

AVIATION OCCURRENCE REPORT

COLLISION WITH TERRAIN

YELLOWHEAD HELICOPTERS LIMITED

BELL 206B II(HELICOPTER) C-GWXJ

GORDONDALE, ALBERTA 8NM SW

20 OCTOBER 1997

REPORT NUMBER A97W0227

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.

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### *Summary*

The Alberta Department of Environmental Protection, Lands and Forests division, chartered the Bell 206B helicopter, serial number 1791, to conduct aerial timber management inspections. In the morning, cut blocks south of Grande Prairie, Alberta, were inspected, and areas northwest of Grande Prairie were being inspected in the afternoon. The afternoon flight reported airborne from Grande Prairie at 1338 mountain daylight time (MDT), and there was no further radio contact. Beginning at 1455, several attempts were made to establish radio contact with the helicopter, but there was no response. A local search helicopter, with three forestry officers on board, was dispatched at 1545, and, at 1700, they reported that they had spotted the missing helicopter. As a precautionary measure, a second helicopter was dispatched with a forestry officer and two paramedics on board to provide medical aid, if required.

The helicopter crashed approximately 52 miles northwest of Grande Prairie, in the vicinity of the cut blocks that were being inspected. The helicopter descended into the trees in a steep right-bank and steep nose-down attitude. The helicopter was destroyed by the impact and by the post-impact fire. The pilot and the two forestry officers sustained fatal injuries.

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<sup>1</sup> All times are MDT (Coordinated Universal Time minus six hours) unless otherwise noted.

## *Other Factual Information*

Records indicate that the pilot was certified and qualified for the flight in accordance with existing regulations. He had approximately 8 280 total flying hours, of which 6 057 hours were on the Bell 206B. He had been with the company since the spring of 1995. Company representatives, forestry officials, and other clients reported the pilot to be very conscientious, capable, and safety conscious.

On 25 September 1997, a charter group arrived at the airport with an extra passenger that the pilot had not planned for while calculating the fuel load for the trip. To accommodate the extra passenger and remain at or below the maximum allowable gross take-off weight, the pilot siphoned fuel from the helicopter by inserting a hose into the helicopter's fuel tank and siphoning into a container on the ground. During the siphoning process, the pilot inhaled some jet fuel. After the trip, at the end of the day, he became ill and received medical treatment from a family physician for jet fuel aspiration and chemical pneumonia. The pilot described his experience in a letter to Transport Canada System Safety, Prairie and Northern Region, for distribution to pilots. After reporting the incident to the company, he was scheduled off flying status for ten days.

The occurrence pilot had one flight each day on the 6<sup>th</sup> and 7<sup>th</sup> of October and did not fly again until the day of the accident. The forestry officer who accompanied him on the morning flight reported that the pilot was in good spirits and was his normal self. He had flown with the occurrence pilot on approximately 12 occasions during the past year.

The logbooks and maintenance records indicate that the helicopter was certified and equipped in accordance with existing regulations and approved procedures. A review of company records revealed no reported deficiencies before the flight. The main rotor hub and tail rotor systems were undamaged by the fire and showed evidence of being powered at the time of impact.

Damage from the impact and the post-crash fire precluded the examination of the engine accessories and components. The engine and the flight control components were examined at the TSB Engineering Branch. The engine power turbine output coupling was sheared in a manner consistent with a torsional overload. An analysis of the metal splattered on the first stage compressor turbine blades and on the nozzle revealed an aluminum alloy composition consistent with the aluminum coating on the inside of the compressor scroll. The flight control hydraulic servos were sectioned and examined, and no indication of pre-impact damage or malfunction was found. Examination of the hydraulic fluid drained from the servos did not reveal any significant contamination or deterioration. Laboratory examination of the annunciator panel revealed that no warning lights were illuminated at impact. The emergency locator transmitter (ELT) was not found; it is possible that it was destroyed by fire.

Tree strikes at the crash site indicate that the helicopter descended in an approximate 90-degree right-bank and 50-degree nose-down attitude. The first tree top was broken 35 feet above ground level and 31 feet before the impact point on the ground. Two trees, closer to the location of the final impact with the ground, were broken in multiple pieces. The first blade of the main rotor to strike the ground penetrated the soil 28 inches and fractured. The second blade was embedded 18 inches and remained attached to the rotor mast. The intense fuel-fed fire that erupted at impact, from the ruptured fuel tanks, burned grass and trees over an area of 50 feet by 60 feet. The two passengers were ejected from the helicopter on impact, and the pilot remained in the cockpit

area.

Environment Canada's recorded weather for Grande Prairie, 52 miles southeast of the crash site, was at 1400: scattered clouds at 14 000 feet above ground level (agl), an overcast ceiling at 25 000 feet agl, a visibility of 25 miles, a temperature of 10 degrees Celsius, and the winds calm. The Dawson Creek weather, 24 miles west of the crash site, was at 1400: high broken cloud, 20 miles visibility, temperature 10 degrees Celsius, and the wind from the west at 14 miles per hour. Neither station reported a significant change in the weather pattern in the following hour. Personnel at a gas transmission plant, near the crash site, reported no unusual weather pattern during the day of the occurrence.

The Canadian Aviation Regulations (CAR) 404.04(3) states that the Minister may:

- (a) request the holder of a medical certificate to undergo, before a specified date, any medical tests or examinations or provide any additional medical information, as necessary to determine whether the holder continues to meet the medical fitness requirements specified in the personnel licensing standards; and
- (b) suspend, or refuse to renew, the holders' medical certificate if the holder fails to comply with the request referred to in (a) before the specified date.

CAR, Part IV 404.06(1) states the following:

...no holder of a permit, licence or rating shall exercise the privileges of the licence or rating if

- (a) one of the following circumstances exists and could impair the holders' ability to exercise those privileges safely:
  - (i) the holder suffers from an illness, injury or disability,
  - (ii) the holder is taking a drug, or
  - (iii) the holder is receiving medical treatment.

There was no record found to indicate that the pilot had been reexamined by an aviation medical examiner after the jet fuel exposure.

Based on the postmortem examination, all three occupants died of multiple blunt injuries. The pilot had an atherosclerotic coronary heart disease with up to 75 percent stenosis of the left anterior descending and left circumflex coronary arteries. The disease was of a degree that could produce sudden unconsciousness due to abnormal heart beats also called cardiac arrhythmia. Microscopic examination of the lungs revealed no residual incapacitating changes from his jet fuel exposure. The pilot's aviation medical reports and electrocardiograms did not reveal the presence of coronary artery disease.

## *Analysis*

Because of the almost complete destruction of the helicopter by the crash and fire, it could not be determined

whether any pre-impact failure or system malfunction contributed to this accident; however, none was identified.

The evidence gathered at the crash scene was similar to that of a weather-related accident where the pilot becomes disoriented and loses control of the helicopter due to the lack of visual cues. However, the reported weather from persons in the local area provides no supporting evidence that unusual weather patterns were present on the afternoon of the occurrence.

There is insufficient medical information available to determine the influence of the 25 September 1997 jet fuel inhalation incident and the subsequent toxic effects which may have acted on the liver, the respiratory, cardiovascular, and immune systems.

The possibility that atherosclerotic coronary artery disease caused the pilot to lose consciousness and/or to be disorientated and, subsequently, to lose control of the helicopter could not be conclusively ruled out.

The following Engineering Branch reports were completed:

- LP 170/97 - Instrument Examination
- LP 171/97 - Helicopter Components Examination
- LP 176/97 - Engine Components Examination

## *Findings*

1. Records show that the pilot was certified and qualified for the flight in accordance with existing regulations.
2. Records show that the helicopter was certified and equipped in accordance with existing regulations and approved procedures.
3. Most of the the helicopter was destroyed by the impact forces and the post-crash fire.
4. Examination of the components revealed no mechanical deficiencies that would have contributed to the accident.
5. The engine was determined to be developing substantial power at impact.
6. Postmortem examination revealed no residual effects from the aspiration-type chemical-induced pneumonia resulting from jet fuel inhalation.
7. The pilot had advanced coronary artery disease.

## *Causes and Contributing Factors*

The cause of the loss of control of the helicopter that led to a steep right-bank and nose-down descent to the

ground could not be determined.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 16 September 1998.*