



Australian Government

Australian Transport Safety Bureau

Smoke and fumes event involving Boeing 787, N36962

110 km E of Port Macquarie Airport, New South Wales, 17 April 2016

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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

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Addendum

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Smoke and fumes event involving Boeing 787, N36962

What happened

On 17 April 2016, a Boeing 787-9, registered N36962, operated by United Airlines as flight UAL870, departed Sydney, New South Wales (NSW), for San Francisco, United States. On board were 4 flight crew, 11 cabin crew and 238 passengers. During the departure, cabin crew switched on the aft galley ovens (Figure 1) in preparation for meal services.

After the two ovens were switched on, there was a short burst of smoke, which set off a fire alarm in a nearby toilet for about one minute. One of the ovens displayed a “FAILURE” message. Several cabin crew detected a strong chemical odour and an electrical smell, as well as a blue haze. Other crew described it as an ozone smell. The oven interactive screen displayed a ‘Critical Error- Broken Fuse’ message.

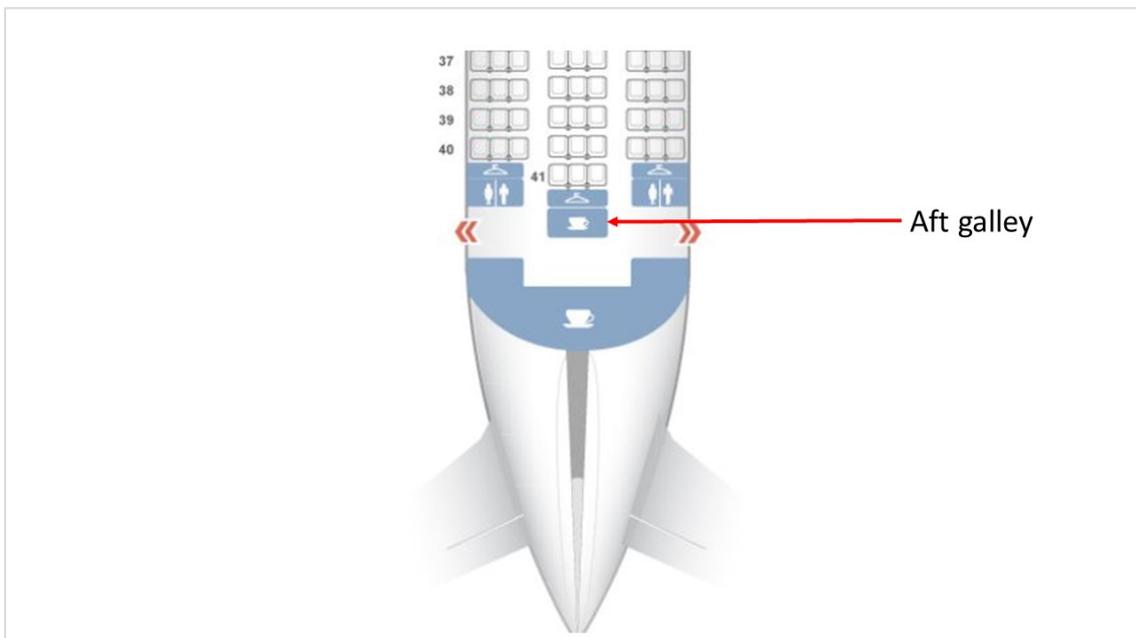
The crew immediately pulled all relevant circuit breakers, and switched off all electrical sources to the aft galley. The inflight service manager (ISM) advised the captain. The ISM and a relief pilot from the cockpit arrived at the aft galley with fire extinguishers. By this stage, the smoke had dissipated, but the odour persisted. As it could not be confidently ascertained that the ovens were the sole source of the problem, the captain contacted the ground-based technical operations maintenance controller (TOMC) by satellite phone.

Boeing 787, N36962



Source: John Richard Thomson

Figure 1: Rear section of a B787-9 depicting aft galley



Source: SeatGuru modified by the ATSB

The discussion with the TOMC involved all flight crew and the ISM. It was agreed that the safest option was to return the aircraft to Sydney. The captain advised ATC by a PAN¹ call. ATC initiated an INCERFA² phase. About 110 km east of Port Macquarie, NSW, the crew commenced a return to Sydney. As the aircraft was well in excess of its allowed landing weight, fuel was dumped during the descent.

The aircraft landed without incident in Sydney at 1258 Eastern Standard Time (EST) with emergency services in attendance.

Post-incident engineering report

A post-engineering inspection quarantined the suspect oven, and after an inspection, a fuse was replaced. After appropriate testing, the aircraft was released back to service.

Boeing and the oven manufacturer investigated the cause of the ‘Critical Error’ fault displayed on the oven screen (Figure 2).

The manufacturer individually tested all oven components. They reported that all individual components worked correctly, however, an additional measurement of the oven motor current detected that the motor did not run smoothly. The motor temperature was also above normal, most likely from insufficient airflow. This known fault had been rectified with a new oven software release.

Boeing reported that the oven manufacturer is working with United Airlines to update the software in all relevant ovens in their fleet.

The exact cause of the odour could not be determined.

A second similar occurrence

United Airlines have advised the ATSB of a second similar occurrence involving another B787 aircraft. On 2 June 2016, a United Airlines B787 aircraft, N35953 experienced an electrical/heat odour in the mid B galley. The flight crew dumped excess fuel and returned safely to Melbourne. On this occasion, no emergency was declared.

Maintenance were able to isolate one oven, and confirmed the error was a broken fuse. The oven was removed and replaced, and the aircraft returned to service.

Figure 2: Error message from oven on N35953



ATSB comment

As part of the investigation, the ATSB obtained reports from the flight crew and cabin crew on board during the incident.

It was evident that all emergency procedures were carried out efficiently and effectively. The captain involved all relevant crew members and the TOMC prior to making a decision to return the aircraft to Sydney.

¹ 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.

² INCERFA is an uncertain ty phase when doubt exists as to the safety of the aircraft and its occupants

Safety message

This incident highlights the correct management of an abnormal situation with effective crew coordination. Each crew member responded effectively and the situation was professionally managed by the captain.

General details

Occurrence details

Date and time:	17 April 2016 – 1048 EST	
Occurrence category:	Incident	
Primary occurrence type:	Smoke and fumes	
Location:	110 km E of Port Macquarie Airport (BEADS IFR)	
	Latitude: 31° 36.18' S	Longitude: 154° 00.30' E

Aircraft details

Manufacturer and model:	Boeing 787-9	
Registration:	N36962	
Operator:	United Airlines	
Serial number:	35880	
Type of operation:	RPT – High Capacity	
Persons on board:	Crew – 15 crew	Passengers – 238
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.