Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

AVIATION INVESTIGATION REPORT
A07O0238

COLLISION WITH TERRAIN IN DETERIORATING WEATHER

EXPEDITION HELICOPTERS INC.
BELL 206L-1 JETRANGER (HELICOPTER) C-FFEX
COCHRANE, ONTARIO, 5 nm W
28 AUGUST 2007

Canada

Aviation Investigation Report

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Summary

The Bell 206L-1 (registration C-FFEX, serial number 45715) was being operated from a remote area located approximately 100 nautical miles east of Webequie, Ontario, and was destined for Cochrane, Ontario. The flight departed under visual metrological conditions; however, deteriorating weather conditions were encountered en route. At approximately 2100 eastern daylight time and five miles west of Cochrane, the pilot lost outside visual reference and the aircraft struck the ground. The aircraft was on a flight plan and therefore a communication search was started by the London Flight Information Centre. Expedition Helicopters Inc. personnel began a ground search and located the aircraft approximately three hours after the occurrence. The aircraft was destroyed and the pilot, who was the only occupant, was seriously injured.

Ce rapport est également disponible en français.

Other Factual Information

On the day of the occurrence, the pilot received a weather briefing from the London Flight Information Centre (FIC) for the series of flights planned for that day. The aerodrome forecast (TAF) for the Timmins, Ontario, area was forecast to be visual flight rules (VFR). The forecast, however, was only valid until 1600 eastern daylight time. [1] Another TAF was expected to be issued at 1000.

A VFR flight plan was filed for the flight to a remote location the company referred to as Tango 1 (T1) and for the return leg to Cochrane. The pilot departed the Expedition Helicopters Inc. facility in Cochrane at 0945.

At 1735, a satellite telephone was used at T1 to update the VFR flight plan on file with the London FIC; however, no weather information was requested. There was no contact made with the company base in Cochrane to determine the local weather conditions.

The aircraft departed T1 for Cochrane at approximately 1800. Approximately 60 nautical miles (nm) northwest of Cochrane, the ceiling deteriorated to about 300 feet above ground level (agl). The weather continued to deteriorate and eventually the pilot was flying at near treetop level and navigating by following a river that headed towards Cochrane. As the aircraft approached its destination, there was a relatively small area of improved visibility and ceiling in the general direction of Cochrane. The pilot subsequently abandoned the river navigation and attempted to fly towards Cochrane; however, visual reference to the ground was lost due to the poor weather conditions.

The aircraft struck the ground while flying in an easterly direction and travelled through the brush upright for approximately 108 feet before becoming airborne again for a short distance. It then struck the terrain in a nose-down attitude, flipped over and came to rest on its left side. The total wreckage trail was 418 feet. The entire cockpit forward of the pilot's seat was destroyed.

Records indicate that the pilot was certified and qualified in accordance with existing regulations for the intended flight. He held a commercial rotary wing pilot licence endorsed for day VFR operations and had accumulated approximately 490 hours of total flight time, which included 430 hours on type. Training records indicate that the pilot had received a total of 10.4 hours of dual instrument training before acquiring his commercial helicopter licence. He was not endorsed for night or instrument flight and had not acquired any additional instrument training following the issuance of his commercial helicopter licence in 2003. This was the pilot's first commercial flying job. The pilot's duty and flight times for the past 30 days met regulatory requirements. This flight occurred after three consecutive days of rest. He had completed three flight legs before the occurrence flight.

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1 All times are eastern daylight time (Coordinated Universal Time minus four hours).

The aircraft was manufactured in 1981 and had accumulated a total time of approximately 7537 hours. Nothing was found to indicate that there was any airframe failure or engine malfunction before or during the flight. There were no maintenance deficiencies entered in the aircraft journey logbook. However, during the flight, the directional gyro rotated to a heading that was approximately 180° from the initial heading that was set before departure from T1. The pilot considered the directional gyro inaccurate and alternatively used the global positioning system (GPS) to determine the magnetic heading of the aircraft.

Aviation routine weather reports (METARs) are not available for Cochrane. The nearest weather reporting station is in Timmins, located 35 nm south of Cochrane. The Timmins weather at 2100 was reported as follows: winds calm, visibility 1 ½ miles in light drizzle, ceiling 700 feet broken, temperature 18°C, dew point 15°C. The weather in Cochrane was reported as low ceilings and fog. The TAF issued at 1739 indicated that the weather in Timmins after 1900 was forecast to be as follows: visibility ¾ mile in light drizzle and mist, and ceiling 300 feet overcast. The ceiling and visibility were forecast to be worse than the preceding TAF that was obtained in the morning, before departing on the initial flight.

Transport Canada defines night as the time between the end of evening civil twilight and the beginning of morning civil twilight. [2] Evening civil twilight ends when the centre of the sun is geometrically six degrees below the horizon, commonly about 30 minutes after sunset. Official sunset for Cochrane on the day of the occurrence was 2014, and the end of evening civil twilight was 2048. Although there was some sunlight cast on ridgelines in the area, the sun was below the horizon and the accident site was in darkness 30 minutes before the occurrence.

The aircraft was equipped with a portable GPS (Garmin GPSmap96), mounted on an adjustable bracket on top of the wet compass, which is located to the right of the instrument panel. The GPS has a feature that enables the user to determine the time of sunset at a certain location. The sunset feature automatically defaults to the current location of the GPS when displaying the time of sunset. In order to show the sunset time at a different location, the location waypoint has to be entered into the sunset page of the GPS.

Before departure from T1, the GPS was used to determine the time of sunset. The GPS calculated the time of sunset at T1 as 2040. During the investigation, the current location was switched to show the Expedition Helicopters Inc. facility in Cochrane, which resulted in a calculated time of sunset as 2018 for the day of the occurrence.

Expedition Helicopters Inc. holds a valid air operator certificate limited to day VFR operations only. The company uses a pilot self-dispatch system and flight crews are required to use the operational flight plan forms provided and to leave them with a responsible person, or file a VFR flight plan with flight services. The Expedition Helicopters Inc. operations manual states that the VFR weather minima in uncontrolled airspace below 1000 feet agl is 1 mile flight visibility and clear of cloud. The Transport Canada regulations are the same.

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2 Section 101.01 of the *Canadian Aviation Regulations*

There were no reports of an emergency locater transmitter (ELT) being activated after the occurrence. Investigators found the ELT detached from the aircraft approximately 60 feet from the cockpit wreckage. The ELT switch was in the ARM position. The external antenna connector was still connected to the unit, but the cable had separated during the impact sequence. The ELT was permanently mounted in the nose section of the cockpit, in the area of the right lower nose window. It was oriented in the proper 45° downward direction as per the manufacturer's instructions. It could not be ascertained whether the ELT did not function as intended, or if the transmitted signal could only radiate a few feet, which would prevent detection of the signal by search and rescue.

On 03 January 2003, following an accident that occurred on 20 May 2002 (TSB report A02P0096 refers) the TSB issued Aviation Safety Advisory A020030-1 to Transport Canada suggesting that it may wish to review the regulations and standards regarding ELT mounting locations and how they are interpreted and applied. Transport Canada responded to the advisory stating that it had determined that a relocation of the ELT in this case would not have necessarily made a difference with regard to the integrity of the antenna.

The ELT was manufactured by ACK Technologies under model number E-01-03. A label on its exterior indicated that the device was to be recertified in May 2007, and aircraft records indicate that the last certification of the ELT was performed in May 2006. According to the regulations, [3] an ELT must be recertified every 12 months. The ELT was examined by the TSB Engineering Laboratory. The examination did not reveal any damage to the case or connectors and there was no damage to the circuit board or the G switch, which is a unidirectional spring/ball type. The ELT examination and testing showed that, although its certification was overdue, the ELT was serviceable at the time of the occurrence.

Analysis

The pilot did not obtain any weather update before his departure from T1. He would not, therefore, have been aware that conditions at destination had been deteriorating throughout the day and the latest forecast was calling for conditions below limits for VFR operations. Furthermore, the destination coordinates were not used for the time of sunset calculations, resulting in a 22-minute error. This resulted in an arrival in the Cochrane area after sunset, with poor weather conditions present.

The pilot received the minimum instrument training required for the issuance of a commercial helicopter licence. Four years had elapsed between the time the pilot had taken this instrument training and the date of the occurrence. If not practiced, instrument flying skills deteriorate over time. In addition, because of the malfunction of the directional gyro, the pilot referenced the GPS for primary heading information. This most likely hampered the proper scan of the primary flight instruments. These two factors likely contributed to the pilot's difficulty in flying the aircraft with reference to instruments only.

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3 Standard 625, Appendix C of the *Canadian Aviation Regulations*

The above-mentioned instrument training is deemed sufficient to allow non-instrument–rated pilots to maintain control of the aircraft in case of inadvertent flight into instrument meteorological conditions (IMC). The pilot can then fly to an area of improving weather. However, in this instance, the weather at destination had deteriorated significantly. Returning to a previous location along the route of flight was likely discounted because it was dark and the pilot did not have a night rating or any experience flying at night. The pilot attempted to fly on instruments but became disoriented and the aircraft was inadvertently flown into the ground.

The ELT was mounted in the area of the lower nose window of this aircraft that was destroyed during the impact sequence. The ELT became detached and the antenna cable was sheared off. The functionality of an ELT may be compromised by the location of its installation. Mounting the ELT in the above-mentioned area made it vulnerable to impact forces.

The following TSB Engineering Laboratory reports were completed:

LP 092/007 – Instrument Examination
LP 125/007 – Shadow Analysis

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

Finding as to Causes and Contributing Factors

1. The flight was continued at night in deteriorating weather conditions resulting in the pilot losing visual reference with the ground and becoming disoriented, which resulted in the aircraft being flown into the ground.

Findings as to Risk

1. Departing without the latest available weather increases the possibility of inadvertent flight into inclement weather.

2. Mounting the emergency locator transmitter (ELT) in the area of the lower nose window made it vulnerable to impact damage. As a result, the ELT became detached and was separated from its external antenna during the impact sequence, increasing the risk of the ELT signal not being detected.

Other Finding

1. An examination and testing of the ELT showed that, although its certification was overdue, it was serviceable at the time of the occurrence.

Safety Action Taken

An Expedition Helicopters Inc. operational notice was issued to all its pilots concerning human factors, pilot decision making and standard operating procedures, with emphasis on visual flight rules (VFR) weather minima. The company also provided recommendations on how to conduct cross-country flights.

The company will continue developing and implementing the safety management systems approach, including the addition of more Transport Canada training aids, safety reports concerning human factors and causes of occurrences. The company has completed a pilot survey regarding company safety culture; the results will be analyzed and used for future safety purposes.

Expedition Helicopters Inc. has also implemented a satellite tracking system on all of its aircraft. As a result, the location of its entire fleet can be monitored from its main facility in Cochrane, Ontario.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 04 November 2008.

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