

Transportation Safety Board  
of Canada



Bureau de la sécurité des transports  
du Canada

**AVIATION INVESTIGATION REPORT  
A07C0148**



**COLLISION WITH POWER LINE TOWER**

**CUSTOM HELICOPTERS LTD.  
BELL 206L-3 C-GCHG  
CRANBERRY PORTAGE, MANITOBA  
09 AUGUST 2007**

**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

### Collision with Power Line Tower

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Bell 206L-3 C-GCHG  
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### *Summary*

The Custom Helicopters Ltd. Bell 206L-3 helicopter (registration C-GCHG, serial number 51508) was transporting a lineman to Tower 63 on the Sheridan power line near Cranberry Portage, Manitoba. While hovering near the tower, the helicopter's skid gear became entangled in the uppermost cables. The helicopter struck the tower and crashed on the adjacent power line right-of-way. The helicopter was substantially damaged by impact forces and fire; the pilot and passenger both sustained fatal injuries. The accident occurred during daylight hours at 0903 central daylight time.

*Ce rapport est également disponible en français.*

## *Other Factual Information*

On the day of the occurrence, C-GCHG departed the Manitoba Hydro yard at Ross Lake (near Flin Flon), dropped off two linemen at Tower 142 (near Whitefish Lake), and then proceeded to Tower 63, which is near Nisto Lake (see Appendix A). The Manitoba Hydro flight-following log indicated that C-GCHG departed Tower 142 at approximately 0854 central daylight time.<sup>1</sup> At 0903, the 230-volt power line circuit breaker (P58C) tripped, which was considered to have coincided with the helicopter striking the tower (number 63) structure and causing an electrical short in the power line.

The pilot held a valid Canadian commercial helicopter pilot licence and had accumulated approximately 1300 hours of flight experience on the Bell 206 helicopter type. He had not received any training specific to helicopter operations near power lines, nor was that type of training required. According to available information, he was fit and qualified to act as the pilot-in-command of C-GCHG on the day of the accident. A preliminary autopsy report indicated that the pilot died of injuries sustained during the initial impact sequence. At the time of the occurrence, the pilot was well rested and had not flown an excessive number of hours.

The passenger was seated directly behind the pilot during the departure of the accident flight. After the accident, his body was found at the base of the tower structure approximately 40 feet from the wreckage. The passenger's injuries were determined to have resulted from a fall.

The nearest recorded weather at the time of the accident was for Flin Flon, 10 nautical miles (nm) north of the accident site. The 0900 Flin Flon weather was as follows: wind 020° true (T) at 6 knots, visibility 15 statute miles in light rain, overcast cloud at 1500 feet above ground level. Weather conditions such as this would allow the helicopter to operate under visual flight rules (VFR).<sup>2</sup> There was no rain at Tower 142. Although the actual weather conditions at the accident site could not be determined, light rain would not have obscured the pilot's perception of his position or his view of the tower.

At the time of the accident, C-GCHG was contracted to Manitoba Hydro for transporting power line maintenance personnel for repair and inspection purposes. Line maintenance personnel were not trained or required to perform work from the helicopter while airborne. The nature of the flying was such that linemen were dropped off at the nearest suitable landing site, from where they walked to the tower, climbed up to perform the required work, climbed down, and walked back to the helicopter. It was not the practice of the operator or of Manitoba Hydro personnel to conduct work on a line from the helicopter during such operations.

## *Wreckage and Site Information*

The main portion of the fuselage was 40 feet northeast of the tower and was almost entirely consumed by the post-crash fire. The burnt area surrounding the fuselage was conical in shape and quite localized. The helicopter skid gear had been caught up in the tower cross arm structure and remained there. The right skid gear had cable scratches on it that matched the

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<sup>1</sup> All times are central daylight times (Coordinated Universal Time minus five hours).

<sup>2</sup> VFR allow the pilot to operate with visual reference to the ground and horizon.

pattern of the uppermost skyline cables.<sup>3</sup> The skid gear attachment point had failed from tensional overload forces in the forward direction where it had separated from the belly of the fuselage. Both upright arms of the hydro tower were damaged and the westerly cable span was significantly stretched.

The main rotor head and the blades separated from the fuselage and were found 100 feet east-northeast of the tower. The rotor mast had failed due to torsional overload forces consistent with those sustained from a high-power, main rotor strike. The tail boom had been torn away from the main fuselage and was located approximately 60 feet south of the main wreckage area.

The first-stage engine compressor rotors showed indications of rubbing on the casing, a small visible collapse of the compressor blades on the left side, and a bending of the left-side inlet guide vane. There was rubbing on the blade tips of the last stage of the power turbine rotor.

There was no indication of any pre-impact mechanical anomalies. C-GCHG was a commercially registered helicopter and a review of its technical records indicated that it been maintained in accordance with the *Canadian Aviation Regulations* (CARs). The gross weight of the helicopter could not be accurately determined; however, an estimated weight and balance calculation indicated that the helicopter's weight and centre of gravity were within limits at the time of the accident.

A global positioning system (GPS) receiver found in the wreckage was sent to the TSB Engineering Laboratory. An examination of the data stored in the unit indicated that no flight track or route data for the flight from Tower 142 to the accident site had been saved.

### *Safety Oversight*

There are hazards associated with flying and hovering in a power line environment that are not associated with other helicopter operations.<sup>4</sup> At the time of the occurrence, the helicopter operator did not offer or require any specialized training to identify and reduce exposure to these hazards.

Large power utility companies and offshore oil exploration companies have a method of conducting safety audits on their contracted aviation companies.<sup>5</sup> At the time of the occurrence, Manitoba Hydro did not have such a method of conducting safety audits on contract aviation companies. The most recent Transport Canada (TC) audit of the operator's flight operations took place in November 2003. TC's audit schedule requires that Custom Helicopters Ltd. be audited every three years.

The operator was not required to have a safety management system (SMS). Several of the management pilots gathered and communicated safety information throughout the company. However, there was no formal procedure for line pilots to report hazardous operations to management or any method of monitoring hazard identification and safety action.

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<sup>3</sup> The skyline cables on this power line were the uppermost cables, used for grounding the power line.

<sup>4</sup> TD world.com Electric Utility Operations, April 2005.

<sup>5</sup> Helicopter Association International, Section 3-1.

It was reported that some of the operator's pilots had been transferred off the Manitoba Hydro contract before the occurrence. It was believed that the reason for these transfers was that these pilots had refused to operate their helicopters under certain types of hazardous conditions. Some pilots had a perception of pressure to operate under hazardous conditions and to avoid reporting such conditions encountered while flying for Manitoba Hydro.

## *Analysis*

The damage to the helicopter engine and rotor assemblies indicates that the damage was sustained while the drive-train was operating under power. The damage to the skid gear and tower structure was consistent with flailing damage sustained from an uncontrollable state of rotation after the helicopter became entangled in the cable and tower structure.

The nature of the damage to the skid gear attachment point indicates that the helicopter was hovering when it became entangled in the tower structure. The reason why the helicopter was hovering so close to the tower was not determined.

The VFR weather conditions that existed at the time of the occurrence (visibility 15 miles and a ceiling of 1500 overcast with the possibility of light rain) would not have affected the pilot's perception of his position or complicated the task of hovering near the tower.

The passenger's injuries and the location of his body indicated that he fell from or was ejected from the helicopter during the accident sequence. The reason for the fall or ejection was not determined.

Although there are hazards specific to helicopter operations near power lines, Manitoba Hydro did not have an audit process to ensure that safety standards and quality of services provided by contract aviation services were met. Such an audit procedure could have helped identify the need for specialized training to reduce risks in operations near power lines.

The operator did not offer or require its pilots to take any specialized training to identify and reduce exposure to power line hazards. It also had no procedure for line pilots to report hazardous operating conditions. Such programs could have reduced the risks associated with helicopter power line operations.

The following Engineering Laboratory report was completed:

LP 091/2007 - GPS Analysis

This report is available from the Transportation Safety Board of Canada upon request.

## *Finding as to Causes and Contributing Factors*

1. The helicopter was hovering close to the power line tower structure and became entangled in the upper (non-energized) cable span. As a result, the helicopter became uncontrollable, collided with the tower structure, and crashed.

## *Finding as to Risk*

1. The operator did not have training procedures specific to helicopter operations in the vicinity of power lines and did not have a procedure for reporting hazardous operating conditions. Such programs could have reduced the risks associated with helicopter power line operations.

## *Other Finding*

1. Manitoba Hydro did not have an audit procedure in place that might have identified the need for specialized training for helicopter operations specific to their contract requirements.

## *Safety Action Taken*

In response to information revealed during the investigation, Manitoba Hydro has taken the following safety action:

- Manitoba Hydro forwarded Other Finding number 1 to its internal audit department in February 2008 for review and implementation.
- Manitoba Hydro has undertaken to write and implement a "Safe Work Procedure Standard" for employees and pilots conducting power line inspections.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 27 May 2008.*

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# Appendix A – Route of Flight

