



**National Transportation
Safety Board**

Memorandum For The Record

DATE: January 31, 2019

FROM: Courtney Liedler, NTSB IIC

SUBJECT: Details of Aircraft Wreckage Examination for N53659

On February 1, 2019, the NTSB, FAA, and CMI completed an initial on-site documentation of the accident scene. On February 2, 2019 the wreckage was removed from the field by local towing companies and transported to West Houston Airport for storage in the pilot's hangar. On February 3, 2019, NTSB and CMI completed a wreckage layout and examination in the pilot's hangar.

Airframe

The left and right wings exhibited significant crush damage to the leading edges consistent with a near vertical impact. The wings were separated from the airframe consistent with wing spar being cut. The flaps on both the left and right wings were separated from their wings from impact damage. Control continuity was established in the right wing to the aileron bellcrank, however the aileron push pull tub had separated from the tie-rod end and the cables had separated and sheered in overload. Control continuity in the left wing was established from the aileron push-pull tube to the bell crank, however the turnbuckle and associated cables were missing. The landing gear remained in the left wing and was in the stowed position. The cabin door was located forward of the airplane in the area of the main wreckage. The fuselage structure was crushed, and from the front seats forward was fragmented within the impact crater. The aft tail section was separated from the remaining wreckage consistent with being cut. Photographs of the wreckage prior to removing the victim shows the tail section still connected to the remains of the fuselage, standing near vertical over the area of the impact crater. The rudder push-pull tube remaining was able to actuate the rudder. The right and left elevator push-pull tubes were connected to the related control surfaces; however, the deformation in the elevator control tubes from impact prevented the control surfaces to be actuated.

The cockpit instrument panel was fragmented, with many of the instruments missing or crushed. The only cockpit instrument able to be read was the altimeter, which indicted an altitude of 100ft. The annunciator panel was removed by the IIC to be sent to the NTSB Recorders Lab for data analysis.

Engine

The engine, engine accessories and propeller were buried in the impact crater approximately 6 to 7 feet deep in wet, muddy earth for over 36 hours.

The engine and airframe were recovered from the crater and relocated to the pilot's hangar (G1) at IWS on February 2 and examined on February 3, 2019. The local fire department washed most of the mud off of the engine prior to transport to the airport.

The engine exhibited impact damage. The oil sump was fractured into pieces and most of the sump was not located. The exhaust and induction systems were impact damaged and mostly absent from the engine. The turbo charger was separated from the engine and located in the impact crater. The valve and rocker arm area of the number 5 cylinder was separated from the cylinder head and remained attached to the engine by baffling.

The alternator was impact damaged and the drive did not turn by hand. The starter had impact-separated from the starter adaptor and was damaged.

The top spark plugs were removed, and the electrodes exhibited worn out signatures when compared to the Champion Check a Plug chart. The electrode areas exhibited darker colored combustion deposits, as well as mud and water.

The ignition harness exhibited impact damage and were cut or partially separated. The left magneto was impact separated from the engine and only piece of the left magneto was recovered from the impact crater. The right magneto remained attached to the engine. The right magneto drive was turned by hand with impulse coupling engagement was heard but no spark observed. The right magneto was disassembled, and water was noted inside of the magneto. No other anomalies were noted to the right magneto.

The number 2 and 4 fuel nozzles were removed and were found to be bent, however both fuel nozzles were free of obstruction. The other fuel nozzles were either impact separated from the engine or surrounding damage prevented removed of the fuel nozzles. All of the fuel nozzle lines exhibited impact damage.

The fuel manifold valve remained attached to the engine, it was removed and disassembled. The retaining nut and plunger were tight and secure, and the diaphragm was intact. Aviation fuel (100 low-lead) was observed in the manifold valve cavity and the fuel screen exhibited no significant obstructions.

The fuel pump was impact separated from the engine. The only pieces of the fuel pump found were the vanes, rotor and housing which exhibited no pre-impact anomalies.

The throttle body was impact separated from the engine and was damaged. The throttle control arm was bent against the throttle body and did not rotate by hand. Mud was imbedded into the throttle opening. When the mud was removed, the throttle valve appeared partially open.

The cylinder overhead areas showed no pre-impact anomalies. A coating of oil was noted, as well as mud and water.

Continuity from the front of the engine to the accessory section was visually confirmed through the bottom of the engine.

The turbo charger was the only turbo charger system component that was recovered from the impact crater. The turbo charger was impact damaged and the compressor wheel did not turn by hand. Mud was noted in the turbo charger compressor.

Propeller

The two-bladed McCauley constant-speed propeller was separated from the engine and the engine crankshaft propeller flange remained attached to the propeller hub. Both propeller blades were broken free inside the hub and were bent aft near the blade root. One blade was bent aft from the root to mid-blade and then it was bent forward. The blade exhibited several nicks in the leading edge as well as leading edge polishing and multi-directional scratches.

The second blade was bent aft at the root. The rest of the blade was relatively straight with a slight twist near the tip. The blade exhibited leading edge polishing and chordwise scratches, as well as leading edge nicks and a semi-circular gouge that was approximately 1-inch in diameter.

The propeller governor remained attached to the engine and exhibited impact damaged. The control arm was impact separated and not located with the propeller governor. The propeller governor was removed, and the gasket screen was free of obstruction. The propeller governors drive gear was impact fractured.