AVIATION OCCURRENCE REPORT
A94Q0164

FUEL STARVATION

CESSNA 182 C-FAQC
NOTRE-DAME-DE-LOURDES, QUEBEC
27 AUGUST 1994

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Summary

The Cessna 182D took off from runway 01 at the Lourdes-de-Joliette airport, Quebec, at about 1400 eastern daylight saving time (EDT) to drop parachutists. A pilot, a parachuting instructor, and four student parachutists were on board. The pilot climbed above the airport in ascending right turns. About 10 minutes after take-off, at an altitude of 3 000 feet above ground level (agl), the four students jumped as planned. The instructor remained on board the aircraft to supervise other students who were to jump later.

After the drop, the pilot turned into a left tail wind for runway 01. He made an extended sideslip to the left to hasten the descent. Just as the pilot was executing his final turn, the engine (Teledyne Continental 0-470-L) stopped. The pilot immediately levelled the wings, and the engine restarted momentarily, but it stopped again when the pilot opened up the throttle. The pilot considered the aircraft's altitude too low to avoid obstacles straight ahead, and so he made a steep right turn to attempt a forced landing in a ploughed field below him. During the turn, the right wing struck the ground and the aircraft yawed before coming to rest on its nose against a tree. The pilot suffered minor injuries. The instructor, who was not secured, suffered serious injuries to the face.

Ce rapport est également disponible en français.

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1 All times are EDT (coordinated universal time [UTC] minus four hours) unless otherwise stated.

Factual Information

Weather conditions conducive to visual flight rules (VFR) flight prevailed at the time of the crash.

The aircraft was examined at the scene of the accident. The fuselage had suffered little deformation. The aircraft was resting on its nose, and both wings were partly torn off. The aircraft was not equipped with seats or safety belts for the passengers. The parachutists would sit on a cushion covering the rear floor of the aircraft. Only the pilot had a seat and a safety belt. According to Air Navigation Order, Series II, No. 2/ CRCc.-28, subsection 5(1):

> An aircraft
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> (a) having a gross weight not exceeding 12,500 pounds and engaged in a non-scheduled commercial air service with a combined load of passengers and freight, or
>
> (b) engaged in the activity of dropping parachutists,
>
> may be flown without providing seats for the passengers or parachutists if it is equipped with safety belts or safety harnesses of a type that may be secured to the primary structure of the aircraft and that have been approved by the Minister.

The examination of the wreckage revealed that the left tank contained approximately five gallons of fuel and that the right tank was empty. The fuel selector was placed on BOTH. There was no evidence of a pre-impact engine malfunction that would have limited the engine's ability to produce its full power. There was no chordwise scratching or any torsion damage on the propeller, indicating that it was not being driven by the engine.

During the preflight check, the pilot had noted that the right tank contained approximately 2.4 gallons of fuel and the left tank, 12 gallons. As the flight was to last 15 minutes, the pilot did not consider it necessary to refuel the aircraft.

The engine is supplied with fuel by two rubber tanks of 32.5 US gallons each, mounted in the wings. These fuel tanks are fitted with two electric control indicators. The fuel from each of the tanks reaches the carburettor through a line whose intake port is located at the root of the wing in the rear third of its chord. The fuel flows by gravity and runs to the carburettor through the fuel selector and the fuel filter. During some uncoordinated flight manoeuvres, such as slipping or sliding, the fuel may move away from the tank outlet port. When the outlet port is uncovered, the engine is no longer supplied with fuel and engine stoppage follows.

Five gallons of fuel in each tank are unusable in normal flight, and 1.5 gallons are unusable in cruising flight. The Cessna 182D flight manual recommends against taking off when the fuel indicator shows the tanks to be one-quarter full or less.

Analysis

On take-off, the amount of fuel in the right tank was insufficient to supply the engine when the aircraft was in a flight phase other than cruising. During a large part of the flight, therefore, only the left tank was able to supply fuel. Considering that the aircraft consumed at least four gallons of fuel during the flight, there were approximately three gallons of usable fuel remaining in the left tank when the engine stopped. As the descent was made in an extended sideslip to the left, the fuel in the left tank moved away from the outlet port, which was thus uncovered. The engine, no longer being supplied with fuel, stopped shortly thereafter. The altitude at which the engine stopped was insufficient for the pilot either to restart the engine and restore power or to manoeuvre safely to make a forced landing on suitable ground.

In light of the condition of the cabin after the accident and the injuries suffered by the pilot, it is reasonable to assume that the passenger's injuries might have been less serious if he had been secured.

Findings

1. On take-off, the amount of fuel in the right tank was insufficient to supply the engine when the aircraft was in a flight phase other than cruising.

2. The amount of fuel in the tanks was below the level recommended by the manufacturer for take-off.

3. The engine stopped after an extended sideslip to the left during the descent.

4. The engine stopped at too low an altitude for the pilot to restart the engine or to make a safe forced landing.

5. No pre-impact abnormality that could explain the engine stoppage was observed.

6. The passenger, who did not have a seat or a safety belt, suffered serious injuries to the face.

Causes and Other Contributing Factors

The engine stopped at too low an altitude for the pilot to restart the engine or make a safe forced landing. The insufficient amount of fuel in the right tank on take-off and the extended sideslip to the left during the descent contributed to the fuel starvation and the engine stoppage.

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 January 1995.