



Position Paper on Aircraft Cabin Air Quality Events

The pressurisation and cabin conditioning systems of commercial aircraft use a combination of filtered recirculated air and air drawn from outside the aircraft. In most aircraft operating today the outside air is provided by a process called 'bleed air' where compressed air is taken from the compressor stage of the engines upstream of the fuel burning sections. Extensive research has been undertaken to assess the quality of air onboard aircraft and in normal operations this air has been demonstrated to be of high quality and meets all relevant air quality standards.

Uncommonly, there can be failures of the integrity of the bleed air system and contaminants such as oil or hydraulic fluids may be heated in the engine or auxiliary power unit (APU) and enter the cabin conditioning system resulting in the potential for occupants to be exposed to odours, mists, fumes or even smoke. Perceived air quality can also be compromised from non-mechanical sources such as galley equipment, food and food packaging, inflight entertainment system and passenger personal electronics, passenger cabin baggage; aircraft hold contents including freight and checked baggage. Odours and vapours can also enter the aircraft cabin from external sources such as jet wash from other aircraft. These Cabin Air Quality Events (CAQEs) may be difficult to investigate to determine root cause, owing to the transient nature of the fumes, the absence of visible haze, dust, or smoke and the varied possible sources.

Most events are minor in nature and are often referred to as 'odour events'. In more serious events, odours may be persistent, irritant or noxious. In such circumstances, the operating crew are likely to adopt a very conservative approach, especially if the source cannot be determined and this may result in an air turn-back or diversion. Crew may also need to don oxygen masks. When the aircraft is safely on the ground, extensive technical investigations take place in an attempt to identify and eliminate any hazard. Events are also notified to the Australian Transportation Safety Board (ATSB) who monitor and report on the data. The ATSB reports that these events are well managed by crew from a safety of flight perspective¹.

In airlines and the defence force, affected aircrew are generally interviewed by safety and medical personnel and given appropriate medical tests and other support. Short term health effects such as irritation of eyes or mucous membranes occur and are usually short lived. The risk to the longer term health of crew involved in such events is a controversial issue and, in the absence of definitive science, rhetoric and propaganda has tended to drive the debate with resultant sensationalist media reports.

Some crew who have been involved in CAQEs do experience ill health and may attribute their symptoms to the exposure, however the research to date has not



established any causative link. The activity of aircrew representative bodies and lobbying organisations such as the Global Cabin Air Quality Executive (GCAQE)ⁱⁱ and the 'Aerotoxic Organisation'ⁱⁱⁱ have assisted in driving governments to increase their research activity on this issue.

ASAM believes that it is important that any discussion on this issue is based on the best available research rather than anecdotal evidence, small case series or individual case reports. To this end ASAM would direct interested parties to some of the following major reviews of the evidence that have been undertaken internationally:

1. The UK Committee on Toxicity has been reviewing the evidence on this subject since 2006 and its most recent position paper^{iv} was released in 2013
2. In 2008 the Australian Civil Aviation Safety Authority (CASA) established an Expert Panel on Aircraft Air Quality (EPAAQ) to review the available evidence on this subject and their report and recommendations are on the CASA website^v
3. In 2010 the US, the Air Transportation Center of Excellence for Airliner Cabin Environment Research (ACER CoE) provided a report to the FAA on their Research in the Intermodal Transport Environment (RITE)^{vi}
4. In Europe, under the auspices of the European Aviation Safety Authority (EASA) there is ongoing research into cabin air quality including the report on the ideal cabin environment (ICE) study^{vii}

These reviews have considered various types of research including epidemiology, air quality monitoring and laboratory analyses. The reviews have been consistent in that none have concluded any evidence to causally link cabin air quality events with long term health effects but also that the evidence is insufficient to definitively rule out such an association. The Aerospace Medicine Association (AsMA) has provided a useful summary report on this topic which is updated from time to time.^{viii}

In relation to the use of the term 'Aerotoxic syndrome', both AsMA^{ix} and CASA (EPAAQ)^v concluded that there was insufficient consistency and objectivity to support the establishment of a clearly defined syndrome and the UK COT has described the use of this term as 'unhelpful' as the symptoms described by individuals are non-specific and varied. ASAM endorses this position and encourages medical practitioners who assess these individuals to assess cases on merit using accepted medical diagnoses.

ASAM stresses the importance of this issue and encourages manufacturers, airlines and the ADF to continue to introduce measures that reduce the frequency of air contamination events. ASAM also supports ongoing research into the possible health effects of these events to ensure duties of care are met.



References:

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- ⁱ An analysis of fumes and smoke events in Australia from 2008 to 2012: A joint initiative of Australian aviation safety agencies. <https://www.atsb.gov.au/media/5394101/AR-2013-213.pdf>
- ⁱⁱ Global Cabin Air Quality Executive (GCAQE) <http://gcaqe.org/>
- ⁱⁱⁱ Aerotoxic Organisation website <http://aerotoxic.org/>
- ^{iv} UK Committee on Toxicity (COT) Position paper
<http://cot.food.gov.uk/sites/default/files/cot/cotpospapcabin.pdf>
- ^v CASA Expert Panel on Aircraft Air Quality <https://www.casa.gov.au/standard-page/expert-panel-aircraft-air-quality-epaaq>
- ^{vi} ACER Report to the FAA <http://www.eng.auburn.edu/research/centers/acer/files/rite-acer-report-16aug10.pdf>
- ^{vii} BRE report into the Ideal Cabin Environment (ICE) study
http://www.bre.co.uk/filelibrary/BFA/ICE_Final_Publishable_report.pdf
- ^{viii} Health Effects of Contaminants in Aircraft Cabin Air Summary Report v2.7. Bagshaw, M.
<http://www.asma.org/asma/media/asma/Travel-Publications/Air-contamination-health-effects-report-v2-7-Apr2014.pdf>
- ^{ix} Hudson MF. Cabin Air Quality in Commercial Aircraft: Is there any cause for concern? A Review of the Current Evidence. Aviat Space EnvironMed; 82(3). March 2011:280-281