



Australian Government

Australian Transport Safety Bureau

Engine failure and forced landing involving Gippsland Aeronautics GA-8 Airvan, VH-BFL

8.5 km NNW of Bellburn Airstrip Western Australia, on 14 May 2018

ATSB Transport Safety Report
Aviation Occurrence Investigation
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Addendum

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The occurrence

What happened

On 14 May 2018, a Gippsland Aeronautics GA-8 Airvan (Airvan) aircraft, registered VH-BFL, departed Kununurra, Western Australia (WA) on a scenic charter flight. The pilot and three passengers were on board.

After about one hour and fifteen minutes, the aircraft landed at Bellburn Airstrip (Bellburn), 202 km SSW from Kununurra, and picked up four more passengers. The aircraft departed at about 1600 Western Standard Time¹, to continue the scenic flight. A second company aircraft was utilised to carry the passengers' baggage.

About 12 minutes after departure, the pilot commenced a planned climb from 2,500 ft to 3,500 ft above mean sea level, during which he felt the aircraft performance was a bit 'sluggish'. The pilot reported that the climb rate was lower than expected with the aircraft's speed between 85–100 kt. The pilot also observed the fuel flow was about 55–60 litres per hour (l/hr), which was less than expected for the full rich mixture setting selected.

The pilot reported that he then completed a check of the engine settings and physically confirmed, through touching the controls, that the mixture was full rich, the throttle control was set to 25 inches of manifold pressure, and the propeller lever was set to 2,500 revolutions per minute. The pilot turned the fuel pump on, which made no difference to the aircraft performance. He then notified the company chief pilot, who was flying the other aircraft.

The pilot decided to divert and commenced a turn back to Bellburn maintaining 3,500 ft. The pilot left climb power set and briefed the passengers that they were diverting to Bellburn. The fuel flow had now reduced to about 50–55 l/hr, however, airspeed and height were maintained. The pilot checked if there were any other abnormal indications but all gauges were indicating normally, with both fuel tanks indicating three quarters full and no warning lights illuminated.

During the transit back to Bellburn, the pilot performed some troubleshooting by gently moving the throttle back and forward. There was a noticeable deceleration when the throttle was moved back so the pilot returned it, to its original position for the transit back to Bellburn.

The pilot reported that about 18 km from Bellburn, without further pilot intervention, the power slowly started to decrease. To maintain height, the pilot increased the aircraft's pitch, resulting in a decrease in airspeed. When the airspeed reached 80 kt, the best glide speed for the aircraft, the pilot commenced a shallow descent, maintaining 80 kt. The pilot reported fuel flow was reading approximately 45 l/hr in the turn. The pilot contacted the chief pilot to advise him of the descent and asked for further assistance. On suggestion from the chief pilot, the pilot moved the mixture control a few millimetres back and then forward again. Immediately the engine started to run very roughly. The fuel flow then dropped to 35 l/hr and the engine started to cough and splutter. The pilot estimated that they lost about 90 per cent of the power that had been available prior to adjusting the mixture setting.

At this point, the pilot determined that a forced landing was required and turned into wind. The pilot maintained 80 kt, and confirmed the fuel pump was on, the mixture control was set to full rich, the ignition was on both magnetos, and the throttle was pushed forward. The pilot advised the passengers that he was performing a forced landing and briefed them on the process for evacuating the aircraft after landing. During the descent, the pilot tried pushing the manual prime button, which produced no increase in engine performance.

The pilot selected a forced landing area and turned towards it. During the descent, at approximately 150 ft above ground level, the pilot secured the engine and turned off the aircraft's

¹ Western Standard Time (WST): Coordinated Universal Time (UTC) + 8 hours

electrical system. During the landing roll, the wings hit some small trees. Towards the end of the landing roll, the aircraft went into a ditch and tore off the nose landing gear.

The chief pilot reported that he notified air traffic control of VH-BFL's situation and position as the aircraft landed.

After the aircraft came to rest, the pilot directed the passengers out and away from the wreckage. The pilot checked everyone for injuries and provided assistance where required. The pilot returned to the aircraft, activated the emergency locator transmitter, and contacted the chief pilot in the company aircraft, which was circling overhead.

The pilot visually checked the fuel level in the left wing, and found it was close to full. There was a noticeable fuel leak from the right wing where a small tree had struck the wing, so the pilot turned off the master and avionics switches and went back to wait with the passengers.

After about ten minutes, two helicopters from Bellburn arrived and transferred the passengers and pilot back to Bellburn. The operator then utilised other aircraft in its fleet to ferry the pilot and passengers back to Kununurra where the pilot and three passengers attended the local hospital with minor injuries.

Figure 1: VH-BFL forced landing site



Source: Operator

The operator carried out a visual inspection of the aircraft at the accident site and noted that the number six cylinder air intake pipe was missing from the engine. Due to difficulties accessing the remote site, there was a delay in recovery and further examination of the wreckage by the operator.

The aircraft's records indicated that a 110 hourly inspection was carried out three weeks prior to the accident. This included an inspection of the induction system and no defects were noted. The last engine overhaul was performed in April 2016, and no scheduled or unscheduled maintenance requiring the removal of the engine's number six cylinder air intake pipe had been recorded since.

Records obtained from the fuel supplier indicated that checks were performed when the fuel was received, in addition to the subsequent daily inspections and a post-occurrence check following this occurrence. These checks all indicated the fuel was clear, bright, and contaminate-free.

Operator comments

The chief pilot provided the following comments:

- When visiting the forced landing site, several days after the event, a search of the forced landing site was performed however, the missing intake pipe was not found (Figures 2 and 3).
- The pilot had recently completed the company induction training package, which included several practice forced landings.

The chief engineer provided the following comments:

- A 'spanner check' was carried out immediately after the accident on all Lycoming engines in the operator's fleet. The same check was also carried out on engines from other manufacturers that had been recently overhauled and fitted. No deficiencies were found.
- Engineering staff were reminded to remain vigilant when refitting engine components.

Figure 2: Image of engine with number six cylinder air intake pipe missing

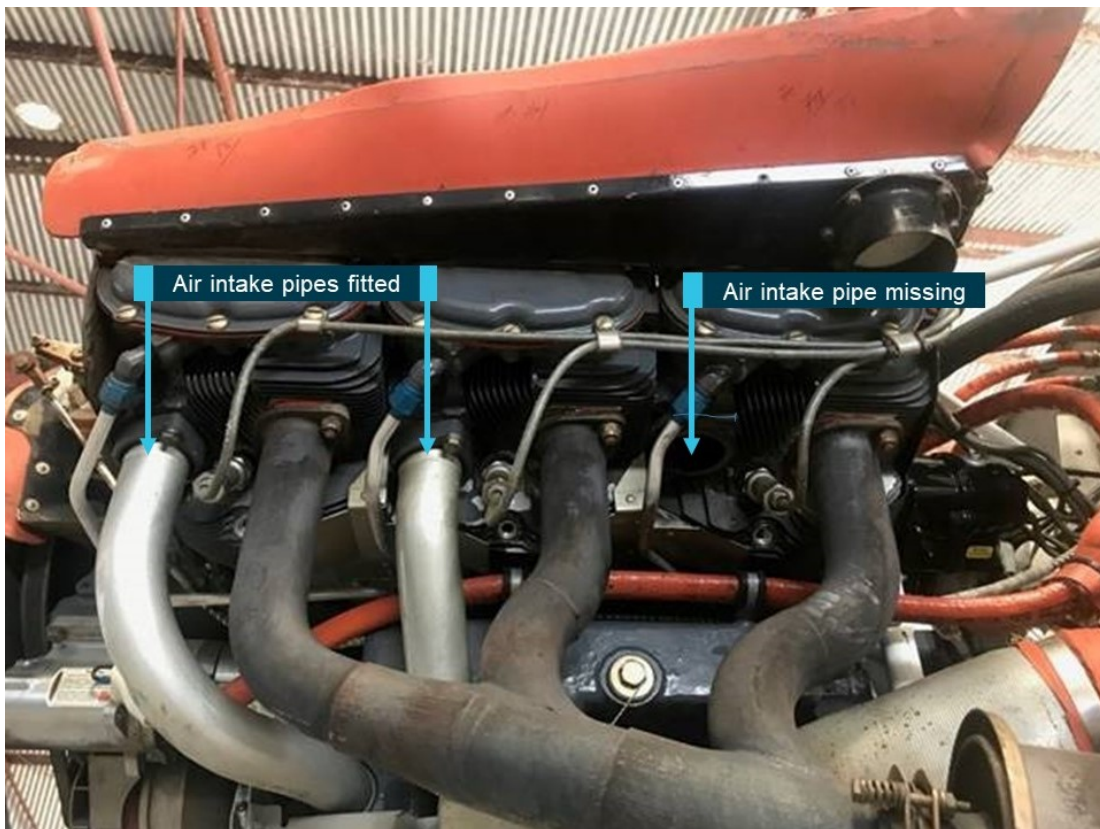


Figure 3: Lower (left image) and upper (right image) air intake pipe attachments points highlighted in red. Air intake pipe, bolts and flange are missing.



Source: Operator

Pilot comment

The pilot provided the following comments:

- On the day of the incident, the pilot had flown VH-BFL from Kununurra to Bellburn and taken off again without any issues.
- The aircraft had sufficient fuel for the flight and was within weight and balance limits.
- Prior to the flight, the pilot conducted fuel drains on VH-BFL. No water or other contaminants were found in the fuel.
- Recent forced landing practice in the Airvan helped the pilot to feel more comfortable with the emergency. In particular, the recent practice gave the pilot a good appreciation for the Airvan's glide ratio, which helped when selecting a suitable landing site.

Engine manufacturer comment

The engine manufacturer advised that detachment of an induction pipe will cause a loss of power and likely engine flame out. They further stated that:

The fuel injector measures the total induction airflow and meters fuel to the correct mixture ratio. An induction leak reduces the airflow through the injector, so there is less fuel metered, however the actual airflow to the cylinders is increased due to the leak, which results in an overall Lean mixture for all cylinders.

Previous occurrence

A review of the ATSB database identified a similar occurrence, involving the same aircraft type, which occurred on 21 October 2015, [AO-2015-123](#). On that occasion the aircraft experienced a power loss shortly after take-off however, sufficient power remained to permit a return to the departure airport. Prior to commencing operations that day a pre-flight inspection of the aircraft had been conducted, with no defects found.

Examination of the aircraft after landing identified that the intake tube on the number four cylinder was loose. Maintenance, involving removal of the intake tube, had been conducted on 10 October 2019, however it was reported that the tube was securely re-fitted and that all other similar securing bolts were also checked. The circumstances that led to the fasteners loosening could not be established.

Safety analysis

During the flight from Kununurra to Bellburn and the subsequent departure from Bellburn, the pilot reported the aircraft was performing normally. From the start of the emergency, there was a gradual degradation in performance until a forced landing was required. The pilot noted that throughout the emergency, the fuel flow was indicating below normal and that all other engine indications were normal.

The reported performance of the aircraft was consistent with the likely symptoms resulting from the air intake pipe to number six engine cylinder becoming loose and then detaching in flight. Consequently, the ATSB concluded that the missing intake pipe was the cause of the loss of power however, consistent with the previous occurrence in 2015, the reason for the air intake pipe coming loose could not be determined.

The pilot made the decision to turn back to Bellburn Airfield early in this emergency and when the situation developed, he quickly recognised the need for a forced landing. By turning into wind and using the best glide speed for the aircraft, the pilot maximised the time available to deal with the emergency and his landing options. In addition, the pilot made good use of the supporting aircraft with the chief pilot on board for troubleshooting advice.

Although it could not be determined as to what extent the pilot’s recent forced landing practice influenced the accident sequence, it is likely that the practice reduced the risk of mishandling the emergency and may have prevented further injury to the occupants of the aircraft.

Findings

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

- The air intake pipe to engine cylinder number six probably detached in flight, leading to the loss of engine performance. There was insufficient evidence to determine why the intake pipe detached from the engine.
- Recent forced landing practice performed by the pilot as part of the operator’s joining procedures likely reduced the risk of mishandling the emergency and may have prevented more serious injuries being received by the pilot and passengers during the forced landing.

Safety message

This accident highlights the importance of frequent emergency procedures training. The pilot’s handling of the forced landing contributed positively to the survivability of this accident in difficult terrain. Although, as a minimum, flight reviews are required every two years, pilots and operators are reminded of the benefits of more frequent practice of emergency procedures.

General details

Occurrence details

Date and time:	14 May 2018 – 1630 WST	
Occurrence category:	Accident	
Primary occurrence type:	Forced Landing	
Location:	8.5 km NNW of Bellburn Airstrip, Western Australia	
	Latitude: 17° 28.168’S	Longitude: 128° 17.994’ E

Aircraft details

Manufacturer and model:	Gippsland Aeronautics Pty Ltd, GA-8	
Registration:	VH-BFL	
Operator:	Shoal Air Pty Ltd	
Serial number:	GA8-06-107	
Engine:	IO-540-K1A5	
Type of operation:	Charter - Passenger	
Persons on board:	Crew – 1	Passengers – 7
Injuries:	Crew – 1 (minor)	Passengers – 3 (minor)
Aircraft damage:	Substantially damaged	

About the ATSB

The 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; 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

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the 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.