NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

February 6, 2013

AIRFRAME AND ENGINE EXAMINATION

WPR13FA095

A. ACCIDENT

Location:	Boulder, UT
Date:	Jan 19, 2013
Aircraft:	Cessna, Registration Number: N2341N, Serial # 12587
NTSB IIC:	Albert Nixon

B. EXAMINATION PARTICIPANTS:

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C. SUMMARY

Examination of the recovered airframe and engine was conducted on February 6, 2013, at the facilities of Air Transport in Phoenix, Arizona. No evidence of preimpact mechanical malfunction was noted during the examination of the recovered airframe and engine.

D. DETAILS OF THE INVESTIGATION

1.0 Airframe Examination

Examination of the airframe revealed buckling and crush damage of the cabin, fuselage and right wing areas. The tail section was mostly intact with the exception of the upper third of the vertical tail and rudder sheared off. The right wing was separated at the fuselage and exhibited buckling and damage throughout. The first half of the wing from the fuselage was crushed and the right main fuel tank structure was loose and the fuel tank separated. The right wing forward main strut was separated about 6 inches from the fuselage. The rear main strut was bent in several places and bent forward about 90 degrees, ¾ quarters down from the fuselage.

The main portion of the fuselage behind the cabin exhibited cable strike marks on the left side and top portion.

The right wing was separated from the fuselage at the wing root area. The wing exhibited a large impact compression in the middle portion of the leading edge of the wing that crushed most of the wing. Rub marks nearly perpendicular to the wing and arching was observed. Two arching holes, black in color, were observed on the bottom wing skin. The aileron remained attached to the wing via its respective mounts and was bent downward. The aileron stop bolts were in place and intact. The flap and rear main spar were separated. A small amount of fuel was present in the right tank and tested negative for water contamination using water finding paste. Several ruptures were observed within the fuel tank due to impact.

The left wing exhibited leading edge damage from a 45 degree impression with black rub marks consistent with a main tire impact. The wing tip was bent upward. The left aileron and flap remained attached at all the respective mounts. The right door separated from the fuselage and was found at the start of the debris trail. The fuselage structure surrounding the cabin area was compressed from impact. The engine and firewall panel remained partially attached to the fuselage area. The instrument panel was crushed and compressed due to impact and from the engine moving aft. The emergency locator transmitter (ELT) remained attached to the antenna and was found in the "off" position**.** Both fuel tank caps were not attached, however, one fuel cap was located in the wreckage.

The left and right stabilizers, rudder, and vertical stabilizer were separated from the fuselage but still attached by their respective flight control cables. The elevator trim tab cable was severed. The left stabilizer exhibited leading edge damage. The vertical stabilizer and rudder were separated from approximately the top third. The separated portion of the vertical stabilizer had lengthwise rub markings on the side where the separation occurred.

The tail wheel assembly was intact.

Flight control continuity from the cabin area to the elevator and rudder control surfaces was obtained. Separation of the right aileron control cable was observed at the attach point.

Continuity of the fuel system was not established due to impact related damage. No residual fuel was present in the airplane fuel strainer, carburetor and left main tank. The carburetor assembly was unable to be disassembled due to impact damage. The fuel lines continuity from the main tanks was not established due to fuel lines between the fuel strainer and the carburetor being sheared off. The fuel line to the right tank was severed; however, the fuel screen was still attached, and clear of debris. The gascolator was attached to the engine firewall but was damaged.

Cockpit Instrumentation / Control Documentation:

Throttle: Full Out Position-Idle
Mixture: Full In
Primer: In and Locked
Carburetor Heat: On (out)
Magneto Switch: Both
Fuel Selector Valve: Left Main

Tachometer: 700 RPM / 04 next digit unreadable
HOBBS: Not noted
Master Switch: On
Flap Handle: Down (Flaps Up)
Altimeter 7,550 feet setting 30.42

2.0 Engine Examination

The propeller assembly separated from the crankshaft propeller flange. The crankshaft propeller flange had impact damage and deformation. The propeller blades exhibited minimal scratches and slight bending to one blade. One blade exhibited rub marks on the leading edge. The other blade exhibited a small gouge on the trailing edge about 4 inches from the propeller blade tip.

The propeller spinner had impact damage and only a portion remained attached to the propeller assembly. The engine remained partially attached to the engine mounting assembly and firewall. The mounting assembly had impact damage. The no. 1 cylinder exhibited damage to the forward portion and dirt contamination in the cooling fins. The mid-section of the crankcase backbone area had deformation of material and a 1 1/2 inch crack to the left side of an attachment bolt. The top right side of the crankcase near the backbone was gouged. The mufflers remained attached and were crushed. The crankshaft was rotated by hand through the crankshaft propeller flange. Cylinder compression, valve and gear continuity was obtained.

All engine accessories remained attached to the engine via their respective mounts with the exception of the carburetor. The starter ring gear hub had impact damage and separated from the engine. The starter gearing rotated freely by hand and was unremarkable. The generator drive shaft rotated freely by hand. Exhaust and intake piping was found partially attached and crushed. The top spark plugs were removed and the electrode areas exhibited light gray deposits. The top spark plugs exhibited normal wear signatures when compared to the Champion Check-A-Plug comparison chart. The number 2 bottom spark plug was loose and upper shell separated.

The rocker covers were removed. The cylinder overhead components were clean, lubricated and unremarkable. Rocker cover seals were damaged and compressed around the screw areas.

The oil sump lower side had about a 1 inch diameter hole. About 1 quart of oil leaked from the engine during the examination. The oil filter was removed and examined. No contamination was present in the oil filter assembly. The oil pickup screen was found free of debris.

The carburetor was found separated from its mount. The carburetor control cables were separated from the carburetor arms. The carburetor throttle cable was separated just aft of the rod end. The carburetor mixture cable was found pulled from the mixture control arm. The carburetor heat cable was found separated. The carburetor was disassembled and the metal floats, needle valve, and needle valve seat were intact. The carburetor float assembly and needle valve exhibited proper movement when moved by hand. The carburetor fuel inlet screen was found attached to the fuel line and exhibited impact damage however, it was found free of debris.

The magnetos remained attached and observed to be intact. The magnetos were removed from the engine and the ignition leads had impact damage. The magneto drive-shafts were rotated by hand and spark was produced at all ignition leads separations.

Examination of the airframe and engine revealed no evidence of mechanical anomaly or failures that would have precluded normal operation.

Submitted by: Albert Nixon