



**Australian Government**

**Australian Transport Safety Bureau**

# Fuel management issue involving a PA-31-350, VH-HJH

19 km north of Goulburn Airport, New South Wales, on 12 October 2015

**ATSB Transport Safety Report**  
Aviation Occurrence Investigation  
AO-2015-120  
Final – 28 January 2016

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

#### **Publishing information**

**Published by:** Australian Transport Safety Bureau  
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#### **Addendum**

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# Fuel management issue, involving a PA-31-350, VH-HJH

## What happened

On the morning of 12 October 2015, the pilot completed flight planning, then prepared a PA-31-350 (Piper Chieftain) aircraft, registered VH-HJH, for an aerial survey flight in the southern highlands area of New South Wales. As the flight was to be conducted at 10,000 ft above mean sea level, the pilot also discussed airspace requirements with both Sydney and Canberra Air Traffic Control (ATC) units. Due to potential conflicts with jet traffic at that level, ATC requested the pilot delay the departure from Bankstown, New South Wales, for a few minutes.

**Piper Chieftain VH-HJH**



Source: South East QLD Aviation News

Prior to departure, the pilot delivered a safety briefing to the client's three personnel who would be on board the flight. The pilot reported spending extra time briefing one of the group (Passenger 3) who had not flown in a light aircraft before.

After departure from Bankstown, at about 1300 Eastern Standard Time (EST), ATC initially provided vectors to the pilot, then cleared the aircraft to the first of many planned waypoints in the area. The pilot reported that both towering cumulus (TC) and cumulus (CU) clouds were beginning to form in the area, and this produced some turbulence, but nothing substantial. However, the pilot remained concerned about Passenger 3, seated at the rear of the aircraft, who appeared to find the conditions difficult to tolerate.

The pilot's workload remained high. Apart from the pre-planned waypoints, additional 'landmarks' were being relayed to the pilot from the client's operator on the ground. The pilot had to check the landmarks on the chart, translate these requests into usable GPS coordinates, and then enter them into the GPS unit. The pilot then requested an amended clearance from ATC. The pilot visually manoeuvred the aircraft around cloud, and kept the aircraft as 'smooth' as possible, so that the survey operators on board could gain the necessary data from their equipment. The pilot also continued to monitor the wellbeing of the passengers, and in particular, passenger 3.

The aircraft was fitted with a main tank (inboard) and an auxiliary tank (outboard), for each of the two engines. As was the pilot's normal routine, they kept a very detailed fuel log, and continually cross-checked the fuel flow, fuel used, and time remaining in each of the four fuel tanks. The power settings required for the survey were less than normal cruise performance settings.

As the plan was to return to Bankstown at the completion of the survey, the pilot kept a continual awareness of the slowly deteriorating weather there. The pilot reported that the potential alternates of Camden, Goulburn, Canberra and Bathurst remained as options. Thunderstorms were now developing in the Sydney Basin area, although Camden Airport automatic terminal information service (ATIS) still advised of clear conditions at that location. One of the passengers (Passenger 1), seated behind the pilot, discussed the thunderstorms and their impact on the flight with the pilot. As the pilot had kept a detailed fuel log and awareness of the surrounding weather, they were able to reassure the passenger that there was plenty of fuel available to complete the survey and, if necessary, divert to an alternate should a return Bankstown not be possible.

After a little over 2 hours, the clients had almost completed their work, and the pilot prepared to fly to the last waypoint before the return to Bankstown. The weather in the immediate area had now deteriorated even further, and the pilot reported having to divert off track to avoid thunderstorms, although all the alternates remained viable options.

As the pilot was about to make a scheduled fuel tank change from the auxiliary (outboard) tanks to the main tanks, the pilot again checked the fuel log. There was 16 minutes of fuel remaining in the left auxiliary tank (slightly more in the right auxiliary)

The pilot momentarily reflected on the weather versus fuel situation. As the weather between the aircraft's current location and Bankstown had deteriorated even further, the pilot elected to alter their original plan, and keep the auxiliary tanks selected in order to use another few minutes of the remaining 16 minutes of fuel. This would leave the maximum fuel available in the main tanks. The main tanks in this aircraft are required to be selected during the descent, approach and landing, and, in this case, a possible diversion to an alternate.

During this period, as the pilot diverted around large banks of cloud to keep the aircraft in clear weather and discussed the necessity to fly to the last waypoint with passenger 1, the left auxiliary tank ran dry and the engine surged. This temporary asymmetric situation caused the aircraft to yaw. The pilot reacted immediately and changed the fuel selectors to the main tanks. The engine responded, and power was restored.

The pilot then continued with the remainder of the flight and landed without incident back at Bankstown Airport. At the time of landing, all reserves were intact with ample fuel remaining.

### ***Pilot comments***

In hindsight, the pilot reported that the decision to run the last few minutes from the auxiliary tanks may have not been necessary, and probably over-conservative. There had been no operational pressure for them to deviate from the scheduled fuel selection plan. The pilot reported that, due to the combination of distractions, they did not notice the low fuel warning light come on. This may have been further influenced by the amount of light in the cockpit at the time perhaps 'dimming' the effect of the red warning light situated on the instrument panel near the compass.

The pilot reported that this was a 'non-standard' high workload flight, coupled with deteriorating weather. Although the pilot had over 7,500 flying hours, with about 400 hours on Chieftain aircraft, they found themselves momentarily 'caught out'. However, due to the aircraft's altitude at the time, and the pilot's quick reaction, there was no danger to the aircraft or the occupants.

The pilot also debriefed all passengers when on the ground.

### ***Operator comments***

The Chief Pilot advised that the pilot followed all company fuel planning procedures as outlined in the company operations manual. There are no procedures in the manual to advise pilots when they must change tanks to prevent a fuel starvation event. The aircraft landed with 279 litres of fuel, from a total of 690 litres of useable fuel. This equates to 104 minutes, less reserves, using the consumption rate of 160 litres per hour.

The Chief Pilot advised of the importance of regular enroute checks, particularly in a distracting environment.

## **Safety message**

In this incident, the pilot followed all the key suggestions in the ATSB's Avoidable Accident Series No 5 – [Starved and exhausted](#): Fuel management aviation accidents. These being that they knew

- exactly how much fuel was on board
- how much / what rate fuel was being consumed
- the aircraft fuel system and kept a detailed fuel log of the four tanks during flight.

However, a high workload, deteriorating weather, and untimely distractions led to a change of a planned procedure and an unplanned outcome of temporary fuel starvation of the left engine.

Another ATSB investigation involving fuel starvation resulted in a more serious outcome, with the aircraft substantially damaged. In that accident, the pilot was also distracted from their scheduled

fuel management due to weather; however the aircraft was at significantly lower altitude. Due to the delayed engine response at low level, the pilot had to conduct a forced landing through fog. The investigation (AO-2015-042) can be found on the [ATSB website](#).

## General details

### Occurrence details

Date and time:	12 October 2015 at 1523 ESuT	
Occurrence category:	Incident	
Primary occurrence type:	Fuel Starvation	
Location:	North of Goulburn Airport, New South Wales	
	Latitude: 34°S 38.83'	Longitude: 149° 46.18' E

### Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-31-350
Registration:	VH-HJH
Serial number:	31-7752127
Type of operation:	Aerial Survey

## About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; and fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

## About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions. \