



Australian Government

Australian Transport Safety Bureau

Engine failure and fire on ground involving Gippsland Aeronautics GA-8, VH-AJZ

Gibb River ALA, Western Australia, 22 April 2017

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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

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Addendum

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Engine failure and fire on ground involving Gippsland Aeronautics GA-8, VH-AJZ

What happened

On 22 April 2017, a Gippsland Aeronautics GA-8 aircraft, registered VH-AJZ, was being used to conduct incendiary bombing aerial work operations¹ in the Prince Regent River area of northern Western Australia (WA). On board were a pilot, a navigator seated in the co-pilot seat and a bombardier in the rear of the aircraft cabin.

While conducting the incendiary bombing operations, the bombardier advised the pilot that he was suffering from motion sickness. The pilot elected to land at Gibb River aircraft landing area (ALA), WA, to take a lunch break and provide the bombardier with time to recover from the motion sickness.

At about 1255 Western Standard Time (WST), the aircraft landed on runway 07 at Gibb River. During the landing roll, the engine failed. The aircraft had sufficient momentum to enable the pilot to turn the aircraft around on the runway and begin to taxi to the parking area at the western end of runway 07. Shortly after turning around, the aircraft came to rest on the runway. The pilot attempted to restart the engine, but the engine did not start. The pilot waited about 10–20 seconds before again attempting to restart the engine.

While attempting the second restart of the engine, the pilot heard a loud noise similar to that of a backfire. The navigator then observed flames and smoke coming from around the front of the engine and immediately notified the pilot. After being notified of the fire, the pilot immediately shut down the engine and switched off the aircraft electrical system.

As the pilot switched off the aircraft electrical system, the navigator located the aircraft fire extinguisher and evacuated from the aircraft through the co-pilot door. After evacuating from the aircraft, the navigator observed fire on the aircraft nose wheel. The navigator had difficulty preparing the fire extinguisher for use and was unable to discharge the fire extinguisher onto the fire.

While the navigator was attempting to extinguish the fire, the pilot exited the aircraft through the pilot door and assisted the bombardier to exit the aircraft. After assisting the bombardier, the pilot moved to the front of the aircraft to assist the navigator with the firefighting. The pilot was able to activate the fire extinguisher and extinguished the fire on the nose wheel. The pilot observed fire continuing to burn within the engine compartment. Due to the heat of the fire, the pilot was unable to access the engine compartment to extinguish this fire. The pilot determined that no more could be done to contain the fire, and therefore, the pilot, navigator and bombardier moved clear of the aircraft to a safe location as the fire continued.

The crew members were not injured. As a result of the fire, the aircraft was destroyed (Figure 1).

¹ Incendiary bombing operations is a method of fire hazard reduction using devices dropped from the aircraft that start fires to conduct controlled burns.

Figure 1: VH-AJZ wreckage



Source: Operator

Pilot comments

The pilot of the aircraft provided the following comments:

- The temperature at Gibb River at the time of the landing was about 33–34 °C.
- There were no abnormal engine indications prior to the engine failing.
- The engine failed in a manner similar to a normal engine shutdown. The pilot had not experienced an engine failure in that manner before.
- The electric fuel pump remained on after landing and throughout the attempted starts. During the attempted starts, the pilot ‘cracked’ the throttle and advanced the mixture lever while cranking the engine. Between the first and second start attempts, the mixture control was selected to idle cut-off.
- When assisting the bombardier to evacuate, one box of incendiary capsules was removed, however, three or four boxes remained in the aircraft.

Chief pilot comments

The operator’s chief pilot provided the following comments:

- Due to the significant fire and heat damage, the cause of the fire could not be determined (Figure 2).
- When taxiing in high ambient temperatures and at low power settings, fuel may vaporise within the mechanical engine fuel pump, and this can lead to the engine failing. When operated in these conditions, the aircraft should be taxied with the electric fuel pump on to prevent fuel vaporisation.

Figure 2: Fire damage to engine



Source: Operator

Engine fire during start emergency procedure

The GA-8 emergency procedures included the ‘engine fire during start emergency procedure.’ In case of an engine fire during start, the procedural steps to be followed are shown in Figure 3.

Figure 3: GA-8 fire during start on ground emergency procedure extract

During Start On Ground	
1. Cranking	CONTINUE, to get a start which would suck the flames and accumulated fuel through the fuel injector and into the engine.
If engine fails to start:	
2. Cranking	CONTINUE
3. Throttle	FULL OPEN
4. Mixture	Idle Cut Off
5. Fuel Shutoff Valve	OFF
6. Ignition	OFF
7. Master Switches Bus 1 & Bus 2.....	OFF
8. Aircraft	EVACUATE and extinguish fire using best available means.

Source: Mahindra Aerospace

After the fire was detected, the pilot shut down, rather than continued cranking the engine. After the engine was shut down, the fuel shutoff valve was not selected off.

Safety analysis

The extent of damage to the engine and aircraft prevented the reasons for the engine failure being determined.

The presence of fire on the nose wheel below the engine indicates that the fire was probably fed by a fluid. However, the extent of damage to the engine prevented the reason of the fire being determined.

After identifying the engine fire, the engine was shut down, and cranking was not continued in accordance with the emergency procedure. Cranking the engine may have extinguished the fire before it became unmanageable. After the engine was shut down, the fuel shutoff valve was not closed to provide a barrier between the fuel tanks and the engine. Not completing this step of the engine fire during start emergency procedure increased the likelihood of fire and allowed the fire to intensify.

Findings

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

- The cause of the engine failure and fire could not be determined.
- After the fire was identified, two steps in the emergency procedure were omitted. This included not closing the fuel shutoff valve, which likely resulted in the fire not being extinguished and subsequently intensifying.

Safety Action

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.

Aircraft operator

As a result of this occurrence, the aircraft operator has advised the ATSB that they are taking the following safety actions:

Retraining

- The pilot has completed retraining with an emphasis on fire procedures.

Safety message

This investigation highlights the importance of knowing and understanding flight manual normal and emergency procedures. In this accident, steps in the engine fire during start procedures were omitted. When facing a situation as serious as a fire, the published emergency procedures provide the foundation for emergency response management.

General details

Occurrence details

Date and time:	22 April 2017 – 1255 EST	
Occurrence category:	Accident	
Primary occurrence type:	Fire	
Location:	Gibb River ALA, Western Australia	
	Latitude: 16° 25.12' S	Longitude: 126° 26.77' E

Aircraft details

Manufacturer and model:	Gippsland Aeronautics Pty Ltd	
Registration:	VH-AJZ	
Serial number:	GA8-05-096	
Type of operation:	Aerial work	
Persons on board:	Crew – 3	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Destroyed	

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.