

AVIATION INVESTIGATION REPORT

A01W0118

LOSS OF CONTROL—COLLISION WITH TERRAIN

AIR SPRAY (1967) LTD.

CESSNA T 310Q C-FGZR

RED EARTH CREEK, ALBERTA, 33 NM NE

25 MAY 2001

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 Cessna T 310Q, C-FGZR, serial number 310Q1034, was working as a birddog aircraft (Birddog 6) on a forest fire about 33 nautical miles northeast of Red Earth Creek, Alberta. During a turning manoeuvre at low altitude, in preparation to lead the tanker group's Douglas B26 water bombers to a drop zone, the aircraft descended into the trees and crashed. The aircraft was destroyed by fire. Both occupants—the pilot and the air attack officer—were fatally injured.

Ce rapport est également disponible en français.

Other Factual Information

The Cessna T 310Q departed the company's main base at Red Deer, Alberta, and flew directly to Manning, Alberta. The aircraft landed at about 1100 mountain daylight time¹ and refuelled. At 1334, the aircraft was dispatched as a member of Tanker Group 6 to conduct an initial attack on a forest fire, Fire 87, located 94 nautical miles (nm) east of Manning. This was the first operational flight of the season for C-FGZR and the pilot.

A birddog pilot's role is to transport the Land and Forest Service air attack officer (AAO) to the scene of a fire, help the AAO plan and coordinate the airborne attack, and manage the restricted airspace near the fire. The pilot assists in the planning and checking of routes to and from the drop zone and in leading the water bombers into their bombing runs. These activities usually involve extensive manoeuvring of the birddog aircraft through a number of circuits at low altitude and low airspeed. It is common for birddog pilots in the Cessna 310 to conduct their low-level operations at about 120 to 140 mph, with 15° of flap and landing gear retracted. Birddogs regularly achieve bank angles of 40° to 60° in turns, as confirmed by measurement of previous recordings from forward-looking infrared cameras mounted on various birddog aircraft.

When Tanker Group 6 arrived on location, Fire 87 was spreading south with a light northerly wind. The smoke column was well defined, with good visibility along the flanks. After flying clockwise reconnaissance circuits around the fire, C-FGZR was observed making steep left-hand turns east of the fire. This was consistent with the crew's communication that they intended to have the tankers lay retardant on the east flank of the fire in a line from north to south. The circuit in which the accident occurred was to be a "dummy run" where C-FGZR would demonstrate the desired flight path and zone for the first retardant drop. C-FGZR was last observed in a left turn about 200 feet above ground level and about 0.7 statute mile (sm) from the east flank of the fire, as it entered the downwind leg of the dummy-run circuit.²

The time and the conditions of the actual impact are unknown; however, C-FGZR was last observed in the turn when radio contact with the aircraft was lost at about 1414. The accident occurred 1911 feet above sea level,³ in relatively level, obstacle-free, forested terrain with trees from 20 to 30 feet tall. An intense fuel-fed fire, initiated by the crash, consumed the wreckage and spread into the surrounding forest. The wreckage was found at about 1525, after the fire and the heavy smoke were reduced by water bombers.

The wreckage was examined on site, to the extent possible because of destruction by impact and fire. No pre-existing defects could be found. The main wreckage trail was about 100 feet long on a track of 330° magnetic, preceded by a 40-foot-long by 10-foot-wide slash through trees at an angle of 42° from horizontal. Trees on the right-hand side of the wreckage trail were cut at a 31° angle from the horizontal. The right-hand wingtip fuel tank contacted the ground first, followed by the right-hand engine, the fuselage nose section, the left-hand engine, and the left-hand wingtip tank.

¹ All times are mountain daylight time (Coordinated Universal Time minus six hours).

² *Downwind*, in this instance, refers to the position of the aircraft in the circuit, not to the actual wind direction.

³ Units are consistent with official manuals, documents, and instructions used by or issued to the crew.

Both engine crankshaft flanges were broken, and the propellers had separated. All propeller blades were twisted and bent, with leading-edge and chord-wise damage. The landing gear was retracted, and flap position could not be determined.

The emergency locator transmitter was destroyed in the impact and the post-crash fire, and did not emit a signal. There was no unusual radio communication or distress call from the pilot before impact.

The pilot held an airline transport rating and a valid first-class medical certificate. He had about 10 000 hours of total flying time, with 368 hours on type, including about 85 hours in 2000 in his first season as a birddog pilot. When he arrived in Red Deer for his annual training in April 2001, the pilot had not flown since the end of the previous season, in September 2000. In April 2000, he received 8 to 10 hours of company supervised flight training on the Cessna 310 and 5 hours of ground instruction. In April 2001, he completed 3 hours of supervised flight training and 4 hours of recurrent ground training. Additionally, in April 2001, he acted as training pilot for 3.1 hours in the Cessna 310. The company requires birddog pilots in the Cessna 310 to undergo annually at least 3 hours of recurrent flight training and 3 hours of recurrent ground training.

Good visual-flight-rules weather conditions prevailed throughout the area. The weather in Fort McMurray, the nearest Nav Canada weather reporting station, was as follows: wind 080° at 10 knots, a few clouds at 5000 feet, ceiling estimated at 25 000 feet broken, visibility 15 sm, temperature 23°C, dew point 10°C, and altimeter 30.07 inches of mercury. The weather reported at 1200 at the Trout Mountain Fire Lookout, 17 nm southeast of the accident site, was as follows: wind northwest at 3 knots; clouds 5/10 coverage, cumulus and cumulonimbus; temperature 21.5°C; and relative humidity 27%. At the time of the accident, the weather on location was observed to be generally high cloud, visibility greater than 15 sm, and wind from the north at about 13 mph, with no turbulence.

The aircraft was certified, maintained, and equipped in accordance with existing regulations and approved procedures. The weight of the aircraft at the time of the occurrence was calculated to have been 5226 pounds, within the maximum-gross-weight limit of 5500 pounds. The calculated centre of gravity (C of G) was 36.8 inches aft of the datum, which is at the forward limit of the C of G envelope for a weight of 5200 pounds.

In *Flight Training Manual*, Transport Canada defines an aerodynamic aircraft stall as a loss of lift and an increase in drag that occurs when an aircraft is flown at an angle of attack greater than the angle for maximum lift. The stalling speed increases in manoeuvring flight, such as turns or abrupt changes in the aircraft's flight path; the steeper the turn, the higher the stalling speed. The manufacturer calculates the power-off stalling speed of the Cessna T 310Q at 5200 pounds, in straight and level flight, with landing gear retracted and flaps at 15°, to be 84 mph indicated airspeed. Under the same conditions at 45° of bank, the stalling speed increases to 100 mph, and at 60° of bank to 119 mph. A forward C of G will normally increase the stalling speed. When an aircraft stalls during a level or descending turn, the inside wing normally stalls first, and the aircraft will roll to the inside of the turn. During a climbing turn, the higher wing normally stalls first and drops abruptly.

Analysis

Several factors were involved during the manoeuvring for the dummy run: low relative airspeed, steep left turns, and forward C of G position, which would have increased the stall speed and decreased the margin between airspeed and stall. The aircraft likely stalled in a climbing attitude. This would result in a sharp roll to the right. With the aircraft's low altitude, recovery before ground impact would be difficult. Tree-strike evidence indicates that at impact the aircraft was in a 42° nose-down attitude in a right bank of about 105°. On ground contact, the aircraft cartwheeled and tumbled.

Examination of the aircraft wreckage revealed no defects that could have led to the accident. Damage to the two propellers indicated that both engines were producing power at impact.

Findings as to Causes and Contributing Factors

1. The aircraft likely entered a stall during a low-level turning manoeuvre from which recovery was not possible.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 11 June 2002.