



**Australian Government**

**Australian Transport Safety Bureau**

# Collision with terrain involving Air Tractor AT-401, VH-DDW

10 km NW of Mareeba Airport, Queensland, 21 January 2017

**ATSB Transport Safety Report**  
Aviation Occurrence Investigation  
AO-2017-009  
Final – 27 April 2017

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](mailto:atsbinfo@atsb.gov.au)  
**Internet:** [www.atsb.gov.au](http://www.atsb.gov.au)

© Commonwealth of Australia 2017



#### **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

# Collision with terrain involving Air Tractor AT-401, VH-DDW

## What happened

On 21 January 2017, at about 0710 Eastern Standard Time (EST), the pilot of an Air Tractor AT-401B aircraft, registered VH-DDW, was conducting aerial spraying operations at a property about 10 km NW of Mareeba Airport, Queensland. The pilot was the only person on board the aircraft.

Part way through spraying the load of chemical on an avocado plantation, the pilot climbed the aircraft at the end of a spray run, to about 200 ft above ground level. As the aircraft climbed, the engine suddenly made loud banging noises and the pilot estimated that the engine power reduced by about half.

**Figure 1: Location of engine failure and accident site**



Source: Google earth annotated by ATSB

The pilot levelled the aircraft and checked the fuel mixture and throttle controls but the engine did not respond. The power available continued to decrease as the pilot looked ahead for a suitable field to conduct a forced landing. The pilot selected a cleared area, but as the aircraft lost height, they realised that the aircraft was not going to make it to that field.

The pilot then radioed their loader driver<sup>1</sup> and advised that they had engine trouble, the aircraft was 'going down', and asked them to contact emergency services. The loader driver had heard the abnormal noise the aircraft's engine was making, and responded immediately to the pilot.

As the aircraft descended, the pilot sighted powerlines ahead and assessed that the aircraft would probably not make it over them. Therefore, the pilot descended to pass under the powerlines. The pilot again spoke to the loader driver briefly on the radio. The aircraft then collided with several lychee trees and a vehicle that was parked in an orchard. The aircraft came to rest upright and was substantially damaged. The pilot sustained a minor injury.

<sup>1</sup> Ground personnel responsible for loading the chemical into the aircraft for spraying.

**Figure 2: Damage to VH-DDW**



Source: Pilot

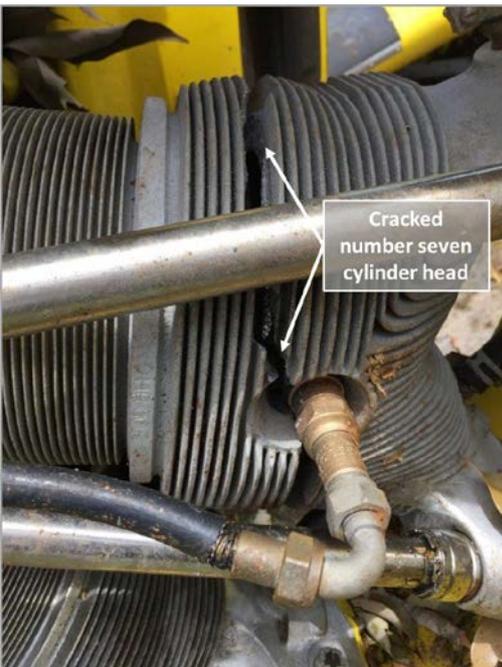
***Operator report***

The operator conducted an investigation into the accident and found the following:

The pilot had conducted a daily inspection, including an inspection of all engine cylinders, and found no signs of cracks. The aircraft had operated normally during the first two flights that day.

The aircraft was fitted with a Pratt and Whitney R-1340 radial engine that had 10,491 total hours and 478.1 hours since overhaul. The engine was inspected after the accident by a representative from an aircraft maintenance organisation and they determined that the number seven cylinder had failed (Figure 3). A crack was located around the circumference of the cylinder head, between the two spark plug holes. A recurring inspection of this area ([CASA airworthiness directive AD/PW-P/19](#)) was conducted about 91.9 hours prior to the accident at the periodic (100 hourly or 12-month) maintenance inspections.

**Figure 3: Engine cracked number seven cylinder**



Source: Aircraft operator, modified by the ATSB

## Safety analysis

### ***Post-accident inspection***

A post-accident inspection revealed a cracked cylinder.

### ***Pre-flight inspection***

The aircraft had operated for about 91.9 hours since the periodic (100 hourly or 12-month) maintenance inspections.

The pilot conducted a pre-flight inspection at about 0500 and everything was normal, the oil was full. The aircraft was fitted with a chip detector,<sup>2</sup> which did not activate at any time. The engine indications indicated normal temperature and pressure immediately prior to the failure.

### ***Weather and performance***

The aircraft took off from Mareeba Airport, which is at an elevation of about 1,560 ft above mean sea level (AMSL), and was operating over a property at about 1,900 ft AMSL. The temperature was about 24 °C and there was 79% humidity. The conditions on the day may have reduced the aircraft's performance. The pilot had substantial experience operating that aircraft in the local area.

The wind was a light westerly at about 2 kt and when the engine lost power the aircraft was tracking to the east, therefore with a light tailwind. This probably did not significantly affect the glide distance or the landing speed of the aircraft.

### ***Forced landing sites***

The area has orchards, houses and powerlines in most of the paddocks with uneven ground and creeks running through it, therefore there were limited sites suitable to conduct a forced landing. The pilot assessed that there was also no suitable road within gliding distance. The accident site was about 2.5 km from where the engine failed.

### ***Chemical load***

About 750 L of chemical was still on board the aircraft when the engine lost power. The pilot did not dump the load. The pilot commented that it was an oversight rather than a conscious decision not to dump the load. However, they further commented that they were trained to dump the load in the event of engine failure, and would do that in future if faced with a similar situation.

## Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

- The number seven cylinder cracked, resulting in a loss of power.
- The aircraft was operating at low level (below 200 ft AGL) in an area where there were limited options available to conduct a forced landing.

## Safety message

In this accident, the time available to manage the engine failure meant that there were few options in regards to the selection of a landing area. The accident highlights the importance of taking positive action and maintaining aircraft control when conducting a forced landing, while being aware of flare energy and aircraft stall speeds.

---

<sup>2</sup> A magnetic device used to gather chips of metal from engine or transmission oil to provide early warning to maintenance personnel of impending engine failure. Depending on the installation, it can be linked to an in-cockpit indicating light to provide immediate advice to aircrew.

The Aerial Agricultural Association of Australia advised that there is nearly always an uncertainty about whether to dump the load and they suggest that the only safe rule is ‘if in doubt, dump’. In a high stress situation such as an engine failure where there is limited time, it is important to apply appropriate emergency procedures. To mitigate against the effect of stress compromising memory even in a minor emergency, pilots should have embedded motor programs to handle emergencies in reactive mode.

The pilot was wearing a helmet and commented that although they were ‘flung’ from side to side during the accident sequence, the seatbelt held them firmly in place.

## General details

### Occurrence details

Date and time:	21 January 2017 – 0710 EST	
Occurrence category:	Accident	
Primary occurrence type:	Engine failure or malfunction	
Location:	10 km NW of Mareeba Airport, Queensland	
	Latitude: 17° 00.90' S	Longitude: 145° 20.65' E

### Aircraft details

Manufacturer and model:	Air Tractor Inc. AT-401	
Registration:	VH-DDW	
Serial number:	401B-0991	
Type of operation:	Aerial work – aerial agriculture	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 1 Minor	Passengers – 0
Aircraft 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 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.