

**Aviation Safety Investigation Report
199703415**

**Piper Aircraft Corp
Chieftain**

19 October 1997

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Occurrence Number: 199703415 **Occurrence Type:** Accident
Location: Cootamundra, Aerodrome
State: NSW **Inv Category:** 4
Date: Sunday 19 October 1997
Time: 1553 hours **Time Zone** EST
Highest Injury Level: None

Aircraft Manufacturer: Piper Aircraft Corp
Aircraft Model: PA-31-350
Aircraft Registration: VH-RDL **Serial Number:** 31-7405195
Type of Operation: Charter Passenger
Damage to Aircraft: Substantial
Departure Point: 'Boonoke' via Deniliquin NSW
Departure Time: 1503 EST
Destination: Cootamundra NSW

Crew Details:

Role	Class of Licence	Hours on	
		Type	Hours Total
Pilot-In-Command	ATPL	650.0	2662

Approved for Release: Monday, June 29, 1998

Piper Chieftain aircraft, VH-RDL, departed Boonoke (a property near Deniliquin) on a charter flight to Sydney in accordance with the Instrument Flight Rules, with a planned intermediate refuelling stop at Cootamundra. As the aircraft approached the Cootamundra circuit area the left engine began to surge. The pilot commenced a straight-in approach to the 10 grass runway, however the right engine also began to surge and lose power.

The aircraft was landed in a paddock, some 400 metres before the beginning of grass strip 10. During the ensuing ground roll the pilot was able to manoeuvre the aircraft over a shallow creek bed and a fence. The aircraft then passed through the aerodrome boundary fence before stopping on the runway. The nine passengers and pilot escaped without injury. The aircraft was substantially damaged.

During a subsequent examination of the aircraft it was determined that all useable fuel had been exhausted from both inboard tanks. The left outboard fuel tank contained 11 litres, while the right outboard tank contained 30 litres.

The Chieftain was one of a number of aircraft chartered to carry a large group of people to and from Boonoke during the weekend of 18-19 October. On the evening of 17 October the operator briefed all pilots associated with the proposed charter on how the operation was to be conducted. During the briefing the operator said that he had arranged with fuel agents at Deniliquin and Cootamundra to provide fuel as required. Fuel purchases were to be placed on the operators account. Refreshments had also been arranged for passengers at Cootamundra while refuelling was taking place.

On the afternoon of 18 October VH-RDL was ferried from Bankstown to Sydney, having departed Bankstown with some 602 litres of fuel, comprised of full inboard tanks, and 100 litres in each of the two outboard tanks. After arriving at Sydney another pilot took command of the aircraft and flew nine passengers to Deniliquin. No fuel was added to the fuel tanks after the aircraft left Bankstown.

The following afternoon VH-RDL, which had remained at Deniliquin, was scheduled to take nine passengers from Boonoke to Sydney. A pilot who had flown another Chieftain, VH-XML, from Sydney to Deniliquin the previous evening, was tasked to carry out the return flight in VH-RDL. Prior to departing Deniliquin the pilot he said he carried out a Daily Inspection. His first action was to turn on the master switch and check the fuel contents indicators. He also opened both inboard tank caps to carry out a visual contents check. Although the tank interiors were in shadow he thought he could just see fuel, but he could not touch it. Based on his observations, and a comparison of the estimated fuel burn from Bankstown, he estimated the fuel remaining totalled 280 litres, whereas he had calculated he required 257 litres to fly to Cootamundra via Boonoke, including appropriate fuel reserves. The pilot also said that it was his understanding from the earlier briefing that each aircraft should carry sufficient fuel from Sydney to allow a return to Cootamundra via Boonoke before refuelling. He believed that it was preferable not to refuel at Deniliquin, although he felt that if he needed fuel it would not have been a problem obtaining it.

Another pilot reported that he spoke to the pilot of VH-RDL prior to the flight and suggested that the aircraft be refuelled prior to departing from Deniliquin, to eliminate the need to land en-route. However, the pilot of VH-RDL indicated he would refuel at Cootamundra, which would also provide for a passenger "comfort stop".

The aircraft was duly flown to Boonoke, to take on passengers, before departing for Cootamundra. After takeoff the aircraft was climbed to its planned cruising altitude of 9,000 ft, drawing fuel from the inboard tanks. Once established in level flight the outboard tanks were selected and fuel was drawn from those tanks until commencing descent, some 16 minutes before the estimated time of arrival at Cootamundra. At about that point the pilot moved the fuel selectors to draw fuel from the inboard tanks. He said the outboard fuel contents gauges were indicating empty, and he had been monitoring the engine exhaust gas temperature gauges for initial indications of exhaustion of the outboard tanks. However, no indications were noticed before he reselected the inboard tanks, in accordance with a Flight Manual limitation to only use the outboard tanks in level flight. The pilot said he thought the inboard fuel tank contents were indicating between 1/4 and 1/2 full. At that stage he said he had no concerns about the amount of fuel remaining.

As the aircraft approached the Cootamundra circuit area the left engine began to surge. The pilot looked at the left fuel gauge and noted it was indicating below 1/4. He selected the left outboard tank and turned on the boost pump. The engine continued to surge briefly before operating normally. He then turned off the boost pump. At that point the aircraft was at an altitude of some 3,500-4,000 ft. Shortly after, the left engine again commenced to surge. The pilot said he again turned on the left boost pump and moved the fuel selector to run both engines from the right inboard tank via the fuel crossfeed.

With the aircraft still descending the pilot elected to carry out a straight-in approach to land on the 10 grass runway, joining final approach at an altitude of about 3,000 ft. Because the aircraft appeared to be high the landing gear was extended. However, both engines began to surge and lose power. Because the pilot was unsure if the aircraft could reach the runway threshold he elected to land short in an adjoining paddock, progressively extending flap prior to touchdown.

A subsequent investigation found that Chieftain, VH-XML, had carried out a similar flight to VH-RDL, from Sydney to Cootamundra, via Deniliquin and Boonoke. However, that aircraft had departed Sydney with full tanks, and was found to have used 551.17 litres upon arrival at Cootamundra. The useable capacity of both inboard and outboard tanks of the Chieftain totals 690 litres. The fuel remaining in VH-RDL after the accident was 41 litres. When compared to the fuel burn of VH-XML, the total fuel on board VH-RDL when it departed Sydney would have been about 590 litres.

The actual fuel carried in the aircraft on departure from Boonoke was probably about 190 litres, some 67 litres less than the minimum fuel required, including reserves.

