

NATIONAL TRANSPORTATION SAFETY BOARD

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



January 24, 2020

MATERIALS LABORATORY FACTUAL REPORT

Report No. 20-002

A. ACCIDENT INFORMATION

Place : San Antonio, Texas
Date : December 1, 2019
Vehicle : Piper PA-24-250, N6678P
NTSB No. : CEN20FA023
Investigator : Jason Aguilera, AS-CEN

B. COMPONENTS EXAMINED

Crankshaft pieces.

C. DETAILS OF THE EXAMINATION

An overall view of the submitted crankshaft pieces from a Lycoming O-540-A1D5 engine is shown in figure 1. The crankshaft had been cut through the number 4 connecting rod journal and was fractured through the cheek between the number 2 main journal (labeled M2 in figure 1) and the number 2 connecting rod journal (labeled C2 in figure 1). The cheek between the number 1 main journal and the number 1 connecting rod journal was bent aft.

A close view of the fracture surface on the aft piece is shown in figure 1. Fracture features had a uniform matte gray appearance across most of the fracture surface consistent with ductile overstress fracture. Near the surfaces, the fracture surface had a smooth flat appearance consistent with overstress fracture through a hardened surface layer. Secondary cracks were observed in the cheek surface adjacent to the fracture as shown in figure 2 consistent with bending overstress fracture in a surface-hardened steel. All fracture features and deformation observed were consistent with bending overstress fracture with no evidence of preexisting damage.

Matthew R. Fox, Ph.D.
Senior Materials Engineer

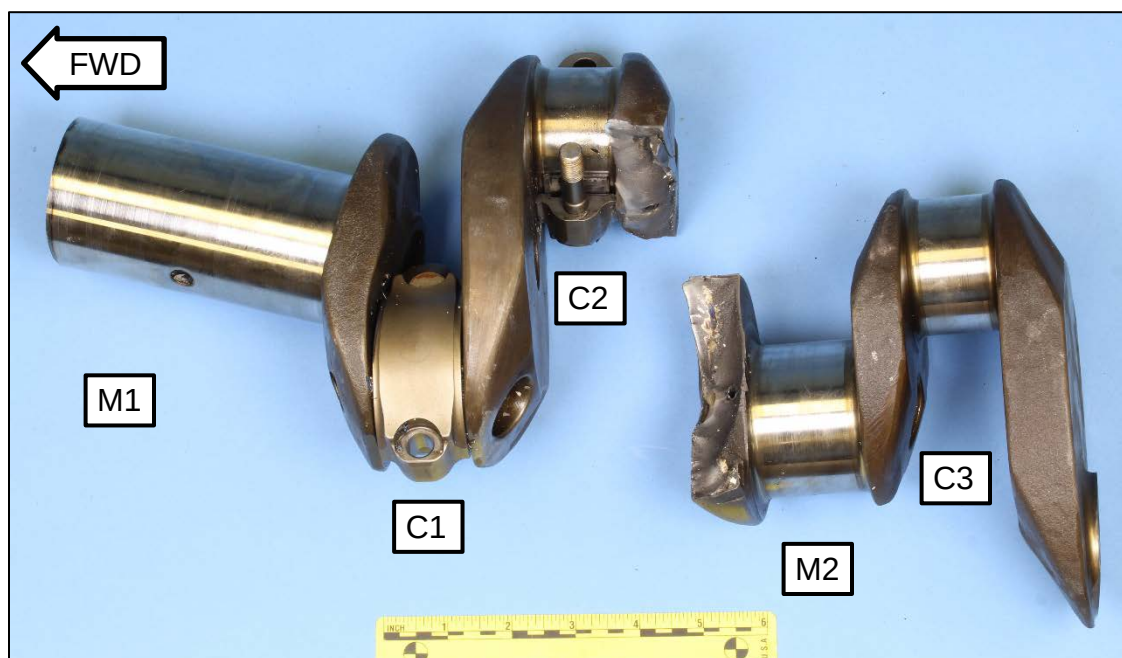


Figure 1. Overall view of the submitted crankshaft pieces (above) with a closer view of the fracture surface on the aft piece (right).



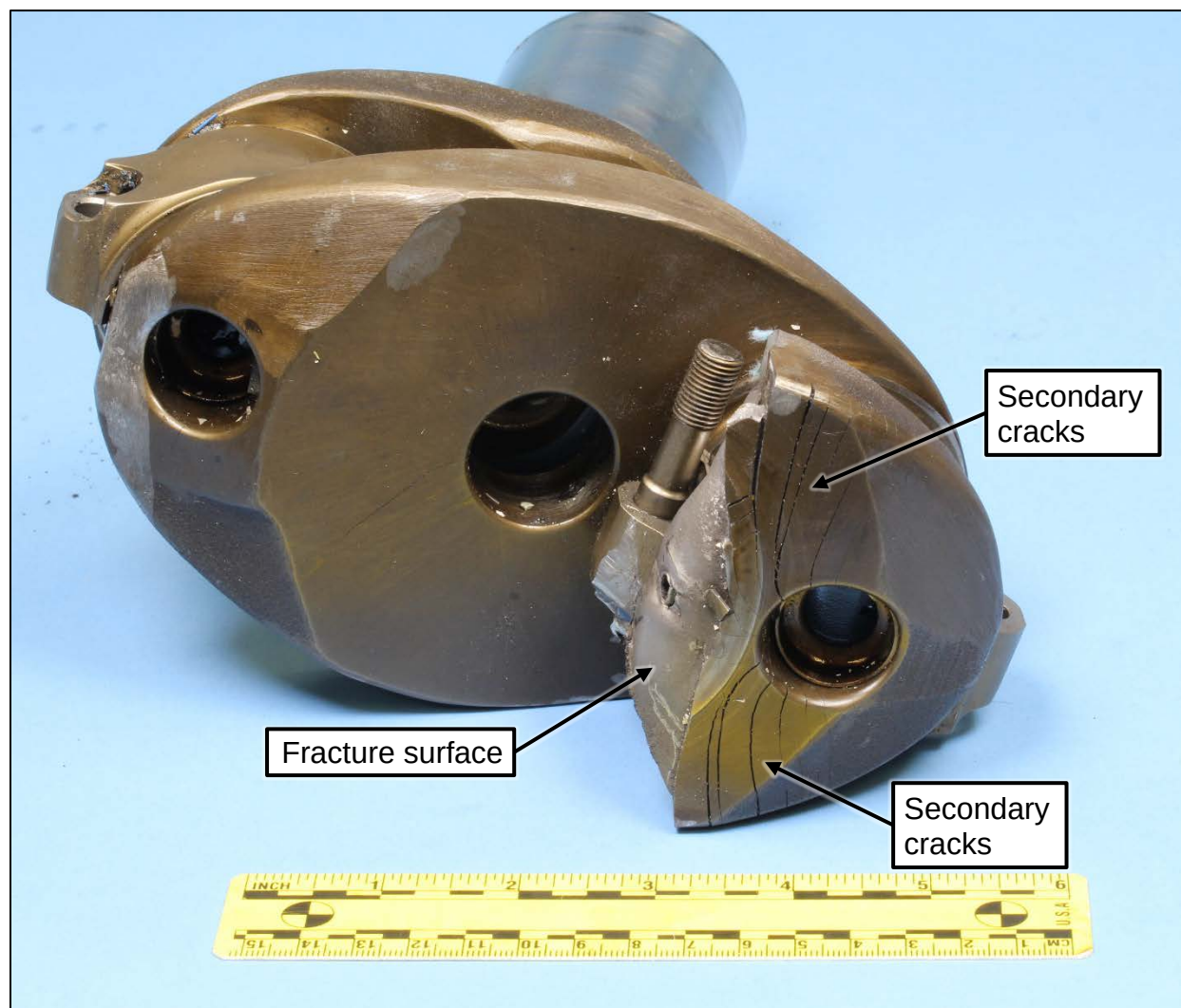


Figure 2. Fracture surface in the forward piece viewed looking forward showing secondary cracks in the cheek adjacent to the fracture surface.