, 2023, and a summary and transcript were prepared.

The NTSB Vehicle Recorder Division received a total of 63 video files from five camera sources. Three of these sources were onboard the lead locomotive (NS4718), and two sources were aboard the second locomotive (NS4412). The files, source, and camera direction are detailed in table 1. The videos from the second locomotive were reviewed and determined to be non-pertinent to the investigation and are therefore not discussed in the rest of this report.

Table 1. Description of Videos Received.

Camera	Locomotive	Number of Files	Total Video Length (mm:ss)
External Forward Facing	NS4718 (lead)	21	20:59
Inward Rearward Facing	NS4718	19	19:00
Inward Forward Facing	NS4718	21	20:59
External Forward Facing	NS4412 (second)	1	20:02
Inward Facing	NS4412	1	20:01

1.0 Video Files Information

Once the individual video files were combined, each camera contained approximately 20 minutes of data, beginning at approximately 2039 EST and ending at approximately 2100 EST. The recordings displayed a data overlay which included locomotive number, UTC date and time, as well as speed and GPS latitude and longitude.

The recordings were made at a resolution of 1920x1080 pixels at a frame rate of 30 frames per second (fps), except for the inward forward-facing video, which was recorded at a frame rate of 10 fps. Additionally, each recording had an associated audio track which was recorded from each camera's internal microphone.

2.0 Timing and Correlation

The videos were timestamped in Coordinated Universal Time (UTC). The videos were time aligned with one another, and then a five-hour offset was applied to reflect the local eastern standard time (EST) of the accident. Therefore, for the duration of this report, times are presented in EST.

3.0 Summary of Recording Contents

The videos began between 20:39:00 and 20:39:02 with the train travelling on the right main track at approximately 21 miles per hour (mph). At this time, the crew engaged in non-pertinent conversation for the first approximately 12 minutes of the recording. The engineer was seated at his station, the conductor trainee was seated at the conductor's seat, and the conductor was seated behind him. The transcript began at 20:50:44.

The locomotive passed over the alerting hot box detector at approximately 20:52:47, and the critical alarm sounded at 20:53:15. The train slowly decelerated over the next minute until several alarms sounded in the cab, beginning at 20:54:22. The train then quickly decelerated, stopping at 20:55:04. The crew discussed the issues they were seeing and communicated with dispatch. The rearward-facing interior camera recording ended at 20:58:01, the forward-facing interior camera

recording ended at 21:00:00, and the forward-facing external camera recording ended at 21:00:03.

The transcript is attached as appendix A to this report. Additionally, two screenshots from the external forward-facing camera are included in this report, attached as appendix B. Figure 1 shows the view from the cab as the video recording began at 20:39:02, and figure 2 shows the view as the train passed the alerting hot box detector at 20:52:47. The detector is visible in the tracks, and the equipment shed is visible on the left of the figure.

Submitted by:

Michael Portman
Aerospace Engineer - Recorder Specialist

APPENDIX A. VIDEO SUMMARY AND TRANSCRIPT

Transcript of an onboard video recorder installed on a Norfolk Southern train that derailed in East Palestine, Ohio on February 3, 2023.

LEGEND

AMBIENT	Ambient recorded sounds, noises, or speech
COND	Voice identified as the conductor
DISPATCHER	Radio transmission from the dispatcher
TRAINEE	Voice identified as the conductor trainee
OBSERVATION	Miscellaneous video observations
WAYSIDE	Radio transmission from wayside
-RDO	Outgoing radio transmission
?	Unknown speech source
*	Unintelligible word
#	Expletive
@	Non-pertinent word
()	Questionable insertion
[]	Editorial insertion

Note 1: Times are expressed in Eastern Standard Time.

Note 2: Generally, only radio transmissions to and from the incident vehicle were transcribed.

Note 3: Words shown with excess vowels, letters, or drawn out syllables are a phonetic representation of the words as spoken.

Note 4: A non-pertinent word, where noted, refers to a word not directly related to the operation, control or condition of the vehicle.

Time and Source	Statement/Observation
20:39:00.0	
START OF INWARD FORWARD-FACING RECORDING START OF SUMMARY	
20:39:01.0	[The inward rearward-facing recording began.]
20:39:02.0	[The external forward-facing recording began, as shown in figure 1.]
20:39:11.2	[The crew engaged in non-pertinent conversation about other crew members, crew positioning and scheduling, and where to live.]
20:41:18.0	[The conductor trainee looked at a mobile device, looking up intermittently, until 20:42:45.9, before placing the mobile device, screen on, on the desk. The screen turned off approximately one minute later.]
20:43:04.0	[The crew discussed territory qualifications and bidding.]
20:45:47.1	[The conductor looked at a mobile device, looking up intermittently, until 20:51:13.5.]
20:46:02.3	[The conductor trainee looked at a mobile device, looking up intermittently, until 20:46:58.3, before placing the mobile device, screen on, on the desk.]
20:46:05.5	[The crew discussed being "good" up until "Wood," holding at Wood, and discussed another train, 10Q.]

Time and Source	Statement/Observation
20:47:38.1	[The conductor trainee looked at a mobile device, looking up intermittently, until 20:48:30.3, before placing the mobile device, screen on, on the desk. The screen turned off approximately one minute later.]
20:47:40.4	[The crew discussed holding at "Laredo."]
20:48:58.6	[The conductor commented that "they still have us at (Conway) at midnight."]
20:49:32.6	[The headlights were dimmed.]
20:49:43.3	[The headlights were brightened.]
20:50:38.0	[The conductor trainee looked at a mobile device, looking up intermittently, until 20:51:08.9, before placing the mobile device, screen on, on the desk.]
20:50:43.6 START OF TRANSCRIPT	
20:50:43.6 COND	how 'bout this...Webster City Virginia...a brakeman sixteen years got hit by moving equipment.
20:50:50.7 ENG	wow...what kind of umm...*** it a train or other equipment.
20:50:55.1 COND	they were flat switching.
20:50:56.5 ENG	oh okay.

Time and Source	Statement/Observation
20:50:59.1 COND	it says he was struck by rail equipment while fouling a cut of cars during a flat switching operation.
20:51:04.6 ENG	that's too bad man.
20:51:32.8 ENG	still showing us all red up there?
20:51:35.2 COND	I got no service now.
20:51:36.4 OBSERVATION	[the conductor briefly looked at a mobile device.]
20:51:36.8 ENG	yeah okay.
20:51:37.8 OBSERVATION	[the conductor trainee looked at a mobile device, looking up intermittently, until 20:52:04.3, before placing the mobile device, screen on, on the desk. The screen turned off approximately one minute later.]
20:51:37.9 COND	it's still showing **...
20:51:38.4 ENG	Imma take over Imma take over once we get to Lum.
20:51:42.8 TRAINEE	they ain't showing red at all...nah they got us goin' (that's what it say).
20:51:46.1 COND	what what at Wood?

Time and Source	Statement/Observation
20:51:47.3 TRAINEE	at Wood yep.
20:51:48.3 ENG	yeah that's all I want I don't care after that.
20:51:49.9 COND	** Wood?
20:51:50.9 TRAINEE	yep.
20:51:51.1 ENG	yep.
20:51:52.3 COND	okay.
20:51:52.5 COND	hold at Bright.
20:51:54.1 ENG	that's okay I just wanna get up over the last hill.
20:51:57.1 TRAINEE	they got...they got ***.
20:51:59.2 ?	** Bright.
20:52:01.0 ENG	we got the light through Wood that's all I want...we'll be stopping at (for real).
20:52:08.2 ?	*.

Time and Source	Statement/Observation
20:52:10.3 AMBIENT	[sound of train horn]
20:52:11.5 AMBIENT	[clicking sounds of bell]
20:52:15.4 COND	hey * did anybody ever tell you you were supposed to let dispatcher know when you got three hours to go?
20:52:20.8 TRAINEE	umm...yeah...***.
20:52:24.0 COND	what's that?
20:52:24.8 TRAINEE	(somebody did say that).
20:52:26.6 AMBIENT	[sound of train horn]
20:52:30.1 COND	*** get on the phone and say hey ***...
20:52:34.0 TRAINEE	yeah I was about to.
20:52:36.3 COND	we'll call at ten o'clock and say uhh...thirty-two-N three hours.
20:52:40.7 COND	well this detector's the one I got caught on right here we stopped right here at this # crossing.

Time and Source	Statement/Observation
20:52:45.0 ENG	mhmm.
20:52:45.2 COND	we couldn't get up to speed.
20:52:47.0 OBSERVATION	[the train passed over a hot box detector, as shown in figure 2]
20:52:47.7 COND	at the crossing we re-crewed right there.
20:52:49.1 ENG	okay.
20:52:51.1 ENG	at the crossing?
20:52:51.7 COND	right-yeah...and they expect us to get to nine miles an hour.
20:52:54.0 ENG	you wasn't gonna...you wasn't gonna get that...did the gate stay down?
20:52:58.0 COND	yeah...I don't know why they stopped there anyways.
20:52:58.7 AMBIENT	[multiple overlapping comments]
20:53:01.7 ENG	they did stay down?
20:53:03.5 COND	yeah...or they stayed up they stayed up.

Time and Source	Statement/Observation
20:53:05.6 ENG	oh okay.
20:53:06.0 COND	they stopped far enough back.
20:53:07.5 ENG	yeah.
20:53:07.7 COND	we re-crewed right there.
20:53:08.9 ENG	okay.
20:53:09.3 COND	and we couldn't get up to nine miles an hour there.
20:53:10.8 ENG	yeah you ain't gonna get that there.
20:53:12.5 COND	sometimes I try to stop–
20:53:14.5 AMBIENT	critical alarm critical alarm critical alarm Norfolk Southern milepost four nine point eight track one hot box axle one zero one south rail. [electronic voice]
20:53:16.5 ENG	all right...here we go.
20:53:18.8 AMBIENT	[unintelligible comments]

Time and Source	Statement/Observation
20:53:23.2 OBSERVATION	[the conductor stood up]
20:53:24.6 COND	hold on.
20:53:27.8 OBSERVATION	[the conductor trainee slammed both hands on the desk]
20:53:32.9 COND	that's us.
20:53:34.6 TRAINEE	what?
20:53:35.1 ENG	one zero one south rail.
20:53:37.0 TRAINEE	yep.
20:53:37.2 COND	south is your side right?
20:53:40.4 ENG	yeah.
20:53:41.3 COND	aright.
20:53:43.0 COND	(come out *).
20:53:44.5 AMBIENT	[sound of single beep]

Time and Source	Statement/Observation
20:53:49.8 AMBIENT	[sound of single beep]
20:53:52.4 COND	write that down.
20:53:54.2 TRAINEE	one zero one south rail?
20:53:55.5 COND	yeaaaah.
20:53:57.9 TRAINEE	* how far back is that?
20:54:00.6 COND	hundred and one? we'll call wayside they'll let us know.
20:54:02.4 ENG	***.
20:54:03.2 ?	hundred and ten?
20:54:05.0 COND	hundred and one...
20:54:07.8 TRAINEE	*.
20:54:10.1 ENG	bring it down to a stop.
20:54:13.7 ?	yeah.

Time and Source	Statement/Observation
20:54:15.9 COND	welp we ain't makin' it now.
20:54:17.6 ENG	just * the one you were talking about.
20:54:21.7 AMBIENT	[sound of cab signal alert, the in-cab signal dropped from clear to restricting, and the engineer physically reacted immediately]
20:54:24.5 AMBIENT	[an overhead red light illuminated in the cab]
20:54:24.9 AMBIENT	[sound of end of train device (EOTD) alert]
20:54:26.5 AMBIENT	[sounds of multiple simultaneous alerts, and mechanical bell. The mechanical bell continued ringing through 20:54:47.1]
20:54:26.8 ENG	woah something's goin' on.
20:54:28.0 COND	yep.
20:54:29.4 TRAINEE	I'm calling it...emergency.
20:54:31.0 ENG	we went into emergency.
20:54:34.6 TRAINEE	* brakes in emergency - emergency emergency.

Time and Source	Statement/Observation
20:54:38.6 COND	***.
20:54:39.4 ENG	what happened back there?
20:54:40.9 COND	something happened.
20:54:47.8 TRAINEE	uhh we tone up the dispatcher first right?
20:54:50.1 COND	yeah go ahead six four eight.
20:54:51.9 AMBIENT	[sounds of locomotive shuddering]
20:54:56.4 TRAINEE	something's wrong. I think I typed it wrong.
20:54:59.7 COND	that's all right we'll get it.
20:55:00.4 AMBIENT	[sound of air whooshing]
20:55:01.3 COND	(that's odd).
20:55:03.5 OBSERVATION	[the locomotive stopped]
20:55:03.7 ENG	that's not good.

Time and Source	Statement/Observation
20:55:04.9 ?	exactly.
20:55:05.1 COND	*. that's not good at all.
20:55:06.2 ENG	we're not on– hope we ain't on the ground nowhere back there.
20:55:09.6 COND	yeah...we'll find out.
20:55:11.3 COND	how's your air? got any air in the back?
20:55:15.0 ENG	we went in emergency.
20:55:15.8 TRAINEE	I can't hear lemme (tone/turn) him up.
20:55:16.9 ENG	here I'll tone him up.
20:55:18.0 COND	*** six four eight.
20:55:19.6 AMBIENT	[overlapping comments between trainee and conductor]
20:55:19.8 ?	I gotcha.
20:55:20.0 AMBIENT	[sounds of dialing]

Time and Source	Statement/Observation
20:55:28.9 TRAINEE	you wanna talk to 'em *?
20:55:32.2 COND	I got it.
20:55:33.9 TRAINEE	I was just gonna say...I can't (read/really) (hear him) **.
20:55:35.4 COND	I got it.
20:55:38.9 COND	takin' a walk.
20:55:40.0 OBSERVATION	[the conductor trainee stood up]
20:55:40.2 ENG	hey @. [unknown individual]
20:55:42.1 TRAINEE	***.
20:55:46.9 COND	they aughta be coming by maybe they can (see).
20:55:48.8 DISPATCHER	dispatcher thirty two N over.
20:55:50.0 COND-RDO	thirty two N.
20:55:52.0 TRAINEE	thirty two.

Time and Source	Statement/Observation
20:55:52.9 DISPATCHER	(are you ** there?)
20:55:54.0 COND-RDO	yeah we got a critical alarm and now we went into emergency here we're at P-C forty eight dot four.
20:56:01.0 DISPATCHER	P-C forty eight dot four roger that. Cleveland east five forty seven over.
20:56:04.7 AMBIENT	[sounds of radio static]
20:56:07.0 DISPATCHER	thirty two N eastbound * track one head end forty eight dot four is in emergency. come down restricted uhh slow down ** over.
20:56:14.4 OBSERVATION	[the headlights were dimmed]
20:56:15.8 AMBIENT	[sounds of radio static]
20:56:23.5 DISPATCHER	aright roger.
20:56:24.5 COND	arrright you wanna...?
20:56:26.8 ENG	huh?
20:56:27.6 COND	I dunno...should we **...?

Time and Source	Statement/Observation
20:56:29.2 DISPATCHER	**** thirty two N ** restricted ** roger. [over the radio to another train]
20:56:30.5 ENG	what's that?
20:56:31.7 ENG	I didn't release the air yet.
20:56:33.1 AMBIENT	[unintelligible radio conversation between dispatcher and another train]
20:56:37.0 ENG	earlier it was running just fine.
20:56:37.9 DISPATCHER	he's at forty eight dot four over. [over the radio to another train]
20:56:41.7 TRAINEE	(he gonna wait up for us?)
20:56:42.2 AMBIENT	[sound of air whooshing]
20:56:43.1 ENG	who else do I call...we gotta call wayside.
20:56:44.0 COND	uhh...call wayside.
20:56:45.5 ENG	what's that– one two seven?
20:56:49.3 ENG	one two...

Time and Source	Statement/Observation
20:56:51.0 AMBIENT	[unintelligible crew comments]
20:56:55.8 ENG	well I don't hear no (courses/horses) back there.
20:56:59.6 ENG	somethin's wrong though.
20:57:03.2 COND	yeah they'll uhh...
20:57:04.9 TRAINEE	they didn't call us.
20:57:06.4 COND	yeah.
20:57:07.3 COND	yeah what's that...what's wayside on there?
20:57:09.0 TRAINEE	I'm trying to see what we got here.
20:57:09.6 COND	you got to call them.
20:57:09.7 ENG	one two seven.
20:57:10.6 AMBIENT	[sounds of dialing]
20:57:12.9 COND	what was that forty– what detector was that...forty...?

Time and Source	Statement/Observation
20:57:16.0 TRAINEE	uhh...
20:57:16.2 AMBIENT	[radio tone back]
20:57:16.7 COND	forty nine? *.
20:57:21.3 COND	we're on track what...one? right.
20:57:26.4 ENG	(well/roger)
20:57:27.2 TRAINEE	forty nine dot eight.
20:57:28.1 ENG	well I can release the air...see if she's comin' up.
20:57:30.2 COND	up to you.
20:57:31.6 ENG	okay.
20:57:32.2 AMBIENT	[sounds of levers moving]
20:57:32.4 AMBIENT	[sounds of air whooshing]
20:57:33.3 TRAINEE	we got a critical alarm but it's...

Time and Source	Statement/Observation
20:57:36.6 ENG	that pisses me off *.
20:57:38.3 COND	we didn't get any air in the back– that means we've come apart.
20:57:41.4 ENG	I hope it ain't back there by all that– 'cause I was bringing it down.
20:57:45.0 COND	mhmm.
20:57:45.7 TRAINEE	***.
20:57:45.8 COND	I didn't feel a pull.
20:57:47.0 ENG	huh?
20:57:47.5 COND	I didn't feel a pull on it.
20:57:48.4 ENG	me either.
20:57:49.1 COND	(I see the flows come up.)
20:57:50.4 ENG	* I didn't release that yet.
20:57:52.7 AMBIENT	[sounds of levers moving]

Time and Source	Statement/Observation
20:57:56.5 ?	you gotta let the road foreman know.
20:58:01.0 OBSERVATION	[the inward rearward-facing camera recording ended]
20:58:01.7 COND	one step at a time.
20:58:06.2 COND	rear emergency.
20:58:14.2 COND	you got anything on the rear yet?
20:58:15.7 ENG	might take a little bit.
20:58:19.2 COND	if we get it on the rear that means at least we're still together.
20:58:21.8 ENG	right– I think we came apart.
20:58:23.8 COND	I think you're right.
20:58:37.9 TRAINEE	they got that uhh...(slide around past us on the other) ***.
20:58:42.0 COND	***.
20:58:43.6 ENG	yeah it ain't comin' up man.

Time and Source	Statement/Observation
20:58:45.0 COND	yeah.
20:58:45.4 ENG	and it wasn't a knuckle either.
20:58:47.6 COND	unless an air hose came apart.
20:58:49.1 ENG	you think it was a draw bar?
20:58:51.2 COND	I think we woulda felt that.
20:58:52.5 ENG	I was in emerg– I mean I was in dynamic.
20:58:55.3 COND	you think you woulda felt...
20:58:56.5 ENG	I mean they called emerg– they called an alarm...even if it was a-a-a critical alarm...though definitely * hot box detector I think something could possibly...we possibly could be on the ground.
20:59:06.8 TRAINEE	that's what I was thinking because...if it was...
20:59:09.4 COND	we'll see.
20:59:11.5 ENG	'cause even if we...if we uhh...***.

Time and Source	Statement/Observation
20:59:14.2 ?	I hope not. ***.
20:59:15.1 ?	I didn't feel no tug.
20:59:16.0 ?	it wouldn't have rung a critical alarm like that.
20:59:17.8 COND	I didn't feel no tug either...that's that's what worries me.
20:59:22.5 ?	[sound of yawn]
20:59:23.8 TRAINEE	yeah it wouldn't say critical alarm 'cause it can't read us...it really can't read us apart.
20:59:29.2 ENG	it's not coming up there at the D-P-U either.
20:59:35.4 COND	(I gotta/better) call the road foreman...
20:59:36.6 ?	you go ahead.
20:59:36.9 ?	I did.
20:59:37.3 TRAINEE	we went apart– we went apart.
20:59:39.7 ?	yep.

Time and Source	Statement/Observation
20:59:40.1 AMBIENT	[multiple overlapping comments]
20:59:41.7 COND	you want them to come on first right?
20:59:43.7 ?	what's that?
20:59:44.2 COND	yeah you did– we did tone them right?
20:59:46.8 ENG	no.
20:59:46.8 TRAINEE	no.
20:59:48.5 ENG	no I toned– we toned wayside.
20:59:49.7 COND	wayside right.
20:59:50.2 AMBIENT	[sounds of dialing]
20:59:56.2 ?	uh sir? **.
20:59:57.4 WAYSIDE	wayside answering (calling).
20:59:58.8 COND	there he is.

Time and Source	Statement/Observation
20:59:59.4 ?	who's that?
21:00:00.0 OBSERVATION	[the inward forward-facing recording ended]
21:00:00.8 ?	wayside.
21:00:02.6 END OF TRANSCRIPT END OF EXTERNAL FORWARD-FACING RECORDING	

APPENDIX B. SCREENSHOTS



Figure 1. View of forward-facing camera at the beginning of the video.



Figure 2. View as the train approached the alerting hot box detector, with the detector visible on the tracks and the equipment shed visible to the left.