



The National Transportation Safety Board

Office of Aviation Safety
Central Region
Memorandum for the Record
Engine Examination Findings
CEN20FA075
Chatham, Louisiana
February 6, 2020

Summary

No pre-impact mechanical anomalies were found with the engine that could have precluded normal operation. Propeller blade damage was consistent with rotation at the time of impact. Power level could not be determined.

Details

- As first viewed, the engine was separated from the aircraft firewall and laying upright at the edge of an impact crater about 15 feet from the fuselage. The impact crater was about 3 feet wide, four feet long and undetermined depth. The fuel injector servo and the left magneto were separated from the engine and found at the accident site. The lower portion of the engine driven fuel pump was impact separated and not observed. The exhaust tubing was crushed.



Photo1: Engine at Accident Site

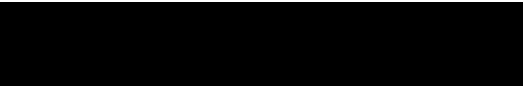
- The engine was suspended from a lift and partially disassembled to facilitate examination. Oil drained from when it was lifted. The oil suction screen was absent of metallic debris. The oil filter was impact damaged and not examined.



- The engine was rotated by turning the propeller and continuity of the crankshaft to the rear gears and to the valve train confirmed. Compression and suction were observed from all six cylinders. The interiors of the cylinders were observed using and lighted borescope and no anomalies noted.
- The most recent annual inspection was completed on 04/05/2019 at a tachometer hour meter reading of 1772.5 hours. A receipt for and oil change dated 11/25/2019 found with the aircraft records indicated that the tachometer hour read 1879.0 hours.
- The fuel injector servo was impact separated from the engine and fire damaged. The throttle and mixture cable rod ends remained attached to the servo throttle and mixture control arms. The servo was partially disassembled, and no damage noted to the air or fuel rubber diaphragms.
- The flow divider remained attached to the engine and was impact damaged. The flow divider was partially disassembled, and the rubber diaphragm observed torn adjacent to the flow divider cover impact damage. No debris was noted in the flow divider.

- The two-piece fuel injector nozzles were unobstructed. The #5 injector nozzle was impact fractured. The upper portion of the engine driven fuel pump remained attached to the engine. The check valve body and cover were separated from the pump and not observed.
- The left magneto was impact damaged and separated from the engine. The two magneto case housings were misaligned. The magneto was stiff to rotated and did not produce sparks. The right magneto base flange was impact fractured, but the magneto remained attached to the engine. The magneto produced spark from all six ignition towers when rotated by hand.
- The spark plug electrodes exhibited light gray coloration and worn normal condition. The engine exhaust tubing was crushed around the lower spark plugs and they were not removed. The lower spark plug electrodes were observed using a lighted borescope in the cylinders.
- The engine ignition harness was impact damaged. The starter was impact damaged and remained partially attached to the engine. The alternator was impact damaged and remained partially attached to the engine. The alternator belt was present but broken.
- The vacuum pump remained attached to the engine and was impact damaged. The composite drive assembly was unbroken. The carbon rotor was fractured but the carbon cans were intact.
- The propeller hub was fractured but remained attached to the engine crankshaft flange. The propeller spinner was crushed. Three slash marks consistent in appearance with propeller strikes were observed on the left side of the impact crater. One propeller blade was separated from the hub and embedded in the soil in the impact crater. When removed from the crater, the blade exhibited leading edge polishing and was bent forward at mid span. The remaining two blades were loose in the propeller hub. All three blades exhibited leading edge paint abrasion.
- The propeller governor remained attached to the engine. The propeller governor control arm was separated from the governor. The propeller governor oil screen was absent of debris.

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