

**AVIATION OCCURRENCE REPORT**

**FLIGHT IN UNFAVOURABLE WEATHER**

**FLEET 80 CANUCK C-FEBF  
HOLDEN LAKE, QUEBEC  
14 MARCH 1994**

**REPORT NUMBER A94Q0038**



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 Occurrence Report

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#### *Synopsis*

The ski-equipped aircraft was on a travel flight from Watabeag Lake, Ontario, to Mallorytown, Ontario, with the pilot and his dog on board. Persons residing along the shoreline of Holden Lake, Quebec, saw the wreckage of an aircraft on the frozen surface of the lake. Police were informed and dispatched to the accident site. The pilot was dead; the dog survived the impact despite serious injuries.

The Board determined that the pilot encountered unfavourable weather conducive to whiteout, and lost visual reference with the ground, thereby reducing the pilot's ability to determine his height above ground. The aircraft descended in a turn until it struck the frozen surface of the lake.

Ce rapport est également disponible en français.

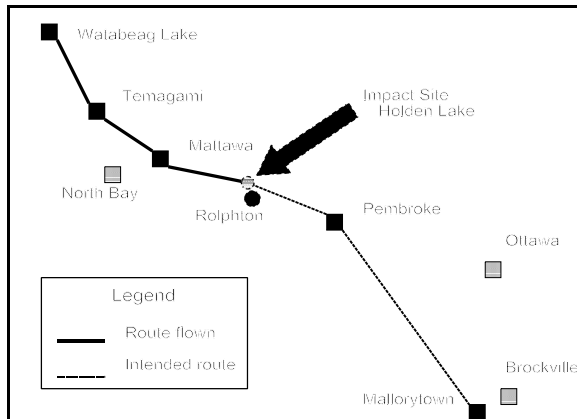
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## 1.0 Factual Information

### 1.1 History of the Flight

The ski-equipped aircraft, registration C-FEBF, took off from Watabeag Lake, Ontario, at 0745 eastern standard time (EST)<sup>1</sup> for a visual flight rules (VFR)<sup>2</sup> flight to Mallorytown with the pilot and his dog on board.



**Figure 1 - Flight Route**

The pilot had intended to stop at Temagami, then proceed along the Ottawa River via Mattawa, Pembroke, and Golden Lake, to his destination of Mallo village located south of Brockville. The aircraft was seen during a stopover at Temagami. When the aircraft took off from Temagami,

weather conditions were favourable for VFR flight. It could not be determined whether the aircraft landed anywhere else en route.

Throughout the morning a dense fog covered the frozen surface of Holden Lake, Quebec, located on the intended route. Between noon and 1300, the fog started to clear, and the wreckage of the aircraft was seen on the frozen lake surface. The police in Rolphton, Ontario, were informed immediately, and assistance was dispatched to the site.

The pilot had sustained fatal injuries; his dog survived the impact. The aircraft was substantially damaged.

The accident occurred in daylight around 1130, at latitude 46°12'N, longitude 077°47'W.

### 1.2 Injuries to Persons

	Crew	Passengers	Others	Total
Fatal	1	-	-	1
Serious	-	-	-	-
Minor/None	-	-	-	-
Total	1	-	-	1

### 1.3 Damage to Aircraft

Damage to the aircraft was substantial, and was mainly concentrated in the right wing, the lower fuselage including the skis, the propeller, and the lower portion of the engine fairing.

### 1.4 Other Damage

None.

### 1.5 Personnel Information

	Pilot-in-Command
Age	86
Pilot Licence	PPL
Medical Expiry Date	01 November 1994
Total Flying Time	3,500 hr estimated
Total on Type	600 hr estimated
Total Last 90 Days	15 hr estimated
Total on Type Last 90 Days	15 hr estimated
Hours on Duty Prior to Occurrence	5 hr
Hours off Duty Prior to	

1 All times are EST (Coordinated Universal Time (UTC) minus five hours) unless otherwise indicated.

2 See Glossary for all abbreviations and acronyms.

Work Period 10 hr

The pilot occupied the left seat at the time of the accident. The pilot was certified and qualified for VFR flight in accordance with existing regulations. The pilot did not hold an instrument flight rating. As the pilot's log-book could not be located, his flying time was estimated.

### 1.5.1 Flight Preparation

The pilot usually did not request meteorological information from Environment Canada or file a flight plan. On the morning of the accident, he obtained information about local weather conditions by listening to the radio.

## 1.6 Aircraft Information

Particulars	
Manufacturer	Fleet Manufacturing Ltd.
Type	80-1012 Canuck
Year of Manufacture	1948
Serial Number	150
Certificate of Airworthiness (Flight Permit)	Valid
Total Airframe Time	4,700 hr
Engine Type (number of)	Teledyne Continental C-90-12F (1)
Propeller/Rotor Type (number of)	McCaughey 1A90 (1)
Maximum Allowable Take-off Weight	1,480 lb
Recommended Fuel Type(s)	regular automotive gasoline
Fuel Type Used	regular automotive gasoline

The pilot was the owner of the aircraft; he had purchased it on 17 August 1988. The aircraft was certified, equipped, and maintained

in accordance with existing regulations and approved procedures. The aircraft was not equipped for instrument flight. The aircraft was fitted with skis, and its weight and centre of gravity were within prescribed limits.

## 1.7 Meteorological Information

A study by Environment Canada indicated that, on the morning of 14 March 1994, southern Quebec and eastern Ontario were under dense fog caused by a very weak pressure ridge line extending from Chibougamau, Quebec, to Petawawa, Ontario, at 0700. The weather map showed that all weather stations in southern Ontario and southwestern Quebec reported reduced visibility in fog.

As a low-pressure system moved in from northwestern Ontario, a southeasterly wind developed in the Ottawa Valley, causing some mixing of the air mass at low levels. This wind gradually dissipated the fog in the area, as reported by the Petawawa station, between 1100 and 1300. At 1109, the Petawawa station, near Pembroke, Ontario, reported good visibility with winds from the southeast at seven knots. However, it is highly probable that some fog patches remained over and near the Ottawa River for a brief period.

Flight conditions on departure from Watabeag Lake were favourable for VFR flight. However, until 1200, Holden Lake was under a layer of fog that reduced visibility to about one-half mile, which is below VFR minima. The fog began to clear later.

## 1.8 Aids to Navigation

No aids to navigation were used. The aircraft was equipped with a Global Positioning System (GPS) which was functioning normally. However, no data were retrieved from it.

The pilot had mentioned that he found it hard to use the GPS correctly, and he preferred to fly at low altitude and follow rivers, which he could then use for an emergency landing if necessary.

## 1.9 Communications

No radio contact was established from the aircraft to a ground station or vice versa. The aircraft was equipped with a radio, but the pilot normally did not use it.

## 1.10 *Accident Site*

Holden Lake was created by the construction of a dam downstream on the Ottawa River. The lake is about 13,000 feet long, and its width varies between 1,500 and 4,000 feet. At the point where the aircraft was found, the width is about 4,000 feet. Holden Lake was on the intended flight route. The frozen surface of the lake was covered with perfectly white snow, and provided a suitable surface for a ski landing.

## 1.11 *Flight Recorders*

The aircraft was not equipped with a flight data recorder (FDR) or cockpit voice recorder (CVR), nor was either required by regulation.

## 1.12 *Wreckage and Impact Information*

### 1.12.1 *Impact Sequence*

The aircraft heading on the intended route was to be 110 degrees magnetic (°M). On the initial impact, the aircraft heading was 360°M and its bank angle was about 30° left. The initial impact marks on the frozen surface of the lake were made by the left wing-tip. The left ski struck the ice at about the same time, and the aircraft continued on a trajectory of 337°M. About 80 feet from that point, all right wing struts and the upper portion and base of the right ski separated from the aircraft. The aircraft finally rotated to the right on the ice and came to rest on its belly about 105 feet further on and facing 195°M.

Just before the aircraft came to rest, the right wing, which was attached to the fuselage by its rear attachment, folded against the upper fuselage at an angle of 45° towards the tail.

The deformation of the tubular structure of the cockpit, the seats, the lower (forward) fuselage, and the two skis, and particularly the shearing of the rivets attaching the ski base to the right ski, indicate that the impact forces were absorbed mainly vertically, despite the induced forward velocity. The deceleration forces of the aircraft on the frozen, snow-covered surface were quickly

absorbed through the transfer of forces from the longitudinal axis to the lateral axis.

Comparison of the forward fuselage with the aft three-quarters (from baggage

compartment to tail) indicated that the aircraft was in a slight nose-low attitude at the time of impact with the ice. However, the minor damage to the left wing-tip indicates that the aircraft was in a very steep left turn when it first struck the frozen surface of the lake. It probably bounced and struck the ice with its nose before falling hard on its right side.

### 1.12.2 *Aircraft Examination*

Detailed examination of the wreckage revealed no pre-crash deficiencies of the aircraft or its systems. There was no evidence of fire either before or after the occurrence.

### 1.12.3 *Powerplant and Propeller*

The engine mount was bent and remained attached to the firewall at only one point. Given the position of the throttle, all indications are that the throttle may have been moved from "cruise" to "idle" by impact forces. The engine crankshaft could be turned normally by hand, allowing the hypothesis of internal metallurgical failure to be rejected. The moderate rearward deflection of the two propeller blades indicates low engine power on impact.

The fuel filter for the engine fuel supply, mounted on the firewall, was ruptured, allowing the entire contents of the fuel tank to drain out. All indications are that the fuel drained onto the ice, but the quantity of fuel lost could not be determined.

## 1.13 *Medical Information*

There was no evidence that incapacitation or physiological or psychological factors affected the pilot's performance.

## 1.14 *Survival Aspects*

### 1.14.1 *Seat-belts*

The pilot was not wearing his seat-belt at the time of impact. Use of the seat-belt probably would have lessened the severity of the pilot's injuries.

### 1.14.2 *Search and Rescue*

The emergency locator transmitter (ELT), manufactured by Canadian Airmotive Ltd. (model EBC-102A), was maintained in accordance with aviation regulations. The Rescue Coordination Centre (RCC) stated that the ELT transmitted a signal and functioned normally during and after the crash. After the signal was received, a helicopter was dispatched from the base at Petawawa.

### 1.15 *Whiteout*

The Transport Canada *Aeronautical Information Publication* (AIP, section Air 2.12.7) describes whiteout as a dangerous flight condition. Whiteout occurs over an unbroken snow cover and beneath a uniformly overcast sky. Because the light is so diffused, the sky and terrain blend imperceptibly into one another, obliterating the horizon. Neither horizon, shadows, nor clouds are discernible, and sense of depth and orientation is lost; pilots can see only very dark, nearby objects.

The real hazard in a whiteout is that pilots do not suspect the phenomenon because they are in clear air. In many whiteout accidents, pilots have flown into snow-covered surfaces unaware that they have been descending, and confident that they could see the ground. Consequently, when pilots encounter the whiteout conditions described above, or even suspect they are in such conditions, they should immediately climb if at low level, or level off and turn towards an area containing sharp terrain features. Pilots should not continue the flight unless they are prepared to cross the whiteout area using instruments, and have the skills to do so.





## 2.0 *Analysis*

There was no evidence found of any airframe failure or system malfunction prior to or during the flight. The pilot had no IFR flight experience and was not instrument qualified, and the aircraft was not equipped for IFR flight.

When the pilot departed Temagami, meteorological conditions were favourable for VFR flight. However, conditions deteriorated on the intended route along the Ottawa River and became conducive to whiteout. As the pilot usually preferred to follow rivers at low altitude, it is likely that he lost visual reference when flying over the middle of Holden Lake, which was snow-covered and shrouded in fog.

The 30° left-roll attitude of the aircraft and the difference between the intended route and the aircraft heading on impact suggest that the pilot was attempting to execute a turn, probably to return to more favourable weather. With visibility about one-half mile and whiteout conditions preventing the pilot from assessing his height above ground, the aircraft probably descended in a turn until it struck the frozen surface of the lake.

Use of the seat-belt probably would have lessened the severity of the pilot's injuries.



### 3.0 *Conclusions*

#### 3.1 *Findings*

1. The pilot was certified and qualified for the flight in accordance with existing regulations.
2. The pilot had no IFR flight experience and was not instrument qualified.
3. The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.
4. There was no evidence found of any airframe failure or system malfunction prior to or during the flight.
5. The weight and centre of gravity were within the prescribed limits.
6. Meteorological conditions at the point of departure were favourable for VFR flight.
7. Meteorological conditions deteriorated en route and were conducive to whiteout.
8. The snow-covered surface of the lake was covered with fog, reducing visibility below VFR minima.
9. Visibility of about one-half mile and whiteout conditions prevented the pilot from assessing his height above ground, and the aircraft descended in a turn until it struck the frozen surface of the lake.
10. Use of the seat-belt probably would have lessened the severity of the pilot's injuries.

#### 3.2 *Causes*

The pilot encountered unfavourable weather conducive to whiteout, and lost visual reference with the ground, thereby reducing the pilot's ability to determine his height above ground. The aircraft descended in a turn until it struck the frozen surface of the lake.



## 4.0 *Safety Action*

The Board has no aviation safety recommendations to issue at this time.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson, John W. Stants, and members Gerald E. Bennett, Zita Brunet, the Hon. Wilfred R. DuPont and Hugh MacNeil, authorized the release of this report on 16 November 1994.*



*Appendix A - Glossary*

AIP	Aeronautical Information Publication
CVR	cockpit voice recorder
ELT	emergency locator transmitter
EST	eastern standard time
FDR	flight data recorder
GPS	Global Positioning System
hr	hour(s)
IFR	instrument flight rules
lb	pound(s)
PPL	Private Pilot Licence
RCC	Rescue Coordination Centre
TSB	Transportation Safety Board of Canada
VFR	visual flight rules
°	degree(s)
'	minute(s)