



NATIONAL TRANSPORTATION SAFETY BOARD
Investigative Hearing

Norfolk Southern Railway general merchandise freight train 32N
derailment with subsequent hazardous material release and fires,
in East Palestine, Ohio, on February 3, 2023

GROUP	B
EXHIBIT	
14	

Agency / Organization

NTSB

Title

Materials Laboratory Factual Report 23-041

National Transportation Safety Board
Office of Research and Engineering
Washington, DC 20594



RRD23MR005

MATERIALS LABORATORY

Factual Report 23-041

May 4, 2023

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A. ACCIDENT INFORMATION

Location: East Palestine, Ohio
Date: February 3, 2023
Vehicle: Norfolk Southern Railway freight train 32N
Investigator: Paul Stancil (RPH-20)

B. COMPONENTS EXAMINED

Disassembled PRD from tank car TILX 402025.

C. EXAMINATION PARTICIPANTS

Specialist Adrienne Lamm
National Transportation Safety Board
Washington, D.C.

D. DETAILS OF THE EXAMINATION

On February 3, 2023, about 8:54 pm, local time, eastbound Norfolk Southern Railway, general merchandise freight train 32N of the 1st (Train 32N), derailed on main track 1 of the NS Fort Wayne Line of the Keystone Division in East Palestine, Ohio. As a result of the derailment, 38 rail cars derailed and a fire ensued which damaged an additional 12 cars.

On-scene investigators collected pressure relief devices (PRDs) from several tank cars and shipped them to Trinity Rail Maintenance Services in Saginaw, Texas for bench testing, which subsequently occurred on March 15, 2023.

Manufacturer part specifications indicated the valve spring assembled in the PRD from tank car TILX 402025 was coated with aluminum. Thus, during testing, portions of the spring were bead-blasted to remove the outer layer of soot and debris and expose the surface of the spring. The exposed spring surfaces are the silver-colored areas shown in Figure 1. The disassembled PRD was then shipped to the NTSB Materials Laboratory in Washington DC for further analysis of the valve spring.

The exposed silver-colored areas on the spring were analyzed using an Olympus Vanta x-ray fluorescence (XRF) alloy analyzer. The XRF results showed a majority weight percent of iron from the underlying base metal steel alloy, with the second highest weight percent present identified as aluminum. Consequently, aluminum coating was confirmed as present on the surface of the valve spring.

Submitted by:

Adrienne V. Lamm
Materials Engineer



Figure 1. Overall and close-up photos showing the PRD from tank car TILX 402025. The red arrow points to the approximate location XRF measurements were taken in a silver-colored area exposed after bead-blasting removed the dark colored soot and debris on the valve spring.