

AVIATION OCCURRENCE REPORT

PROPELLER FAILURE

**PELICAN C-IAZR
CHENAIL-DU-MOINE, QUEBEC
01 OCTOBER 1995**

REPORT NUMBER A95Q0199

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 pilot of the float-equipped Pelican ultralight, registration C-IAZR, had just taken off from Chenail-du-Moine, Quebec, for a local pleasure flight. Shortly after take-off, the pilot executed a 180-degree right-hand turn to come back to the channel. While overflying the channel, the wings of the aircraft suddenly began to vibrate, and a continuous noise was heard. The aircraft then turned around again, creating the impression that the pilot intended to return to his point of departure. After crossing the channel, the aircraft executed a third 180-degree turn. During this turn, and at a height of about 100 feet above ground level, the aircraft stalled and crashed on an island.

Shortly after the accident, an explosion occurred. The aircraft caught fire and was destroyed. The pilot, the only occupant of the aircraft, died on impact.

Other Factual Information

The pilot was qualified for the flight. He had acquired his aircraft in October 1994, and he subsequently took his training on his own aircraft. He obtained his ultralight pilot licence in March 1995 and had accumulated 141 flying hours at the time of the accident.

The pilot had always flown on his own aircraft.

At the time of the accident, the sky was clear and there was no wind. Several boats were in the channel.

The autopsy revealed that death was caused by multiple trauma sustained on impact when deceleration forces exceeded the limits of human tolerance. The results of toxicology tests conducted at the Civil Aviation Medical Unit (CAMU) of Health Canada located in Toronto, Ontario, were negative.

The Pelican is an advanced ultralight. The aircraft was built in 1988 by its first owner. The aircraft was flown for three years, then was parked at an airport until it was sold to its current owner.

The owner replaced the Rotax engine with a Subaru engine. He also removed the right-hand dual control and installed floats and a new carbon fibre propeller. The pilot later repaired the propeller. The leading edge of one of the blades had been damaged when the propeller came in contact with the engine cowling during a static power test sometime before the accident. The precise nature of the repairs could not be established.

The day before the accident, the owner mentioned that he was not satisfied with the repairs. On the flight made following the repairs, the engine had started to vibrate and the vibrations had damaged the engine mounts. That evening, he repaired the propeller again and also repaired the engine mount. He mentioned at the time that he had doubts about the quality of the repair.

The aircraft struck the ground at almost 90 degrees and flipped over.

At the conclusion of the impact sequence, the aircraft fuselage lay flat on the ground, and the wings were upside down on the side opposite to their normal position on the fuselage. Both floats were on the same side of the aircraft. The aircraft was approximately 80 per cent destroyed by the fire.

When the wreckage was examined, only two of the three propeller blades had been found. In an information circular to owners, the propeller manufacturer indicated that the type of propeller used by the owner can be repaired by the user following a certain procedure. However, the manufacturer stated that only propellers with nickel-armoured leading edges should be used in floatplane operations. That type of propeller cannot be repaired by the user and must be returned to the manufacturer.

Witnesses stated that, during the flight, the engine seemed to be operating normally. Some witnesses heard variations in the sound of the engine after the vibrations started. They associated the sound with variations in engine power.

A fire broke out a few seconds after ground impact. The tanks in both wings contained fuel. When the owner had installed the engine, he had relocated the battery towards the aft fuselage area for balance. The battery cables ran along the bottom of the fuselage to the front. Evidence of a short circuit was observed on one of the battery cables in the forward cabin area.

The flight controls were examined for continuity. The elevator cables and rudder cables were intact. The aileron control had broken in the tube running between the left and right controls. The aileron bell cranks and the control tubes running from the cabin to each of the ailerons had melted in the intense heat of the fire.

The aileron control was forwarded to the TSB Engineering Branch Laboratory. A rupture test was performed on the end opposite to the one found ruptured in the wreckage examination. The end ruptured at 950 pounds. This evaluation determined that the control had been manufactured in accordance with established safety standards and complied with the manufacturer's standards.

Analysis

The pilot was qualified for the flight, and meteorological conditions were favourable for the flight.

The pilot had made repairs to one propeller blade. However, the precise nature of the repair could not be determined because that blade was never found. However, the pilot did not seem satisfied with the repair, as a previous repair to the same propeller had not produced the desired results.

When the aircraft started to vibrate in flight, all indications are that the pilot tried to come back to the channel and land the ultralight. To that end, he adjusted engine power several times to reduce the vibrations caused by the loss of the propeller blade.

As there were several boats on the water, the pilot executed a 180-degree turn to avoid them before setting the ultralight down. The evidence indicates that the aircraft stalled during this low-altitude turn before crashing on the island and catching fire.

The following Engineering Branch report was completed:
LP 141/95 - Aileron Pushrod Examination.

Findings

1. The pilot was qualified for the flight.
2. The pilot repaired one blade of the propeller and seemed unsatisfied with the results.
3. The pilot was authorized to repair the propeller.
4. One propeller blade separated in flight and was not found.
5. The cause of the loss of the propeller blade in flight could not be determined.
6. The wings of the aircraft started to vibrate shortly before the accident.
7. The aircraft stalled in a low-altitude turn and crashed.

Causes and Contributing Factors

The aircraft stalled in a low-altitude turn after one blade separated from the propeller. The repair to the propeller of the ultralight contributed to the accident.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson John W. Stants, and members Zita Brunet and Maurice Harquail, authorized the release of this report on 13 February 1996.