Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

AVIATION INVESTIGATION REPORT
A09W0105

COLLISION WITH TERRAIN

BEECHCRAFT V35B BONANZA C-GWUW
CASTOR, ALBERTA, 13 nm NE
15 JUNE 2009

Canada

Aviation Investigation Report

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Summary

The privately operated Beechcraft V35B Bonanza (registration C-GWUW, serial number D-9134) was on a visual flight rules flight from Edmonton City Centre Airport, Alberta, to view the Badlands area in the vicinity of Drumheller, Alberta. When the pilot did not return by 1600, the family initiated the process to begin a search at 1700 on 15 June 2009. On June 16, Joint Rescue Coordination Centre resources from Winnipeg, Manitoba, located the aircraft 12 nautical miles northeast of Castor, Alberta. The aircraft was destroyed by impact forces and the pilot, who was the sole occupant, was fatally injured. There was no post-impact fire.

Ce rapport est également disponible en français.

Other Factual Information

On 29 May 2009, the pilot topped-up the aircraft fuel tanks by adding 37.9 litres of Avgas. Neither the aircraft nor the pilot had flown since that date.

Radio communication for this flight was limited to the airport's air traffic control unit. The pilot indicated that the flight would be conducted in the Cooking Lake and Camrose, Alberta area. A visual flight rules (VFR) flight plan was not filed with NAV CANADA. The pilot had communicated a flight itinerary with family indicating that he would be flying and would return later that same afternoon.

The aircraft departed from the Edmonton City Centre Airport at 1147 [1] and was observed on the NAV CANADA Edmonton radar, departing Runway 30 (see Appendix A—Radar Track of C-GWUW). The aircraft remained on Edmonton radar until 1225. The flight path detailed by the radar was in a southerly direction through Camrose and past Bashaw, Alberta. Altitudes were recorded from approximately 4000 feet above sea level (asl) to 4600 feet asl. At 1237, Calgary radar picked up the aircraft in the vicinity of Drumheller, Alberta and maintained radar contact until 1243. The track recorded indicated a left turn towards the northeast. The aircraft appeared on the Medicine Hat, Alberta, radar from 1249 until 1252, approximately 42 nautical miles (nm) southwest of the accident site. The aircraft was flying at a ground speed of approximately 160 knots at 4400 feet asl, about 1500 feet above ground level (agl) at this time.

Prior to the accident, the aircraft descended momentarily with an associated minor reduction in power. The engine power came back up and the aircraft pitched up followed by an entry into an extreme nose-down attitude. Because there was no associated sound of a crash or smoke plume, this information was not provided to authorities until the next day, following a media announcement of the search effort. Search-and-rescue assets focused on this area and subsequently found the aircraft on the afternoon of 16 June 2009.

The aircraft came to rest in a lightly wooded area on a rough pasture. Wreckage site examination and the extreme impact damage indicated that the aircraft had struck the ground at high speed in a near-vertical, nose-down attitude. Lighter debris was scattered circumferentially around the main wreckage in a radius of about 50 feet; however, there was no measurable longitudinal component to the wreckage trail. Both the flight path angle (the angle between the aircraft flight path and the horizontal) and the impact angle (the angle between the flight path and the terrain) were estimated to be 90 degrees. The aircraft embedded itself into the ground at impact; there was no evidence that it had bounced or otherwise re-positioned itself after impact.

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[1] All times are mountain daylight time (Coordinated Universal Time minus six hours).

The aircraft sustained extreme impact damage. The engine, propeller, and fuselage forward of the wing leading edges were embedded to an estimated depth of four to five feet in the ground. The left wing had sustained slightly more impact damage than the right wing, suggesting the aircraft may have been somewhat left wing low at impact. Both wings displayed extreme span-wise compression wrinkling that extended from tip to tip. All fuel tanks were ruptured. The tailplane had partially separated from the fuselage and bent forward over the top of the fuselage at impact. The cabin and cockpit were destroyed.

All flight control surfaces were found attached at their respective positions. There were numerous impact-related discontinuities in the flight control systems. To the extent that the wreckage was visually examined at the accident site and after recovery, all discontinuities were attributed to the severe impact forces.

All main components, including the wings, tail surfaces, landing gear components, cabin door, baggage compartment door, and four cabin seats were accounted for at the accident site. There was no evidence of in-flight or post-impact fire damage and no evidence of fluid accumulation on the tailplane surfaces.

Examination of the landing gear and flaps indicate that they were up and retracted at the time of impact.

Both fuel caps were found at the accident site. The airframe fuel system was not examined in detail, due to the degree of impact damage. There was no odour of fuel at the accident site. Hot daytime conditions prevailed between the time of the accident and the time of the field examination of the wreckage.

To the extent that the airframe was examined, there was no indication of a catastrophic failure or malfunction that would have contributed to the accident.

The engine sustained severe impact damage. Damage to the engine mounts, oil pan, propeller governor, and cylinders reflected damage caused by the impact. There was no evidence of a catastrophic mechanical failure that would have contributed to a sudden loss of power.

The aircraft's emergency locator transmitter (ELT) was found at the site; it was damaged upon impact, rendering it inoperative. The occurrence aircraft was not equipped with a cockpit voice recorder or flight data recorder, nor were these required by regulation.

Research into the handling characteristics of the Beechcraft Bonanza revealed the following:

> If the pilot or autopilot stops working at keeping the wings level, the Bonanza will drop a wing and enter a spiral….Even if the initial bank angle is slight, the airplane's lateral (*roll stability*) stability is too weak to raise the wing. Instead the wing will continue to drop and as it does, the nose will drop and airspeed will begin to build. Bank angle, pitch down and airspeed will all increase as the load factor increases and the spiral tightens. There is no tendency for this process to stabilize at any moderate bank angle or airspeed. [2]

The weather conditions in the vicinity of the occurrence indicated the presence of cumulus and towering cumulus clouds from 10 000 to 20 000 asl. Visibility was forecast to be at least six statute miles (sm) with light rain showers. Local accounts indicated the presence of high clouds and good visibility, warm temperatures, and no rain. Weather was not considered to have been a factor.

The pilot began his aviation career in 1940 with the Royal Canadian Air Force. During the post-war period he continued to fly as a member of the Air Force Reserve. His civilian private pilot's licence was issued in 1968 and he owned and flew a variety of aircraft. In 1990, he became a part owner of the occurrence aircraft and had logged approximately 248 hours in it. In the preceding year, he had flown a total of 9 hours in the aircraft. His total flight time was approximately 3532 hours. The owners of the aircraft had adopted an informal annual mutual check on-type program. The occurrence pilot had flown as the safety pilot for the other owner on 25 May 2009. He had planned on conducting his own check flight with the co-owner in the near future. The occurrence pilot had flown solo on 29 May 2009.

At the time of the accident the pilot was 88 years old. He held a valid private pilot's licence (aeroplane) and was licensed in accordance with the regulations at the time of the occurrence. The pilot had successfully completed a Category 3 medical examination on 06 May 2009 that validated his licence to 01 June 2011. Private pilots who are over the age of 40 are required to undergo Civil Aviation Medical examination every 24 months in order to exercise the privileges of their pilot's licence.

It could not be determined if the pilot had suffered an in-flight incapacitating medical event. The Medical Examiner of Alberta identified the cause of death as multiple blunt force trauma associated with an aircraft accident. The pilot was not known to have suffered from any medical condition that would have precluded him from holding a Civil Aviation Medical Certificate.

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[2] John C. Eckalbar, *Flying the Beech Bonanza,* Skyroads Project, 1997

Analysis

No evidence was found to suggest that the aircraft's structure or systems malfunctioned.

The pilot was deemed to be fit and capable.

The vertical impact and the energy with which the aircraft struck the ground do not support a hypothesis of an aerodynamic stall.

Given the tendency for the aircraft to roll, the aircraft may have unintentionally entered into the initial stages of a spiral dive. If this were the case, the 90-degree impact angle of the aircraft would suggest that the spiral dive had progressed to vertical. The relatively low altitude at which the aircraft entered into this near-vertical attitude would have made recovery unlikely.

Without corroborating evidence to support any hypothesis, the cause of the accident could not be determined.

The following TSB Laboratory reports were completed:

LP 089/2009 Instruments and Global Positioning System (GPS) Analysis

LP 095/2009 Exhaust Pipe Analysis

LP 115/2009 Engine Crankshaft Analysis

These reports are available from the Transportation Safety Board of Canada upon request.

Finding as to Causes and Contributing Factors

1. For undetermined reasons, the aircraft departed controlled flight and crashed in an extreme nose-down attitude.

Other Finding

1. The pilot had not filed a visual flight rules (VFR) flight plan detailing his intended flight path, which resulted in a delay in finding the aircraft by search-and-rescue resources.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 01 December 2009.

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Appendix A – Radar Track of C-GWUW