

Summary of Aircraft Examination

NATIONAL TRANSPORTATION SAFETY BOARD Office of Aviation Safety Washington, DC 20594

SUMMARY OF AIRCRAFT EXAMINATIONS

-- CEN20FA096 --

A. ACCIDENT

Location: Rogers, Minnesota
Date: February 22, 2020
Time: 1111 central standard time
Aircraft: Beech A36, N3266Q, serial # E-2966
Engine: Continental IO-550R (6B), serial # 1037555

B. OVERVIEW

On February 22, 2020, about 1111 central standard time, a Beech A36 airplane, N3266Q, was destroyed after impacting terrain near Rogers, Minnesota. The pilot was fatally injured. The airplane was registered to and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Day visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed. The flight departed from Flying Cloud Airport (FCM), Eden Prairie, Minnesota, about 1100 and was destined for Breezy Point Airport (8MN3), Breezy Point, Minnesota.

C. PARTICIPANTS

Representatives from the NTSB, FAA, Textron Aviation, and Continental Aerospace Technologies participated in examination the on-site and at the recovery location. Representatives from the NTSB and Continental Aerospace Technologies participated in an engine run at the manufacturer's facility at Mobile, Alabama.

D. SUMMARY OF ON SITE EXAMINATION

The airplane came to rest upright with the cabin area destroyed by a post-impact fire. The engine top cowling separated exposing the engine.

The three-blade Hartzell constant speed propeller remained attached to the crankshaft propeller flange with no noticeable damage to propeller blade leading edges. The three propeller blades all exhibited rearward bending signatures beginning approximately 12" outboard of the blade roots. The propeller spinner exhibited impact dents, but no spiral damage was noted.

A small tree branch was recovered near the wreckage which exhibited 45-degree cuts consistent with propeller chopping. No impact damage was noted on the engine upper crankcase, induction components or cylinders.

The flexible fuel hose b-nut connecting the firewall fuel-outlet fitting to the fuel inlet-fitting located on the engine-driven fuel pump was found to be only finger tight. The green torque putty placed on this b-nut did not align between the fuel fitting on the fuel pump and the b-nut shoulder, which was consistent with movement between the fuel fitting and

Summary of Aircraft Examination

the fuel b-nut shoulder.

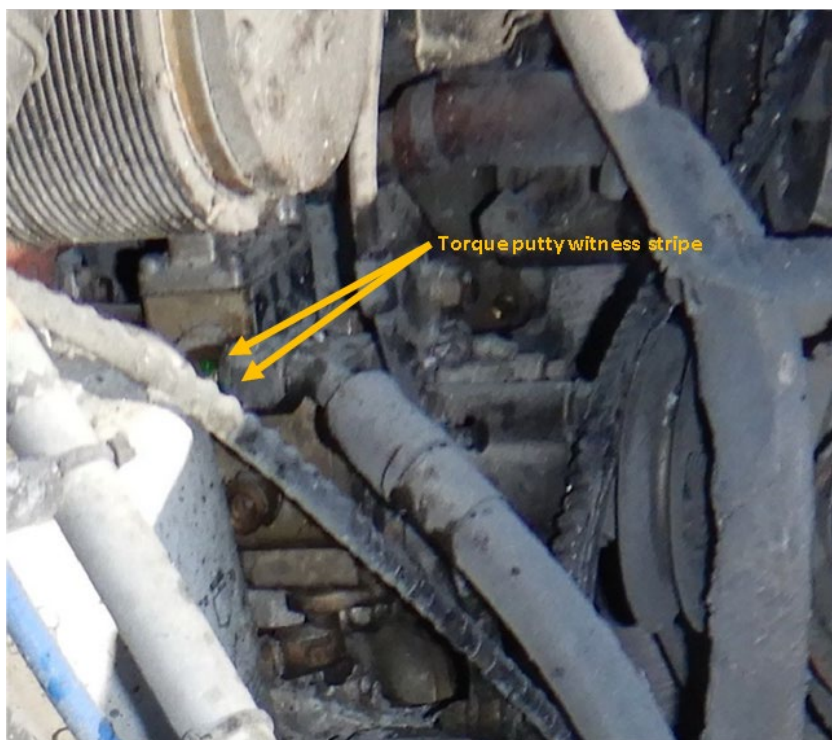


Photo 1 – Fuel inlet b-nut fitting at accident Site



Photo 2 – Close up view of fuel inlet b-nut fitting

Summary of Aircraft Examination

The fuel inlet b-nut fitting was disassembled. No anomalies were noted with the inlet fitting or the b-nut shoulder.



Photo 3 – Fuel pump inlet fitting



Photo 3 – Fuel pump inlet – shoulder of b-nut

Summary of Aircraft Examination

The fuel mixture control located on the engine driven fuel pump was against the full rich stop and the assembly hardware was secure. The throttle control cable was secured to the throttle arm located on the throttle body.

The engine driven fuel pump was removed, and the drive coupling was intact. When manually rotated, the fuel pump operated smoothly, and no fuel was expelled from fuel fittings.

The engine oil rod was removed and reinstalled. When removed again, the engine oil sump level indicated approximately 5 quarts. The front section of the engine was lower than the aft section.

The left wing was separated by tree impact near wing station (WS) 23 and WS 113. The outboard section of the left wing was observed about 20 ft to the left of the energy path.

The inboard section of the left wing was observed next to the fuselage. The outboard section of the right wing was observed separated near WS 113 and folded under the main wreckage. The inboard section of both wings exhibited significant fire damage.

The empennage remained attached to the forward fuselage. Fire damage to the fuselage was observed from the fire wall aft to the aft end of the passenger cabin area.

Both horizontal stabilizers, elevators, vertical stabilizer, rudder remained attached. The left elevator balance weight was separated from the elevator at the impact site.

The left-wing aileron sector was intact and both cables were attached. Both cables were separated from the right-wing aileron bellcrank. The aileron crossover cable was continuous from the separated right fitting to the left bellcrank.

Both left and right direct cables were continuous into the cockpit area. The aileron control yoke connection chain was intact. Both control columns were in the burned cockpit area. The elevator and rudder cables were attached to their respective control surfaces in the aft fuselage and continuous up into the burned cockpit area.

The flap drive cables and fittings were attached to each other; however, the drive assembly had been melted away by the fire. Both flap actuators were in the retracted position.

The aircraft fuel system was compromised by the post impact fire. The boost pump switch was not found in the burned wreckage. Both fuel filler caps were installed in their respective filler neck in the wings.

The fuel selector valve/ fuel strainer was fire damaged. Disassembly revealed the selector was in the left tank position. The screen was fire damaged, with no obstructions observed.

The main and nose landing gear were in the retracted position. The main and emergency landing gear actuators were consumed by post impact fire.

Summary of Aircraft Examination

All cockpit instruments were fire damaged and no readings were possible. The airplane was equipped with a standby vacuum system.

The wreckage was transported to a secure hangar.

E. SUMMARY OF RECOVERY LOCATION (WENTWORTH) EXAMINATION

Engine oil was found to be draining from the “quick drain” valve. The drain valve was closed, and the leak stopped.

Impact damage was noted on the engine included broken front left and right engine mounts, and the B&C standby-alternator housing was broken just aft of the mounting flange.

The engine starter was fire damaged. The air-conditioning compressor hoses and drive belt were thermally damaged.

The top sparkplugs were removed and examined. When compared to a Champion Sparkplug “Check-A-Plug” chart, the sparkplugs condition was “normal”.

The damaged propeller was removed, and the engine was manually rotated. Thumb compression was achieved on all six cylinders and ignition spark was confirmed at all top sparkplug ignition leads. Impulse couplings were heard to “snap” as each released when the engine was manually rotated.

On the side of the engine oil filter was written “next oil due 2,946.3”.

The left and right mufflers were removed and inspected. The right muffler cover was removed and there was no sign of deterioration or pre-impact damage. The flame cones were intact in the left and right mufflers.

F. SUMMARY OF ENGINE TEST CELL RUN AT MANUFACTURER’S FACILITY

Due to impact damage, the crankshaft was deflected .085 inch. Three shims were installed to enable normal propeller tracking.

An edge of the fuel pump inlet fitting was damaged. This inlet damage was not present during the onsite or recovery location exams. The damage was not repaired for the engine test cell run.

Nominal engine parameters were observed during the engine run, which was abbreviated to 3-minute intervals based on concerns of an observed fatigue crack in the propeller flange. The full engine run log is in the docket for the investigation.

Cylinder compression testing following the engine run was nominal. The #1 to #6-cylinder compression was measured at 60/80, 65/80, 70/80, 69/80, 70/80, 72/80 psi respectively.

G. SUMMARY OF MAINTENANCE RECORDS AND FLIGHT HISTORY

The engine data plate confirmed that the engine was a Continental Motors model IO-550-R (6B), serial number 1037555. According to the Continental Motors engine serial database, the engine was assembled at the Continental Aerospace Technologies factory in Mobile, Alabama on May 15, 2019 as a factory new engine and sold to Summit Aviation, Inc.

When the accident airplane was assembled in 1995 by the Beech Aircraft Corporation as a model A36 Bonanza, it was equipped with a Continental Motors engine model IO-550-B.

Summary of Aircraft Examination

According to an FAA form 337 located in the airplane's airworthiness file, the original IO-550-B engine was removed and the accident engine, model IO-550-R was installed IAW STC # SA10145SC-D on 10-17-2019 by Prairie Air, Inc. Elbow Lake, MN. as an "Atlantic Aero Inc. engine install".

According to maintenance records, the engine was installed on October 17, 2019, with a recorded tachometer time of 2921.9. An engine run was completed for 60 minutes, followed by a break-in run for 130 minutes. No defects were noted. The engine oil was changed and filters inspected, with no defects noted.

No further maintenance entries were observed after October 17, 2019.

Flight data from FlightAware indicated the airplane was airborne for about 16 hours after the engine was installed.

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