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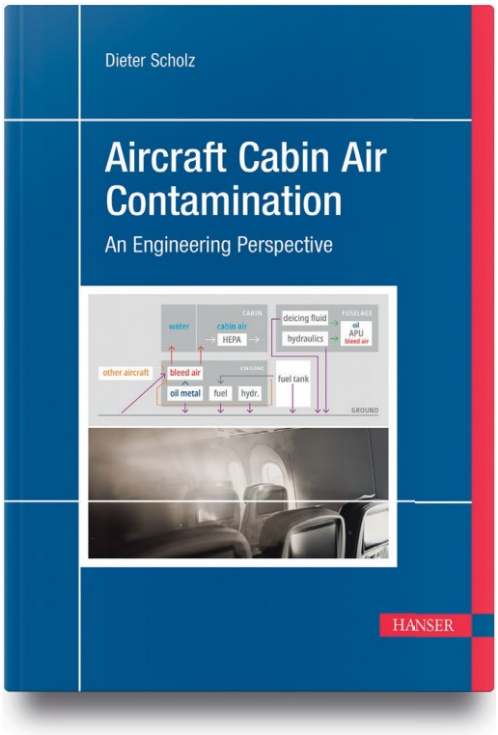
Solutions to a Hotly Debated Problem



Abstract

Purpose – This text is written to bring the engineering explanations of aircraft cabin air contamination together in one place and on another level of detail. Explanations go into technical detail, but all interested parties and people from all disciplines should benefit. --- **Methodology** – It is a review of the evidence combined with own contributions to the field. --- **Findings** – At a closer look, the aircraft is anything else but a glamorous polished machine. For technical reasons, dangerous chemicals are in use. These substances leave their intended places and get distributed everywhere. As such they just follow the law of nature: entropy. Unfortunately, while spreading, the substances also arrive in the human body with health and flight safety consequences. All occupants are potentially affected, but predominantly the crew, who spend much more time in an airplane than even a frequent flyer. In this way low dose exposures accumulate and are potentially topped by a high dose exposure in a failure case. The major problem is that almost all passenger aircraft take the air for air conditioning from the compressor of the engine. This was different at the start of the jet age and needs to be changed again in the way the Boeing 787 shows. Air conditioning needs dedicated compressors and air inlets. --- **Research Limitations** – Focus is on cabin air contamination from engine oil in transport category airplanes. Contamination due to hydraulic fluid, deicing fluid, and even ozone is also considered. --- **Practical Implications** – People who suffer from consequences of aircraft cabin air contamination may find answers to the main question: Why?Others may find hints on how to get protected. --- **Social Implications** – This text can prove evidence of the engineering fundamentals in court. **Originality** – No comparable text seems to be published.

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About the Author

Dieter SCHOLZ is a professor at Hamburg University of Applied Sciences. He teaches Aircraft Systems (among other subjects) and was engaged in research with Airbus on simulation and design of the Environmental Control System (among other topics). He uses two official Airbus A320 Aircraft System Simulators (MTD) with real hardware in his laboratory for teaching. Dr. Scholz has contributed a chapter on aircraft systems to three aerospace standard handbooks and has contributed to the topic at various meetings, conferences, and hearings. Chapter 8.5 and Chapter 9.1 – which are central to this text – have been partially published Open Access with peer review. The professor is active in various functions in the German Society for Aeronautics and Astronautics and is a fellow of the Royal Aeronautical Society. Scholz holds a Private Pilot License (PPL-A and PPL-B), CVFR-Rating, Night-Rating, AZF, more than 700 Flight Hours (PIC), experience in Educational Flight Testing, ICAO Language-Proficiency in English: Level 6 ("near native").
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