

NATIONAL TRANSPORTATION SAFETY BOARD

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



May 19, 2022

MATERIALS LABORATORY FACTUAL REPORT

Report No. 22-030

A. ACCIDENT INFORMATION

Place : Winterville, NC
Date : 5/22/2021
Vehicle : Flight Design CTSW, N708JM
NTSB No. : ERA21FA225
Investigator : Timothy Monville

B. COMPONENTS EXAMINED

Fractured cables from Nos. 1/3 and 2/4 carburetors (Figures 1, 2)

C. DETAILS OF THE EXAMINATION

The carburetors submitted for examination had been exposed to a post-crash fire. The aluminum body of carburetor No. 1/3 had mostly melted and formed an amorphous mass with the throttle lever arm and other steel components attached and embedded within the mass (Figure 1). Two portions of control cable were attached to the throttle lever and assigned a label as shown in the figure. The aluminum body of carburetor No. 2/4 exhibited some areas of melting and deformation but overall, still resembled a carburetor body with a throttle lever and a choke lever attached (Figure 2). Two portions of control cable were attached to the each of the throttle and choke levers and these cables were assigned labels as shown in the figure.

The control cables were cut from their respective lever arms to facilitate microscopic examination. The labeled control cables along with their respective function are shown in Figure 3. The cables described as "tail ends" were the portions of the control cables that extended past the lever arms and terminated. These cable tail ends exhibited chisel point fractures of the wires consistent with having been cut with a wire cutter tool.

Cable 1/3 1-A (Figures 4, 5) exhibited wires with chisel point fracture surfaces consistent with having been cut with wire cutters.

Cable 1/3 1-B (Figures 6, 7) exhibited wires with necking down towards the fracture. The fractures were distributed along varying lengths along the cable. The fractures exhibited cup shapes in some instances as well as slant fractures. The failure mode of cable 1/3 1-B is consistent with overstress.

Cable 2/4 1-A (Figures 8, 9) exhibited wires with necking down towards the fracture. The fractures were distributed along varying lengths along the cable. The fractures exhibited cup shapes in some instances as well as slant fractures. The failure mode of cable 2/4 1-A is consistent with overstress.

Cable 2/4 1-B (Figures 10, 11) exhibited wires with chisel point fracture surfaces consistent with having been cut with wire cutters.

Cable 2/4 2-A (Figures 12, 13) exhibited wires with chisel point fracture surfaces consistent with having been cut with wire cutters.

Cable 2/4 2-B (Figures 14, 15) exhibited wires with necking down towards the fracture. The fractures were distributed along varying lengths along the cable. The fractures exhibited cup shapes in some instances as well as slant fractures. The failure mode of cable 2/4 2-B is consistent with overstress.

Joseph Panagiotou
Fire Protection Engineer

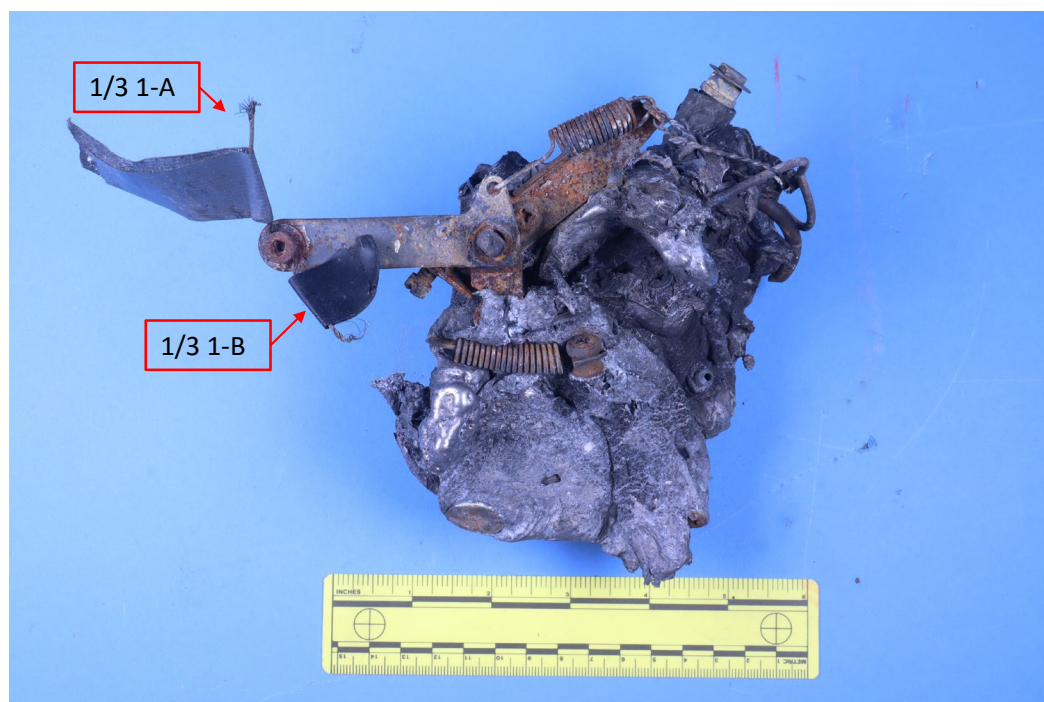


Figure 1: Carburetor No. 1/3 with cables labeled.

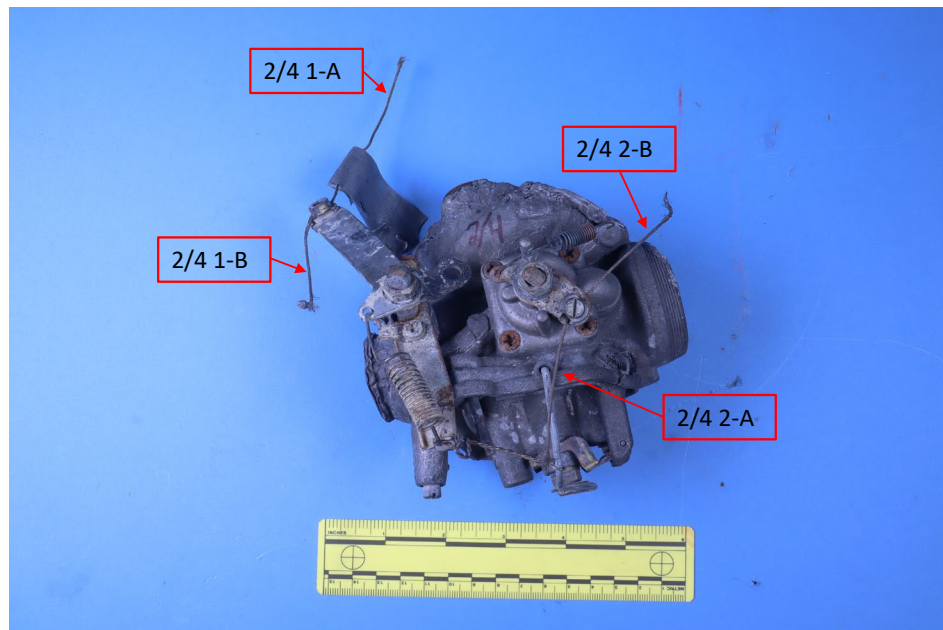


Figure 2: Carburetor No. 2/4 with cables labeled.

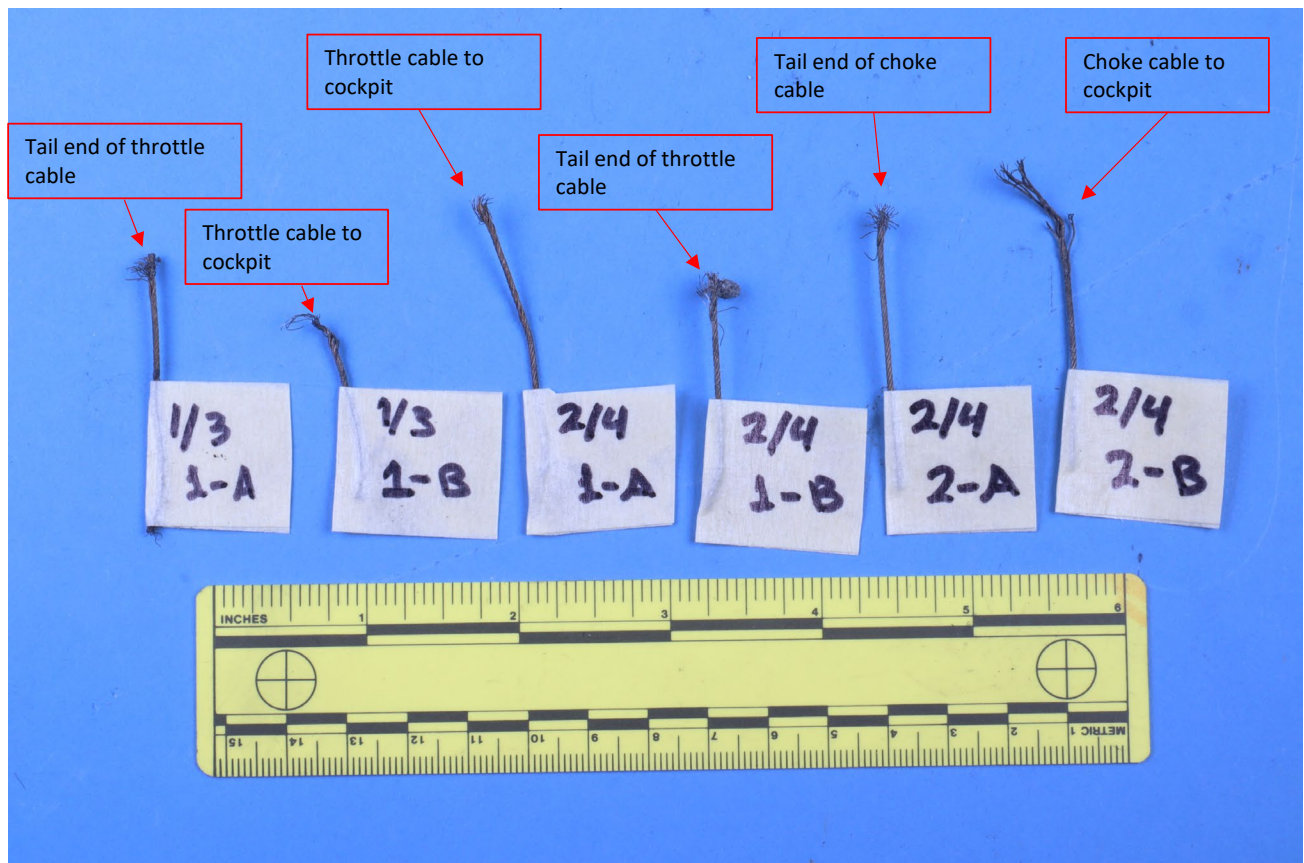


Figure 3: Control cables after separation from carburetors.



Figure 4: Cable 1/3 1-A (overall view).



Figure 5: Wires from cable 1/3 1-A exhibiting chisel point fractures.



Figure 6: Cable 1/3 1-B (overall view).



Figure 7: Wires from cable 1/3 1-B exhibiting necking, cup, and slant fractures.



Figure 8: Cable 2/4 1-A (overall view).



Figure 9: Wires from 2/4 1-A exhibiting necking, cup, and slant fractures.

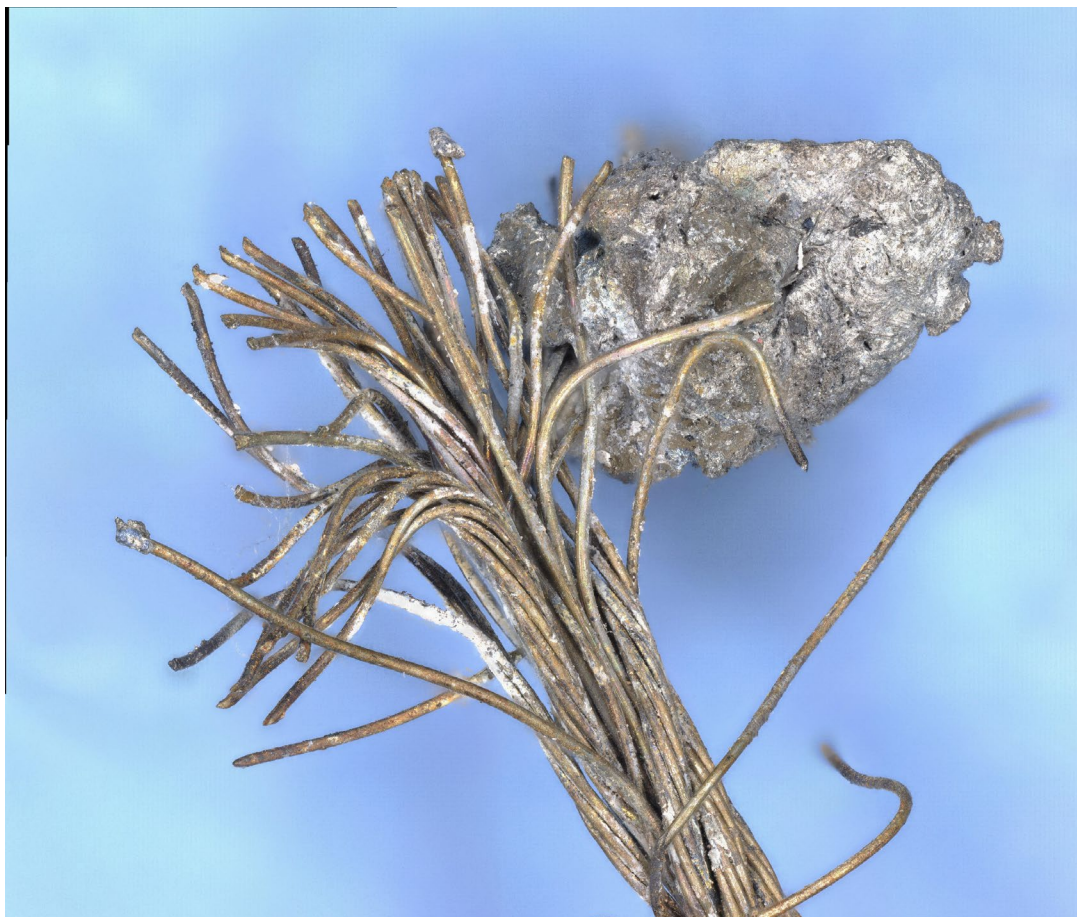


Figure 10: Cable 2/4 1-B (overall view).

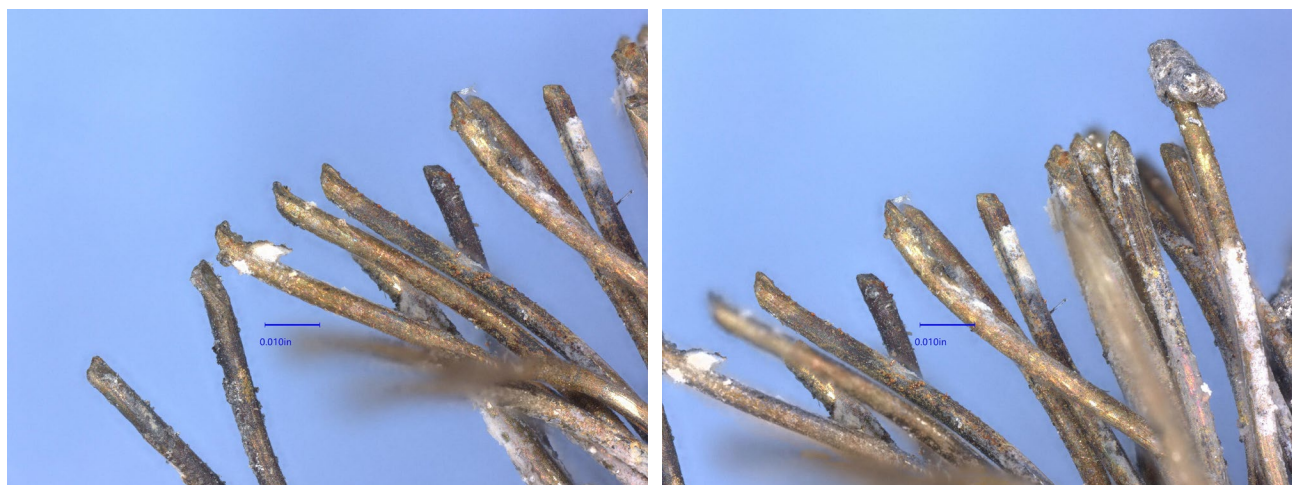


Figure 11: Wires from 2/4 1-B exhibiting chisel point fractures.



Figure 12: Cable 2/4 2-A overall view.



Figure 13: Wires from 2/4 2-A exhibiting chisel point fractures on the ends.



Figure 14: Cable 2/4 2-B overall view.



Figure 15: Wires from 2/4 2-B exhibiting necking and slant fractures.