

NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

May 23, 2019

Onboard Image Recorder

Specialist's Factual Report
By Sean Payne

1. EVENT

Location: Baltimore, MD
Date: February 7, 2019
Aircraft: Locomotive, NS9207
Operator: Norfolk Southern
NTSB Number: RRD19FR004

2. GROUP

A group was not convened.

3. SUMMARY

On February 7, 2019, about 7:00 a.m. eastern standard time, a Norfolk Southern Corporation (NS) railroad conductor, who was working with an engineer as part of a switching crew, was fatally injured while performing switching operations in Bayview Yard, Baltimore, Maryland. The conductor was standing on a ladder on the last railcar while the train was moving in reverse from one track to another. At the time of the accident, the sky was clear with few clouds, the temperature was 44°F, and wind was variable at 3 miles per hour. The sun rose about 8 minutes after the accident.

4. DETAILS OF INVESTIGATION

On February 8, 2019, the National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following onboard image and audio file:

Recorder Manufacturer/Model: **Leidos RailView**
Recorder Serial Number: **N/A**
Filenames: **Multiple**

4.1. Leidos RailView Recorder Description

The Leidos RailView system, previously known as the SAIC RailView system, is an electronic system designed for railroad applications that records video and audio streams from locomotives. The system records video at a resolution of

640x480 pixels, in color, with an optional audio track. Playback of the information is accomplished via the manufacturer's proprietary software.

4.2. Recorder Damage

Files were provided electronically, and video and audio information was played back using the manufacturer's software which was obtained through Leidos. The NTSB initially had difficulty finding the right division of Leidos that supported the RailView program and playback in the laboratory was not accomplished until a number of months post the event.

4.3. Video Files

Two sets of video files were available for the accident. One set of video files covered image and audio information for the forward-facing image and audio recorder, a second set of files provided image information only for the inward facing (cab compartment) image recorder. Both sets of files encompassed approximately the 30 minutes prior to the accident and one minute post-accident.

4.4. Timing and Correlation

The times used in this report are expressed as local time of the accident (EST). Times were assumed to be associated with the recorder's GPS signal information. All times are given in EST.

4.5. Summary of Recording Contents

In agreement with the Investigator-In-Charge, a video group did not convene and a summary report was prepared.

4.5.1. Outward Facing Video

Recorded imagery and audio associated with the forward-facing recorder was available starting at 06:14:41. The locomotive was moving forward on a track toward the yardmaster's office. Around 06:22:22, the locomotive came to a stop on a track near the yardmaster's office. Personnel were visible in the vicinity of the locomotive and track in front of the forward-facing image recorder while the locomotive was stopped. One individual consistent with the conductor who was killed in the accident was initially visible on the left side of the track. The conductor was wearing high-visibility apparel. Shortly thereafter, other personnel were visible moving near the non-engineer's side of the stopped locomotive. Around 06:24:20, a female employee was visible near the nose of the locomotive and later at 06:24:52, the female employee was visible walking away from the locomotive wearing high-visibility apparel and carrying a bag. Around 06:25:30, a male employee wearing high-visibility apparel and carrying a cooler was visible walking away from the stopped locomotive. Around 06:26:00, a crew van was visible in the vicinity of the stopped locomotive on an access road to the left of the image frame. Employees in high-visibility apparel were visible around the crew van. At 06:26:19, the video file ended.

The next video file began at 06:31:16¹. At the start of the next file, the locomotive was moving slowly forward from the position it had stopped at in the previous file. At 06:34:06, the locomotive came to a stop near a bridge. Around 06:37:51, the locomotive began moving forward again and the video file ended.

The next video file began at 06:37:58. The locomotive was moving forward from the position in which the previous video ended. At 06:38:37, the locomotive came to a stop nearly under the bridge at a closed switch. Around 06:39:00, the conductor who was killed in the accident was visible exiting the locomotive and shortly thereafter, threw the closed switch. The conductor lined the switch so the locomotive would travel to the next track over to the left of the locomotive. The locomotive began moving forward again around 06:40:06. As the locomotive moved forward it passed over a number of pre-lined switches in the direction toward an area of intermodal tracks. At 06:46:15, the locomotive stopped in the vicinity of the intermodal tracks. The video file ended at 06:49:55.

The next video file began at 06:53:17. The locomotive was in the same position as it was when previously stopped and was now moving forward. The locomotive then came to a stop. There was unintelligible audio captured around this time on the associated audio track. Around 06:55:35, the conductor was visible walking forward and away from the locomotive on the right side of the track. The conductor was wearing high-visibility apparel and was holding a lantern in his left hand. The conductor was visible walking continuously along the right side of the track in which the locomotive would later travel and the video file ended at 06:57:24.

At 06:58:07, the next video file began. The locomotive was moving forward slowly. The conductor was no longer visible ahead of the locomotive. The locomotive passed over a series of switches as it headed toward the President's Street Bridge. At 06:59:07 the locomotive passed over the switch onto the Bank track. The conductor was visible on the left side of the track next to the switch, the conductor was wearing high-visibility apparel and was holding a lantern. Figure 1 is a screenshot of the forward-facing image recorder's data at this moment. The screenshot has been redacted to obscure the conductor's who was standing on the left side of the track.

¹ Recorded information between files were not quantified. Absence of recorded information was attributed to the RailView system's recording logic, e.g. rail recorders typically remain dormant when a certain number of parameters are inactive, such as train movement or locomotive cab power.



Figure 1. A redacted screenshot showing the conductor at a switch in the vicinity of the President's Street Bridge. The oval object redacts the conductor's who was standing on the left side of the track.

At 06:59:49, the locomotive came to a stop past the President's Street Bridge. Some unintelligible audio was detected within the next minute.

At 07:00:38, the locomotive began reversing. At 07:01:29, the locomotive reversed passed the switch it previously crossed. The switch was now lined straight onto the Bank track in which the locomotive was now reversing. A screenshot is included as figure 2 at this time.



Figure 2. The locomotive reversing past a switch in the vicinity of the President's Street Bridge. The switch is lined for the Bank track, the Perryville track is seen to the right of the locomotive.

Data indicated the locomotive was reversing around 7 miles per hour. As the locomotive reversed, it passed over two more switches that were lined straight onto the Bank Track. At 07:02:26, an intermodal well car was first visible on the Perryville Track to the right of the locomotive (engineer's side). Data indicated the locomotive's speed was about 5.5 miles per hour as it reversed at this time.

The locomotive continued to reverse past the first intermodal well car on the Perryville Track. At 07:02:38, the locomotive was still reversing and a lighted object consistent with a conductor's lantern was visible between the Bank Track (258) and the Perryville track (259), next to a set of intermodal cars. Data indicated the speed of the reversing locomotive was 5 miles per hour. A screenshot of the forward-facing camera is included at this time as figure 3.



Figure 3. A lantern consistent with that of the conductor's visible between the Bank track and the Perryville track.

At 07:02:45, an object consistent with the motionless body of the conductor in high-visibility apparel was present laying between the Bank track and the Perryville track. No part of the object was visible in the gauge of the Bank Track. The object retained the characteristics of wearing high-visibility clothing. At 07:02:55, the sound of air was audible. The locomotive came to a stop around 07:03:02. The recording ended at 07:03:48.

4.5.2. Inward Facing (Cab Compartment) Video

The file contained only video of the inside of the cab. No audio was available for this video track. The video began at 06:14:41. A male and female crew member, both wearing high-visibility apparel, were visible in the cab. The locomotive was moving in the forward direction. Crew interaction with each other and the locomotive's systems were unremarkable. The locomotive came to a stop around 06:22:30. The crew began exiting the cab at this time.

Around 06:22:49, the engineer during the accident portion of the trip was visible boarding the locomotive. The video file ended at 06:26:19.

The next video file began at 06:31:18, the accident engineer was visible sitting in the engineer's seat and operating the locomotive. The locomotive was moving forward at this time.

For the summary of the inward facing video, it was not specifically noted each time the locomotive stopped. For information on when the locomotive made a movement, reference outward facing video summary above. The behavior of the engineer during this video file was unremarkable and the video file ended at 06:37:51.

The next video file began at 06:38:00. The engineer was seated and operating the locomotive as described previously. Around 06:38:47, the locomotive was stopped and the engineer exited out of the nose of the locomotive. Around 06:39:40, the engineer re-entered the cab through the nose and took a seat in his cab position. The actions of the engineer were generally unremarkable. The video file ended at 06:49:55.

The next video file began at 06:53:20. The engineer was seated and operating the locomotive as described previously. Around 06:55:39, the conductor was visible out of the forward window of the cab, on the engineer's side of the track (right side), walking forward in front of the locomotive along the right side of the track. From the inward facing recording, it was difficult to tell if the engineer interacted with the conductor who was on the right side of the locomotive. The video file ended at 06:57:24.

The next video file began at 06:58:10, the locomotive was moving forward, the engineer was seated in the engineer's position. The locomotive moved forward and underneath the President's Bridge and came to a stop beyond the President's Bridge as described in the section above. It not apparent that the engineer interacted with the conductor as he passed the switch in the vicinity of the President's Street Bridge. The locomotive began reversing as described in the section above. Landmarks and other railcars were visible as described in the section above. When the lantern became visible through the locomotive's windscreen, the engineer stood up from his seated position and leaned to the right near the right window of the locomotive. The engineer then became seated again and moved his left hand in the vicinity of the locomotive's brakes while looking in the direction forward of the locomotive as the locomotive continued reversing. Moments later, the engineer made a quick series of actions with the locomotive's braking components. By 07:03:02, the locomotive came to a stop. The engineer remained seated. It was unclear if the engineer made a radio call during this time. The video file ended at 07:03:48.