

**Aviation Safety Investigation Report
199300002**

**Cessna Aircraft Company
310Q**

28 January 1993

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Occurrence Number: 199300002 **Occurrence Type:** Accident
Location: 305km N Forrest
State: WA **Inv Category:** 4
Date: Thursday 28 January 1993
Time: 1620 hours **Time Zone** WST
Highest Injury Level: Serious
Injuries:

	Fatal	Serious	Minor	None	Total
Crew	0	1	0	0	1
Ground	0	0	0	0	0
Passenger	0	3	0	0	3
Total	0	4	0	0	4

Aircraft Manufacturer: Cessna Aircraft Company
Aircraft Model: 310Q
Aircraft Registration: VH-FYZ **Serial Number:** 310Q-1014
Type of Operation: Charter Passenger
Damage to Aircraft: Substantial
Departure Point: Tjuntjunjarra WA
Departure Time: 1555 WST
Destination: Warburton WA

Crew Details:

Role	Class of Licence	Hours on	
		Type	Hours Total
Pilot-In-Command	Commercial	50.0	460

Approved for Release: Wednesday, July 20, 1994

The aircraft, with the pilot and three passengers on board, departed Tjuntjunjarra with fuel sufficient for the flight. The auxiliary tanks were selected after the aircraft reached a cruising altitude of 3,500 ft AMSL. The cruising altitude, which was 2,200 ft above ground level, was selected because of potentially adverse wind conditions at higher altitudes. The pilot was unsure of the precise contents of the auxiliary fuel tanks, because of an indicator inaccuracy, but he expected to gain at least a further 30 minutes endurance from them. Twenty five minutes after departure the right engine lost all power.

The pilot assumed that the right auxiliary tank had run dry and he selected the right fuel selector to the main tank. The engine did not re-start and the pilot observed the fuel flow to be zero. To ensure that the left engine continued to run the pilot selected the left fuel selector to the main tank.

The pilot then attempted to select the right auxiliary fuel pump to HIGH (the settings are OFF, LOW and HIGH) but inadvertently selected the left pump to HIGH. Realising his mistake, the pilot reversed the selections. Shortly after, the left engine also lost all power.

In an attempt to rectify the situation the pilot carried out an engine failure and re-start check on the right engine, selecting HIGH on the auxiliary fuel pump (as directed by the Engine Failure During Flight check list). He also altered the fuel selections for both engines, from main to auxiliary and back to main. At no stage did he feather either propeller. During the attempts to re-start the engines the left auxiliary fuel pump was also selected to HIGH. The only response to the pilot's actions was a momentary surge of power from the right engine.

During the trouble-shooting process the pilot had placed the aircraft in a glide descent and turned towards the nearest clear area. Within approximately 2 minutes of the first loss of power the aircraft was approaching 500 ft above ground level, and the pilot decided to concentrate his efforts on completing a successful forced landing and ceased his trouble-shooting activities. He lined the aircraft up on a clear area and attempted a landing, using full flap, with the landing gear retracted. The aircraft touched down heavily before colliding with several trees and sliding to a stop.

The occupants, all of whom received back injuries, evacuated the aircraft through the forward cabin door and the baggage compartment door.

A check of expected fuel consumption against auxiliary tank contents indicated that the right auxiliary fuel tank ran dry at about the time that it should have. Consequently, the most likely reason for the initial loss of power in the right engine was exhaustion of the fuel in the right auxiliary tank.

The Aircraft Flight Manual contains the following CAUTION;

'If the auxiliary fuel pump switches are placed in the HIGH position with the engine-driven fuel pumps operating normally, total loss of engine power may occur.'

Operation of the auxiliary fuel pump in conjunction with the engine-driven pump can cause an over-supply of fuel to the engine and an excessively rich air/fuel mixture which can lead to a power loss.

As both engine-driven fuel pumps appeared to be operating normally up until the time of the power loss, the most likely reason for the loss of power in the left engine and the failure of both engines to re-start normally was that the pilot had selected both the auxiliary fuel pump switches to HIGH during his trouble-shooting. The momentary surge of power from the right engine probably occurred as the fuel pressure passed through the normal range, with HIGH selected, as it built up to a level that caused the engine to lose power again.

The pilot was aware of a cockpit placard which indicated that the auxiliary fuel pump should be selected to HIGH if there was very low or no fuel pressure. He was also aware that the engine failure checklist indicated that he could operate the auxiliary fuel pump on HIGH if the fuel pressure was deficient. His initial selection of HIGH was based on his observation of a zero fuel pressure reading. The pilot was not aware of the CAUTION in the Aircraft Flight Manual nor of the danger of operating the auxiliary fuel pump switches on HIGH. He could not recall covering this during his endorsement training on the type. However, his instructor believed that it had been.

The aircraft should have been capable of maintaining height on one engine. The immediate priority following the right engine failure should have been to ensure continued operation of the left engine. The pilot's perception of the urgency of the situation caused him to divert his attention to the restoration of power to the right engine. As a result his actions exacerbated the problem.

The deficiency in the pilot's knowledge concerning the use of the auxiliary fuel pump HIGH setting, and which action should have had priority, was not identified by the operator's check and training system, as the pilot was employed on a casual basis and had not been checked by the operator in the Cessna 310.

The low cruising altitude chosen by the pilot reduced the amount of time available to trouble-shoot the problem before he had to make a commitment to the landing.

Significant Factors

The following factors were considered relevant to the development of this accident:

- 1.The pilot's preparation for flight in the Cessna 310 was inadequate, in that his knowledge of the aircraft's systems was insufficient to meet the requirements of a basic abnormal situation.
- 2.The operator's procedures were deficient in that they did not attempt to identify the pilot's level of system knowledge prior to allocating him to a commercial task.
- 3.The low cruise altitude reduced the amount of time available for the pilot to trouble-shoot the situation.