

AVIATION INVESTIGATION REPORT

A02W0173

COLLISION WITH TERRAIN

AIRCO AIRCRAFT CHARTERS LTD.

PIPER PA-34-220T (SENECA III) C-FRKZ

HIGH PRAIRIE, ALBERTA

04 SEPTEMBER 2002

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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High Prairie, Alberta 07 nm SE

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Report Number A02W0173

Summary

The Airco Aircraft Charters Piper PA-34-220T (Seneca III), registration C-FRKZ, serial number 34-8233048, departed the Edmonton City Centre Airport, Alberta, at 0802 mountain daylight time, for High Prairie, Alberta, on an instrument flight rules flight plan with one pilot and one passenger on board. The aircraft was cleared out of the controlled airspace in the vicinity of High Prairie at 0843 mountain daylight time, with an estimated time of arrival of 0906 mountain daylight time. The aircraft did not arrive in High Prairie, and a communications search was initiated without results. No emergency locator transmitter signal was detected by a search and rescue satellite or overflying aircraft. The Trenton, Ontario, Rescue Coordination Centre responded by dispatching search and rescue aircraft to High Prairie, but the search was hampered by low ceilings and visibilities. The aircraft was visually located at 1700 mountain daylight time, approximately seven nautical miles southeast of the High Prairie Airport in a densely wooded area. The aircraft was destroyed by impact forces; there was no post impact fire. The pilot and the passenger were fatally injured.

Ce rapport est également disponible en français.

Other Factual Information

The flight was chartered to fly a customer to High Prairie for the day and return to Edmonton in the late afternoon. The pilot had performed this trip several times in the past and was familiar with the route and the airport. The flight departed Edmonton a few minutes after the planned departure time of 0800 mountain daylight time (MDT)¹, and the aircraft levelled off at the flight planned altitude of 8000 feet above sea level (asl) approximately 15 minutes after take off. Radar information showed that the aircraft tracked approximately 295 degrees magnetic (°M) at an average ground speed of 165 knots. These figures are consistent with the aircraft's cruise performance, the track to the High Prairie non-directional beacon (NDB) via the transition from the Edmonton NDB, and the upper winds.

At 0843, the Seneca III was cleared out of the controlled airspace via the NDB Runway 25 approach at High Prairie (See Appendix A). A descent was initiated by the pilot at 0849, and the last radar return was at 0854, with the aircraft descending through 6800 feet asl 33 nautical miles (nm) from the High Prairie Airport. The investigation was unable to determine the flight path of the aircraft from the last radar return to the point of impact, or the exact time of the accident. At no time did the pilot report any malfunctions or anomalies.

The NDB approach for Runway 25 is a non-precision (no glide path) approach that allows for the pilot to descend to a minimum descent altitude of 2660 feet asl (688 feet above ground level [agl]) with the use of a distance measuring equipment (DME) receiver, and provides for lateral approach guidance to Runway 25. When the pilot was cleared for the approach, the minimum safe altitude (MSA) through the transition zone was 6700 feet asl, with 4300 asl (2300 feet agl) as the MSA when within 25 nm of the NDB.

The Seneca III descended into a densely-treed area seven nm southeast of the High Prairie Airport on a heading of 358°M (see Appendix A). The wreckage trail was approximately 360 feet long. Just prior to striking the ground, tree impact marks showed a descent angle of about 22° with a bank angle to the right of approximately 50°. The aircraft was configured with the landing gear up and the flaps in the retracted position. All control surfaces were accounted for at the accident site, and all damage to the aircraft was attributable to the impact forces.

The global positioning system (GPS) installed in the aircraft was recovered and sent to the manufacturer for data retrieval. The last valid position recorded was very near the beginning of the wreckage trail. The last recorded active flight plan was direct from Edmonton to the High Prairie Airport. The GPS was not certified under *Technical Standard Order C129* or *C129A* for domestic en route instrument flight rules (IFR) flight guidance.

Almost all cockpit instrumentation was destroyed at impact. The electric powered gyro for the horizontal situation (heading) indicator and the vacuum (suction) powered gyro for the attitude indicator were recovered and examined at the TSB Engineering Branch Laboratory. It was determined that both gyros were functional at the time of impact. A two-axis autopilot was installed in the aircraft, as required by regulation, but because of impact damage, no information could be obtained as to whether the autopilot was in use during or prior to the occurrence.

The engines were initially examined at the site and more extensively after the wreckage was recovered, with the

¹ All times are mountain daylight time (Coordinated Universal Time minus six hours) unless otherwise noted.

engine manufacturer assisting. No engine components showed discrepancies that would have prevented the engine from operating prior to the impact, and the engine damage was consistent with the engines producing considerable power at impact.

All six blades on the two propellers exhibited bending and twisting, to varying degrees, with little or no leading-edge or chord-wise damage. The damage was consistent with deceleration forces encountered as a result of the propellers being powered by the engines when coming into contact with materials such as trees.

Records show that the aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures. At the time of the accident, the aircraft's weight and centre of gravity were within the prescribed limits. The aircraft was certified for flight into known icing conditions.

A trough was located in the vicinity of the High Prairie Airport during the time period associated with the accident. Weather forecasted was as follows: overcast layers of cloud from 5000 feet asl to 20 000 feet asl, visibility forecast to be 2 to 6 statute miles (sm) in light rain and mist, scattered embedded altocumulus castellanus type clouds with associated visibilities of 1 sm in rain showers and mist, ceilings of 500 to 1200 feet agl. Moderate mixed icing was forecast from the freezing level to 15 000 feet asl. The freezing level in the High Prairie area was forecast to be at 7500 feet asl increasing to 10 000 feet asl at the point of departure. There were no pilot reports of icing in the High Prairie area at or after the time of the accident.

There is no weather reporting service located at High Prairie Airport. The nearest weather reporting stations are at Slave Lake, Alberta, 59 nm east of High Prairie Airport, and Peace River, Alberta, 60 nm north of High Prairie Airport. The automatic weather observation system (AWOS) weather special (SPECI) for Slave Lake Airport issued at 0824 was as follows: wind 260°T at 7 knots, visibility 9 sm, overcast cloud at 2200 feet agl, overcast cloud at 8600 feet agl, temperature 8°C, dew point 7°C, and altimeter setting 29.94 inches.

The observed weather (SPECI) for Peace River issued at 0850 was as follows: wind 360°T at 9 knots, visibility 10 sm in light rain, broken cloud at 900 feet agl, overcast cloud at 3000 feet agl, temperature 7°C, dew point 5°C, and altimeter setting 30.02 inches.

A company pilot overflying the route passed along reports of weather in the vicinity of High Prairie to the pilot of C-FRKZ via the company radio frequency when the flight was about 25 miles north of High Prairie. The pilot was advised of lower weather in the High Prairie area. Search and rescue aircraft encountered cloud layers from tree top height to about 500 feet agl late in the morning and throughout the afternoon. Visibilities varied from one to five miles in rain and mist.

The pilot possessed an Airline Transport Pilot License, and was certified and qualified for the flight in accordance with existing regulations. According to company and personal logs, the pilot had accumulated 2390 total flight hours, with 955 hours of multi-engine experience, 315 hrs of instrument experience, and 181 hours on the occurrence aircraft. A detailed examination of the pilot's work and rest schedule did not reveal any indicators of chronic or acute fatigue. The pilot was reported to be content with his current employer and working conditions. Based on the autopsy, toxicology, and medical records, there was no evidence to indicate that the pilot's performance was degraded by physiological factors.

Airco Aircraft Charters Ltd. had been in operation for approximately 11 years with a mixed fleet of turbine and piston powered twin-engine aircraft. The Operations Certificate (OC) issued by Transport Canada permitted Airco to operate commercial air services under *Canadian Aviation Regulations (CAR) 703* Air Taxi operations and *CAR 704* Commuter operations. The Seneca III was operated under *CAR 703* with the approval for

single-pilot IFR operations.

The degree of destruction of the aircraft systems and components prevented the investigation from gathering important data points. Compounding this was that neither occupant survived, radar coverage in that area ceased at about 7000 feet, there were no eyewitnesses, and the aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR). The installation of an FDR or a CVR was not required by regulation for this aircraft.

Aircraft typically used in *CAR 703* operations are not fitted at manufacture with the electrical infrastructure required to support an FDR, and the installation of FDRs in this category of aircraft would require extensive system upgrades. A light-weight, comparatively simple and inexpensive alternative to an FDR is a cockpit video digital recorder (CVDR). While CVDR technology exists to record the instrument panel and the view forward from an aircraft in flight, there is no regulatory requirement or schedule to install this equipment in commercially operated, non-FDR equipped aircraft. A functioning crash-protected CVDR would have allowed investigators to reconstruct the flight sufficiently to better understand the circumstances that led to the accident. There have been numerous other recent *CAR 703* fatal occurrences where the availability of CVDRs would have provided investigators a better opportunity to identify safety deficiencies related to the occurrence.

The U.S. National Transportation Safety Board (NTSB) recently forwarded Safety Recommendation No. A-99-60 to the U.S. Federal Aviation Administration (FAA), urging the installation of crash-protective CVDRs on all turbine-powered aircraft that are not currently required to be equipped with an FDR once an applicable technical standard order has been issued. The recommendation has not yet been implemented. This issue had been previously raised in TSB Report number A01W0261.

Analysis

The accident was precipitated by an unexplained descent below the 25-mile minimum safe altitude as depicted on the approach plate. It could not be determined why the aircraft descended to ground impact or if it was under the control of the pilot at the time. The analysis will examine some factors which may have been involved in this occurrence.

Weather forecasts and observations in the High Prairie area indicated that the latter portions of the flight were conducted in instrument meteorological conditions (IMC). Forecast icing conditions and an absence of icing reports in local pilot reports (PIREPS) suggest that aircraft icing was not an influencing factor in this accident.

The configuration of the aircraft—flaps retracted and gear up—and the length of the wreckage trail are indicators that the aircraft struck the trees in a fairly steep dive with a considerable amount of speed. Because of the severity of the impact, limited information was available as to the aircraft's performance and functionality. Inspection of the aircraft's engines and propellers indicated that they were developing power at the time of impact. All of the aircraft control surfaces and airframe components were accounted for at the site; it is therefore unlikely that an in-flight component failure occurred.

The autopsy and toxicology report, pilot's rest schedule, training, and experience indicate that the pilot's performance was not affected by physiological factors. There was nothing abnormal in the pilot's conversations with a company pilot when receiving weather information prior to the occurrence. It is not known if the pilot suffered a loss of situational awareness, as it appears the aircraft was on track to the NDB, and the pilot was familiar with the airport and the approach.

Because of low cloud ceilings in combination with low visibilities in rain and mist, the pilot may have had

limited external visual references to determine the aircraft's attitude and altitude above the ground for recovery, if control was lost in cloud on descent to the MSA.

The following TSB Engineering Branch report was completed:

LP 93/02 - Flight Instrument Analysis

Findings as to Causes and Contributing Factors

1. For undetermined reasons, the aircraft descended below the minimum safe altitude as prescribed on the NDB 25 approach for High Prairie and struck the terrain.

Other Findings

1. Had the accident aircraft been equipped with a CVDR or similar device, the investigation might have been able to determine the initiating events and associated safety deficiencies that resulted in this accident.

This report concludes the TSB's investigation into this occurrence. Consequently, the Board authorized the release of this report on 05 May 2003.

Visit the TSB's Web site (www.tsb.gc.ca) for information about the TSB and its products and services. There you will also find links to other safety organizations and related sites.

Appendix A - High Prairie NDB 25 Approach Plate

Not for navigational use.