

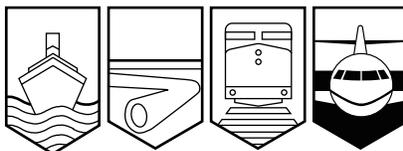
Transportation Safety Board  
of Canada



Bureau de la sécurité des transports  
du Canada

## AVIATION INVESTIGATION REPORT

A03P0265



### COLLISION WITH TERRAIN

de HAVILLAND DHC-2 MK. 1 C-GHAF  
PENTICTON, BRITISH COLUMBIA 11 NM NE

29 AUGUST 2003

Canada

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

## Aviation Investigation Report

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### *Summary*

The amphibious, float-equipped de Havilland DHC-2 Mk. 1, Beaver, C-GHAF, serial number 1408, left Nanaimo, British Columbia, and landed at Penticton Airport at 1232 Pacific daylight time (PDT). The aircraft was fuelled with 184 litres of fuel, filling all three belly tanks. At this time, the rear portion of the aircraft cabin was observed to be loaded with luggage and cargo. The pilot/aircraft owner was planning his flight to Calgary (Springbank), Alberta, and spent at least an hour flight planning and talking with the Kamloops Flight Information Centre by telephone. He had some difficulty determining a route to fly to Springbank, because of airspace restrictions due to forest fires, but decided on a routing of Penticton, Kelowna, Vernon, Revelstoke, and Springbank.

The aircraft took off from Penticton Airport at 1420 PDT, with the pilot and two passengers on board and crashed approximately seven minutes later in a ravine of Penticton Creek, 11 nautical miles northeast of Penticton Airport. A post-impact fire broke out and consumed most of the fuselage area. The fire caused a small forest fire, seen by a firefighting aircraft crew. There were no radio calls from the occurrence aircraft, and the three occupants were fatally injured.

*Ce rapport est également disponible en français.*

## *Other Factual Information*

The pilot held a valid private pilot licence issued by Transport Canada (TC) and was endorsed for single-engine landplanes and seaplanes. The medical certificate had a restriction that glasses must be worn; it indicated that the last medical was conducted on 03 July 2002, and was valid to the first day of the 25th month after examination. He had accumulated approximately 915 flying hours on light, single-engine aircraft, including 615 hours on the DHC-2 Beaver. An autopsy and a full toxicology examination of the pilot did not reveal any condition that could have led to or contributed to the accident. It could not be determined whether the pilot was wearing glasses at the time of the occurrence.

One of the passengers was a licenced private pilot. When the aircraft arrived in Penticton, this person was observed to be occupying the left seat, the pilot position in the DHC-2 Beaver. When the aircraft had to be moved to another position on the ramp at Penticton for refuelling, she was observed taxiing the aircraft from the left seat. She had accumulated approximately 200 flying hours on light, single-engine aircraft and had flown C-GHAF in the past, but the number of hours flown in the aircraft could not be determined. It could not be determined who occupied the left seat on departure from Penticton, or who was flying the aircraft; the aircraft was fitted with dual controls.

The passenger held a private pilot licence issued by TC and was endorsed for single-engine landplanes and seaplanes. Her medical certificate indicates that the last medical was conducted on 16 October 2001 and was valid to the first day of the 25th month after examination. Information from the passenger's family doctor indicated that she suffered from a number of illnesses, including coronary artery disease, and she was cautioned that her condition might have an adverse affect on flight safety. This information was not passed to TC by the family doctor in accordance with Section 6.5 of the *Aeronautics Act*. When she underwent her last medical, she did not advise the TC medical examiner that she had recently been diagnosed with this condition. However, in June 2003, she had undergone extensive tests at the Mayo Clinic and her condition had been assessed as stable. She continued to take blood pressure lowering medication, a beta blocker, a blood thinner, and aspirin, as well as various medications for abdominal problems. The remains of containers for some of these medications were found in the wreckage.

Autopsies conducted on both passengers were limited to external examination, and no toxicological tests were conducted.

Records indicate that the aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures. The aircraft was manufactured in 1958 and had flown a total of 9029.9 hours as of 01 May 2003. A review of the airframe, engine, and propellor logbooks showed nothing remarkable, except as noted below. The engine, a Pratt & Whitney R-985-AN-1, serial number 42-21504, had accumulated 558.4 hours since overhaul.

The reported weather at Penticton, 11 nautical miles southwest of the accident site, at 1400, approximately 27 minutes before the accident, was as follows: wind 340° True at 4 knots; visibility 10 statute miles; a few clouds at 7000 feet; temperature 26° Celsius; dew point 10°C;

altimeter setting 30.14; remarks: 1 okta cumulus, light smoke, sea-level pressure 1020.4 hectopascals. The reported weather at Penticton at 1500, approximately 33 minutes after the accident, was almost identical. The density altitude at Penticton was calculated to be 2427 feet above sea level (asl). Penticton elevation is 1129 feet asl.

The wreckage was found at the bottom of the steep ravine in which Penticton Creek is located, at an elevation of about 4800 feet asl. The wreckage was lying across the creek on a heading of about 305° Magnetic (M). The aircraft had initially hit four tree tops. Tree damage and contact markings indicated that the aircraft struck the first two tree tops in a wings-level, climbing attitude, and the third and fourth tree tops in a descending attitude. The wreckage trail was oriented on a heading of 360° M, 90 degrees to the saddle that the aircraft was approaching. Fire consumed most of the fuselage, the inboard right wing, and the right float. There were no soot streaks observed on the aircraft; there was some paint bubbling, which had been caused by the fire.

All control cables and push rods were found either intact, cut by rescue personnel, broken by impact forces, or destroyed by fire. Flight control cable continuity could not be established due to the extensive fire damage. There was no smell of fuel or other indication of the presence of fuel in the wing tip tanks.

The outboard one foot of both propeller blades showed heavy curling, leading-edge damage, and chord-wise scratching. The propeller section that remained attached to the engine showed backward bending and extreme twisting on one blade. The engine showed some impact damage and extensive fire damage.

The fuselage, forward of the baggage compartment, was destroyed by impact and fire. The three belly fuel tanks were entirely destroyed by fire except for their sender units. The right float was almost completely destroyed by fire. The left float was intact, with the nose gear area somewhat damaged by impact. The landing gear was determined to be retracted.

Cargo and other articles found in and around the wreckage were weighed using certified scales; the total weight of the recovered articles was 195 pounds. Some of the cargo was not recovered because it was destroyed by fire, was carried away from the accident site by the creek, was damaged so significantly that it could not be recovered (such as shards of glass and crockery seen in the creek), or was not found. Some items that were weighed would probably have been heavier when they were on board the aircraft before the crash. For example, five broken but unopened 4-litre plastic containers of aviation oil and one 1.75-quart rubber container of used oil were recovered, but contained only a trace of oil. When full, the unopened containers would have weighed over 40 pounds and the used oil container about four pounds.

Nothing could be found to indicate the pilot had completed a weight and balance calculation prior to taking off from Penticton. Post-accident weight and balance calculations, using reported occupant weights, full belly fuel tanks, and the weight of the cargo recovered from the accident site, suggested that the aircraft take-off weight was at least 5350 pounds, with the centre of gravity at 3.2 inches forward of the datum. The aircraft was being operated at a maximum allowable take-off weight (MTOW) of 5370 pounds in the belief that the installation of Wipline 6100A floats, in accordance with Supplementary Type Certificate (STC) number SA610GL, raised the MTOW to 5370 pounds. However, this STC specifies, under limitations and conditions, that

the MTOW will be 5100 pounds, or 5370 pounds “when appropriate structural modifications are incorporated.” It was determined that only two out of five of these modifications were incorporated. The correct MTOW is, therefore, 5100 pounds, and the allowable centre of gravity range is 1.25 to 6.1 inches aft of the datum.

## *Analysis*

Although flight control cable continuity could not be established, nothing was found that would indicate any faults with the flight controls before impact. Propellor blade marks and damage indicated that the engine was producing considerable power on impact. Calculations indicate that density altitude effects would have reduced the aircraft’s performance, compared to its performance on a standard day.

Post-accident calculations showed that the aircraft weighed at least 5350 pounds, about 250 pounds over its maximum allowable take-off weight. The actual weight of the aircraft was likely even greater, as some of the cargo was destroyed by fire or was unrecoverable. The overweight condition would have had the effect of further reducing the aircraft’s performance and may have been a factor in the aircraft not out-climbing the rising terrain.

Tree damage and contact markings indicate the aircraft was in a wings-level, climbing attitude when it struck tree tops. The aircraft was approaching rising terrain head-on and very close to the summit. A principle of mountain flying is that a pilot should approach a saddle at a 45-degree angle, so there will be room to turn away if it becomes obvious the aircraft will not clear the high terrain. It could not be determined why the pilot did not approach at a 45-degree angle and then simply turn away from the rising terrain when contact with the tree tops became imminent.

## *Findings as to Causes and Contributing Factors*

1. As the aircraft approached high terrain in a climb, the pilot, for undetermined reasons, did not turn away from the terrain; the aircraft struck tree tops and crashed.
2. The aircraft’s climb performance was adversely affected by density altitude and the relatively high aircraft weight, so that the aircraft was unable to clear the high terrain ahead.

## *Findings as to Risk*

1. The licenced passenger had not informed the TC medical examiner who conducted her last medical that she had been diagnosed with coronary artery disease, posing the risk that she could pilot an aircraft while not medically fit to do so.
2. The aircraft was being operated at a higher weight than was justified by the STC, under which it was converted to an amphibian. Some of the structural modifications called for by the STC for the higher weight had not been carried out.

## *Other Findings*

1. It could not be determined who was piloting the aircraft on the occurrence flight.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 07 September 2004.*

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