

NATIONAL TRANSPORTATION SAFETY BOARD

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



April 26, 2019

MATERIALS LABORATORY FACTUAL REPORT

Report No. 19-024

A. ACCIDENT INFORMATION

Place : Canoncito, New Mexico
Date : 10/16/2018
Vehicle : Cessna 182P N9326G
NTSB No. : CEN19FA008
Investigator : Andrew Todd Fox

B. COMPONENTS EXAMINED

Carburetor heat box, fractured heat valve shaft and portion of control cable sheathing (figure 1).

C. DETAILS OF THE EXAMINATION

The carburetor heat box had been deformed from impact forces. The heat valve vane inside the carburetor heat box conformed to the deformation of the heat box body. No evidence was observed to reveal the vane's pre deformation position.

The heat valve shaft that carried the carburetor heat box vane was fractured. The fracture occurred in a part of the shaft that was cross drilled for the vane attachment. A portion of the heat valve shaft remained attached in the deformed carburetor heat box. The separated portion of the heat valve shaft included a control arm with a portion of control cable attached (figure 2). Examination of the heat valve shaft's fracture surface revealed fracture features consistent with a brittle overstress fracture (figure 3).

The portion of control cable attached to the heat valve shaft control arm was approximately 3.5 inch long. The last inch of the control cable on the end opposite the control arm exhibited a scalloped wear pattern and a tar like substance adhering to the cable surface (figures 4, 5). The fracture surface on this end of the control cable also exhibited a tar like substance adhering to the fractured end (figure 6). After ultrasonic cleaning in Acetone the fractured end of the control cable was examined using a scanning electron microscope (SEM). SEM micrographs (figure 7) revealed a fracture surface characterized by microvoid coalescence consistent with an overstress fracture. A portion of the fracture surface exhibited polishing wear and another portion exhibited microvoids that had been smeared.

Joseph Panagiotou
Fire Protection Engineer



Figure 1: Carburetor heat box, portion of heat valve shaft and cable sheathing as received.



Figure 2: Portion of heat valve shaft, control arm and portion of control cable.

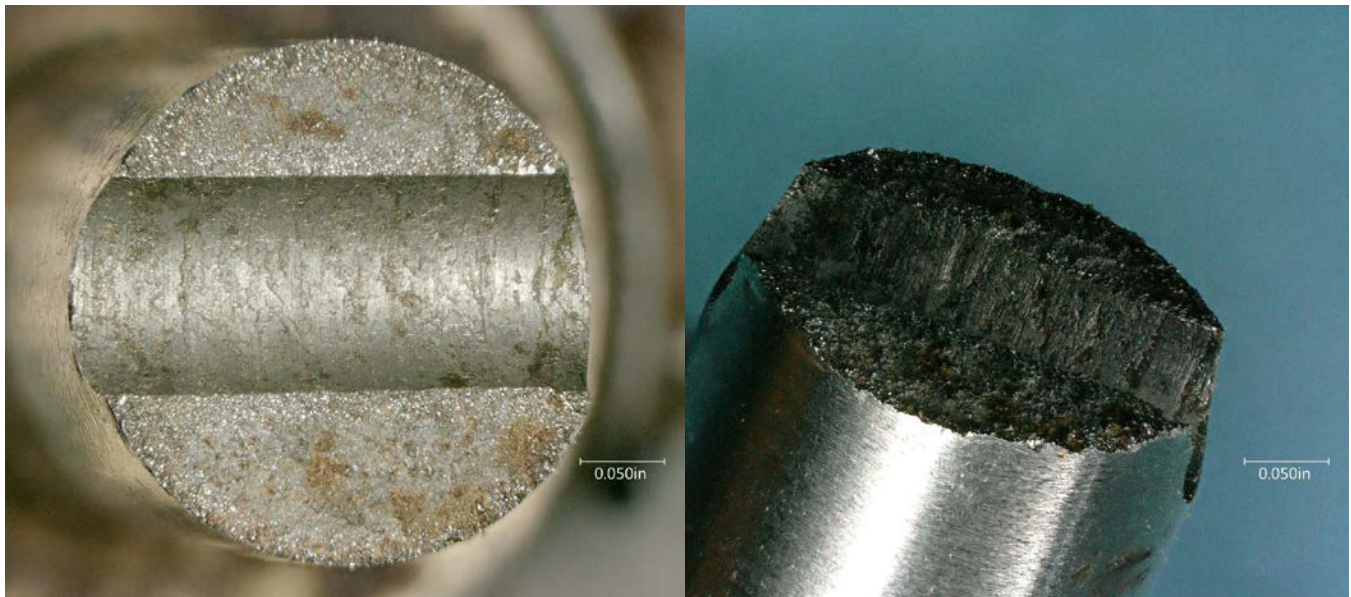


Figure 3: Heat valve shaft fracture surface.



Figure 4: Heat valve shaft control cable end.



Figure 5: Close-up of scalloped wear pattern on control cable end (right image taken after cleaning).

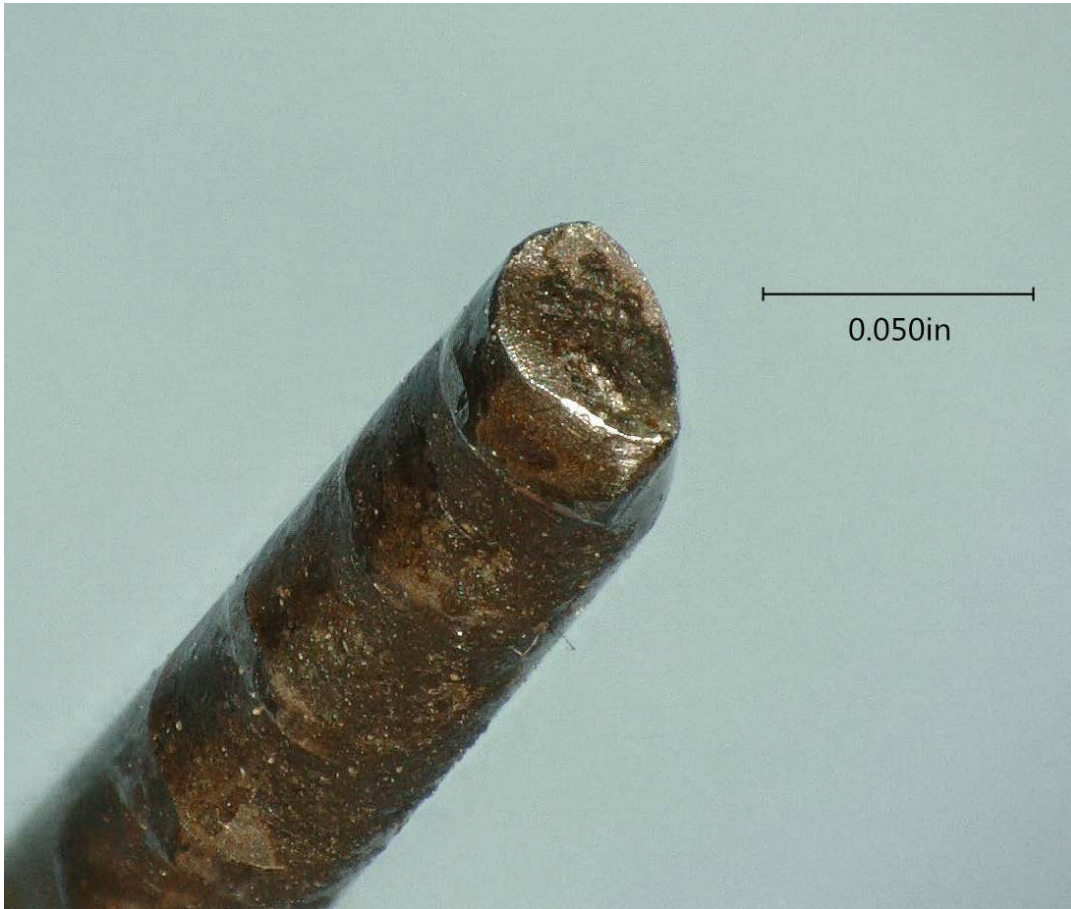


Figure 6: Control cable end fracture surface.

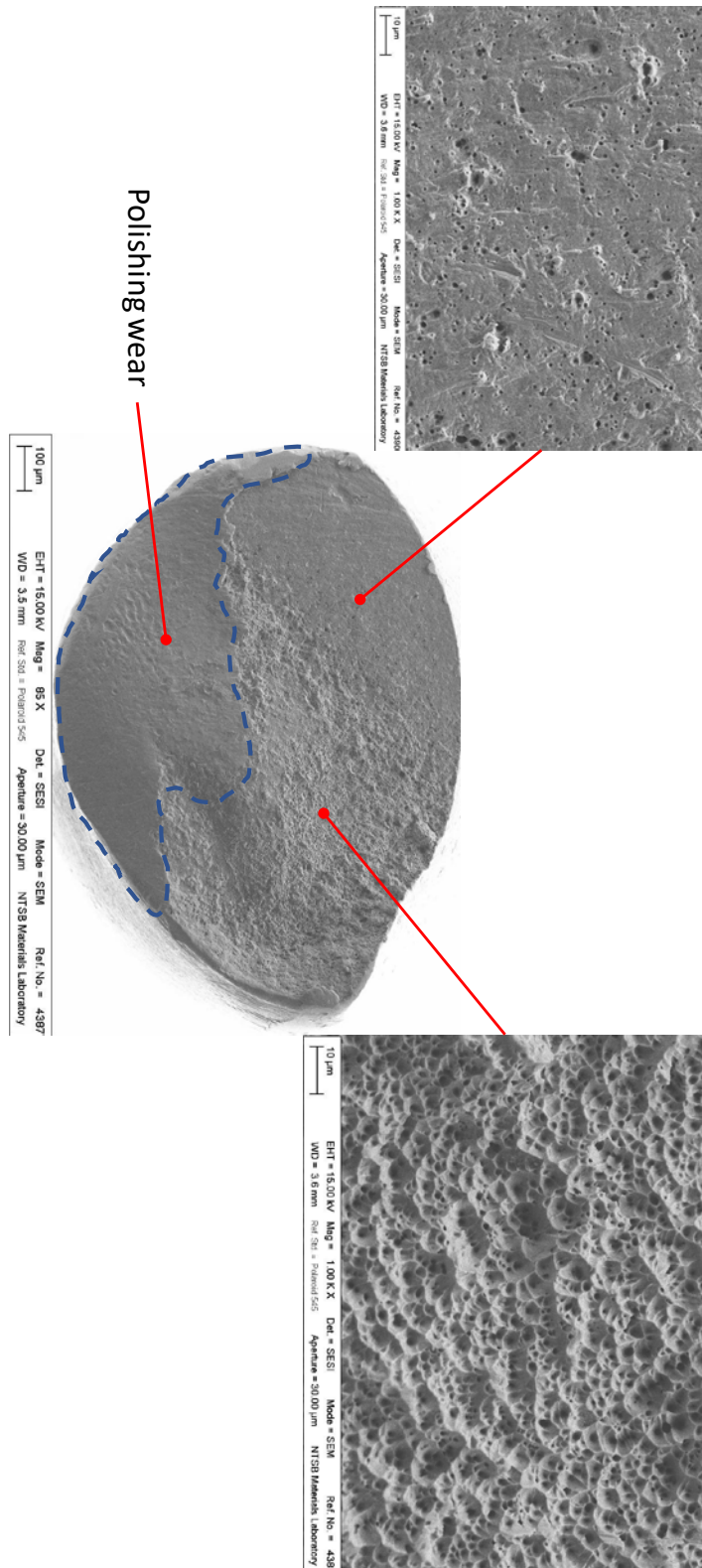


Figure 7: SEM micrographs of control cable end fracture surface.