



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation
Safety Alaska Region

November 6, 2018

AIRFRAME AND ENGINE EXAMINATION SUMMARY

ANC18FA055

A. ACCIDENT

Location:	Willow, Alaska
Date:	July 18, 2018
Aircraft:	DHC-2, N9878R
Investigator-in-Charge (IIC):	Noreen Price
Participants to the examination:	Paula Huckleberry, FAA Aviation Safety Inspector IIC Kennedy Canarr, Regal Air Asst Director of Maintenance

B. DETAILS OF THE INVESTIGATION

1.0 BACKGROUND

On July 18, 2018, about 1900 Alaska daylight time, a float-equipped De Havilland DHC-2 Mk 1 (Beaver) airplane, N9878R, impacted tree-covered terrain following a loss of control during the initial climb from the Willow Seaplane Base, Willow, Alaska. Of the three people on board, the airline transport pilot died at the scene, and the two passengers received serious injuries. The airplane was destroyed by a postcrash fire. The airplane was registered to Laughlin Acquisitions, LLC, and operated by Alaska Skyways, Inc., dba Regal Air, as a Title 14 *Code of Federal Regulations* Part 135 visual flight rules on-demand passenger flight. Visual meteorological conditions prevailed and company flight following procedures were in effect. The accident flight originated from the Willow Seaplane Base about 1900 and was destined for a remote, unnamed lake about 61 miles northwest of Willow.

According to statements of the passenger, the pilot loaded the airplane with the passenger's cargo which consisted of multiple bags of masonry mortar, three totes full of food and stores, two propane tanks, and miscellaneous baggage and supplies. Numerous witnesses at Willow Lake stated that the airplane appeared heavy as they watched two takeoff attempts followed by a takeoff on the third run. At least three separate witnesses recorded the takeoff attempts on their mobile phones due to what they perceived as an unusual operation. Each witness stated that the airplane departed to the south and descended out of sight below the tree line. Soon thereafter, a loud airplane impact was heard. A home security video recorded the last 10 seconds of the flight, although the airplane is mostly obscured by trees. The airplane impacted the ground in a left roll/spin, left wing first.

The airplane impacted an empty residential lot in a nose down attitude on a heading of 300°. According to the passenger's statement, she observed the pilot unconscious in his seat and she and her son egressed, soon thereafter much of the airplane was consumed in a postcrash fire.

The NTSB investigator-in-charge (IIC) and FAA IIC arrived on the scene the evening of July 18, about 1.5 hours after the accident. An on scene examination was conducted. The fire department dispersed water, foam, and dry chemicals on the fire. GPS Coordinates: 61.73222, -150.048056, elevation: 245 ft msl

The airplane came to rest in a level wooded residential lot in a nose down attitude heading about 300°. The postcrash fire incinerated the fuselage, cockpit instruments, empennage, floats, engine components, and cargo.

2.0 AIRFRAME EXAMINATION

Airframe SN: 1135

TTAF: 22, 599.6 hours at last annual inspection, 7/8/2018

On July 19, 2018, the wreckage was recovered by Alaska Claims and moved to a secure facility via a flatbed truck until the detailed examination was performed on November 19, 2018. See figure 1.



Figure 1. N9878R airframe wreckage at examination hangar.

The wreckage consisted primarily of the wings, forward fuselage frame, floor structure and engine with propeller attached. The wreckage exhibited either soot, charring, oxidized metal, or melted aluminum. There was hardened masonry mortar intermixed with airframe and engine components. The right wing was mostly intact with some fore to aft buckling on the outboard leading edge and the flap and aileron were attached. The left wing had significant leading edge buckling near the outer edge. The left flap and aileron were attached, but the flap control rod was disconnected at the C clamp. The left aileron inboard edge had impact damage that matched the adjacent flap edge damage with the flaps extended about 30°, which indicated the flaps were likely at or near the takeoff position at the time of impact.

Aileron flight control continuity was established from the control column through the lower pulley frame to recovery cable cuts, and then from the wing root aileron bell cranks to the aileron surfaces. The rudder control system was continuous from the left rudder pedals to the rudder torque tube, which was fractured, then through recovery cable cuts to the aft rudder bellcrank. The elevator controls were continuous from the cockpit control column to the forward torque tube attachment point. The aft elevator control cable was disconnected from the torque tube and covered in melted material and was continuous aft to recovery cable cuts. Full system flight control continuity and control could not be established due to thermal, impact and recovery damage.

The hydraulic reservoir, flap hand pump and flap selector assembly was located on the airframe floor covered in debris. The flap selector lever was in the DOWN position (flaps extension mode) and the hydraulic hand pump lever was down. During a detailed examination, the assembly was cleaned and removed from the airframe. Dark purple hydraulic fluid was present at the disconnected lines. The reservoir contained about ¼ inch of fluid. The flap selector lever was manually moved from detent to detent and exhibited smooth operation throughout. The flap selector lever was placed in the DOWN position and the pump handle was moved from stop to stop which resulted in positive hydraulic fluid flow out the down port. The flap selector lever was placed in the UP position and hydraulic fluid flowed out the up port when the pump handle was moved. See figure 2.



Figure 2. Hydraulic flap pump exhibiting positive flow.

3.0 ENGINE EXAMINATION

Pratt and Whitney R-985 AN14B

SN:42-202743

450 HP@ 2,200 rpm

Last 100 Hr Inspection: 7/8/2018, TSMOH: 990.0 hrs, Eng. TT 7981.1 hrs

The engine rear accessory section was melted, and accessory gears were liberated from the assembly. The propeller was attached to the crank shaft and the forward propeller hub was intact with soot and orange oxidation present. All 9 cylinders were present, however when debris (mud, dirt, and mortar) was cleaned away from the No 4 and 5 cylinders, the no. 4 cylinder head detached. No. 5 control tube ends and valves were significantly burned and buried under hardened mortar and burned debris. The valve covers for cylinder numbers 3 through 7 displayed thermal damage and black, white, and yellow deposits. All of the interconnecting oil lines were burned or missing with charred deposits present. The oil sump was intact. The air intake and exhaust tubes exhibited impact deformation and oxidation, with most significant crushing aft of cylinders 4 -8. All control rods were intact and straight. Spark plugs were removed from each cylinder except for No. 4 which was not located and presumed to be in the hardened mortar mix that was removed from the cylinder. All spark plugs exhibited dark orange oxidation deposits and no. 5 exhibited white crystalline granules and no. 7 exhibited extensive oxidation and some white crystallization. All spark plug wear appeared normal. The carburetor exhibited extensive thermal damage with the throttle valve separated and melted. The mixture control rod was attached, and the throttle arm was attached to the throttle valve which was detached and burned. The air intake was charred and destroyed. See figure 3.



Figure 3. Pratt and Whitney R-985 engine and propeller exhibiting mechanical and thermal damage.

The engine crankshaft could not be rotated due to extensive damage and melted mortar debris, therefore valvetrain and crankcase continuity was not established.

The propeller was attached, and each blade exhibited thermal discoloration or deformation. One blade was bent aft with some torsional twist, and the other two blades were straight with impact and thermal deformation at the outer ends.

4.0 SUMMARY

There were no pre-impact anomalies discovered during the airframe and engine exam that would have precluded normal operation. Full flight control continuity could not be confirmed due to extensive thermal damage and hardened debris. The airframe and engine damage was consistent with a nose down impact with terrain and post-crash fire.