

SERIOUS INCIDENT

Aircraft Type and Registration:	Airbus A320-232, G-EUYE
No & Type of Engines:	2 International Aero Engine V2527-A5 turbofan engines
Year of Manufacture:	2009 (Serial no: 3912)
Date & Time (UTC):	27 July 2015 at 2110 hrs UTC
Location:	90 nm south-east of London Heathrow Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 6 Passengers - 157
Injuries:	Crew - None Passengers - None
Nature of Damage:	Worn avionic blower fan bearing
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	41 years
Commander's Flying Experience:	10,250 hours (of which 4,700 were on type) Last 90 days - 255 hours Last 28 days - 93 hours
Information Source:	AAIB Field Investigation

Synopsis

Whilst in the cruise at FL240, the flight crew became aware of an unusual noise and an electrical burning smell. The noise quickly developed into a high pitched squeal, with some associated vibration and the smell became stronger, although there was no visible smoke. After donning their oxygen masks the flight crew actioned the appropriate emergency checklist, after which the noise ceased. The aircraft landed safely at its planned destination.

Investigation revealed the cause of the event to be worn bearings in the avionics blower fan. This is a known problem, and both the fan and aircraft manufacturers have taken safety actions to prevent similar incidents in future.

History of the flight

The incident occurred during a scheduled passenger flight between Paris Charles de Gaulle Airport and London Heathrow Airport. Whilst cruising at FL240 and approaching the descent point for London, the flight crew became aware of an unusual noise and an electrical burning smell. The noise quickly developed into a high pitched squeal with some associated vibration and the smell became stronger, although there was no visible smoke.

The flight crew donned their full-face oxygen masks and selected a 100% oxygen supply to protect against the fumes. At the time, the co-pilot was the handling pilot. The commander transmitted a MAYDAY call and received clearance from London ATC for an expeditious descent. He then initiated the drill for smoke/fumes/avionics smoke using the Quick Reference Handbook (the first step, donning the oxygen masks, having already been completed).

The next step of the checklist required that the 'blower' fan in the avionics ventilation system be set to override, following which the noise immediately ceased. The commander completed the checklist, and the crew thought it most likely that the blower fan had been the source of the problem, although they had no means of confirming it.

The commander contacted the senior cabin crew member and briefed her on the situation. She was unaware of the problem and reported that the cabin was unaffected. There was a brief report later of a similar burning smell in part of the cabin, but this did not persist.

There were no unusual flight deck indications before the onset of the problem. After the checklist was actioned, the ECAM¹ alerted the crew to a ventilation system BLOWER FAULT. Later, as the aircraft neared Heathrow, the ECAM generated a further caution, EXTRACT FAULT. The crew noted the cautions, which did not necessitate any further crew action.

As the approach progressed, the flight crew considered that the situation had probably been successfully contained. However, as a precaution, they elected to remain on 100% oxygen until after landing. The approach and landing were uneventful. After the aircraft had vacated the runway, the commander brought it to a stop to allow an external inspection by the airport fire service. As there were no abnormal indications, the aircraft then continued taxiing to its parking stand.

The flight crew later commented that the service provided by London ATC in response to their emergency had greatly assisted them in achieving an expeditious descent and landing. In particular, direct routings and minimal frequency changes had helped to keep their workload at a reasonable level.

Flight crew training

The use of the flight crew oxygen masks is practised during simulator training and checking details. The crew considered that their simulator training had been effective in allowing them to don the masks quickly, to communicate through them and to continue to deal with the situation effectively. After the incident the commander remarked that, because simulator masks are used regularly for training, they do not include the protective clear film cover over the visor which is in place on the actual aircraft masks. Consequently, it is easy to forget that the cover is present, particularly as a situation requiring mask use will inevitably be a stressful one. This happened in this case, although omitting to remove the protective cover did not cause the crew any difficulties with vision.

Footnote:

¹ Electronic Centralised Aircraft Monitor.

Engineering investigation

The avionics blower fan is part of the equipment cooling system and is located in the forward avionics compartment. Visual examination of the fan from G-EUYE in situ revealed no anomalies, but when the fan was switched on a rumbling noise was heard and vibration was felt through the cabin floor. The symptoms were similar to previous fan failures caused by worn bearings, which typically results in a rumbling noise, followed by the smell of burning in the cabin. The fan was removed and when spun by hand it emitted a burning odour and the bearings were worn and noisy.

There are two types of avionics blower fan bearing in service: the original blower fan uses steel ball bearings and the improved fan has ceramic bearings. The fan removed from G-EUYE contained ceramic bearings.

The operator advised that, following a number of recent events, they were in the process of implementing a revised maintenance policy to overhaul fans with ceramic bearings every 12,000 flying hours. At the time of failure the fan from G-EUYE had accrued approximately 16,000 flying hours and was due to be removed for overhaul at the next scheduled maintenance ('C Check'), in September 2015.

Safety actions

In March 2005 the fan manufacturer issued a Vendor Service Bulletin, 3454-21-108, to replace the original steel ball bearings with an improved ceramic bearing. The aircraft manufacturer issued a corresponding Service Information Letter, SIL 21-141, to notify operators. SIL 21-141 was replaced by In Service Information (ISI) 21.26.00027, published in November 2013. The introduction of ceramic bearings has reduced the in-service arising rate, but the aircraft manufacturer reported that fan failure still causes between five and 10 aircraft diversions per year.

In August 2013 the fan manufacturer issued a Service Information Letter, 3454HC-21-250, to inform operators that a new overhaul task had been added to the fan Component Maintenance Manual. The task periodically replaces the bearings and other components subject to wear, with a recommended periodicity of 10,000 Flying Hours. However, the fan manufacturer acknowledged that operators may wish to set their own avionics blower fan maintenance plan and recommended that operators avoid exceeding 12,000 flying hours between fan overhauls.

The aircraft manufacturer advised that, in the longer term, fan vibration monitoring will be the subject of an in-service evaluation aimed at reducing similar events in the future.