Australian Government
Australian Transport Safety Bureau

Engine shut down involving British Aerospace Jetstream 32, VH-OTQ

60 km WNW of Newcastle (Williamtown) Airport, NSW, 14 December 2016

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2016-171
Final – 27 April 2017

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

Addendum

Page	Change	Date

Engine shut down involving British Aerospace Jetstream 32, VH-OTQ

What happened

At about 0730 Eastern Daylight-saving Time (EDT) on the 14 December 2016, a Pelican Airlines British Aerospace Jetstream 32 aircraft, registered VH-OTQ (OTQ), departed Newcastle (Williamtown) Airport for Dubbo, New South Wales (NSW). Two flight crew and six passengers were on board the regular public transport flight.

Just after the aircraft reached the cruising altitude of FL 160,[1] the captain who was the pilot monitoring,[2] noticed the right engine exhaust gas temperature (EGT) gauge was indicating just outside the top of the green arc (650 °C) and was indicating about 655 °C in the yellow arc. The captain reduced the power to the right engine, but there was no corresponding reduction in the EGT.

The flight crew conducted the quick reference handbook (QRH) emergency checklist for the lack of response to power lever movement, which included the engine ignition selected to continuous operation and the engine and airframe ice protection turned on. In accordance with the checklist, the power lever was checked after about 5 minutes and was found to still be unresponsive. The captain indicated that this was very unusual and turned off the engine computers to try to isolate the fault, but this made little difference and so they turned the computers back on. The captain then moved the power lever further back and noticed a momentary increase in EGT, by about 8 °C to 10 °C, as well as an increase in torque.

At this stage of the flight, the aircraft was at a position where they would ordinarily change frequency to a different air traffic controller. However, the flight crew decided to remain on this frequency and return to Newcastle Airport. When the controller instructed the crew to change frequency, the crew advised the controller of their situation and requested a new clearance to return to Newcastle. The crew also advised the controller that as a precaution they might conduct an in-flight engine shut down. The controller gave them a clearance to descend and track direct to Newcastle and subsequently confirmed with the crew that the airport emergency services were required to be available. The controller initiated an alert phase[3] and the airport emergency services were requested to be on standby.

The flight crew followed the guidance in the QRH checklist to continue to operate the engine and noted that an engine shut down may be necessary for the approach and landing. As the aircraft was lightly loaded, the captain believed that there would be no issues operating on one engine. The crew conducted the QRH engine in-flight shutdown checklist and shutdown the right engine prior to commencing their descent to Newcastle. The captain briefed the passengers through the aircraft's public address (PA) system about the precautionary engine shut down and instructed them to familiarise themselves with the passenger safety card.

At about 50 km from Newcastle and on descent passing through about 8,000 ft, the captain became the pilot flying and the first officer the pilot monitoring. They reviewed the QRH abnormal checklist for landing with one engine inoperative. The crew conducted a visual approach and

---

1 Flight level: at altitudes above 10,000 ft in Australia, an aircraft's height above mean sea level is referred to as a flight level (FL). FL 160 equates to 16,000 ft.

2 Pilot Flying (PF) and Pilot Monitoring (PM): procedurally assigned roles with specifically assigned duties at specific stages of a flight. The PF does most of the flying, except in defined circumstances; such as planning for descent, approach and landing. The PM carries out support duties and monitors the PF's actions and the aircraft's flight path.

3 Alert Phase (ALERFA): an emergency phase declared by the air traffic services when apprehension exists as to the safety of the aircraft and its occupants.

landed on runway 30 without further incident. The two crew and six passengers were not injured and the aircraft was not damaged.

Captain's comment

The captain reported that they were flying at a level where icing conditions may be encountered and from previous experience, flying in a different country, it was not uncommon to have an unresponsive power lever control in icing conditions.

The captain reported that they had adequate time to assess the unresponsive power lever, evaluate the performance of the aircraft with only one engine operating and plan for the landing. The workload was not high as they were flying in visual meteorological conditions with adequate time and no other traffic.

On reflection, the captain indicated that although the situation did not appear like an emergency, making a PAN PAN[4] call to the controller would have eliminated any uncertainty.

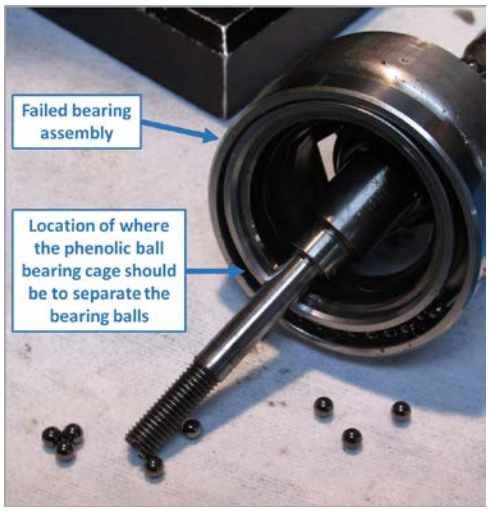
The captain indicated that they had only conducted engine shut downs in a training environment and this was the first time landing with one engine inoperative.

Operator comment

The operator reported that the aircraft had been in storage in Australia from 2007 to March 2016. Since March, the aircraft had undergone major maintenance at an aircraft maintenance facility. The right engine involved in the incident had undergone maintenance at an engine overhaul facility and had been preserved during its time of inactivity, prior to its installation on OTQ. The aircraft was released to service 11 days (about 26 flight hours) prior to the incident occurring.

Aircraft maintenance personnel inspected the right engine after the flight and found that the engine's fuel control unit[5] was at fault. An examination of the fuel control unit at a component overhaul facility found that the input drive shaft was not free to move. The fuel control unit was inspected and a bearing was found to have failed (Figure 1). The phenolic bearing cage[6] that separates the bearings was found broken (Figure 2) with many small fragments found to be interfering with the operation of the fuel control unit in that area.

Figure 1: Failed bearing assembly



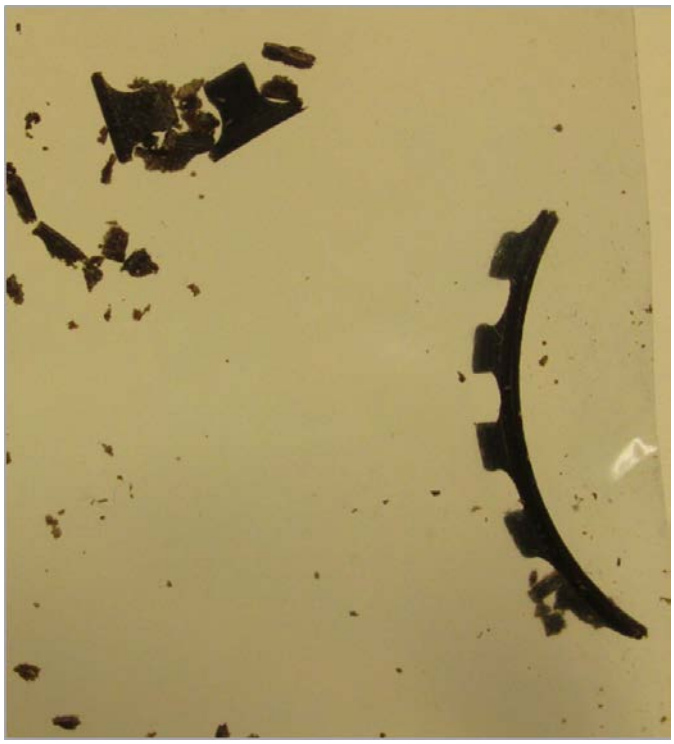
[4] PAN PAN: an internationally recognised radio call announcing an urgency condition which concerns the safety of an aircraft or its occupants but where the flight crew does not require immediate assistance.

[5] The fuel control unit governs the engine fuel supply in accordance with pilot engine control inputs and selections, ambient conditions, and engine limitations.

[6] The phenolic bearing cage is manufactured from fibre-reinforced phenolic resin. The cage retains the ball bearings, to maintain a specific separation between all the bearing assembly parts.

Source: Aircraft operator

Figure 2: Pieces of the failed phenolic bearing cage



Source: Aircraft operator

Findings

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

- The engine issue related to a failed fuel control unit bearing, where fragments of the bearing cage interfered with the unit's operation.

Safety message

It is important when time permits to broadcast a 'pan' or 'mayday', whichever is applicable, to air traffic control to alert the controller and remove any uncertainty about the severity of the situation. If controllers receive a 'pan' or 'mayday' broadcast, they will organise (depending on the situation) a priority landing to allow an aircraft that might have a problem to land as soon as possible. A situation that seems relatively innocuous can deteriorate quickly. Hesitating or not broadcasting the situation can result in help being delayed.

Airservices Australia defines the two levels of emergency notifications as:

• MAYDAY: My aircraft and its occupants are threatened by grave and imminent danger and/or I require immediate assistance.

• PAN PAN: I have an urgent message to transmit concerning the safety of my aircraft or other vehicle or of some person on board or within sight but I do not require immediate assistance.

Additional information is provided in the following publications:

Airservices Australia *In-flight emergencies*, is available from the Airservices website.

Airservices Australia Safety Bulletin 18 July 2016 *What happens when I declare an emergency*, is available from the Airservices website.

General details

Occurrence details

Date and time:	14 December 2016 – 0748 EDT	
Occurrence category:	Incident	
Primary occurrence type:	Technical systems fuel	
Location:	60 km WNW of Newcastle Airport, New South Wales	
	Latitude: 32° 33.13' S	Longitude: 151° 15.47' E

Aircraft details – VH-OTQ

Manufacturer and model:	British Aerospace Jetstream 32	
Registration:	VH-OTQ	
Operator:	Pelican Airlines Pty Ltd (operating as FlyPelican)	
Serial number:	975	
Type of operation:	Air transport low capacity - passenger	
Persons on board:	Crew – 2	Passengers – 6
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

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.