Australian Government
Australian Transport Safety Bureau

Fuel contamination – Cessna 182P, VH-WTS

near Cunnamulla Aerodrome, Queensland, 19 June 2012

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What happened

Mayvale Station airstrip

Source: *Google Earth*

On 19 June 2012, at about 0815 Eastern Standard Time[1], the pilot of a Cessna Aircraft Company 182P aircraft, registered VH-WTS (WTS), departed Mayvale Station, about 53 km east-north-east of Cunnamulla, Queensland, for an aerial inspection of the property. Shortly after becoming airborne, at about 80 to 100 ft, the pilot recalled the aircraft losing airspeed and then clipping a tree during the subsequent forced landing. The pilot's next recollection was being on the ground, out of the aircraft and unable to stand. The aircraft had collided with the ground and came to rest inverted (Figure 1).

The pilot, who was the only occupant, was seriously injured and the aircraft was destroyed. The pilot reported securing his seat belt before takeoff, but had not used the shoulder harness. About 3 hours later, when WTS had not returned to the Station, and the pilot could not be contacted by radio, a search was commenced and the aircraft and injured pilot were found. Although the aircraft was fitted with an Emergency Locator Transmitter (ELT)[2], it had not activated, and a personal ELT carried by the pilot in the aircraft was inaccessible. The reason why the fitted ELT had not activated was not determined but may have been due to shielding of the ELT's antenna when the aircraft came to rest inverted.

The day before the accident flight, the pilot refuelled the aircraft with about 20 L of aviation gasoline (AVGAS) from a 200 L (44 gallon) drum kept as an emergency fuel supply. The drum stock was stored upright in the hangar and had not been used for about 3 months. The pilot reported that he had not tested the fuel in the drum for water or contamination. The hand-pump used to pump the fuel from the drum was not fitted with a filter, but when the pilot pumped a small quantity of fuel onto the ground before refuelling the aircraft, he did not notice any contamination.

The pilot reported taking samples from the wing tank fuel drains during the pre-flight inspection and had opened the fuel strainer drain to release a small quantity of fuel onto the ground. The pilot stated that taking a fuel sample from the fuel strainer drain point was difficult due to the distance between the drain point and the strainer knob[3]. The pilot had not detected any water or contamination of the aircraft's fuel.

Following the accident, a considerable amount of water was found in fuel samples taken from a number of locations in the aircraft's fuel system. Water was also found in a sample taken from the drum.

Refuelling from drum stock

Civil Aviation Order (CAO) 20.9 requires all ground fuel stock to be carefully checked for the presence of undissolved water before fuelling. The CAO notes that such checks are particularly important when handling fuel from drum stocks. It also notes that it is necessary to use a positive testing method, such as suitable water-detecting paste or paper, as sensory perceptions of colour

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

2 Crash-activated radio beacon that transmits an emergency signal that may include the position of a crashed aircraft. Also able to be manually activated.

3 The fuel strainer drain knob was located under an access panel on the right side of the engine cowling. The drain point was located under the nose of the aircraft.

and smell, if used alone, can be misleading. Additionally, approved aviation fuel filters should always be used when refuelling from drums.

Safety message

Pre-flight checks

Checking fuel for water, and other contaminants, is something pilots can never be too careful about. The ATSB research report into managing partial power loss after takeoff, published in 2011, found that pre-flight checks, including checking samples from all fuel drain points, are a vital barrier in reducing the likelihood of power loss after takeoff. The Cessna *Pilot Safety and Warning Supplements* document (1998) provides general advice on fuel sampling as part of pre-flight checks.

Occupant restraints

Although WTS was fitted with a single shoulder strap harness, the pilot had only fastened the seat belt. In order to afford the best possible protection against injury in the event of an accident, aircraft occupants should fasten both the seat belt and shoulder harness, where provided, particularly for takeoff and landing.

Survival equipment

The seriously injured pilot of WTS was rescued about 3 hours after the accident. Pilots are encouraged to leave a flight note with a responsible person as discussed in the Aeronautical Information Publication (AIP) and a personal ELT should be carried on the person so that they are readily available when most needed.

The following publications provide further information relating to refuelling and fuel checks:

- ATSB Avoidable Accidents No. 3 – *Managing partial power loss after takeoff in single-engine aircraft* is available at www.atsb.gov.au/publications/2010/ar2010055.aspx
- Civil Aviation Order 20.9 titled *Air service operations – precautions in refuelling, engine and ground radar operations* is available at www.comlaw.gov.au/Details/F2011C00881
- *Safety on the ground*, provides advice on refuelling from a drum, and on the correct way to store a fuel drum; available from the Civil Aviation Safety Authority's website at: www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_91386
- The Cessna *Pilot Safety and Warning Supplements* (1998) is available at: www.docs.google.com/gview?url=http://www.gaceflyingclub.com/Member+Download/Pilot+Safety+and+Warning+Supplements+Searchable.pdf&chrome=true

Figure 1: VH-WTS

Source: ***Approved Aircraft Maintenance***

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 182P	
Registration:	VH-WTS	
Type of operation:	Aerial work	
Location:	53 km from Cunnamulla aerodrome, Queensland	
Occurrence type:	Fuel contamination	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (Serious)	Passengers – Nil
Damage:	Substantial	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau 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.