RNF

REPORT ON ACCIDENT

Power loss on take-off after touch-and-go landing

M-03506/AIG-19

N9911V
Cessna 180H
Fljot, Hornstrandir, West Iceland
June 5, 2006

1 Factual information

Factual information	
Place:	Fljot, Hornstrandir N 66° 26.732', W 022° 54.989'
Date:	June 5, 2006
Time[1]:	16:23
Aircraft:	
• **type:**	Cessna 180H
• **registration:**	N9911V individual
• **year of manufacture:**	1966
• **serial number:**	18051763
• **CoA:**	Standard Airworthiness Certificate issued by the FAA The certificate was valid
• **engine type:**	Continental IO520F61 (O-470-U25) modified to Texas Skyways O-470-U/TS (STC ZS849SE)
• **engine s/n:**	821718-R. Modified Texas Skyways s/n 126
• **propeller type:**	McCauley variable pitch hub model C2A34C204-C
• **propeller s/n:**	772865
Type of flight:	Private
Persons on board:	One
Injuries:	None
Nature of damage:	Substantial to landing gear, propeller, engine mounts, and airframe
Short description:	Aircraft lost power during touch-and-go landing
Owner:	Private owner
Operator:	Private operator
Weather:	See below
Meteorological conditions:	Visual Meteorological Conditions (VMC)
Flight rules:	Visual Flight Rules (VFR)

Commander		
Age, sex:	46 year old, male	
License:	Holder of PPL/A license issued by the Icelandic Civil Aviation Administration. License was valid	
Medical certificate:	Second class. Valid	
Ratings:	Single engine piston (land)	
Experience:	Total all types:	484.8 hours
	Total on type:	30.4 hours
	Last 90 days:	30.4 hours
	Last 28 days:	N/A
	Last 24 hours:	N/A
Previous rest period:	According to pilot he was well rested	

[1] All times in this report are UTC (coincides with local time)

1.1 History of flight

The pilot of N9911V had made a short flight from Fljot to Isafjordur airport and was returning to Fljot. Fljot is in the north-western part of Iceland where aircraft land on a compacted sandy beach, shown in Figure 1. At Fljot there is an amateur weather station. The pilot contacted a person in Fljot via radio to obtain the latest weather information. The reported wind was south-easterly at 10-12 knots.

During the descent from 2,000 feet the pilot applied partial carburetor heat momentarily. The pilot slowed the aircraft down and then continued the descent towards the landing area. Approaching final toward the east the pilot decided to practice a touch-and-go landing before making the final landing. There was a slight crosswind (see Figure 2) from the right and the pilot approximated that he flew the aircraft with a 10-20 degree bank towards the right wing and 40 degree flaps.

Figure 1: Landing area in Fljot

Figure 2: GPS track and reported wind direction shown by blue arrow

According to the pilot the touchdown was normal and after approximately 30-40 meters (98-131 feet) he applied power again. Just after rotation and initial climb the engine rpm suddenly dropped. The engine started sputtering and sounded like it was going to stop. The pilot removed power by throttling back in an attempt to keep the engine running. The pilot's attempts were not successful and the engine stopped running.

The pilot quickly glanced at the aircraft instruments and engine controls to find reasons for the engine stopping. He made no changes to the fuel selector valve or engine control settings but focused on maintaining control of the aircraft and keeping the airspeed above stall.

Figure 3: Aircraft at accident site

The aircraft touched down hard on the main landing gears in the knee-deep water beyond the landing area (see figure 3 above). The pilot secured the aircraft by switching off the master switch, turning the magnetos off, and putting the fuel selector valve to the off position. The pilot was not injured and left the aircraft unassisted.

Following the accident the pilot notified AAIB Iceland by phone. AAIB Iceland dispatched two investigators to the accident scene. AAIB Iceland sent an international notification to the NTSB in the United States of America. The NTSB did not appoint an accredited representative but offered their assistance to the investigation.

1.2 Aircraft information

The aircraft sustained substantial damage to the main landing gears, the landing gear attachment structure and fuselage, propeller, engine mounts and cowlings. The aircraft systems were systematically checked to find potential faults in the system. Each system and its detail examination is described in the subchapters below.

1.2.1 Fuel system

N9911V has a modified Teledyne Continental Motors engine, model IO520F61. The modification is a Texas Skyways modification in accordance with a Texas Skyways Supplemental Type Certificates (STC) SE09319SC and SE8949SW.

Fuel is supplied to the engine from two tanks, one in each wing. N9911V is equipped with long range tanks and the total usable fuel, for all flight conditions is 79 gallons (USG). Fuel from each tank flows by gravity to a selector valve. Depending upon the setting of the fuel selector valve, fuel from the left, right, or both tanks flows to a fuel strainer and carburetor to the engine induction system.

The fuel selector valve in the aircraft is shown in Figure 4. According to the pilot he placed the fuel selector valve to the "RIGHT ON" position when departing Isafjordur and it remained in that position until after the accident. When the AAIB arrived on scene the fuel selector valve had been set, by the pilot, to the "OFF" position. The homemade checklist the pilot was using did not contain an item for selecting "BOTH ON" before landing.

Figure 4: Fuel selector valve

The fuel selector valve was tested by measuring the flow rate from each tank seperately and then both tanks. A 0.5 liter bottle was placed under the fuel strainer drain and the fuel selector valve opened. The results can be seen in the table 1 below.

Fuel Selector Valve	Flow rate (L/sec*10^2)
Both	4.8
Right	3.5
Left	4.0

Table 1: Flow rate depending on fuel selector valve position

The fuel system was inspected for leaks. A small leak was noted from the fuel strainer when the fuel selector valve was in the off position. The fuel selector valve did not completely seal when in the off position.

The wing tanks were opened and inspected. They are rubber cells that are attached to the inner surface of the wing. Each wing tank has two fuel outlets, one forward and one aft. Visual inspection found the wing tanks to be clean and the fuel outlets appeared normal. The aircraft was put in a level position and was manually banked towards the right wing until the fuel outlets uncovered (see fuel quantity below). A 6.4 degree bank uncovered both the forward and aft fuel outlets in the right hand tank.

The fuel system was drained using a drain glass. The sample was clean and contained no contaminants. It was verified that fuel was flowing freely to the carburetor. The remaining fuel was drained and the fuel was weighed to establish the fuel quantity in each tank. The right tank contained approximately 15 gallons and the left tank contained approximately 8 gallons. No contaminants were visible in the drained fuel.

The fuel selector valve was disassembled and examined in detail. The fuel selector valve mechanism moved freely and was free of dirt. Seals and gasket looked normal. The fuel selector was re-assembled and installed in the aircraft.

The function of the accelerating pump was tested. It was found to be satisfactorily functioning. The carburetor was removed and inspected in detail. No defects were found.

1.2.2 Electrical system

The electrical system in the aircraft is a 14-volt direct-current system powered by an engine driven alternator. All circuit breakers were untripped. The master switch was switched on and appeared to be functioning normally. The magneto to engine timing was checked. The right magneto was found to be at 22 degrees before top center and the left magneto 26 degrees before top center. According to Teledyne Continental Service Bulletin MSB94-8C, the magneto timing shall be 22 (±1 degree setting tolerance) degree for both magnetos. All the spark plugs were removed and visually inspected. All spark plug leads were tested and found serviceable.

1.2.3 Intake and exhaust air systems

The air intake was visually inspected for blockage and defects. The air filter and intake were clean and free from debris. The exhaust system was inspected for blockages. No defects were found.

1.2.4 Engine and propeller

The propeller, the propeller governor, and engine were visually inspected. Both propeller blades were bent backwards indicating a low power ground strike. The propeller governor shaft was found a little worn. General visual inspection of the engine revealed no defects. The engine cylinder compression was tested and found satisfactory on all cylinders.

1.3 Meteorological information

According to the pilot's report the wind was south-easterly at approximately 10-12 knots (5-6 m/s). Visual meteorological conditions were prevailing and the temperature was 18°C. The weather data was obtained from an amateur weather station which is located close to the landing area in Fljot.

The nearest weather stations to Fljot are Straumnesviti (Straumnes lighthouse) and Hornbjargsviti (Hornbjarg lighthouse). These are automatic weather stations that record weather information at hourly intervals. Straumnesviti is about 10 km (5.4 Nm) from Fljot and Hornbjargsviti is about 25 km (13.5 Nm) from Fljot. Figure 3 below summarizes the weather information that was obtained from the Icelandic Meteorological Office for these two locations.

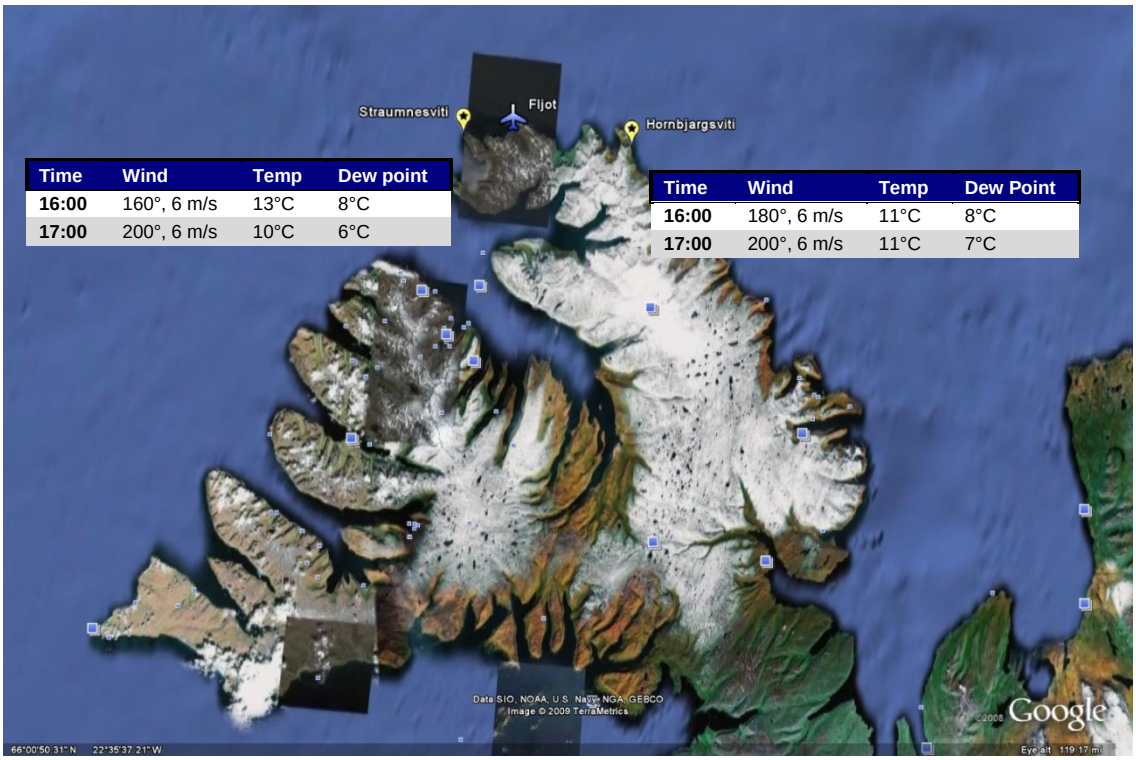

Figure 5: Weather information from nearby weather stations

2 Analysis and conclusions

2.1 Aircraft fuel system

The fuel selector valve in the aircraft was selected to the "RIGHT ON" (right hand wing tank) during the flight from Isafjordur airport. Cessna Owner´s Manual landing checklist stipulates that the fuel selector valve must be in the "BOTH ON" position. The Owner´s Manual contains the following note in a section on the fuel system:

> *"Unusable fuel is at a minimum due to the design of the fuel system. However, with ¼ tank or less, prolonged uncoordinated flight such as slips or skids can uncover the fuel tank outlets, causing fuel starvation and engine stoppage when operating on a single tank. Therefore to avoid this problem with low fuel reserves, the fuel selector should be set at "BOTH ON" position."*

According to the pilot he approximates that he was banking the aircraft 10-20 degrees towards the right wing. During the investigation it was established that with the aircraft level in pitch and at a right bank angle of 6.4 degrees and a fuel quantity of 15 gallons the fuel outlets of the right hand wing tank were uncovered.

When the pilot added power to the engine for take-off the engine would have demanded increased fuel. If both fuel outlets were temporarily uncovered then air would get into the fuel line towards the carburetor causing fuel starvation and possibly engine stoppage.

2.2 Meteorological information

The temperature and dew point from the nearby weather station Straumnesviti are plotted (temperature in Fljot plotted in blue) on the carburetor icing chart[2] below. Based on that, the ambient conditions were likely conducive to carburetor icing. The pilot did not apply carburetor heat to the full on position but according to the aircraft manufacturer the carburetor heat shall be applied fully and before closing the throttle.

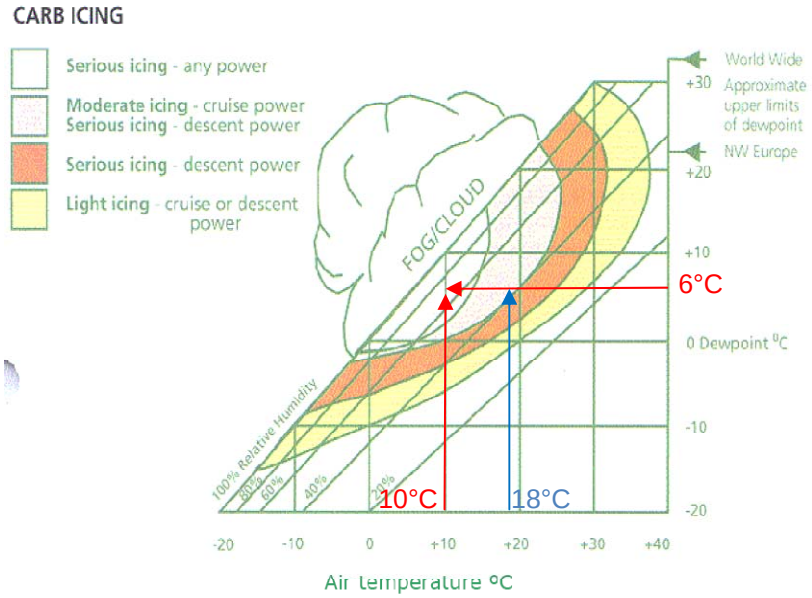

Figure 6: Temperature and dew point from Straumnes and Fljot indicate possible carburetor icing.

[2] UK CAA, Safety Sense Leaflet 14: Piston Engine Icing

2.3 Findings as to causes and contributing factors

2.3.1 The landing checklist on-board the aircraft was missing the item "Fuel Selector Valve – BOTH ON".

2.3.2 The pilot did not apply full carburetor heat before starting the descent and decreasing power.

2.3.3 The fuel selector valve was positioned to select fuel from the right wing tank only.

2.3.4 The uncoordinated approach likely uncovered the fuel outlets in the right hand wing tank. This would have introduced air into the fuel system possibly causing fuel starvation and engine stoppage.

2.4 Findings as to risk

2.4.1 According to the carburetor icing chart the ambient conditions were conducive to carburetor icing.

2.5 Other findings

2.5.1 The pilot was qualified to fly the aircraft.

2.5.2 All systems relating to engine power were investigated and found to be functioning.

2.5.3 The aircraft was airworthy before the accident and its certificate of airworthiness was valid.

AAIB Iceland encourages pilots to use checklists and operating instructions provided by the aircraft manufacturer.

3 Safety recommendations and action taken

No safety recommendations.

3.1 Safety action taken

The pilot and owners of the aircraft have made these changes following the accident:

1. Installed an ice detection system (ICEMAN SE) from Lamar Technologies that gives the pilot a warning of ice build-up in the carburetor.

2. Reviewed and updated the aircraft checklist.

3. Installed Micro Aero vortex generators to improve low speed performance of the aircraft.

Reykjavik, May 28, 2009

Aircraft Accident Investigation Board Iceland