



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

May 23, 2014

**ACCIDENT SITE, AIRFRAME, AND ENGINE
EXAMINATION SUMMARY**

ANC13FA084

This document contains 14 embedded photos.

A. ACCIDENT

Location: Anchorage, Alaska
Date: August 24, 2013
Aircraft: Cessna 150L, N18699
NTSB Investigator-in-Charge: Joshua Cawthra

B. SUMMARY

Examination of the accident site, airframe, and engine was conducted by the NTSB investigator-in-charge along with representatives from the Federal Aviation Administration and Cessna Aircraft at the accident site and a local engine repair facility between August 24 and 26, 2013. No evidence of any preexisting mechanical anomalies were noted during the examination of the airframe and engine that would have precluded normal operation. The damage to the front main bearings, thrust bearings, crankshaft oil slinger ring, and the middle and aft bearing shift was found consistent with impact damage.

C. DETAILS OF THE INVESTIGATION

1.0 Accident Site Examination

Examination of the accident site revealed that the airplane came to rest in a nose low position about 398 feet west of the departure end of runway 25, oriented on a heading of about 344 degrees magnetic. Wreckage debris remained within about 50 feet of the main wreckage. About five feet directly in front of the main wreckage was a ground scar about 2 feet in width, 6 inches long and about 5 inches deep. Extending from the ground scar in an easterly direction was a swath of paint chips, white in color. At the end of the swath of paint chips, was a portion of the right wing green navigation lens.

Accident Site GPS Coordinates: N61 12.925, W149 51.341



Photo 1: View of the accident site and wreckage.

2.0 Airframe Examination

The right wing was intact and remained attached to the fuselage via its mounts, and came to rest in a leading edge, wing tip low position with the inboard portion of the wing elevated. The right aileron and flap remained attached to the wing via their respective mounts. The right flap appeared to be in the “up” position. The flap actuator was observed in a position consistent with the flaps being full up. The leading edge of the wing from the wing tip inboard to the flap aileron junction was crushed aft to the forward wing spar. The leading edge was crushed aft and decreased in damage towards the wing root from the flap aileron junction. The wing lift strut remained attached to the wing and fuselage attach point. The fuel cap was secured in place. Trace amounts of fuel was observed within the fuel tank. The fuel tank was removed from the wing structure and approximately 1.8 gallons of fuel was removed from the tank. Water finding paste was used to test the fuel for water with negative results for water.



Photo 2: View of the Right Wing

The left wing remained attached to the fuselage via its mounts, and came to rest in a leading edge, wing tip low position with the inboard portion of the wing elevated. The left aileron and flap remained attached via their respective mounts. The left flap appeared to be in the “up” position. The leading edge and wing structure was bent/wrinkled about 14 to 15 inches inboard from the wing tip. The left wing was bent downward slightly just inboard from the flap aileron junction. The fuel cap was secured in place. Fuel was observed leaking from the area of the fuel vent. The lift strut remained attached to the wing and fuselage attach points. The left wing fuel tank was removed from the wing and appeared to be intact and not breached. Approximately 1 quart of fuel was removed from the wing tank. The left wing fuel tank is equipped with a vent line drain on the forward outboard area of the tank. Water finding paste was used to test the fuel for water with negative results.



Photo 3: View of the left wing.

The forward portion of the fuselage was crushed aft. The engine was displaced aft and upward into the instrument panel and windshield. A circular impression on the cabin roof structure just aft of the upper area the windshield was observed, which was consistent with impact from the engine crankcase was observed. Evidence of a postaccident fire was observed near the front part of the engine and cowling area. No soot pattern was observed in the surrounding area of the fuselage or wings.

The fuselage fuel strainer was removed. Fuel was observed within the bowl with a slight amount of dirt debris. The screen was free of debris. Water finding paste was used to test the fuel for water with positive results for a slight amount of water in the bowl.

The left and right forward doorposts were damaged. The right seat was removed by first responders and the left seat remained attached to the seat rails. The fuselage structure aft of the baggage compartment was distorted, twisted in a right direction, and bent downwards.

The fuel system was mostly intact. The fuel lines from both the left and right fuel tank outlet ports were intact down their respective aft door post to the fuel selector valve. The fuel selector valve was observed in the "ON" position. The fuel vent line from the right fuel tank to the left fuel tank was separated and exhibited impact damage consistent with impact from the engine crankcase. The vent line from the left fuel tank to the vent was intact, undamaged, and free of debris. Both the left and right fuel caps were vented and the seals were intact and pliable.



Photo 4: View of the fuselage and accident site area.



Photo 5: View of the forward portion of the fuselage.

The empennage was intact and appeared to be undamaged with the exception of the right horizontal stabilizer and elevator, which were bent upward slightly about mid span. The rudder remained attached to the vertical stabilizer via its respective mounts. The left and right elevator remained attached to the left and right horizontal stabilizer via their respective mounts. The trim tab remained attached to the right elevator via its respective mount. The trim tab actuator was measured at 1.6 inches and found to be in a position consistent with 3 degrees tab up.



Photo 6: View of the Empennage.

Flight control continuity was established from the cockpit control column to all primary flight control surfaces. Rudder flight control continuity was established from the pedals aft to the rudder.

Cockpit documentation revealed that the instrument panel was displaced aft and fractured into multiple sections with multiple instruments displaced. The primer was found in the full in, but unlocked position. The throttle was found fully extended outward (idle position) and bent downward.

Instrument/Cockpit Documentation:

Airspeed: about 68 knots

Altimeter: 1,500 ~

Knollsman: 29.82

Oil Pressure: Deflected right of the green arc (between 50 and 100)

Oil Temp: Fully deflected left

Ampres: 0

Tachometer: 0 RPM / 6232.8 hours

HOBBS: 4140.3 hours

Suction: 0

Left and Right Fuel Gauge(s): Damaged

Cabin Air: Full In / off

Cabin Heat: Full In / Off

Comm 1/Nav 1: Damaged

Comm 2: Digital

Throttle: Extended / Bent downward

Carburetor Heat: In / Knob bent downward

Mixture: Full rich / knob separated

Magneto Switch (Key): Both

Primer: Forward, notch not within the detent and locked. The primer handle was bent downward.

3.0 Engine Examination

The engine was removed from the airframe and subsequently further examined at a local engine repair facility. The examination of the engine, a Continental Motors O-200-A, revealed that the vacuum pump was separated from its mount pad, two of the four engine mounts were damaged, and the carburetor was separated from the induction intake spider. The oil sump was compressed upwards and breeched. All four cylinders remained attached to the engine. Evidence of fire damage was observed on the carburetor and the cylinder 1 and 3 (right) side of the engine.



Photo 7: View of the recovered engine.

The induction system was impact damaged. The exhaust (left and right) were impact damaged and free of any debris within the exhaust flow path.

The starter was impact damaged and the starter adapter was intact.

The generator was intact, however, thermally damaged.

The ignition harness was impact damaged.

The top sparkplugs, Champion REM 38E's were removed. The number one and two spark plugs exhibited light gray deposits within the electrode area. Number three and four exhibited a brownish color deposit within the electrode area. The number one spark plug exhibited worn out normal signatures and the number two, three, and four exhibited normal wear signatures.



Photo 8: Top Spark Plugs

The left magneto was intact and exhibited slight thermal damage. The magneto was placed on a test bench and produced spark on all posts with impulse coupling engagement.

The right magneto was intact and exhibited slight thermal damage. The magneto was placed on a test bench and produced spark on all posts with impulse coupling engagement.

The carburetor was displaced from its mount and exhibited extensive fire damage. The carburetor bowl was separated. The venturi was intact and in place. The mixture arm was impact damaged and moved slightly by hand. The throttle arm was impact damaged and moved slightly by hand. The metal floats were intact, however, one was separated. A significant amount of a foreign substance, consistent with fire extinguishing material, was observed throughout the carburetor bowl, intake filter mount, and brackets. The carburetor heat lever moved partially by hand and remained connected to the air box. The fuel screen was removed and was free of debris.

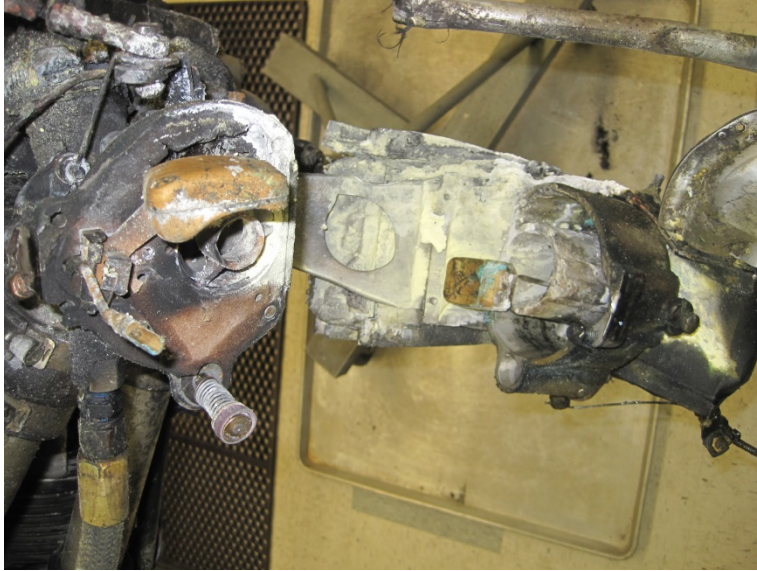


Photo 9: View of the Carburetor

The accessories, accessory housing, top spark plugs, camshaft gear, and rocker box covers were removed. The accessory gears were oil coated and intact. The engine partially rotated by hand with a degree of stiffness.

The accessory case was intact and fire damaged. The oil pump rotated freely by hand. The oil pickup screen was secured and impact damaged.

All four cylinders were removed from the crankcase. All four pistons remained attached to their respective connecting rod via the piston wrist pin. All four pistons and piston rings were unremarkable. All four cylinders were unremarkable. All intake and exhaust valve rocker arms were unremarkable.

Internal examination of the crankcase revealed that one of the thrust bearings was displaced and found free within the engine.

The crankcase bolts were loosened and the crankshaft rotated freely.

The crankshaft was intact; however, the oil slinger ring was separated throughout its circumference. All four connecting rods remained attached to the crankshaft and moved freely.



Photo 10: View of the crankshaft.

The cylinder 1 and 3 side crankcase halve was intact. The front, middle, and aft bearings appeared to be slightly shifted aft. The forward thrust bearing saddle exhibited impact damage with forward to aft oriented striations. The cylinder 2 and 4 side crankcase halve was intact. The forward, middle, and aft bearings were intact and shifted slightly aft. Damage was observed to the forward bearing saddle and thrust bearing saddle.

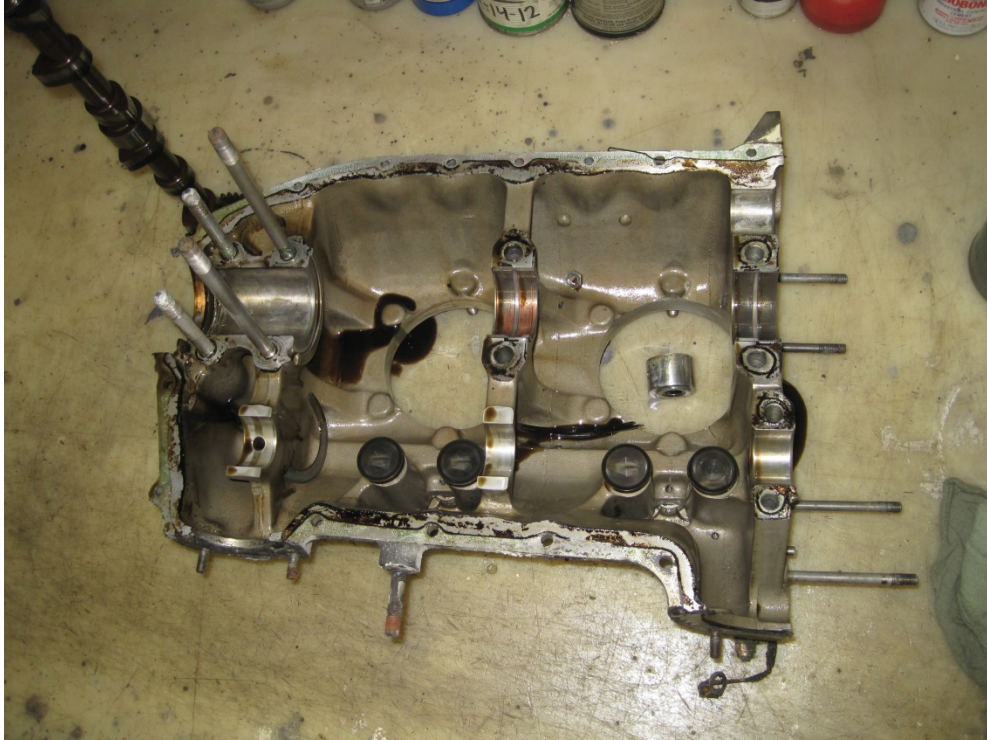


Photo 11: Cylinder 1/3 Side of the Crankcase

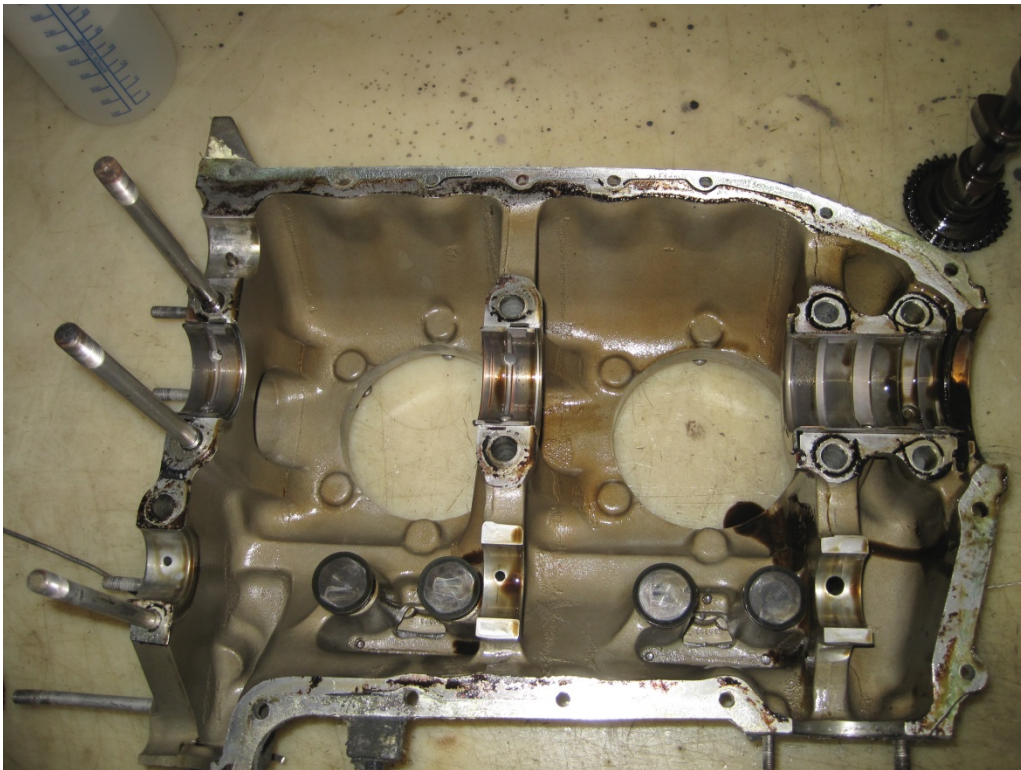


Photo 12: Cylinder 2/4 side of the Crankcase

All lifters were intact and undamaged. The camshaft was intact and undamaged. All cam lobes were unremarkable.

The propeller remained attached to the engine crankshaft propeller flange. Chordwise striations were observed on the inner half of each blade. Both propeller blades were slightly bent aft.



Photo 13: View of the propeller.



Photo 14: View of the propeller.

Submitted by: Joshua Cawthra