Aviation Safety Investigation Report 198803433

Cessna TU206-A

18 February 1988

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Occurrence Number: 198803433 **Occurrence Type:** Accident
Location: 30 km SSE Proserpine QLD
Date: 18 February 1988 **Time:** 1210
Highest Injury Level: Minor
Injuries:

	Fatal	Serious	Minor	None
Crew	0	0	0	0
Ground	0	0	0	-
Passenger	0	0	0	0
Total	**0**	**0**	**2**	**0**

Aircraft Details: Cessna TU206-A
Registration: VH-DGD
Serial Number: U206-0522
Operation Type: Aerial Work
Damage Level: Substantial
Departure Point: Cairns QLD
Departure Time: 0843
Destination: Mackay QLD

Approved for Release: February 27th 1989

Circumstances:

Before DEPARTURE, the pilot removed the fuel filler caps and checked that both tanks were full. He calculated the fuel endurance as 300 minutes. The flight proceeded normally with fuel selection being alternated between the left and right tanks. After a flight time of about 207 minutes, and with the left tank selected, the engine began to surge in a manner described by the pilot as typical of a tank running dry. The pilot immediately selected the right tank and turned the auxiliary fuel pump to "LO". The surging continued so he reselected the left tank and then the right tank, operating the auxiliary fuel pump on "HI" in short bursts. The engine did not restart. By this time, the aircraft had descended to about 2500 feet above ground level so the pilot ceased trouble-shooting and concentrated on landing the aircraft. The aircraft was landed in a cleared area but sustained damage when it nosed into a ditch late in the landing roll. Calculations indicated that 123 litres of fuel had been used from the left tank and 84 litres from the right tank. This was the first occasion since the pilot had been flying the aircraft that he had used more than 90 litres from the left tank. Inspection of the aircraft revealed that the right tank was about one third full. The left tank, however, was dry and five press studs attached to the upper surface of the fuel cell had become detached from the wing upper skin. This allowed the roof of the cell to sag, thus reducing the cell's capacity. The fuel gauge continued to indicate normally. There was, therefore, no way the pilot could have detected the fault other than to run the tank dry. The auxiliary fuel pump is operated by two switches situated side by side on the instrument panel. The right switch is labelled "LO" and is used for engine starting. It will only operate when the ignition switch is turned to start. The left switch, labelled "HI", is used for engine operation should the engine driven pump fail, and also when switching from an empty tank to one containing fuel. Tests determined that the auxiliary fuel pump in the aircraft was operating correctly on both settings. The pilot was under the impression that to leave the auxiliary pump on "HI" would flood the engine. For this reason, he selected "LO" and operated the "HI" switch in short bursts. These actions, along with changing back to the (empty) left tank, were insufficient to purge the air from the fuel lines in

the short time the pilot was able to devote to trouble shooting the problem. A placard on the instrument panel lists the procedures to be followed in the event of a major fuel flow fluctuation/power surge. The first item on the list is "AUXILIARY FUEL PUMP ON" but there is no reference to the "HI" or "LO" switches. Had the placard read "AUXILIARY FUEL PUMP - HI", the uncertainty felt by the pilot concerning use of the "HI" setting may not have arisen.

Significant Factors:

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

1. The left wing tank partially collapsed, limiting the amount of fuel the tank would hold.

2. The left tank ran dry earlier than expected by the pilot.

3. The engine failed due to fuel starvation.

4. The pilot was uncertain as to the operation of the auxiliary fuel pump on the "HI" and "LO" settings.

5. The instrument panel placard listing instructions for major fuel flow fluctuations/power surges was inaccurately worded.

6. The pilot mismanaged the fuel system when attempting to restart the engine.

7. The area selected for landing was unsuitable because of the position of the ditch across the paddock.

Reccomendations:

The recommendation is made that aircraft fitted with the type of auxiliary fuel pump system figuring in this accident be fitted with instrument panel placards which clearly indicate that the pump should be set to "HI" as the first action in the event of a major fuel flow fluctuation or power surge.