



Australian Government

Australian Transport Safety Bureau

Engine fire involving Fairchild SA227, VH-UZI

near Brisbane, Queensland, 22 March 2016

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2016-026
Final – 27 July 2016

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
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Addendum

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Engine fire involving a Fairchild SA227, VH-UZI

What happened

On 22 March 2016, the pilot of a Fairchild SA227 aircraft, registered VH-UZI, operated a freight charter flight from Mackay Airport to Brisbane Airport, Queensland. The flight was uneventful. After landing, the pilot calculated that about 100 lb (45 kg) of additional fuel had been used during the flight to that planned, with 1,100 lb rather than 1,200 lb of fuel remaining. As that amount was within the allowable deviation, the pilot was not required to and did not report the discrepancy.

During a transit check of the aircraft, maintenance personnel at Brisbane Airport found evidence of a substantial fuel leak in the left wheel well of the aircraft. Further investigation found fuel pooling in the cowls, and about 400 ml of fuel spilled out when the cowls were opened. The maintainers found evidence of fire damage to the engine combustion case and a number of components forward of the firewall (Figure 1). The upper engine mount, fuel manifold, adjacent components and the engine frame had evidence of high temperature damage.

The pilot was unaware of the engine fire, as no fire warning had been generated (see *Fire detection system*).

Figure 1: Fire damage to the left engine



Source: Aircraft operator

Engineering report

The post-incident inspection found evidence of fire in the area of the number 10 fuel nozzle. The fuel leak was due to a leaking flexible fuel manifold hose in the area where it is swaged¹ into the end fitting of the secondary manifold at the number 10 fuel nozzle (Figure 2).

Figure 2: Leaking flexible fuel manifold hose



Source: Aircraft operator

A fuel nozzle change had been carried out on the left engine during the last maintenance check, and engine ground runs were then carried out with no leaks detected.

A functional check of the engine fire detection system was conducted after the incident in accordance with the aircraft maintenance manual with no defects evident.

Airworthiness bulletin

The Civil Aviation Safety Authority issued [Airworthiness Bulletin \(AWB\) 73-006](#) in August 2011. This was in response to three service difficulty reports regarding fuel leaks from the fuel manifold hose, and one associated engine fire. Another 14 fuel leaks and 3 engine fires due to the failure of the same hose had been reported to the equivalent US and Canadian authorities since 1990.

The AWB commented that these manifolds did not have a life limit, but were subject to removal after a specified number of hours for a fuel nozzle inspection. That frequent removal may have contributed to cracks. The flexible portion of the manifold was concealed and could not be inspected visually.

The AWB (non-mandatory) recommendations included:

- every time the manifolds are installed, they should be leak tested

¹ Forged shape.

- when the manifolds are removed for a scheduled fuel nozzle inspection they should be sent to the maintenance provider with the nozzles for inspection and testing
- special attention should be paid to removal and installation, as improper practices may contribute to cracking.

Maintenance conducted

The relevant maintenance inspections conducted by the operator prior to the incident covered the replacement of engine flammable fluid lines forward of the firewall (except the nozzle manifold hose which leaked in this incident), cleaning and testing of the fuel nozzles, fuel nozzle assembly inspection and a detailed inspection of the plumbing. The inspection included a visual check of fuel nozzle flexible manifold hoses for condition and ground run leak checks. The engine repair agency advised that periodic pressure leak testing of the manifolds was conducted after a maximum of 3,600 flight hours.

At the time of the incident, the operator's system of maintenance did not cover all aspects of the recommended practices specified in AWB 73-006. The operator did not find any evidence that they had carried out an assessment of that bulletin.

Fire detection system

The aircraft had a fire detection system, however, there were no sensors in the immediate area of the leak. As such (and noting that the fire detection system tested serviceable following the incident), the system was ineffective in alerting the pilot to the fire. Without the fire detection system being activated, the pilot was not aware of the issue.

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 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.

Continuing airworthiness

The aircraft operator has introduced procedures in accordance with the recommendations specified in Airworthiness Bulletin 73-006.

Safety message

This incident highlights the importance of assessing any recommendations relating to maintenance. A recommendation is generally made in response to an event and complying with procedures specified may avoid a similar incident occurring.

General details

Occurrence details

Date and time:	22 March 2016 – 2319 EST	
Occurrence category:	Incident	
Primary occurrence type:	Fire	
Location:	near Brisbane, Queensland	
	Latitude: 27° 23.05' S	Longitude: 153° 07.05' E

Aircraft details

Manufacturer and model:	Fairchild Industries Incorporated SA227-AT	
Registration:	VH-UZI	
Serial number:	AT-570	
Type of operation:	Charter – Freight	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Minor	

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.