

NATIONAL TRANSPORTATION SAFETY BOARD

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



September 18, 2018

MATERIALS LABORATORY FACTUAL REPORT

Report No. 18-046

A. ACCIDENT INFORMATION

Place : Fulton, Texas
Date : March 25, 2018
Vehicle : MX Aircraft LLC, MXS airplane, N540JH
NTSB No. : CEN18LA127
Investigator : Pam Sullivan, AS-CEN

B. COMPONENTS EXAMINED

Fractured crankshaft from a Lycoming AEIO-540 engine.

C. DETAILS OF THE EXAMINATION

Figure 1 shows a photograph of the as-received crankshaft. The crankshaft fractured at the cheek between the #5 and #6 rod journals. Bench binocular microscope examination of the crankshaft revealed the forward fracture face contained crack arrest marks typical of fatigue cracking that emanated from the aft radius of the #5 rod journal in the area indicated by bracket "O" in figures 2 and 3. The surface of the #5 rod journal and both radii for this rod journal exhibited black-blue heat tint consistent with exposure to heat and contained circumferential gouges. Fatigue crack propagation was through approximately 90% of the cheek cross section. The remaining fracture exhibited rough texture features consistent with overstress separation. The surface of the exposed rod and main journals showed no evidence of circumferential gouges. A soft steel wire was inserted through all the oil lubrication ports. The oil lubrication ports contained no evidence of metal/debris.

A connecting rod remained attached to the #6 rod journal. This connecting rod fractured at the arm portion. The arm portion in the area of fracture showed evidence of elongation deformation. One of the two counterweight assemblies fractured from the cheek. An ear portion extends out of the cheek and it serves as an attachment point for the counterweight assembly. The counterweight separated at the ear portion. The fracture faces on the connection rod arm and the attachment ear for the counterweight assembly exhibited a rough texture on slant planes consistent overstress separation.

Frank Zakar
Senior Metallurgist

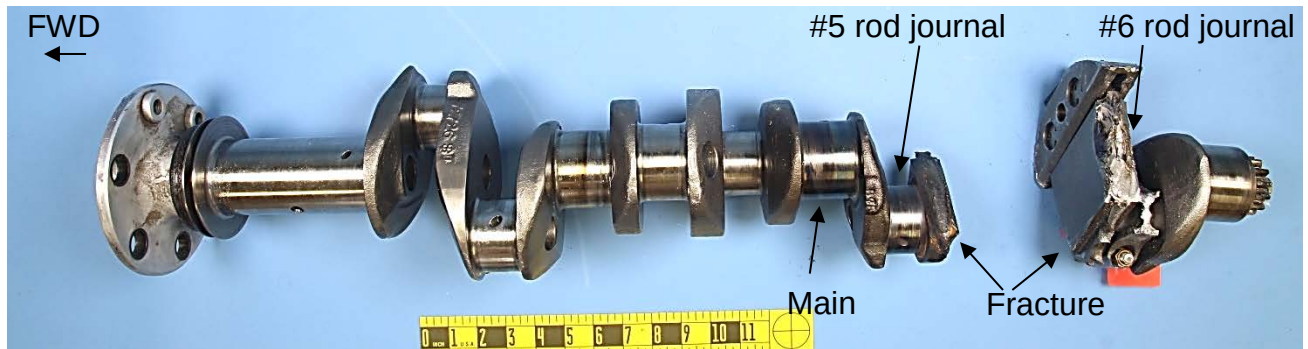


Figure 1. As-received crankshaft.

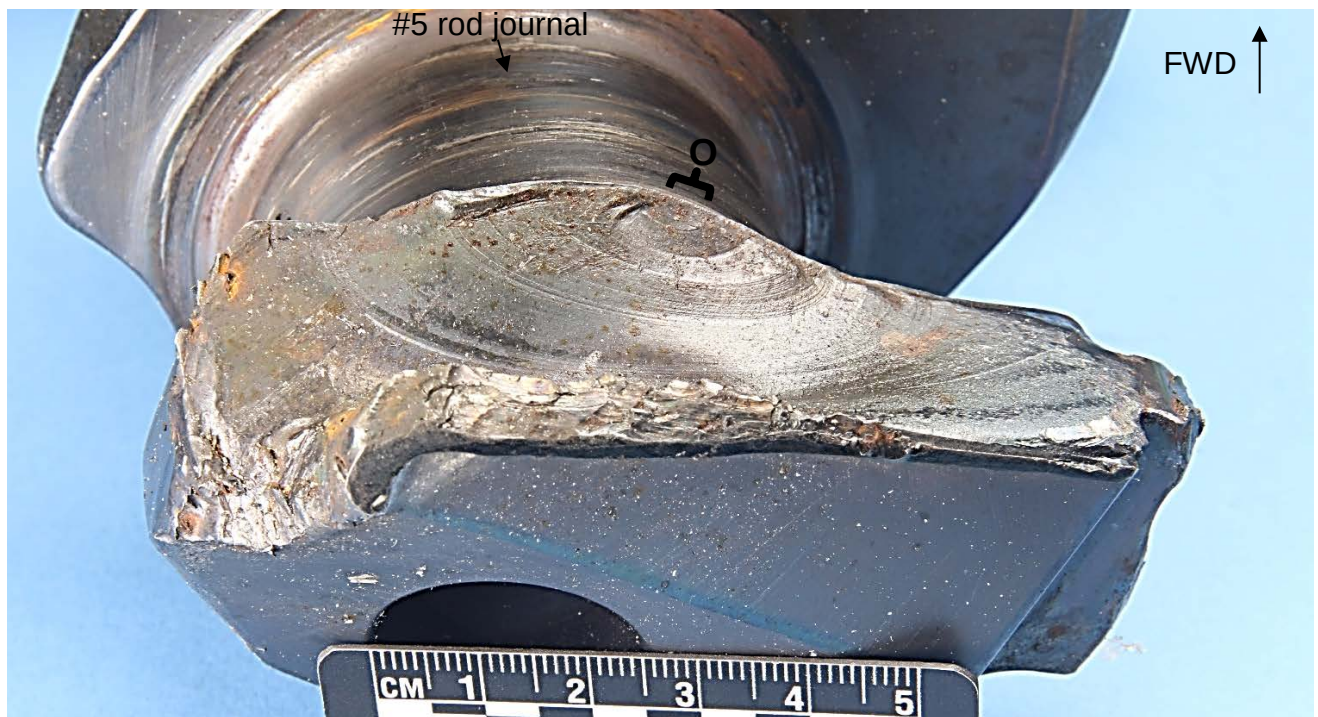


Figure 2. Close-up photograph of the fracture face showing the origin of the fatigue crack indicated by a bracket "O" that emanated from the aft radius of the #5 rod journal.

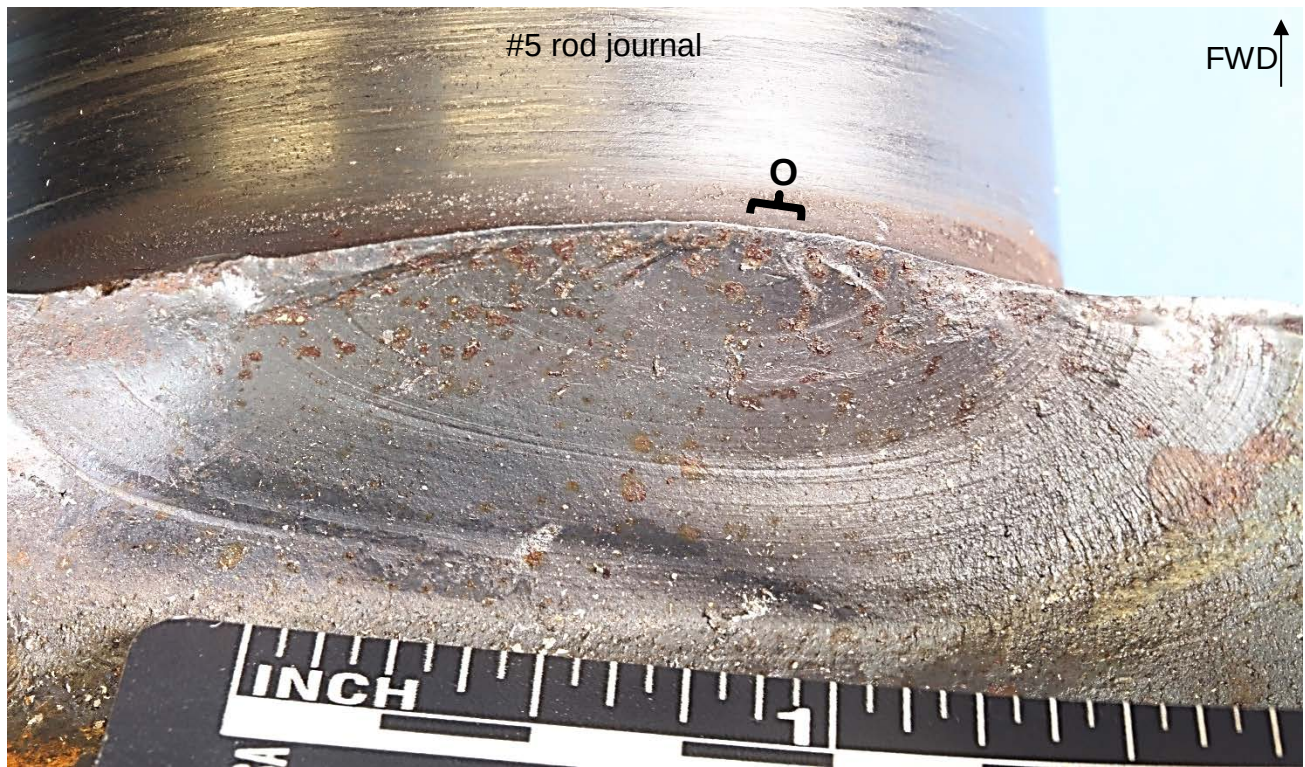


Figure 3. Close-up photograph of the origin of the fatigue crack indicated by a bracket "O".