



Australian Government

Australian Transport Safety Bureau

Fumes event involving an Airbus A330, VH-XFB

Near Perth Airport, Western Australia, 9 June 2014

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Addendum

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Fumes event involving an Airbus A330, VH-XFB

What happened

At around midday on 9 June 2014, an Airbus A330, registered VH-XFB, operated by Virgin Australia, took off from Perth, Western Australia, on a scheduled passenger service, bound for Sydney, New South Wales. As engine power was applied at the commencement of take-off, the cabin crew members at the rear of the cabin noticed a burning odour. Based upon their experience on this particular aircraft, the cabin crew initially dismissed the fumes as being relatively common. The crew had experienced similar fumes on previous occasions, noting that they usually dissipated soon after take-off. On this occasion however, the crew noted that the fumes seemed more intense than usual, and appeared to grow in intensity as the departure continued.

Concerned about the growing intensity of the fumes, the cabin crew contacted the cabin supervisor, who was seated further forward during the take-off. When the cabin crew were released from their seats by the flight crew, the cabin supervisor came back to assist with identification of the source of the fumes. Some cabin crew further forward also noticed the odour, but to a lesser extent than the crew at the rear of the aircraft. The cabin crew turned off the fridges in the rear galley, believing that a fridge malfunction may be the source of the fumes, but that action had no effect. Upon further investigation, the crew then traced the source of the fumes to a vent in the rear cabin bulkhead.

The cabin crew moved away from the area and monitored the intensity of the fumes, which continued for about 20 minutes before dissipating. The captain was briefed by the cabin supervisor and came to the rear of the cabin to assess the situation, but by that time the fumes had dissipated. The captain indicated to the cabin crew that there had been no flight deck indications to suggest that there was a problem.

Some cabin crew members were adversely affected by the fumes and were unable to complete their normal in-flight duties. The flight crew considered diverting to Adelaide but elected to continue to Sydney given that the most affected crew members had been administered oxygen and were recovering from their exposure to the fumes. Some cabin crew members also sought medical attention following the flight. At the completion of the flight, the captain made a maintenance log entry indicating that acrid fumes were evident in the rear galley area after take-off.

Subsequent engineering investigation

Following the flight, a subsequent engineering inspection found that a portion of insulation blanket fitted to the rear pressure bulkhead of the aircraft had collapsed and came into contact with the Auxiliary Power Unit (APU)¹ bleed air duct, where the duct passes through the rear pressure bulkhead. The engineering investigation determined that the insulation blanket had not been correctly refitted following maintenance by a previous operator of the aircraft.

The insulation blanket is constructed of glass wool encased in a wrapping material. The wrapping was damaged and heat affected where the insulation blanket was in contact with the APU bleed air duct. Damage to the wrapping exposed the inner glass wool material, which also showed evidence of having been affected by heat where the material was in contact with the bleed air duct

¹ The APU is a self-contained unit at the rear of the aircraft that provides a source of air-conditioning and electrical power when required. During this incident, the APU was shut down by the flight crew soon after push-back from the gate, which is normal practice.

(Figures 1 and 2). Engineering staff determined that the insulation blanket in contact with the bleed air duct was the likely source of the fumes.

Figure 1: Insulation blanket damage adjacent to upper surface of APU bleed air duct



Source: Aircraft operator (image cropped by ATSB)

Figure 2: Insulation blanket damage adjacent to lower surface of APU bleed air duct



Source: Aircraft operator (image cropped by ATSB)

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 operator

The operator found similar damage on another A330 aircraft, registered VH-XFA. As an interim measure, the operator prohibited use of the APU on both VH-XFB and VH-XFA. Both aircraft were then subject to an Engineering Order which required that a section of the insulation blanket adjacent to the APU bleed air ducting to be trimmed and sealed, and that the remainder of the blanket be appropriately restrained. The Engineering Order also required a detailed visual inspection of the rear pressure bulkhead structure immediately around the bleed air duct (looking for signs of heat damage, paint discolouration or distortion). The second part of the Engineering Order directed that the insulation blanket be replaced entirely, as a permanent repair.

Aircraft manufacturer

In response to the information provided by the operator, the aircraft manufacturer recommended the following inspections:

- Inspection of a flexible union in the APU bleed duct in the area near the rear pressure bulkhead for evidence of a bleed air leak.
- A heat damage evaluation, including the assessment of any effect on primary structure (using electrical conductivity testing) in the affected area and an inspection of floor panels above the damaged blanket.
- Visual inspection of surface protection (water repellent agent) in the affected area.

The manufacturer also sought to have the damaged insulation blanket shipped to the blanket manufacturer in order to better understand the origin of the damage (this was not possible because the damaged insulation blanket had been discarded when it was replaced).

Safety message

Fumes can originate from a wide range of sources. While some fumes may appear subtle and innocuous, they may be the first indication of a more serious problem. Furthermore, the effect of fumes on the human body is dependent on many variables, including the nature and intensity of the fumes, and the duration of exposure. This incident serves to highlight the importance of treating all fumes with suspicion, and implementing a cautious and conservative response, consistent with published guidance.

In 2011, the FAA released an Information for Operators (InFO) notice dealing with smoke and/or fumes in transport category aircraft (number 11002). This notice was issued to inform operators of the need for 'greater emphasis on finding new ways to identify areas susceptible to smoke or may become susceptible to smoke'. The notice commented that 'approximately 900 smoke or fumes in the cockpit or cabin events occur annually in transport category airplanes'. The notice recommends that operators record and track smoke and/or fumes related events and use this data to definitively resolve and thereby reduce incidents of smoke and/or fumes entering aircraft. A copy of InFO notice 11002 can be found on the FAA website via the following link:

www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/

The ATSB recently released a research report (AR-2013-213) titled *An analysis of fumes and smoke events in Australian aviation* (www.atsb.gov.au/publications/2014/ar-2013-213.aspx). The study was undertaken to further understanding of the nature and impact of aviation fumes and smoke related occurrences in Australia. Research associated with that report found that:

The most common source of fumes/smoke was aircraft systems issues, primarily relating to failure or malfunction of electrical and auxiliary power unit (APU) systems. Equipment and furnishings also featured highly as a source of fumes and smoke. Within this category, air conditioning and galley equipment were the most common sources of fumes/smoke. External sources of fumes/smoke and cargo/baggage related events were relatively rare.

General details

Occurrence details

Date and time:	09 June 2014 – 1143 WST	
Occurrence category:	Incident	
Primary occurrence type:	Fumes	
Location:	Near Perth, Western Australia	
	Latitude: 31° 56.42' S	Longitude: 115° 58.02' E

Aircraft details

Manufacturer and model:	Airbus	
Registration:	VH-XFB	
Operator:	Virgin Australia	
Serial number:	0372	
Type of operation:	Air Transport	
Persons on board:	Crew – 11	Passengers – Unknown
Injuries:	Crew – 4	Passengers – Nil reported
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 fare-paying passenger operations.

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.