



Australian Government

Australian Transport Safety Bureau

Fuel starvation involving Lancair ES, VH-DFH

22 km NW Mansfield (ALA), Victoria, 18 April 2016

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2016-037
Final – 28 September 2016

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
Internet: www.atsb.gov.au

© Commonwealth of Australia 2016



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

Fuel Starvation involving Lancair ES, VH-DFH

What happened

On 18 April 2016, at about 1030 Eastern Standard Time (EST), a Lancair ES aircraft, registered VH-DFH (DFH), was taxiing to depart from a private airstrip about 22 km NW of Mansfield (ALA), Victoria. The pilot was the only person on board the private flight.

After conducting an engine run-up, the pilot taxied the aircraft to take-off towards the east on the sealed strip. The pilot reported that the engine run-ups, taxi, and take-off were normal. During the initial climb, at about 500 ft, the engine suddenly lost power and the pilot established the aircraft in a glide, reducing the throttle and looked for a suitable forced landing area. Some engine power returned but was very intermittent and the engine was not producing the correct power for the engine control settings.

The pilot advised that conducting a forced landing straight ahead would have involved negotiating houses, trees, livestock, and the unknown nature of the ground surface. They assessed that sufficient height was available to return to the airstrip so commenced a turn to the left.

The pilot lined up with the airstrip landing towards the west. As the pilot considered that the aircraft had good height and speed, the pilot elected to extend the flaps half-way and subsequently extended the flaps to the full down position as the pilot was concerned that the aircraft would overshoot the airstrip.

The aircraft touched down about 25 m before the threshold on a grass area. The aircraft bounced slightly, touching down again on the grass area beside the airstrip. The left wing contacted an electric fence post and came to a stop a further 100 m after the initial touch down point (Figure 1). The pilot exited the aircraft after turning off all the electrical and engine controls. The pilot was not injured and the aircraft had minor damage.

Figure 1: DFH at the accident site



Source: Aircraft owner

Pilot comment

The pilot reported that the aircraft was inspected subsequent to the incident at an aircraft maintenance facility and no defects were found with the aircraft or engine. The maintenance personnel assessed that fuel starvation¹ was the probable reason for the power loss due to the way the aircraft had been parked on an incline prior to taxi and take-off. The pilot reported that the aircraft has two independent fuel tanks, one in each of the slim line wings. During the pre-flight inspection, the aircraft was situated with the left wing on the downhill side for a little over half an hour. It is believed that the fuel drained away from the fuel pick up toward the wing tip through a one-way flapper valve² reducing the quantity of fuel available in the sump area where the left wing fuel pick up is located. The pilot reported that the left fuel tank had been selected for the taxi and take-off.

The pilot reported that a self-briefing was routinely conducted before each flight for possible emergencies with decision points and suitable emergency landing areas considered.

The pilot indicated that the wind speed was about 10 knots gusting to about 25 knots from the NE which may have contributed to an undershoot of the airstrip.

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 owner

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

The owner is considering installing a placard in the aircraft to remind pilots when the aircraft is parked on an incline to consider which fuel tank to select for take-off.

Safety message

The ATSB booklet [Avoidable Accidents No. 3 - Managing partial power loss after take-off in single-engine aircraft](#) is available from the ATSB website and aims to increase awareness among flying instructors and pilots of the issues relating to partial power loss after take-off in single-engine aircraft.

During and after take-off, a partial power loss is three times more likely in today's light single-engine aircraft than a complete engine failure. There have been nine fatal accidents from 2000 to 2010 as a result of a response to a partial power loss compared with no fatal accidents where the engine failed completely. Analysis of the occurrences supports the need to raise greater awareness of the hazards associated with partial power loss and to better train pilots for this eventuality.

The booklet highlights the importance of:

- pre-flight decision making and planning for emergencies and abnormal situations for the particular aerodrome including a thorough pre-flight self-brief covering the different emergency scenarios.
- conducting a thorough pre-flight and engine ground run to identify any issues that may lead to an engine failure.

¹ Fuel starvation happens when the fuel supply to the engine(s) is interrupted although there is adequate fuel on board.

² The flapper valve prevents fuel from sloshing around during normal flight.

- taking positive action and maintaining aircraft control either when turning back to the aerodrome or conducting a forced landing until on the ground, while being aware of flare energy and aircraft stall speeds.

Further information about the wing fuel tank one-way flapper valve is contained in an article published by the Lancair Owners & Builders Organisation, [Fuel system inspection & calibration](#) and is available from their website. The article discusses how the flapper valve prevents fuel from flowing away from the inner most fuel compartment where the engine fuel supply line is located. It also discusses how the small wing dihedral makes the aircraft particularly sensitive to the outward flow of fuel.

General details

Occurrence details

Date and time:	18 April 2016 – 1030 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Fuel related - starvation	
Location:	22 km NW Mansfield (ALA), Victoria	
	Latitude: 36° 54.68' S	Longitude: 145° 58.67' E

Aircraft details – VH-DFH

Manufacturer and model:	Amateur Built Aircraft LANCAIR ES	
Registration:	VH-DFH	
Serial number:	044	
Type of operation:	Private - Pleasure / Travel	
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.