



MEMORANDUM for RECORD

Millicent Hill
Air Safety Investigator
Alaska Region Aviation

Date: February 23, 2023
Person Contacted: Mike Childers, Lycoming Engines
NTSB Accident Number: ERA22LA139

This investigator corresponded Mr. Childers by email and telephone regarding the engine examination.

Tachometer hour meter reading – 5597.1

As first viewed, the engine remained attached to the aircraft firewall through the tubular mount. The propeller and alternator were separated from the engine. The exhaust system was partially crushed. The #1 induction tube was impact separated. The engine was removed from the aircraft, suspended from a lift and partially disassembled to facilitate the examination. The engine crank shaft was rotated using a tool inserted in the vacuum pump and continuity of the crankshaft to the rear gears and to the valve train confirmed. Compression and suction were observed from all four cylinders. The interiors of the cylinders were observed using a lighted borescope and no anomalies noted.

A review of photographs of the aircraft maintenance logbooks provided by the NTSB revealed that the most recent annual inspection was completed on 04/12/2021. The most recent engine field overhaul was completed on 04/14/1998, almost 23 years before the date of the accident. The engine had accumulated 1598.1 hours of time-in-service since that overhaul. Lycoming Service Instruction No. 1009BE states:

“All engine models are to be overhauled within twelve (12) calendar years of the date they first entered service or of last overhaul. This calendar year time period TBO is to mitigate engine deterioration that occurs with age, including corrosion of metallic components and degradation of non-metallic components such as gaskets, seals, flexible hoses and fuel pump diaphragms.

CAUTION CALENDAR YEAR TBO IS BASED ON ACCELERATED TESTING AND OVERALL FLEET SERVICE DATA. LOCAL CLIMATE CONDITIONS, STORAGE CONDITIONS, FREQUENT EXTENDED PERIODS OF INACTIVITY, PRESERVATION

TECHNIQUES USED DURING INACTIVE PERIODS, AND FREQUENCY OF OIL CHANGES CAN AFFECT CORROSION OF METALS AND DEGRADATION OF NON-METALS.

For FAA Part 91 or EASA Part NCO (non-commercial) or equivalent operations, only an appropriately rated and qualified maintenance person (or international equivalent) can allow the twelve (12) calendar year TBO to be exceeded with concurrence from the controlling civil aviation authority to verify agreement with this provision and after thoroughly examining the engine for corrosion and degradation in accordance with 14 CFR 43 Appendix D (or international equivalent) and determining that the engine remains in an airworthy condition. This inspection is to be repeated annually or as necessary to ensure continued airworthiness. The twelve (12) calendar year TBO must not be exceeded if the engine is affected by AD 2012-19-01 and not in compliance with AD 2012-19-01.”

The propeller was impact separated from the engine crankshaft flange. One propeller tip was embedded in a portion of a tree trunk at the accident site. One propeller blade exhibited an “S” bend near the propeller tip. The other blade was bent aft about 45 degrees at about 12 inches from the tip.

The carburetor was fractured across the throttle bore and separated from the engine. The throttle control cable remained attached to the carburetor throttle control arm. The arm along with the throttle shaft were partially impact separated from the carburetor. The cockpit throttle control knob was positioned forward. The mixture control cable wire was separated from the carburetor mixture control arm. The mixture control wire securing hardware remained attached to the carburetor mixture control arm. The arm was observed in a mid-range position. The cockpit mixture control arm was positioned fully forward. The carburetor heat control cable remained attached to the carburetor air valve control arm. The induction air box was impact damaged. The cockpit carburetor heat control arm was positioned fully forward. The induction air filter remained in place and was unobstructed.

The carburetor was partially disassembled. No damage to the brass floats or other internal components was observed. No liquid was observed in the float bowl. The carburetor fuel inlet screen was unobstructed. The aircraft fuel strainer was partially disassembled and the strainer screen observed unobstructed. No liquid was observed in the strainer bowl.

Both magnetos remained attached to the engine. No damage was noted and both magnetos produced spark from all ignition towers when rotated by hand.

Tempest and Champion spark plugs were installed in the cylinders. The #3 bottom spark plug was impact damaged. The electrodes of the remaining spark plugs exhibited worn normal condition. The #2 top and #1 bottom spark plug electrodes were oily.

No damage to the ignition harness was noted. It was not tested. The starter remained attached to the engine. No damage was noted and it was not removed.

The alternator was impact separated from the engine and observed near the front of the aircraft in photos provided by the FAA.

The vacuum pump remained attached to the engine and no damage was noted. It was partially disassembled and no damage to the composite drive assembly, carbon rotor or carbon vanes noted.

Oil was observed in the engine. The oil suction screen and oil filter media were absent of debris.