



**National Transportation
Safety Board**

Memorandum For The Record

DATE: October 15, 2018

FROM: Courtney Liedler, NTSB IIC

SUBJECT: Details of Aircraft Wreckage Examination for N180QT

On October 14, 2018, the NTSB, FAA, Lycoming Engines, and Piper Aircraft Inc traveled to Cartersville, Georgia to complete the on-scene accident investigation; the following notes summarizes these activities.

Airframe

Fuselage

The fuselage exhibited impact damage from the firewall through the cockpit area, the fuselage in this area was deformed upward. There was no evidence of fire or fire damage observed to the wreckage. The canopy area of the fuselage was separated to facilitate occupant recovery. All the windshields and windows were fragmented and separated from their retainers. The baggage door was observed to be closed and latched. The cabin door remained attached to the fuselage and latched. The cabin door was cut by first responders. The nose gear was impact damaged and partially separated from the engine mount.

The pilot's seat remained attached to the seat tracks and exhibited minor impact damage. The copilot's seat was partially separated from its seat tracks and exhibited impact damage. The pilot and copilot seat belts remained attached to their respective attach points and were determined to be functional during field test. The rear bench seat appeared undamaged and remained attached to the fuselage. The rear seatbelts were attached to their mounts and were determined to be functional during field test. There were no shoulder harnesses installed in this aircraft.

A liquid consistent in color and odor to that of aviation type gasoline was observed within the electric fuel pump and gascolator bowl. The electric fuel pump filter was clear of debris and field test of the pump determined it to be functional. The gascolator bowl and screen were clear of debris.

The instrument panel was impact damaged and deformed. The pilot's control wheel shaft was fractured near the control wheel's attach point, and the T-bar was deformed and fractured. The throttle and mixture controls were in the forward position. The magneto switch was on "both". The electric fuel pump switch was in the "off" position. The strobes, rotating beacon and navigation

light switches were in the “on” position. The primer was separated from the panel and was observed to be stowed. The battery master switch was observed impact damaged and in the “off” position.

The flap lever was stowed/ 0 degrees of flap extension. The rudder pedal assembly was deformed and fractured. The fuel selector was selected to the right fuel tank and its selected position was confirmed during field test with low pressure air. Field test of the fuel selector valve in the left fuel tank position and in its off position was confirmed with low pressure air.

Left Wing

The left wing remained attached to the fuselage and did not exhibit any major impact damage; however, minor impact damage was observed to the outboard leading edge of the wing, about 12 inches from the wing tip. The main gear was impact damaged but remained attached to the wing. No anomalies were observed to the lift detector, and the stall warning light bulb was retained by the NTSB for further evaluation.

The fuel tank was intact and the fuel cap was in place. There was no fuel observed within the fuel tank, and with low pressure air, fuel line continuity was confirmed from the gascolator to the left fuel tank.

The pitot mast was separated from the wing and its pitot and static ports were observed to be clear of any obstructions.

The flap and aileron remained attached to their respective attaching points with not major impact damage observed. The flap was observed in the “up/ 0 degrees of flap extension” position, and flap control continuity was established flap the flap control lever to the flap. No anomalies were observed to the aileron bellcrank or the aileron’s control cables, and control continuity was established from the T-bar to the aileron, and cable tears were observed to the aileron cable pass-through holes in the fuselage.

Right Wing

The right wing was partially separated from the fuselage. The wings main spar was fractured at the wing root and the wing’s aft attach point hardware was separated from the attach point. The fractured surfaces of the main spar were consistent with overload separation. There were no obvious impact damage observed to the wing skins. The main gear remained attached to the wing and exhibited impact damages.

The fuel tank was intact and the fuel cap was in place. There was a residual amount of fuel observed within the fuel tank, and with low pressure air, fuel line continuity was confirmed from the gascolator to the left fuel tank.

The flap and aileron remained attached to their respective attach points with no impact damage observed. The flap control rod was deformed but remained attached to the flap and flap torque tube. The flap was observed in the “up/0 degrees of flap extension”, and flap control continuity

was established from the flaps control lever to the flap. No anomalies were observed to the aileron bellcrank or the aileron's control cables, and control continuity was established from the T-bar to the aileron.

Empennage

No anomalies were observed to the vertical stabilizer. The rudder remained attached to its mounts, and minor impact damage was observed to the lower area of the rudder. Rudder control continuity was established from the rudder to the rudder pedal assembly.

The stabilator remained attached to its mounts, and electrical burn marks were observed to its left trim tab and aft stabilator tip area, and arching marks were observed under the stabilator's attach point hardware. The stabilator trim tab remained attached; however, several of its hinges were burned and partially separated from the electrical arching. There was no other impact damage observed to the stabilator.

About 9 threads were exposed from the top of the stabilator trim barrel assembly, which is indicative of a slight nose up aircraft trim setting. The stabilator trim cables were cut by first responders to facilitate occupant recovery. Stabilator control continuity was established from the T-bar to the stabilator.

Propeller

The propeller remained attached to the crankshaft flange. The propeller spinner was fragmented. On propeller blade exhibited chord-wise abrasions on the curved surface. The other blade was bent aft about 10 degrees at about mid-span. That blade exhibited chord-wise abrasions and twisting toward the blade face. There were no leading edge damage observed to either blade.

Engine

The engine remained attached to the fuselage. As first viewed, the engine came to rest tilted nose up about 80 degrees and remained partially attached to the aircraft through the tubular engine mount. The exhaust tubing and the induction air box were partially crushed. The top and bottom engine cowlings were fragmented and separated from the fuselage. Several tubes of the engine mount were fractured and the mount was deformed upward. The induction air box was observed in the primary/filtered air position and the air filter was free of obstruction. The forward muffler exhibited rust type holes, and its internal flame cone was deformed. Exhaust staining was observed in this area of the heat muff.

The engine was removed from the aircraft and placed on a trailer at the accident site and was partially disassembled to facilitate the examination. The engine was rotated by turning the crankshaft flange 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.

Tach 3894.74

Hobbs 986.4

The carburetor remained attached to the engine and no external damage was noted. The induction air box was partially crushed. The carburetor heat control cable remained attached to the carburetor heat valve control arm but the cable was impact deformed. The position of the carburetor heat valve was undetermined. The cockpit carburetor heat knob was observed fully forward. The throttle control cable remained attached to the carburetor throttle control arm and the arm was positioned against the full throttle stop. The cockpit throttle control knob was observed fully forward. The mixture control cable remained attached to the carburetor mixture control arm and the arm was position against the full rich mixture stop.

The carburetor was partially disassembled, and no damage noted to the brass floats or other internal components. About ¼ teaspoon of fuel was observed in the carburetor float bowl. The carburetor fuel inlet screen was absent of debris.

The engine driven fuel pump remained attached to the engine and no damage was noted. A small amount of fuel drained from the pump when it was removed. The pump was operated by hand and produced suction at the inlet port. The pump was partially disassembled, and no damage noted to the rubber diaphragms or internal check valves.

The aircraft electric fuel pump remained attached to the firewall. A small amount of fuel was observed when the pump fuel screen cover was removed, and the screen was absent of debris. The pump operated when 12 volts were applied to the pump electrical terminal.

The left magneto remained attached to the engine and no damage was noted. The right magneto was impact separated from the engine and the magneto mounting flange fractured. Both magnetos produced spark from all four ignition towers when rotated by hand.

The spark plug electrodes exhibited light gray combustion deposits and undamaged, worn normal condition. No damage was noted to the ignition harness. The starter remained attached to the engine and no damage was noted. The starter drive gear was extended. The starter was not removed. The alternator remained attached to the engine and no damage noted. The alternator belt remained in place and unbroken. The alternator was not removed.

The vacuum pump remained attached to the engine and was impact damaged. The pump was removed and partially disassembled. The pump drive spine pins were broken off, but the composite drive coupling was intact. The carbo rotor was fragmented. The carbon vanes were intact.

The oil suction screen contained about 1/4 teaspoon of non-metallic debris which was easily crushed with finger pressure. The oil filter was impact damage and not examined. No damage was noted to the oil cooler. The oil cooler oil hoses were secure.