

**Aviation Safety Investigation Report
199100512**

Cessna 340A

24 January 1991

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Occurrence Number: 199100512
Location: 17 km E Ceduna SA
Date: 24 January 1991
Highest Injury Level: Nil
Injuries:

Occurrence Type: Accident
Time: 2214

| | Fatal | Serious | Minor | None |
|--------------|----------|----------|----------|----------|
| Crew | 0 | 0 | 1 | 1 |
| Ground | 0 | 0 | 0 | - |
| Passenger | 0 | 0 | 0 | 2 |
| Total | 0 | 0 | 0 | 3 |

Aircraft Details: Cessna 340A
Registration: VH-XGL
Serial Number: 340A-0739
Operation Type: Private
Damage Level: Substantial
Departure Point: Parkes NSW
Departure Time: 1729
Destination: Ceduna SA

Approved for Release: 4th June 1991

Circumstances:

The aircraft was refuelled by the pilot immediately prior to the accident flight. It was reportedly the first occasion on which he was able to fill the tanks to capacity due to weight considerations on previous legs. The pilot also conducted tyre inflation checks during which he confirmed that no drain cocks were left open after the water drain checks. Some 20 kilometres short of his destination, the engines malfunctioned which lead to a total loss of power from what the pilot believed to be complete fuel exhaustion. A MAYDAY call was made and the pilot reported descending through cloud and then sea mist. Fortunately, as the pilot regained visibility, he noticed a whitish track in the beam of the landing lights and he was able to manoeuvre and select the landing gear down in the remaining height available. The landing gear did not have time to extend fully before the aircraft touched down on the dirt road. The aircraft slid some 50-60 metres on its under-surface before the left wing struck some roadside scrub which slewed the aircraft through about 150 degrees as it came to rest. The pilot had flight planned to allow the mandatory fuel reserves and was puzzled as to how the aircraft could have run out of fuel. The investigation was confined to this aspect of the operations as there were no reported aircraft anomalies. In examining the pilot's fuel management procedures, two anomalies were discovered. Contrary to the aircraft operating manual, he had run the aircraft engines on the main tanks for 90 minutes after engine start rather than 90 minutes after take-off. This practice would result in the main tanks containing more fuel than recommended when the subsequent selection of the auxiliary tanks is made. When the auxiliary tanks are selected, the fuel is fed directly to the engines. However, the fuel from the auxiliary tanks that is not used by the engines is pumped back into the main tanks. With the main tanks containing more fuel than is recommended and continually being topped up by the engine fuel return pumps, the main tanks will eventually fill up and start to overflow, thereby reducing the aircraft's overall endurance. The other anomaly related to the pilot's report that fuel transfer from the only nacelle tank to the main tanks was indicated as complete after some 34 minutes rather than nearly 60 minutes as reported in the operating manual. This anomaly

would indicate that there was more fuel in the main tanks than recommended. The significance of this difference was not noted by the pilot. A witness reported that some 13 litres of fuel remained in the nacelle tank after the crash and other evidence suggested spillage during the crash. Notwithstanding, the amount of fuel lost from the nacelle tank and possible venting would not account for the magnitude of the fuel shortage experienced by the pilot. The aircraft had only been available for operations for a short time and the operator had reportedly not been aware of any fuel usage rates different from the manufacturer's recommended figures and they recommended the use of these rates to the pilot. The pilot stated that he was extremely attentive to fuel considerations and usually calibrated his own aircraft dipsticks but he had not had time to do so for this aircraft. In addition, due to time constraints and fuel loads, he had not been able to establish an actual fuel usage rate. After the accident, evidence from other operators of the aircraft type suggested that a fuel planning figure as high as 240 pounds/hour should be used compared to the manufacturer's recommended figure of 182 pounds/hour. To compound the problems for the pilot, he had established that there was a significant error in the aircraft fuel gauges. Evidence points to the fact that the pilot was very meticulous in his approach to flight planning and operating procedures although he had only a limited experience on the aircraft type. Other evidence available to the investigation suggests, however, that the pilot was not as confident in his knowledge of aircraft systems and operations as he would like others to believe. Albeit in hindsight, the accident might have been avoided if the pilot had not placed implicit faith in his preflight fuel calculations and had had a more healthy scepticism over Whyalla at which point he had done a recalculation of his fuel reserves. A better knowledge of the aircraft's fuel system should have caused him to be more circumspect about his actual fuel remaining as evidenced by the nacelle fuel tank transfer anomaly. In addition, prudence should have engendered further caution in what was his first long range operation in a relatively unfamiliar aircraft for which he had no established fuel usage rates.

Significant Factors:

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

1. The pilot was inexperienced on the long-range operation of the aircraft.
 2. Accurate fuel usage rates were not available to the pilot.
 3. Inaccurate calculations of fuel usage and/or fuel loss or mismanagement led to fuel starvation of the engines.
- This accident was not the subject of an on-scene investigation. -