

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Materials Laboratory Division
Washington, D.C. 20594



March 26, 2019

MATERIALS LABORATORY FACTUAL REPORT

Report No. 19-013

A. ACCIDENT INFORMATION

Place : Longmont, CO
Date : February 16, 2018
Vehicle : Thorp T-18, N89ER
NTSB No. : CEN18LA102
Investigator : Mike Folkerts (AS-CEN)

B. COMPONENTS EXAMINED

Rudder cable

C. DETAILS OF THE EXAMINATION

The rudder cable from an experimental Thorp T-18 fractured during landing rollout. The cable was sent to the NTSB Materials Laboratory in two sections taped together so the separated ends were on one side, as shown in Figure 1. Figure 2 shows close-up photos of the two separated ends of the cable. The individual strands of the cable had separated at various lengths and were not concentrated in one axial location.

The separated cable ends were examined using a 5x to 50x magnification stereo microscope. There were flat, elongated, angular fracture surfaces on the ends of many of the strands. The angular fracture surfaces had rub marks and the cross-sections of the strands adjacent to the separations had thinned. The orientation and characteristics of the fractured strand ends is consistent with between-strand wear and subsequent overstress separation.

The remaining strands had cup-and-cone like fracture surfaces accompanied by adjacent necking of the strand cross-section, which is consistent with overstress separation.

Digital microscope images of exemplar strand fracture surfaces are shown in Figure 3.

Adrienne V. Lamm
Materials Engineer

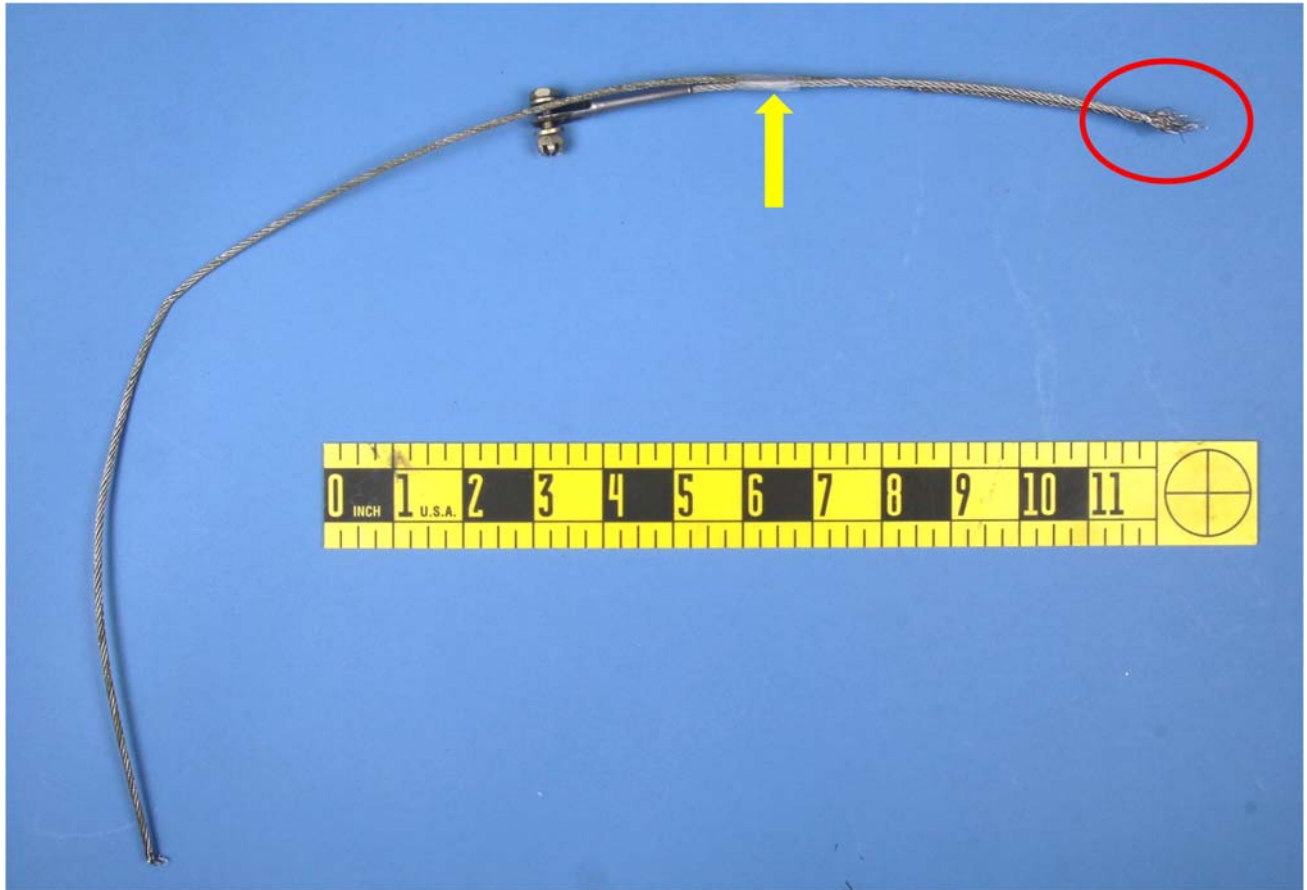


Figure 1: Overall photo of the two sections of rudder cable sections taped together so the separated ends were on one side. The yellow arrow points to the tape and the red circle indicates the separated ends.

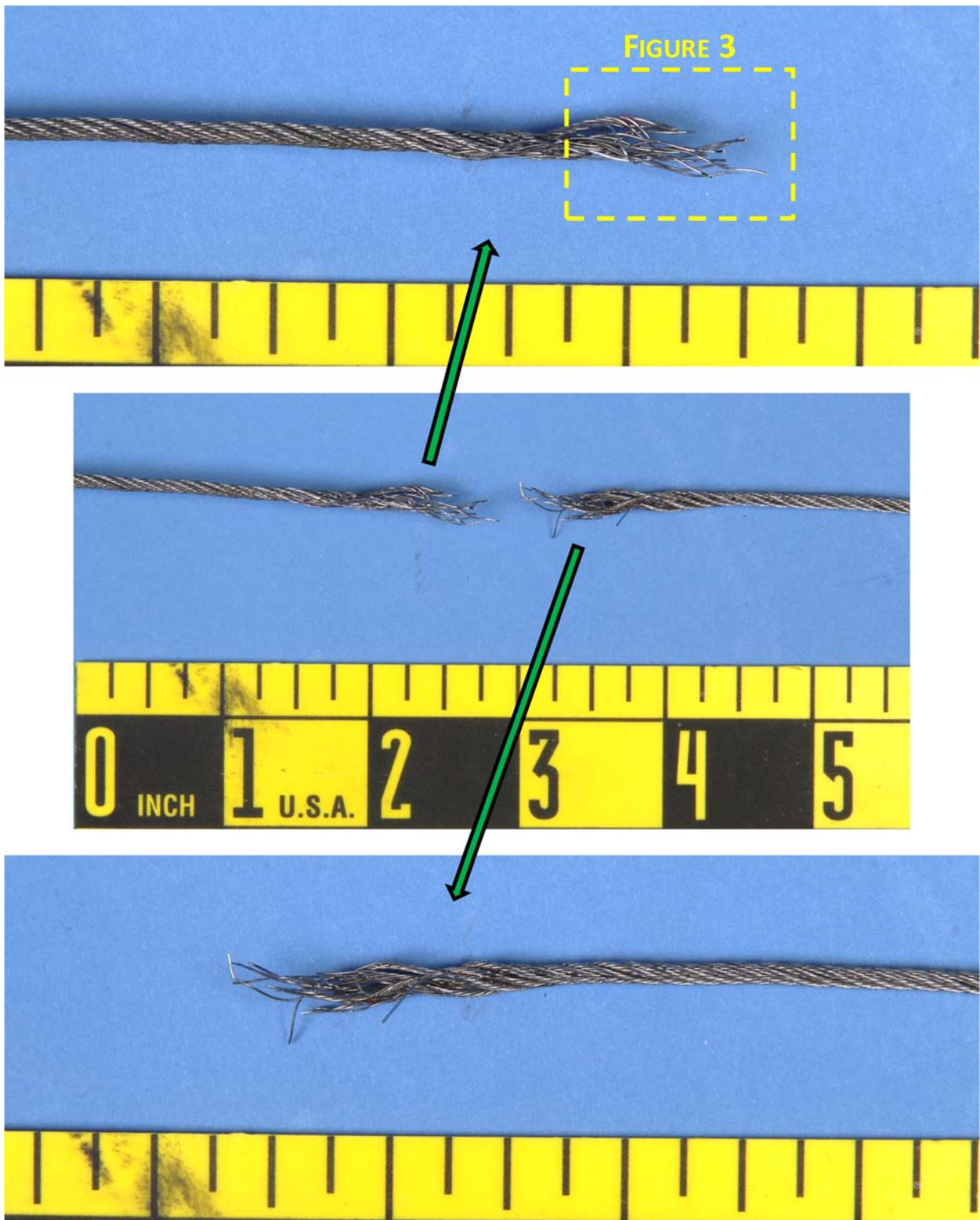


Figure 2: Close-up photos of the two separated ends of the cable. The end in the top photo is shown in more detail in Figure 3.

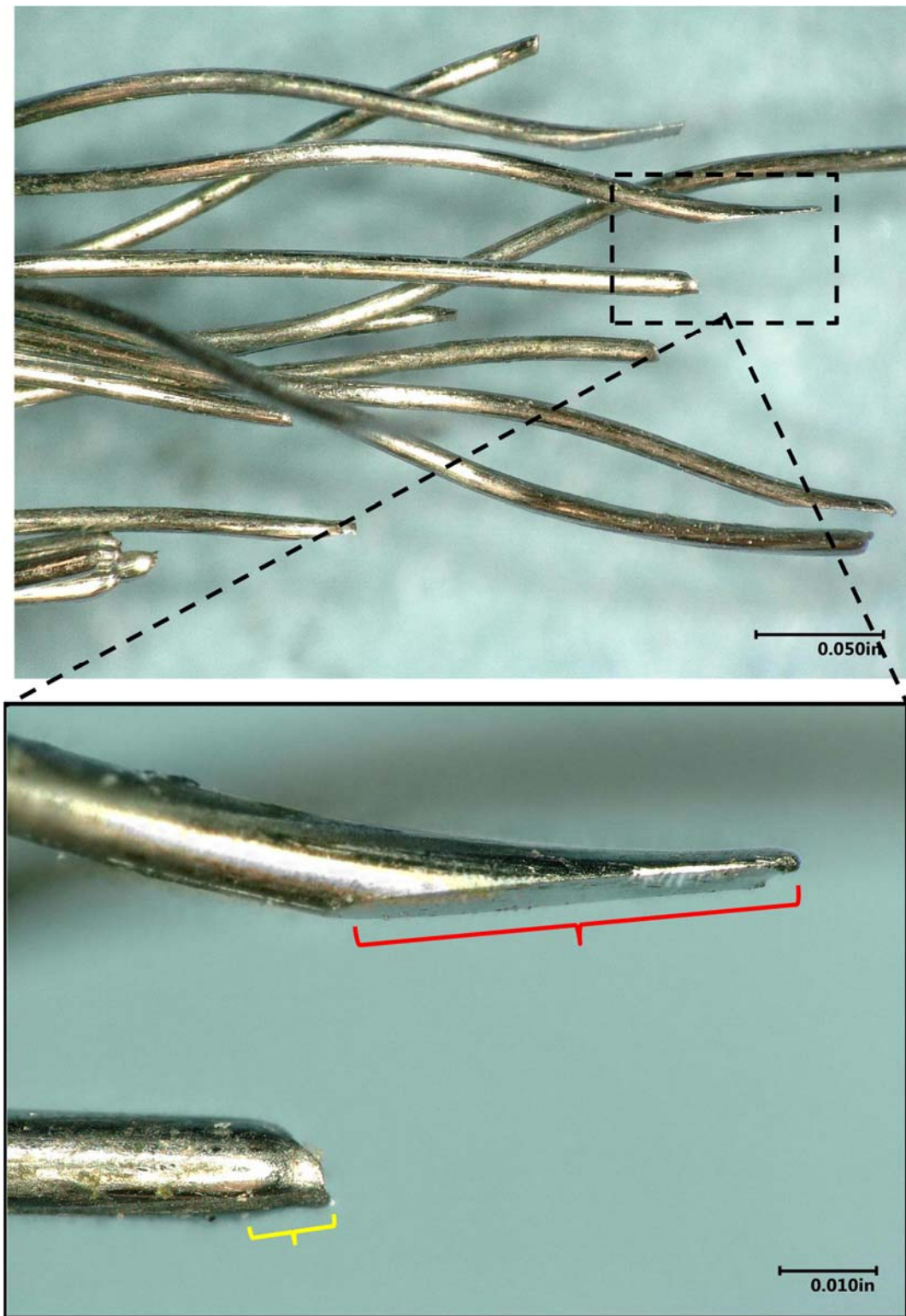


Figure 3: Digital microscope images of exemplar strand fracture surfaces. The red bracket indicates a separated end that had thinned due to wear before overstress separation. The yellow bracket indicates a separated end that had necked prior to overstress separation.