NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

January 5, 2017

Onboard Image Recorder

Specialist's Factual Report
By Sean Payne

1. EVENT

Location:	New Orleans, Louisiana
Date:	February 20, 2016
Locomotive:	Norfolk Southern NS8783
Operator:	Norfolk Southern
NTSB Number:	DCA16FR003

On February 20, 2016, at approximately 6:10 a.m. central standard time (CST), Norfolk Southern (NS) Train #298 struck and fatally injured a NS Terminal Trainmaster on main track #2 at milepost 186 of the NE Subdivision, Alabama Division. The visibility conditions at the time of the accident were very poor with low lying fog.

2. DETAILS OF INVESTIGATION

On February 26, 2016, the National Transportation Safety Board (NTSB) Vehicle Recorder Division received the following rail image recorder files:

Recorder Manufacturer/Model:	**SAIC/Leidos RailView**
Recorder Serial Number:	**3522 (electronic files only)**
Train/Locomotive Number:	**Train 298 – Locomotive 8783**

2.1. Recorder Description

RailView is a ruggedized digital video recorder for use in locomotives. The system records and stores images when the locomotive is in motion. The device also records audio from a microphone that is included in the system. The audio records noises external to the locomotive's cab. The system records at a variable framerate between 4 and 10 frames per second (fps). At 4 fps, the system has the ability to store up to 18 days of images and audio. Authorized personnel can retrieve the recorded material via a removable flash memory module or via a PC download with the appropriate cable.

2.2. Video Files

Seven binary files associated with the SAIC/Leidos RailView were transferred to the NTSB Vehicle Recorder Laboratory. The files and their associated internal timestamps are located in table 1 below. All times are given as CST in the format HHMM:SS.00.

Table 1. A summary of electronic files received and their associated time stamps in CST.

Filename	Time Start (Internal)[A]	Time End (Internal)
RV3522H_02202016_053013.bin	Feb. 20, 2016 0530:13	Feb. 20, 2016 0542:30
RV3522H_02202016_054230.bin	Feb. 20, 2016 0542:30	Feb. 20, 2016 0554:04
RV3522H_02202016_055404.bin	Feb. 20, 2016 0554:04	Feb. 20, 2016 0604:04
RV3522H_02202016_060404.bin	Feb. 20, 2016 0604:04	Feb. 20, 2016 0610:38
RV3522H_02202016_061038.bin	Feb. 20, 2016 0610:38	Feb. 20, 2016 0628:44
RV3522H_02202016_062844.bin	Feb. 20, 2016 0628:44	Feb. 20, 2016 0636:50
RV3522H_02202016_063650.bin	Feb. 20, 2016 0636:50	Feb. 20, 2016 0646:49

A. Time represented is prior to applying the offset discussed in section 2.3 below.

2.3. Timing and Correlation

The times used in this report are expressed as local time of the accident (CST).

Timing was initially set internally via the recorder. This timing information was found to be inaccurate when compared to locomotive 8783's event recorder time stamp which was determined to be the authoritative timing for this accident.

Locomotive 8783's event recorder showed the train had entered emergency braking (PCS open) at 06:08:21 A.M. CST. The image recorder showed the same event occurring at 06:41:47.3 A.M. CST. Therefore, the following timing offset was created and applied:

Loco 8783 Image Recorder – 2006.3 seconds = CST

During playback, the software applies sequential frame numbering to each frame in the recording. This unique frame number is referenced in this report where necessary. Using this frame number count, it was estimated that the frame rate of the camera was approximately 5.5 fps during the portion of the recording when the individual was struck.

2.4. Summary of Recording Contents

In agreement with the Investigator-In-Charge, a video group did not convene and a summary report was prepared. Only portions of video file RV3522H_02202016_063650.bin are summarized in this report. Video screenshots exported from the SAIC/Leidos RailView software were exported and summarized.

2.4.1. Video Recording One: RV3522H_02202016_063650.bin

All times are given in CST.

Figure 1 is a screenshot taken at 0605:40.7 (system frame number 74413116). The locomotive was passing a signal. The image was obscured by the locomotive's windshield wiper. The video file's metadata at this time showed the locomotive was traveling at a speed of 46.3 mph.

Figure 1. A exported screenshot at 0605:40.7 at a signal area.

Figure 2 is a screenshot taken at 0607:57.7 (system frame number 74413875). The locomotive was passing a signal. The image was obscured by the locomotive's windshield wiper. The video file's metadata at this time showed the locomotive was traveling at a speed of 57.2mph.

Figure 2. A exported screenshot at 0607:57.7 at a signal area.

Figure 3 is a screenshot taken at 0608:13.2 (system frame number 74413955). At this time, reflective material was visible for the first time on the camera's recording. The image was partially obscured by the locomotive's windshield wiper. The video file's metadata at this time showed the locomotive was traveling at a speed of 58.0 mph.

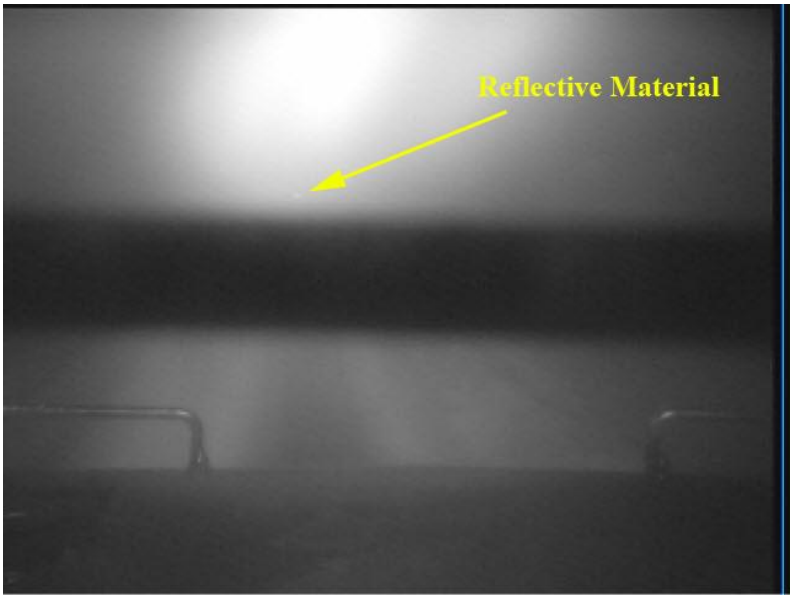

Figure 3. A exported screenshot at 0608:13.2 (system frame number 74413955) showing the first image of reflective material.

For the next approximate 16 frames, the reflective material became larger in the camera's frame. During this time interval, the reflective material began to become defined as multiple individual pieces of reflective striping.

In system frame number 74413972 (0608:16.3), the reflective material disappeared behind the obscuration made by the locomotive's windshield wiper. Figure 4 is a screen capture from the system's software at this time.

Figure 4. A exported screenshot of system frame number 74413972 at 0608:16.3. The reflective material disappeared behind the locomotive's wiper.

By system frame number 74413980 (0608:17.7), the reflective material reappeared behind the obscuration made by the locomotive's windshield wiper. The striping of the reflective material became more defined. The striping was compared to Norfolk Southern's Safety and Health Equipment Catalog (February – March 2016 edition). This catalog is included in this report as Attachment 1. The reflective striping was consistent with the following NS safety gear:

- "Hi-Vis Rainwear" on page 95.
- "ANSI Class 3 100% Waterproof 4-in-1 Parka with NS Logo" on page 152.
- "Lime Green/Navy 100% Waterproof Rain Parka – ANSI Class 3 on page 156

The image appeared to show the struck individual laying with his torso across the right rail. The reflective striping on the safety gear appeared consistent with the struck individual facing away from the locomotive. The struck individual's legs appear to be facing away from the right rail. The struck individual's head and neck could not be conclusively defined.

To the right of the rail on the ballast area and slightly closer to the locomotive than the struck individual was an additional piece of reflective material. The location of this piece of reflective material was consistent with a lantern found on scene post-accident.

By system frame number 74413983 (0608:18.3), the locomotive's camera frame no longer showed the struck individual. At this time, the recorder's metadata showed the locomotive's speed as 58.2 mph.

From the first indication of visibility of reflective material until when the struck individual was no longer in view of the locomotive's camera, there was no

obvious movement of either the reflective material or the struck individual. From the first indication of visibility of reflective material until when the struck individual was no longer in view of the locomotive's camera, the elapsed time was approximately 5.1 seconds.

At system frame number 74413998 (0608:21.0), the video's metadata showed that the locomotive had entered emergency braking. At this time, the locomotive's speed was indicated as 58.3 mph.

At 0609:24.7, the locomotive came to a stop.