

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR24FA226

MATERIALS LABORATORY

Factual Report 25-017

March 10, 2025

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A. ACCIDENT INFORMATION

Location: Eatonville, Washington
Date: July 6, 2024
Vehicle: Champion 7GCBC, N3464D
Investigator: Stephen Stein, AS-WPR

B. COMPONENTS EXAMINED

Control cable.

C. EXAMINATION PARTICIPANTS

Specialist Matthew R. Fox, Ph.D.
NTSB
Washington, DC

D. DETAILS OF THE EXAMINATION

An overall view of the submitted cable piece as received is shown in figure 1. The cable was fractured at one end and cut at the other end as indicated in figure 1. The control surface associated with the cable was unknown. The cable had 7 strands with 19 wires each, consistent with a 7x19 steel control cable.

A closer view of the fractured end as received is shown in figure 2. Black flexible tape consistent with electrical tape was wrapped around the cable adjacent to the fracture. The tape was wrinkled and covered with debris.

The black tape was cut longitudinally on one side and removed with tweezers. A view of the fractured end after the tape was removed is shown in figure 3. Several strands were displaced within approximately 1.5 lays from the fractured end. Individual wires on multiple strands were crushed and bent back away from the fractured end. The three longest strands were similarly bent as indicated in figure 3.

The cable piece was wrapped with yellow duct tape approximately 2 to 4 inches from the fractured end and was cut with a cable cutter within the newly taped section. The cut piece with the fractured end was then submerged in a solution of Alconox detergent and warm water while cleaned using an ultrasonic cleaner for approximately 10 minutes. The cleaned piece was then rinsed with water followed by ethanol and was then dried with compressed air. The resulting cleaned piece is shown in figure 4.

A closer view of the fractured end after cleaning is shown in figure 5. The image in figure 5 was obtained using a Keyence VHX-7000 operated in depth mode with the high dynamic range (HDR) image enhancement setting enabled. In figure 5,

the cable was positioned to show the side of the cable at the inside of the bend for the three bent strands indicated in figures 3 and 4. The external surface of several wires in two of the strands had flattened surfaces consistent with damage from contact with another object at the inside of the bend. In other strands, many of the wires were flattened and deformed consistent with contact with adjacent wires within the cable. All wires had thinning and deformation patterns consistent with ductile overstress fracture. No evidence of a progressive fracture mechanism or significant wear or corrosion was observed.

Submitted by:

Matthew R. Fox, Ph.D.
Chief Technical Advisor, Materials Laboratory

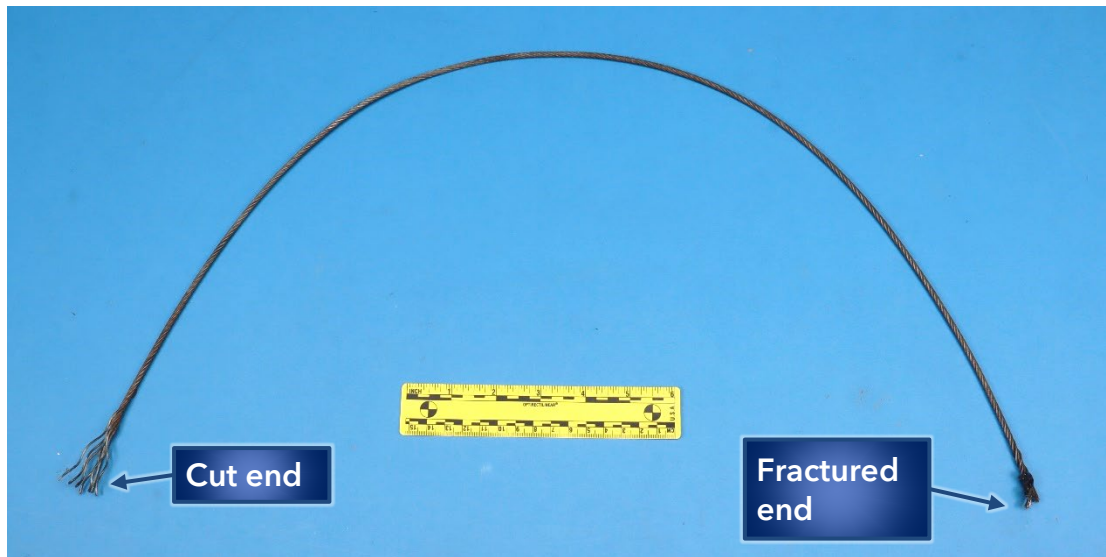


Figure 1. Overall view of the submitted cable piece as received.

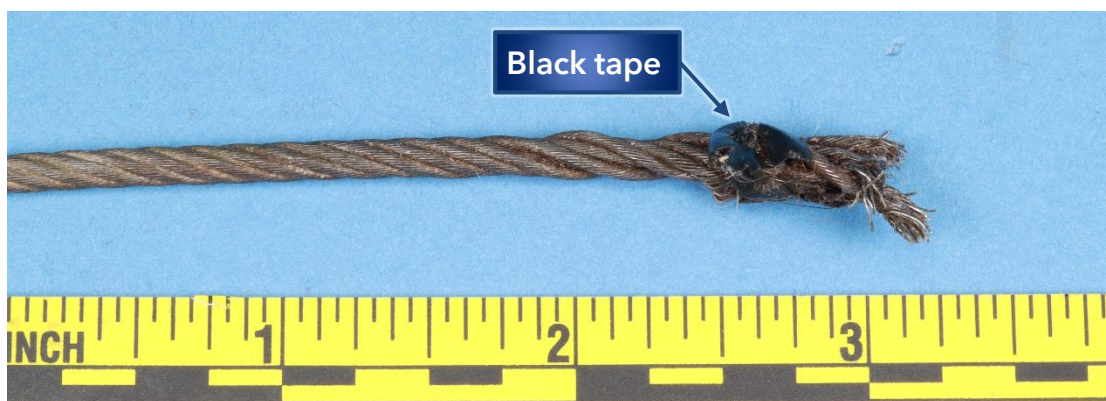


Figure 2. Close view of the fractured end as received.



Figure 3. Fractured end after the tape was removed.



Figure 4. Fractured end of the cable after cutting and cleaning.

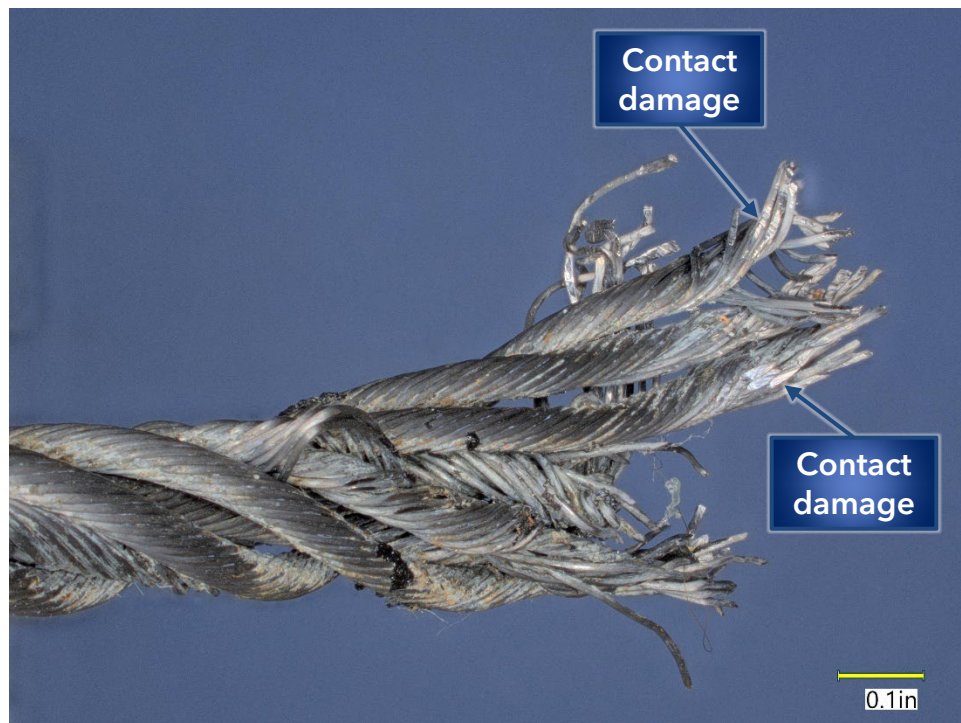


Figure 5. Optical image of the cable end obtained using a Keyence VHX-7000 in depth mode with HDR showing contact damage on the inner radius of the bent strands.