



**Australian Government**

**Australian Transport Safety Bureau**

# Engine failure involving SAAB 340, VH-RXS

near Dubbo Airport, New South Wales, 23 March 2017

Aviation Occurrence Investigation

AO-2017-034

Final – 18 September 2017

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 failure involving SAAB 340, VH-RXS

## What happened

On 23 March 2017, at about 0942 Eastern Daylight-saving Time (EDT), a Regional Express SAAB 340B, registered VH-RXS (Figure 1), departed Dubbo Airport, New South Wales (NSW) to operate scheduled passenger flight ZL821 to Sydney, NSW. There were three crew and 23 passengers on board.

At about 0944, as the aircraft climbed through about 4,300 ft, the flight crew heard several bangs from the right engine accompanied by jolts through the aircraft. At the same time, the cockpit master warning illuminated and the right engine instruments displayed multiple warnings. These warnings were accompanied by a burning smell. The first officer, who was pilot flying,<sup>1</sup> identified a failure of the right engine and the flight crew immediately enacted the memory items of the engine failure checklist. The engine was shut down and the smell dissipated.

**Figure 1: VH-RXS**



Source: VJ Bhana

After completing the memory items, the flight crew commenced the standard failure management procedures. The flight crew secured the right engine and established that the aircraft was performing satisfactorily. The flight crew declared a PAN<sup>2</sup> to air traffic control and requested emergency services. The flight crew then descended the aircraft to 4,000 ft and identified an area to the south-east of Dubbo which was clear of cloud and other traffic. The first officer manoeuvred the aircraft to this area in order to reduce workload while the flight crew continued the standard failure procedures. The captain identified Dubbo as the most suitable airport for landing. The flight crew reviewed the weather conditions for Dubbo and elected to conduct a visual approach and landing. The flight crew then briefed the cabin crew member on the situation, advised that they were returning to Dubbo and to expect a normal disembarkation. The captain then used the

<sup>1</sup> 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.

<sup>2</sup> 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.

aircraft public address system to inform the passengers of the situation and that the aircraft was returning to Dubbo.

After briefing the passengers, the captain contacted the emergency services to ensure they were prepared for their arrival. In accordance with standard operating procedures, the captain took over the pilot flying role prior to landing.

At 1004 the aircraft landed on runway 05. No persons were injured and the aircraft suffered minor damage in the incident.

### ***Captain comments***

The captain of the flight provided the following comments:

- The first officer remained as the pilot flying until they were prepared to make the approach, as this allowed the captain to focus on the engine failure checklist.
- Emergency procedures and simulator training undertaken by the flight crew was effective. The training prepared the flight crew well for the incident and along with the procedures in place, allowed the flight crew to effectively manage the engine failure.
- During emergencies, it is important to follow procedures and not rush. This ensures all necessary actions are completed correctly. At each step, take a moment to review the overall situation and aircraft performance to ensure that it is safe to continue.
- The engine failure checklist instructs the flight crew to consider a restart of the failed engine. At the time of the failure the right engine low oil pressure, over-temperature and chip detector<sup>3</sup> warnings all illuminated. As the warnings indicated that the engine was damaged and not recoverable, the captain elected not to attempt to restart it.
- There was cloud in the area of the runway 05 area navigation (RNAV)<sup>4</sup> approach, the captain elected to remain clear of cloud and conduct a visual approach. As the runway 05 RNAV approach had quite a high minimum descent altitude, entering cloud may have resulted in a single engine missed approach.
- After the flight, the captain received reports that passengers were concerned at the length of time taken after the engine failure for the flight crew to update them on the situation.

### ***Engineering examination***

The engine manufacturer conducted an engineering examination of the failed engine, however the examination was not completed in time for the release of this report.

An initial engineering examination found that the number four bearing failed. The bearing failure allowed the high pressure compressor to move off-centreline within the engine. This caused further damage and led to complete failure of the engine.

The damage to the failed bearing was consistent with overheating due to a lack of lubrication. At the time of the release of this report, the reason for the lack of lubrication to the number four bearing had not been determined.

### **Safety Analysis**

The number four bearing within the right engine failed, possibly due to a lack of lubrication. As a result of the bearing failure, secondary damage occurred to the high pressure compressor which led to a complete loss of power from the engine.

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<sup>3</sup> Chip detector: a magnetic device used to gather chips of metal from engine or transmission oil to provide early warning to maintenance personnel of impending engine failure. Depending on the installation, it can be linked to an in-cockpit indicating light to provide immediate advice to aircrew.

<sup>4</sup> Area navigation (RNAV) approach: An approach flown along a path of GPS waypoints.

## Findings

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

- The right engine number four bearing failed, resulting in engine power loss.

## Safety message

This incident highlights the importance of effective training and emergency procedures. Faced with an abnormal situation, the training provided to the flight crew ensured they were able to effectively implement the standard failure procedures, secure the failed engine and return for a safe landing.

During an emergency, flight crew prioritise the management of the emergency to ensure that the safety of the flight is not compromised. Completing the emergency procedures, along with the coordination of emergency services and communications with supporting agencies may absorb a significant amount of time before the flight crew are able to provide an update to passengers.

## General details

### Occurrence details

Date and time:	23 March 2017 – 0944 EDT	
Occurrence category:	Incident	
Primary occurrence type:	Engine failure or malfunction	
Location:	Near Dubbo Airport, New South Wales	
	Latitude: 32° 13.00' S	Longitude: 148° 34.48' E

### Aircraft details

Manufacturer and model:	SAAB Aircraft 340B	
Registration:	VH-RXS	
Operator:	Regional Express Airlines	
Serial number:	340B-285	
Type of operation:	Air Transport Low Capacity - Passenger	
Persons on board:	Crew – 3	Passengers – 26
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.