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1791 Tullie Circle, NE • Atlanta, GA 30329-2305 USA • Tel 404.636.8400 • Fax 404.321.5478 • http://www.ashrae.org

William A. Harrison
President

Reply to: TRANE ARKANSAS
1501 Westpark Drive, Suite 9
Little Rock, AR 72204-2457
☎ 501-661-0621
Fax 501-661-9109
billharrison@mail.ashrae.org

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Lynne A. Osmus
Acting Administrator
U.S. Federal Aviation Administration
800 Independence Ave SW
Washington, DC 20591

Patrick Goudou
Executive Director
European Aviation Safety Agency
Postfach 10 12 53
D-50452 Koeln, Germany

RE: Request to investigate and determine requirements for bleed air contaminant monitoring and solutions to prevent bleed air contamination

Dear Ms. Osmus and Mr. Goudou:

In 2007, ASHRAE published "Air quality within commercial aircraft" (ASHRAE, 2007; copy attached), developed by Standard Project Committee 161. The standard addresses a wide range of air quality issues including ventilation, temperature, and contaminants from a variety of sources. In light of the committee's flight safety concerns and the references cited below, the committee requests that, this year, you investigate and determine the requirements for bleed air contaminant monitoring and solutions to prevent bleed air contamination, including maintenance/operating/design control measures and bleed air cleaning equipment.

As background, ASHRAE is an engineering association that, among other things, develops and publishes voluntary indoor air quality standards that are often adopted by regulatory authorities. This aircraft air quality standard was developed over a ten year period. It was a significant undertaking that was ultimately approved for publication unanimously by a committee of members that represent the full spectrum of aviation interests and expertise: namely, aircraft and component manufacturers, airlines, crewmembers, passengers, and a general interest group, appointed according to administrative rules that ASHRAE issued in 2000 to ensure that all interest groups were represented and would be heard. Pre-publication, the standard was also released for two 45-day comment periods during which the general public and other interested parties had the opportunity to weigh in.

Section 7.2 of the standard requires the installation of "one or more sensors intended to identify a substance or substances indicative of air supply system contamination with partly or fully pyrolyzed engine oil or hydraulic fluid" with flight deck indication when such fumes are present to enable the pilot(s) to respond appropriately and rapidly. Also on the subject of air supply monitoring, Section 8.2 of the standard notes the utility of making portable, reliable, easy-to-use air monitoring devices available in the cabin and flight deck. Finally, Section 8.2 states that air cleaning technologies intended to reduce bleed air contaminants may be considered.

Many other publications support this request. For example, the Air Accidents Investigation Branch (AAIB) of the UK Department for Transport echoed the call for bleed air monitoring, noting "adverse physiological effects in one or both pilots, in some cases severe" (AAIB, 2007). These smoke/fume events had been reported on commercial flights, so the AAIB recommended that the EASA and the FAA "consider requiring, for all large aeroplanes operating for the purposes of commercial air transport, a system to enable the flight crew to identify rapidly the source of smoke by providing a flight deck warning of smoke or oil mist in the air delivered from each air conditioning unit." The installation of sensors which would

identify contaminated air events would further help to address the concerns raised by the FAA and others of the underreporting of such events (FAA, 2006(a); FAA, 2006(b); Michaelis, 2003). It has been estimated that less than 4% of oil fume incidents are reported as required (Michaelis, 2007). Sensors would help mitigate the reported high failure rate of crews to use emergency oxygen, despite clear industry guidelines to use oxygen when the air is (or is suspected to be) contaminated.

Similarly, controlling bleed air contamination is supported by many recent publications that have cited either pilot incapacitation or impairment caused by exposure to oil fumes (AAIB, 2007; ATSB, 2007; SAAIB, 2006; CAA, 2002; CAA, 2000). Oil fume events have been reported fleet-wide across a wide range of aircraft types (Murawski, 2008). For example, on the BAe146 aircraft, the FAA itself requires particular inspections and cleaning to "prevent impairment of the operational skills and abilities of the flightcrew caused by [emphasis added] the inhalation of agents released from oil or oil breakdown products, which could result in reduced controllability of the airplane," describing oil contamination as an "unsafe condition" and requiring that corrective actions be completed prior to further flight (FAA, 2004).

Although no systematic fleet-wide or industry-wide audits have been conducted, the UK Committee on Toxicity recently calculated the incidence of oil/hydraulic fluid events as 1% of flights based on pilots reports and 0.05% of flights based on engineering investigations (with the caveat that the incidence may vary with airframe, engine type, and servicing) (COT, 2007).

Still, no aviation regulator requires either bleed air monitoring or bleed air treatment. To this end, the ASHRAE committee that developed Standard 161-2007 is writing to ask you to establish a joint independent committee (perhaps with other regulatory authorities) this year to investigate the technical implications and flight safety benefits of addressing bleed air contamination, and to determine the requirements for bleed air contaminant detection systems and solutions to prevent bleed air contamination, as described. The committee thanks you for your commitment to aviation safety and encourages you to direct any questions, correspondence, or requests for references to the committee Chairman, Dr. Byron Jones.

Sincerely,

William Harrison
President

Cc: Andrew Persily

REFERENCES

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