



Australian Government

Australian Transport Safety Bureau

Engine failure and forced landing involving Cessna 210, VH-TWD

111 km south-east of Halls Creek, Western Australia, 28 November 2014

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Addendum

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Engine failure and forced landing involving Cessna 210, VH-TWD

What happened

On 28 November 2014, a Cessna 210 aircraft, registered VH-TWD (TWD), was being operated on a charter flight from Broome, Western Australia. On board were the pilot and four passengers.

At about 1135 Western Standard Time, the aircraft landed at Fitzroy Crossing to refuel before continuing to Balgo Hill Western Australia, where three of the passengers disembarked (Figure 1).

At 1202, the aircraft departed Balgo Hill for the Ringer Soak aeroplane landing area (ALA) Western Australia, where the remaining passenger was due to disembark. About 25 NM from Ringer Soak, while cruising at 5,500 ft, the pilot noticed a low oil pressure indication. He reported that all other engine instruments were within normal parameters. As Ringer Soak was only a few minutes away, he elected to continue and assess the situation after landing.

VH-TWD near Ringer Soak



Source: Pilot

Figure 1: TWD flight route



Source: Google earth

Shortly after, the pilot detected a burning smell in the cockpit, followed by a loud bang from the engine. The engine started to vibrate and make an abnormal sound, and a small amount of white smoke emanated from the front section. The pilot immediately commenced the memory items from the emergency checklist, but there was no response from the engine. After shutting down the engine, he pitched the aircraft up slightly to both gain some altitude and to allow the speed to

decrease. After configuring the aircraft for the best glide speed of about 80 kt, and with one stage of flap selected, he searched for a suitable landing area amongst the predominantly thick scrub and trees in the surrounding area. He eventually located an area that was more open, and during this time he also completed the emergency checklist to cover any items he may have missed during his initial actions.

Due to the intermittent communication at low altitudes in remote locations, the pilot then broadcast MAYDAY¹ on the Brisbane Centre frequency, and then switched on the emergency locator transmitter. Brisbane Centre gave assistance to the pilot and initiated a search and rescue phase. The pilot then briefed his passenger on the emergency procedures, and prepared for a forced-landing. Due to the rough terrain, he elected to keep the landing gear retracted and unlatched both doors and briefly turned on the master switch to fully extend the flaps.

He prepared the aircraft for touchdown with the tail in a lower than normal position. The aircraft impacted the ground firmly and slid forward at least 20 m before it came to rest. The passenger immediately exited using the right door, and after checking all switches were off, the pilot exited the left door.

The passenger reported he had a minor head injury while the pilot was uninjured. The aircraft was substantially damaged (Figure 2).

Post-accident activities

After retrieving the first aid kit, emergency rations and the Global Positioning System from the aircraft, the pilot set up a temporary shelter under the aircraft wing, while they awaited rescue. He communicated via very high frequency (VHF) radio with three separate aircraft deployed at different times by Air Traffic Control to overhead the accident. This enabled messages to be relayed to and from Brisbane Centre and the pilot. He conserved the aircraft battery by only turning on the power to communicate briefly with each aircraft and at one hourly intervals. At about 1500, a helicopter arrived to retrieve the pilot and passenger and ferry them to Halls Creek.

Figure 2: VH-TWD after emergency equipment had been retrieved



Source: Pilot

¹ Mayday is an internationally recognised radio call for urgent assistance

Weather

The weather enroute was fine with scattered cloud at about 7,000 ft. It was the wet season in northern Australia, and was typically hot and humid, with a temperature in excess of 38°C.

The aircraft

In July 2013, TWD was fitted with a factory rebuilt Continental IO-550 engine. Since installation of the engine, the aircraft had completed 1,059.5 hours. During this time, the operator had observed an unusually high oil consumption.

On 19 November 2014, the aircraft used 7 quarts² of oil during a 4.7 hour flight. This resulted in the aircraft being taken out of service for maintenance. Engineers found that cylinders number 3, 4 and 5 had glazed walls; these were honed and replaced. The piston rings were also removed and replaced. After a test flight, the aircraft was returned to service. The accident flight was the aircraft's first commercial flight since being returned to service.

The operator conducted a further trend analysis of the aircraft's oil consumption. They found that TWD had flown 168.3 hours, and used 152 quarts of oil which was about twice the typical consumption rate of about 0.43 quarts per hour.

Pilot experience and comments

The pilot had accrued about 3,270 hours total flight time with about 967 hours on Cessna 210 aircraft.

On the day of the flight, he had conducted the aircraft pre-flight inspection and submitted a flight plan as normal. The pilot checked the oil quantity as part of the pre-flight inspection at Broome and noted it was 8.6 quarts. The normal oil quantity range for this aircraft was 8-10 quarts. Due to the high weight of the payload, and as per normal procedure, the aircraft had to depart with less than full fuel and refuel at planned stops throughout the flight.

Due to the late arrival of one of the passengers, the flight was delayed for about one and a half hours. The pilot felt some concern about trying to regain some of this lost time in order to provide a timely service. He also reported that the passenger for Ringer Soak was quite anxious to get to his destination.

Engine examination

The insurance assessor advised the ATSB that the engine has been relocated to Perth for further examination. At the time of publication of this report, the reason for the engine failure had not been determined.

Operator comments

The operator conducted an internal investigation into the accident, and provided their report to the ATSB, where they raised concerns about the reliability of the factory overhauled IO-550 engines that had been installed in two of their C210 aircraft.

Major points from the company report are listed below.

- Although the pilot checked the fuel at every stop on the flight, he did not manually check the oil quantity. Due the late arrival of a passenger at Broome, the pilot had departed 1.5 hours behind schedule. It is likely this influenced the pilot's decision not to spend time manually checking the oil quantity at each stop.
- In hindsight, TWD may have been unsuitable for the long flights to/from the more remote ports. Even though the aircraft was considered serviceable it may have been more appropriate for TWD to remain on short flights to further analyse the oil usage rates.

² 10 quarts is equivalent to 9.46 L

CASA Comment

The ATSB raised the issue of IO-550 engine failures with the Civil Aviation Safety Authority (CASA).

CASA completed a review of their database, and although there had been several failures of this engine type, there have been a number of different causal factors. After examining the information, they determined that there was no increasing trend of failures in this engine type.

Engine manufacturer

The ATSB contacted the engine manufacturer and will continue to liaise with them in regard the IO-550 engine.

ATSB comment

In the past 12 months, the ATSB has investigated three accidents involving engine failures of factory re-built IO-550 engine. At this stage, it has not been possible to determine any links between the accidents.

Safety actions

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

The operator

As a result of this occurrence, the aircraft operator has advised the ATSB that they are taking several safety actions, some of which are listed below:

Flight restriction for other aircraft installed with a IO-550 engine

The company have placed a flight restriction on their other Cessna 210 aircraft fitted with an IO-550 engine. Until more trend data is available, they have restricted this aircraft to shorter, close to base flights.

Assistance from operations section

To promote better support from different sections of the company, the operations section will now assist flight crew when dealing with issues such as late passengers, loading and cargo problems and also to help determine a go-no-go time for delayed flights.

Maintenance controller

The maintenance controller is to more closely consider aircraft that have unusual, but acceptable usage of oil or other similar types of issues. These aircraft are to be flagged to the operations and safety section for closer trend monitoring, and also only utilised on shorter flights.

Chief pilot

The chief pilot will conduct flight crew refresher training on issues such as flight log and maintenance release entries, SARTIME and procedural requirements.

Chief engineer

The chief engineer will arrange for additional instruction to be available for engineers working on the IO-550 engine, and provide a go-to expert to contact for further information.

Company Procedures

The company noted that their operations manual detailing the correct operating procedures for the IO-550 engine contained some ambiguous instructions. The manual will be amended to better clarify the intent of its content.

Safety message

As was displayed in this instance, it is a timely reminder for pilots to be well rehearsed in both emergency procedures and to be pro-active in the post-accident survival phase, especially when operating in a remote area.

Section 5 – Emergency Procedures of the Visual Flight Rules (VFRG) guide gives an overview of planning for and dealing with emergency situations in aviation.

It is available at:

www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_90008

While no one ever plans to get into trouble, the possibility of an emergency situation should always be considered by all pilots before take-off. When faced with an engine failure in a remote area, there are extra survival considerations both prior to and immediately the aircraft has 'landed', as usually there will be an inevitable wait for assistance to arrive.

The Rescue Coordination Centre of the Australian Maritime Safety Authority (AMSA) produced a short booklet which highlights some of the considerations for preparedness for operations in remote areas.

The link to the publications is available at:

www.amsa.gov.au/forms-and-publications/Publications/AviationSearchandRescue.pdf

General details

Occurrence details

Date and time:	28 November 2014 1235 WST	
Occurrence category:	Accident	
Primary occurrence type:	Engine failure	
Location:	111 km south-east of Halls Creek Airport (near Ringer Soak ALA) Western Australia	
	Latitude: 18° 58.87' S	Longitude: 128° 22.38' E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 210N (IO-550 engine)	
Registration:	VH-TWD	
Serial number:	21064356	
Type of operation:	Charter - passenger	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passengers – 1 (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.