Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

AVIATION INVESTIGATION REPORT

A00P0094

COLLISION WITH TERRAIN

STITS PLAYMATE SA-11A (AMATEUR BUILT) C-FWFU

KAMLOOPS, BRITISH COLUMBIA 3 nm N

01 JUNE 2000

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.

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Summary

The pilot departed from his home base at the Kamloops, British Columbia, airport in his amateur-built Stits Playmate aircraft, C-FWFU, serial number S2, at 0707 Pacific daylight time for a local flight to the north of the airfield. The pilot, who was also the builder of the aircraft, was the only person on board. Between 0830 and 0900, the aircraft flew over Heffley Creek and Rayleigh, communities 9 and 13 nautical miles, respectively, north of Kamloops. At about 0900, the Kamloops Flight Service Station heard a weak radio call from C-FWFU indicating that the aircraft was losing power and that the pilot was going to attempt a forced landing. The aircraft was observed flying southbound, low and parallel to Highway 5, and losing altitude. Its engine was running rough. The highway at this location is on top of a built-up embankment. At the base of the embankment, parallel to the highway, are a row of poles, which support hydro lines and a telephone line, and a fence about four feet high.

Just before the crash, the aircraft's wings wobbled from side to side, the left wing dropped, and the aircraft made an abrupt left turn. The aircraft passed over the fence, struck and severed the telephone line, and struck the embankment below the highway. The pilot of a helicopter working in the area heard a "PAN PAN" call from C-FWFU and diverted to the scene.[1] Responders arrived at the scene almost immediately. Although effectively destroyed, the aircraft was still largely intact, and the cockpit was not compromised. The pilot received fatal injuries.

Ce rapport est également disponible en français.

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[1] "PAN PAN" is a radio communication used to indicate a situation where the safety of an aircraft or person is threatened but immediate assistance is not required.

Other Factual Information

The Stits Playmate is an amateur-built aircraft, constructed using plans that were first available in 1966. The accident aircraft was equipped with a Lycoming O-320-B1A engine, serial number L-4467-39. Information from the aircraft's logbooks showed that the owner began constructing the aircraft in 1967. He first flew the aircraft on 6 October 1998. Records indicate that on 18 November 1998 the aircraft was extensively damaged during a hard landing. The aircraft was repaired and signed out as ready for flight on 30 May 2000. The next flight was the fatal accident flight. The total accumulated airtime on the aircraft, not including the accident flight, was 12.5 hours.

The wreckage was initially examined at the accident site. There was no indication of fire. The aircraft was found upright on an embankment on the lower side of Highway 5, oriented 90 degrees to the highway, with the nose facing up the embankment. An impact mark on the embankment, approximately 15 feet above the wreckage, suggests that the aircraft struck the embankment about 10 feet below the level of the highway and slid down the slope.

The carburettor and the exhaust system were extensively damaged, and the carburettor was detached from the engine. Because of the damage, it could not be determined if the carburettor heat system was operable or if the carburettor heat had been selected "on". The fuel line fitting into the carburettor had fractured and detached from the carburettor, and the gascolator had broken from the firewall. The 24-gallon (US) fuel tank, located forward of the instrument panel, was found to be empty. The fuel selector was found in the "on" position immediately following the crash, although the selector was later moved by first responders to reduce the risk of fire. A small amount of fuel was found in the carburettor float bowl and in the fuel line between the gascolator and the carburettor. Both of these fuel samples were light red and smelled of MOGAS.[2] Because of the damage to the fuel system, any fuel that might have been in the fuel tank at impact would have drained onto the ground. The ground, under the engine, was discoloured and smelled like fuel; the volume of fuel that had spilled could not be determined.

The wreckage was recovered from the accident site for a more detailed examination. All airframe defects found were determined to have been caused by the impact at the time of the accident. The continuity of all flight controls was confirmed. The engine, which was too damaged to allow a run-up, was examined externally and then disassembled for internal inspection. The engine and its components were damaged in several areas during impact. The carburettor, part number IO-3678-12, was the subject of Lycoming Service Bulletin No. 258, issued 29 May 1959. The Service Bulletin states that some aircraft have experienced rough engine operation due to an excessively rich mixture in the cruise power range and recommends that the carburettor be replaced with a "-32" model. There are no airworthiness requirements for amateur-built aircraft owners to comply with engine manufacturer's service bulletins. The left and right magnetos were bench-tested and then disassembled for inspection. The left magneto operated only three of the four spark plugs below 750 rpm (revolutions per minute) and only two spark plugs below 300 rpm. The magneto should be able to operate all the spark plugs down to about 150 rpm.

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[2] MOGAS, unleaded automotive gasoline, is approved by Transport Canada for use in certain aircraft types under specific conditions. *Aeronautical Information Publication,* issued by Transport Canada, describes MOGAS as being either green or undyed.

The engine teardown revealed that the engine had been operated using automotive gasoline that was dyed red. Two plastic, five-gallon fuel containers, found in the pilot's vehicle, were full of gasoline identical to the fuel samples recovered from the aircraft wreckage. It is common for pilots to use automotive gasoline in light aircraft. The only aviation fuels available at the Kamloops Airport are 100LL AVGAS (aviation gasoline), which is dyed blue, and Jet A, which is straw-coloured. Neither of those fuels matches the characteristics of the fuel found in the aircraft wreckage or in the five-gallon containers.

The pilot held a valid Canadian private pilot licence and a current Canadian aviation medical examination certificate. He had accumulated about 500 hours of flight time and was the sole pilot of the accident aircraft, in which he had accumulated 12.5 hours before the accident flight. He had not recorded any flight time since November 1998. Results of the autopsy and the toxicology tests gave no indication that incapacitation or physiological factors would have affected the pilot's performance. The pilot was not using the available shoulder harness.

The exact route the pilot flew before the accident could not be determined. The amount of fuel on board the aircraft on departure from Kamloops and the amount of fuel that was consumed during the accident flight were also not determined.

The weather recorded at Kamloops Airport at the time of the accident indicated good visual flight conditions. The wind was southeasterly at eight knots, and the lowest cloud base was at 6000 feet above ground level. The temperature was 12 degrees Celsius, and the dew point was 7 degrees Celsius. According to *Aeronautical Information Publication,* section AIR (Airmanship) 2.3, this combination of temperature and dew point is conducive to "serious" (the most extreme of four possible conditions) carburettor icing at any engine power setting. This section also notes that engines operating on automotive gasoline are more susceptible to the formation of carburettor ice than are engines operated on AVGAS. The staff at the engine overhaul facility at Kamloops Airport were conducting an engine run-up at about the same time as the accident occurred. Serious carburettor icing reportedly occurred in the engine they were testing, an engine that was operating on AVGAS.

Analysis

Testing and examination of the carburettor and the magnetos revealed defects that may have led to a rough-running engine. However, by themselves, these defects are unlikely to have caused a loss of engine power extreme enough to have required the pilot to force land.

The outside air temperature and dew point at the time of the accident are known to have been highly conducive to the formation of carburettor ice, and the use of MOGAS increased the likelihood of this occurring. Based on these conditions, and the problems experienced by the engine test company at about the same time, carburettor icing was almost certainly the major factor in the aircraft's loss of engine power.

The pilot was seen to be flying parallel to the highway for some time before the crash occurred. It could not be determined why the pilot did not land on the highway as his aircraft was losing power.

Examination of the aircraft did not reveal any defect that would have led to a loss of aircraft control. It is concluded that the abrupt wing-drop and left turn immediately before impact were

probably the result of an aerodynamic stall resulting from low airspeed. The pilot would not have had time to recover from a stall at such a low height before the aircraft struck the ground.

The severity of injury resulting from the crash was increased because the shoulder harness was not worn. Transport Canada regulations do not require the use of a shoulder belt or a harness for aircraft in this category.

Findings as to Causes and Contributing Factors

1. Carburettor icing almost certainly contributed to engine loss of power, which led the pilot to attempt a forced landing.

2. The aircraft stalled at a height above the ground that was too low for the pilot to recover.

Findings as to Risk

1. The pilot did not wear the available shoulder harness, greatly increasing the risk of injury.

2. Environmental conditions at the time of the accident presented a serious risk of carburettor icing.

3. The aircraft was being operated on automotive gasoline, which is known to exacerbate carburettor icing problems.

4. The model of carburettor used on the accident engine is known to have caused rough-running engines. As well, the accident aircraft's carburettor and magnetos had defects that may have led to a rough-running engine.

5. The faulty left magneto may have caused the engine to run rough at lower rpm.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 09 May 2001.