

## **Case Study: Analysis of Reported Contaminated Air Events at One Major US Airline in 2009-10**

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**Pyrolyzed engine oil sometimes contaminates aircraft environmental control systems, exposing aircraft occupants to oil fumes containing toxic chemical constituents. Exposure to oil fumes has been reported to cause both acute and chronic neurological and respiratory symptoms, and has been documented to compromise flight safety. Neither the frequency nor the causes and characteristics of fume events have been well-described, either at individual airlines or industry-wide.**

**As a case study, the author identified reported air contamination events on one side of the operations of one major US airline over a two-year period. A total of 87 fume events were identified on 47 aircraft fleet-wide, but A319, B767, and E190 aircraft appear to be overrepresented. Crew reported unusual odors on 83 of 87 flights, most commonly described as “dirty socks.”**

**Although the odor was reported prior to take off on 44 flights, only 20 of those flights were either cancelled or delayed, while the rest flew to their planned destinations, many with crew health and potential flight safety consequences.**

**Out of all 87 fume events, one or more crewmembers had symptoms serious enough to require emergency medical care after 27 flights (31%), follow-up medical care after 43 flights (49%), and lost work time after 37 flights (43%).**

**Mechanical records confirmed that oil contaminated the air supply on 41 of the 87 flights. After 30 of the flights, no mechanical cause was identified but oil was suspected based on the event characteristics, highlighting the need for maintenance workers to be trained to perform more targeted troubleshooting with less time pressure to enable them to identify and remedy the primary sources of contamination.**

**The significant crew health, flight safety, and operational impact of these events, all support recommendations for crew training to recognize and respond to events, maintenance worker training to more effectively troubleshoot systems, and design/maintenance measures to prevent events, including bleed air filters/monitors on commercial aircraft that supply engine bleed air to occupants.**