



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Eastern Region

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AIRFRAME AND ENGINE EXAMINATION

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EXAMINATION PARTICIPANTS:

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SUMMARY

Examination of the recovered airframe and engine was conducted on 1/6/2019 at the Cullman Regional Airport (CMD), Cullman, Alabama. No evidence of preimpact mechanical malfunction was noted during the examination of the recovered airframe and engine.

DETAILS OF THE INVESTIGATION

Airframe Examination

Examination of the airframe revealed the cockpit section of the airplane was crushed to the bulkhead of the fuselage. The instrument panel was crushed, and the instruments were impact damaged. The instruments did not display any reliable information due to impact damage.

Examination of the fuel selector revealed that the selector was between the left and right fuel tank. Pressurized air was supplied to the fuel selector, and it was discovered that when positioned between both tanks, fuel was only supplied from the left tank. The fuel selector was placed in the right tank position and pressurized air was supplied through the lines and the air moved to the right fuel tank line as noted on the selector. The selector was placed in the left fuel tank position and pressurized air was supplied through the lines and the air moved to the left fuel tank line as noted on the selector. The fuselage exhibited crush damage to the aft empennage. The empennage was buckled and crushed to the right. The vertical and horizontal stabilizers remained attached to the empennage.

The rudder remained attached to the vertical stabilizer and was unremarkable. The elevators remained attached to the horizontal stabilizer and were unremarkable. The tail wheel assembly remained attached to the empennage and was bent upward. Flight control continuity was established from the control stick to the elevators. The rudder cables were traced from the rudder pedals to the attachment points on the rudder and the tail wheel steering assembly.

An examination of the left-wing assembly revealed crush damage along the leading edge of the wing assembly. The fuel tank was breached, and no signs of fuel was discovered within the fuel

tank. The flap assembly was in the retracted position and still attached to the wing. The aileron was still attached to the wing and remained connected to the push pull control tubes. Flight control continuity was established from the left aileron to the control stick.

An examination of the right-wing assembly revealed crush damage along the leading edge of the wing assembly. The fuel tank was breached, and no signs of fuel was discovered within the fuel tank. The flap assembly was in the retracted position and still attached to the right wing. The aileron was still attached to the right wing and connected to the push pull control tubes. Flight control continuity was established from the right aileron to the control stick.

Engine Examination

Examination of the engine revealed that the crankcase remained intact and displayed impact damage. There were no fractures in the case that would indicate a catastrophic internal engine failure. During the examination of the carburetor the upper section was removed from the float bowl and was observed to be about ½ full of blue liquid with and odor consistent with aviation gasoline. A test of the liquid with water finding paste revealed no indication of water in the liquid. No damage was noted to the brass fuel floats or the needle and seat assembly. The engine-driven fuel pump remained attached to the engine and no damage was noted. The pump was removed and produced air from the outlet port when actuated by hand. Liquid with an odor consistent with aviation gasoline drained from the pump when it was removed and tilted. The pump was partially disassembled, and no damage noted to the internal check valves or the rubber diaphragms. No liquid drained from the fluid line from the airframe to the engine driven fuel pump or the fluid line from the pump to the carburetor when they were removed.

The propeller flange and starter ring separated from the crankshaft and the propeller remained attached to the propeller hub. The rear engine accessories were impact damaged. The accessories were removed to facilitate valvetrain continuity. The vacuum pump drive was rotated and valvetrain continuity was established throughout the engine. The cylinders were examined using a lighted borescope. The piston faces, cylinder bores, and valve heads displayed normal operating and combustion signatures. While rotating the vacuum drive it was noted that all four cylinders displayed thumb compression and suction.

During rotation it was noted that all the rocker arms and valves moved accordingly. Examination of the magnetos revealed the left magneto was broken away from the accessory case and the right magneto remained attached. Both magnetos were rotated and both produced spark on all terminals. Examination of the propeller assembly revealed the two blade, constant speed propeller remained separated from the propeller flange and displayed impact damage signatures. Both propeller blades revealed "S" type bending and exhibited chordwise scratching. One blade displayed aft bending and twisting deformation.