

SERIOUS INCIDENT

Aircraft Type and Registration:	Boeing 777-236, G-YMMU	
No & Type of Engines:	2 Rolls-Royce RB211 Trent 895-17 turbofan engines	
Year of Manufacture:	2008 (Serial no: 36519)	
Date & Time (UTC):	3 July 2019 at 1530 hrs	
Location:	On departure from London Heathrow Airport	
Type of Flight:	Commercial Air Transport (Passenger)	
Persons on Board:	Crew - 13	Passengers - 259
Injuries:	Crew - None	Passengers - None
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	56 years	
Commander's Flying Experience:	24,433 hours (of which 13,397 were on type) Last 90 days - 206 hours Last 28 days - 49 hours	
Information Source:	Aircraft Accident Report Form submitted by the commander and information supplied by the operator	

Synopsis

Shortly after takeoff from London Heathrow the pilots smelt fumes on the flight deck. They donned oxygen masks, carried out the appropriate checklist and returned to Heathrow where the aircraft landed without further incident.

Extensive engineering investigation was carried out and several components were changed, but the source of the fumes was not found.

History of the flight

On 3 July 2019 G-YMMU was scheduled to operate from London Heathrow to Bengaluru Kempegowda International Airport in India. The aircraft's Auxiliary Power Unit (APU) bleed air valve and right air conditioning pack were isolated, in accordance with the Dispatch Deviations Guide (DDG), following two previous fumes events. The flight was operated by three pilots due to the length of the flight.

After the engines were started but before the aircraft began to taxi, the third pilot smelt fumes. Neither the commander nor the co-pilot could smell anything unusual. After discussing the smell the crew decided to continue with the flight.

Shortly after takeoff, all three pilots smelt fumes on the flight deck. They described the

smell as an “organic cheesy, oily smell” which left a metallic taste. The intensity of the smell increased as the aircraft passed through 2,000 ft. The co-pilot donned his oxygen mask and the commander passed control of the aircraft to him. The commander and third pilot then assessed the situation. They asked the Senior Cabin Crew Member (SCCM) to come to the flight deck to confirm the smell and confirm if there were any fumes in the cabin. The SCCM confirmed the smell of fumes on the flight deck and that he had not smelt anything in the cabin. After the SCCM left the flight deck the commander and third pilot donned their oxygen masks and started the ‘SMOKE, FIRE or FUMES’ QRH checklist.

After completing the first few items of the checklist the crew discussed if they needed to land urgently. At this stage the aircraft was approximately 51 tonnes above the maximum landing weight. As the fumes were isolated to the flight deck and all three pilots were on oxygen the crew decided the safest course of action was to jettison fuel to maximum landing weight rather than land overweight.

The pilots made a PAN (urgency) call to ATC and started jettisoning fuel. The remaining items of the smoke, fire or fumes checklist required the left air conditioning pack to be switched off (to determine if this was the source of fumes). However, as the aircraft had dispatched with the right air conditioning pack isolated, this would have depressurised the aircraft. The crew also realised that they would not be able to determine if selecting the pack off stopped the fumes without removing their oxygen masks. They initially requested descent to FL100 to enable them to depressurise the aircraft but subsequently decided the safest course of action was to leave the left pack on.

Once fuel jettison was completed and the cabin crew and passengers had been briefed, the aircraft returned to Heathrow for a normal approach and autoland.

The cabin crew subsequently reported that during the approach to land, fumes could be smelt around Door 2L¹ and on the left side of the cabin from row 1 to 5.

Previous fumes events

Fumes were previously reported on G-YMMU on 29 June 2019 on final approach to land at Heathrow following a flight from Buenos Aires, Argentina. The flight crew reported that they smelt an oily smell but that it was not bad enough to don oxygen masks. They reported the smell to the operator’s engineering department, which was unable to replicate the smell on the ground. They suspected the source was the APU bleed, so this was isolated in accordance with the DDG and the aircraft was returned to service pending further investigation.

On 1 July 2019, G-YMMU was returning to Heathrow from Cairo, Egypt. Whilst levelling at FL80 in the Heathrow hold the flight crew smelt “diesel fumes”. Both pilots described experiencing a “dry, tickly throat”. They donned their oxygen masks and declared a PAN to air traffic control. The aircraft landed at Heathrow uneventfully.

Footnote

¹ Door 2L is the second door from the front on the left hand side of the aircraft.

Following this event, the operator's engineering department carried out further work to determine the source of the fumes. Damage was found in the right pack air cycle machine, so this was replaced. Several other components were changed in the air conditioning system. An odour from the APU and right pack was detected during subsequent ground engine runs. The aircraft was returned to service with the APU bleed valve and right pack isolated pending further investigation.

Subsequent events

Two further fume events occurred on 8 August and 17 August 2019, neither event required the use of oxygen. On 8 August the flight crew detected oily fumes during takeoff from London Heathrow. The fumes dissipated shortly after takeoff and the flight continued to destination. On 17 August 2019 the co-pilot detected a "wet dog" or "sock" smell on the flight deck at FL90 approaching London Heathrow. The commander initially thought the smell was associated with ozone from nearby thunderstorms. The smell lasted for approximately one minute. The smell reoccurred on the ground as the aircraft taxied to stand.

Further engineering investigation

Following the event on 3 July 2019 the operator investigated further, including ground engine runs and a flight test. During the flight test fumes were detected associated with the left pack. Following further inspections, the aircraft was returned to service with the left bleed valve isolated and the APU bleed valve and right pack reinstated.

Further engineering inspections were conducted on 7 and 15 July 2019. Several additional components were replaced and further ground runs were conducted during which no fumes or odours detected. The aircraft was returned to service with the left bleed valve reinstated on 15 July 2019.

After the events on the 8 and 17 August further engineering inspections were conducted but no faults were found.

Conclusion

Fumes were reported in the flight deck on five flights over a two month period. Two of the events required the flight crew to use oxygen.

Despite extensive engineering investigation by the operator prior to returning the aircraft to service, at the time of publication, the source of the fumes has not been found.