

NATIONAL TRANSPORTATION SAFETY BOARD

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



March 10, 2016

MATERIALS LABORATORY FACTUAL REPORT

Report No. 16-028

A. ACCIDENT INFORMATION

Place : Fort Lauderdale, Florida
Date : July 23, 2015
Vehicle : Piper PA-28R-180, N4631J
NTSB No. : ERA15LA289
Investigator : Timothy W. Monville, AS-ERA

B. COMPONENTS EXAMINED

Fractured piece of engine mount (P/N 67119-049)

C. DETAILS OF THE EXAMINATION

Figure 1 shows a photograph of the as-received left main landing gear assembly. The assembly fractured at the two locations indicated by arrows "1" and "2". Bench binocular microscope examination of the engine mount revealed fracture face arrowed "1" contained a fatigue crack indicated by bracket "01" in figure 2 that emanated from the outer surface and fracture face arrowed "2" contained two fatigue cracks indicated by brackets "02" and "03" in figure 3 that emanated from the outer surface. Each fatigue crack emanated from multiple origins on the outer face of the tube portion in areas indicated by brackets "01", "02" and "03" in figures 2 and 3. Each fatigue crack exhibited crack arrest marks and propagated through the wall of the tube portion. The fatigue cracks terminated in the areas indicated by dashed lines in figures 2 and 3. The areas outside of the fatigue crack regions were on a slant plane and contained rough texture features consistent with overstress separation.

Scanning electron microscope examination of fracture faces "01" and "02" revealed a large portion of the fine fracture features in the fatigue regions were obliterated by mechanical damage as a result of relative movement between mating fracture faces. Figure 4 shows an isolated area in fatigue region "01" that contained fatigue striations. The areas located outside of the fatigue regions contained dimple features consistent with overstress separation.

Frank Zakar
Senior Metallurgist



Figure 1. Photograph of the as-received engine mount that fractured at two areas indicated by arrows "1" and "2".

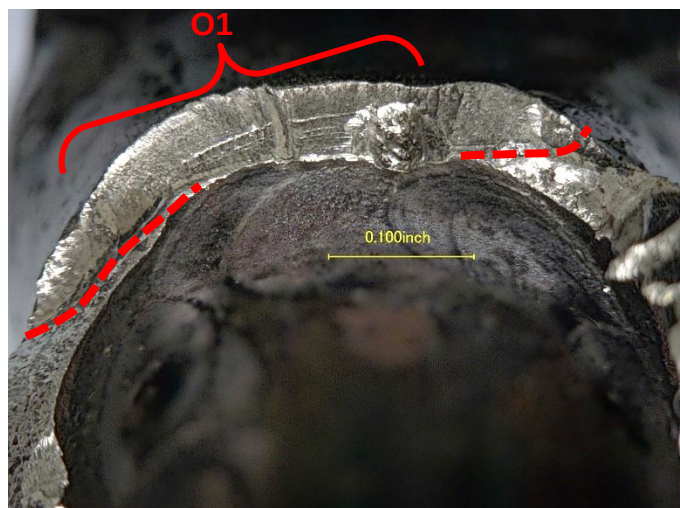
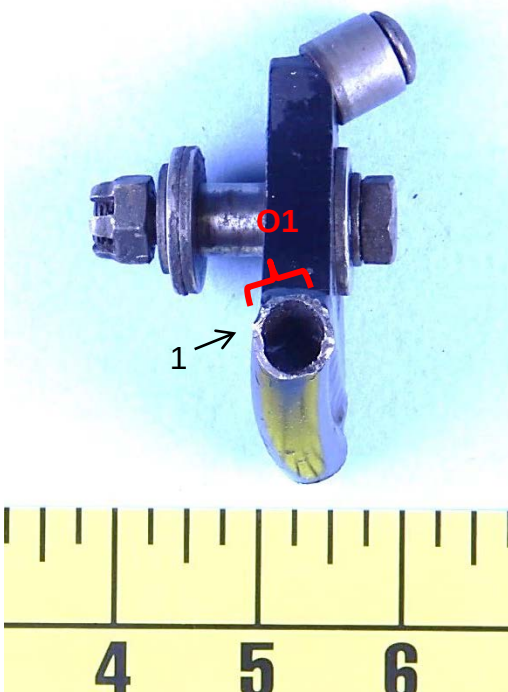


Figure 2. Photograph of fracture face arrowed "1" in figure 1 (left) and close-up photograph of the fatigue crack origin area indicated by bracket "O1" (right).

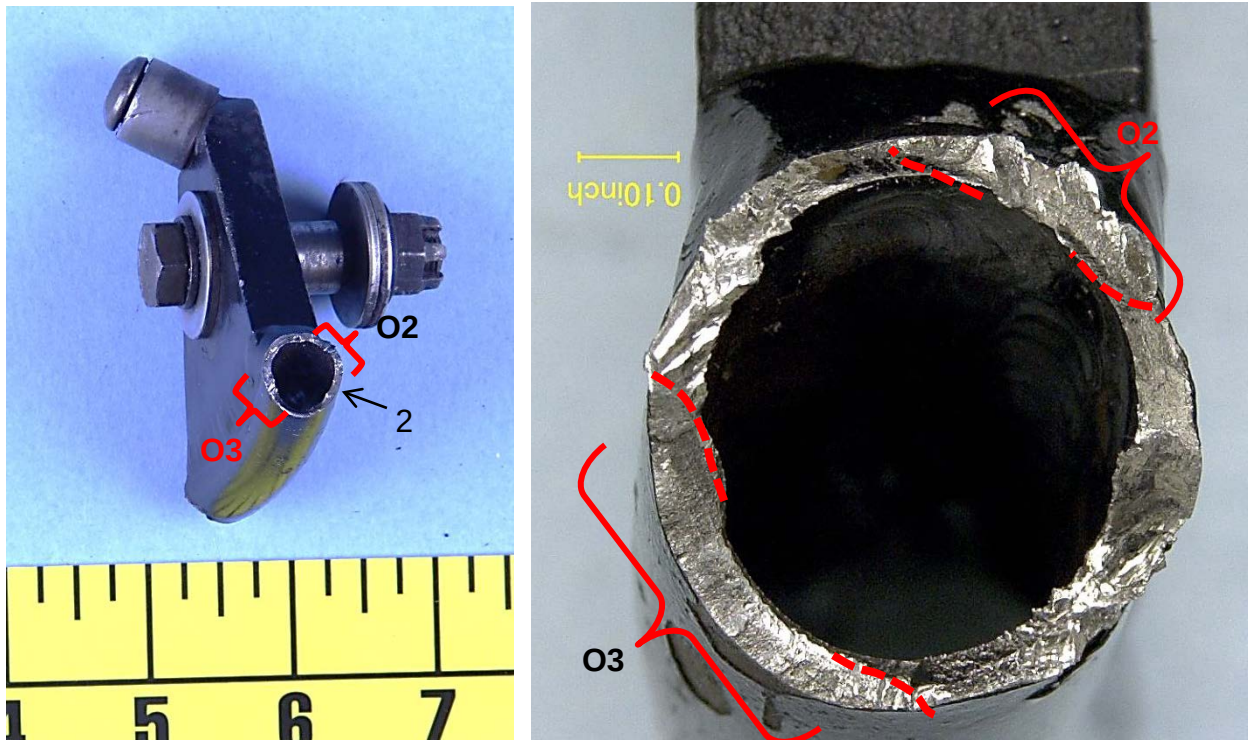


Figure 3. Photograph of fracture face arrowed "2" in figure 1 (left) and close-up photograph of the fatigue crack origin areas indicated by bracket "O2" and O3" (right).

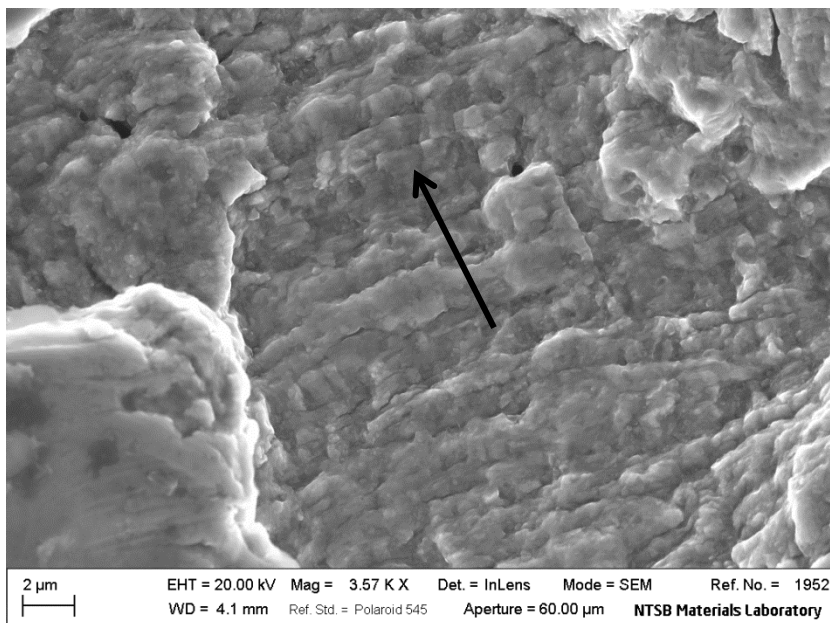


Figure 4. Scanning electron microscope image of fracture face "1" in the area of fatigue origin "O1" in figure 2 showing fatigue striations. Fatigue propagation was in the general direction indicated by an arrow.