

Australian Government Australian Transport Safety Bureau

Total power loss involving a Piper PA-28-161, VH-CCQ

9 km N of Cunnamulla aerodrome, Queensland, 1 October 2013

ATSB Transport Safety Report Aviation Occurrence Investigation AO-2013-168 Final – 19 March 2014 Released in accordance with section 25 of the Transport Safety Investigation Act 2003

Publishing information

Published by:	Australian Transport Safety Bureau		
Postal address:	PO Box 967, Civic Square ACT 2608		
Office:	62 Northbourne Avenue Canberra, Australian Capital Territory 2601		
Telephone:	1800 020 616, from overseas +61 2 6257 4150 (24 hours)		
	Accident and incident notification: 1800 011 034 (24 hours)		
Facsimile:	02 6247 3117, from overseas +61 2 6247 3117		
Email:	atsbinfo@atsb.gov.au		
Internet:	www.atsb.gov.au		

© Commonwealth of Australia 2014



Ownership of intellectual property rights in this publication

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia.

Creative Commons licence

With the exception of the Coat of Arms, ATSB logo, and photos and graphics in which a third party holds copyright, this publication is licensed under a Creative Commons Attribution 3.0 Australia licence.

Creative Commons Attribution 3.0 Australia Licence is a standard form license agreement that allows you to copy, distribute, transmit and adapt this publication provided that you attribute the work.

The ATSB's preference is that you attribute this publication (and any material sourced from it) using the following wording: *Source:* Australian Transport Safety Bureau

Copyright in material obtained from other agencies, private individuals or organisations, belongs to those agencies, individuals or organisations. Where you want to use their material you will need to contact them directly.

Addendum

Page	Change	Date

Total power loss involving a Piper PA-28-161, VH-CCQ

What happened

On 1 October 2013, at about 0900 Eastern Standard Time (EST),¹ a Jabiru J160 aircraft departed Lilydale Airport, Victoria, for a planned flight to Charleville, Queensland with a fuel stop in Bourke, New South Wales. When about 9 NM north of Lilydale, the engine began to run rough and surge, and the pilot elected to return to Lilydale. Maintenance engineers were unable to resolve the engine issues with the Jabiru in a timely manner.

Damage to VH-CCQ



Source: Insurer

At about 1330, the pilot hired a Piper PA-28-161 aircraft, registered VH-CCQ, and planned the flight to Charleville,

Queensland via Bourke. The pilot reported that he was advised that the historical fuel burn for the aircraft was about 25-27 L/hr.²

At about 1420, the aircraft departed Lilydale for Bourke with full fuel tanks, which the pilot reported to be about 185-190 litres.³ On board the aircraft were the pilot and one passenger. During the cruise, maintaining 8,500 ft above mean sea level (AMSL), the pilot selected an engine power setting of 65% and leaned the fuel mixture. He reported that the aircraft's groundspeed and fuel flow correlated with the true airspeed (TAS)⁴ and fuel flow specified in the aircraft operating manual.⁵

The pilot conducted fuel calculations every 30 minutes during the cruise, and changed between the left and right fuel tanks to maintain the aircraft's balance within the normal operating limits. When approaching Bourke, the pilot calculated the fuel remaining on board based on the fuel gauge indications and the nominal fuel flow, and elected not to land at Bourke for refuelling, but to divert and continue directly to Charleville.

When approaching the New South Wales/Queensland border, the pilot sighted stratus cloud ahead and descended the aircraft to an amended cruise level of 6,500 ft AMSL.

At about 1900, when about 20 NM east of Cunnamulla, Queensland, the engine began to run rough and surge. The pilot assessed that the most likely cause was fuel contamination in the selected right tank and changed to the left fuel tank. The engine continued to run rough and the pilot elected to divert to Cunnamulla.⁶ The pilot selected carburettor heat on, however, the engine continued to run rough and surge.

The pilot declared a 'MAYDAY'⁷ on both the area frequency and the common traffic advisory frequency (CTAF), with no response received. The engine power then reduced to idle and the pilot configured the aircraft for a forced landing. During the descent, the engine continued to surge. The pilot reported that all engine temperature and pressure indications were normal.

As it was dark by this time, when at about 1,500-2,000 ft above ground level (AGL), the pilot selected the landing light on to illuminate a suitable forced-landing site. The light flashed on and

¹ Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

² The operator reported that the aircraft burns 30 L/hr and that the flight log in the aircraft advises the same fuel burn.

³ The operator reported that the total usable fuel on board was 180 L.

⁴ True airspeed (TAS) is the indicated airspeed corrected for air density.

⁵ The aircraft was not fitted with a fuel flow gauge.

⁶ Cunnamulla was 103 NM south-south-west of Charleville.

⁷ Mayday is an internationally recognised radio call for urgent assistance.

then failed. The initial illumination of the landing light caused a loss of night vision for the pilot who then relied on the aircraft instruments to estimate the aircraft's height above the ground.

The aircraft landed in a paddock at about 1920, bounced once and, during the subsequent landing roll, the pilot shut down the engine. The aircraft subsequently collided with a tree, detaching the left wing. The pilot reported that he had detected a fuel smell and heard the sound of liquid running. The pilot and passenger exited the aircraft and moved away from the aircraft in case of fire. After about 20 minutes, with no fire eventuating, the pilot returned to the aircraft and located a telephone with which he called emergency services.

The aircraft was substantially damaged (Figure 1), the pilot sustained serious injuries and the passenger sustained minor injuries.

An engineering report provided to the ATSB stated that during an inspection of the engine conducted after the accident, the carburettor float bowl was found to be empty.



Figure 1: Damage to VH-CCQ

Source: Insurer

Pilot comments

The pilot reported that, when the engine began to run rough, he noted that the fuel gauge indicated that 60 L of fuel was remaining. Also, he had performed a fuel check about 6 minutes prior, which indicated that 1 hr of fuel was remaining in each tank. Table 1 shows the fuel calculations performed by the pilot throughout the flight.

Time	Fuel remaining in Litres	Title
1410	185	At startup
1420	180	After taxi
1500	166	
1530	150	
1600	138	
1634	126	
1659	113	
1730	101	
1804	88	
1854	66	

Table 1: Pilot enroute fuel calculations

Safety message

This incident highlights the importance of thorough pre-flight planning and understanding the implications of both aircraft and pilot limitations.

The ATSB publication Avoidable Accidents No. 5 – Starved and exhausted: Fuel management aviation accidents, www.atsb.gov.au/publications/2012/avoidable-5-ar-2011-112.aspx, states that

Accurate fuel management also relies on a method of knowing how much fuel is being consumed. Many variables can influence the fuel flow, such as changed power settings, the use of non-standard fuel leaning techniques, or flying at different cruise levels to those planned. If they are not considered and appropriately managed then the pilot's awareness of the remaining usable fuel may be diminished.

CAAP 234-4(1)⁸ *Guidelines for Aircraft Fuel Requirements*, states that fuel gauges, particularly on smaller aircraft, may be unreliable. In an aircraft that is not fitted with a fuel flow indicator, the fuel gauges should not be relied on as the sole means of calculating fuel burn in flight.

Night flight in single-engine aircraft carries an increased level of risk in the event of an engine power loss, and the combination of engine and landing light failure may have had more serious consequences if the pilot had not also held a current instrument rating. The pilot's inability to see any horizon or ground features necessitated his reliance on the aircraft instruments to control the descent and landing.

The Civil Aviation Advisory Publication (CAAP) 5.13-2(0),⁹ stated that, for single-engine aircraft operations, the most serious night time emergency is total engine failure. Further, it advised that due to limited outside visual reference at night, the aircraft has to be flown by reference to instruments, otherwise the pilot runs a considerable risk of becoming disoriented.

Landing and navigation are also more difficult at night because of the limited visual cues available to assist the pilot. The CAAP also advised that exposure to bright light causes the eyes to lose the dark adaptation of night vision.

⁸ www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/234_1.pdf

⁹ www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/5_13_2.pdf

General details

Occurrence details

Date and time:	1 October 2013 – 2015 EST	
Occurrence category:	Accident	
Primary occurrence type:	Engine failure	
Location:	9 km N of Cunnamulla aerodrome, Queensland	
	Latitude: 27° 56.98' S	Longitude: 145° 38.20' E

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-28-161		
Registration:	VH-CCQ		
Serial number:	28-7816358		
Type of operation:	Private		
Persons on board:	Crew – 1	Passengers – 1	
Injuries:	Crew – Minor	Passengers – Minor	
Damage:	Substantial		

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 fare-paying passenger operations.

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.