

Up In The Air

Passengers and crews are reporting incidents of fumes—possibly toxic—in cabins

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Lufthansa is pushing for new tools to diagnose cabin air quality following passenger reports about cabin fumes onboard Airbus A380s and a serious incident involving an A319. But health damages have not been proven scientifically.

The airline is putting in place initiatives to reduce the number of cabin fume events on its A380s. The measures include adjustments to the Rolls-Royce Trent 900 engines, procedural changes and better surveillance of cabin air quality.

The cabin fume events have been observed particularly on flights outbound from Singapore. Crew and passengers have reported noxious odors but no related health problems, the airline states. This month, Germany's accident investigation office, BFU, released a preliminary report into the serious incident that occurred December 2010 at Cologne/Bonn Airport. A Germanwings A319 on a scheduled flight from Vienna to Cologne/Bonn in severe winter weather was delayed for several hours before departure. It was deiced immediately before departure and had the bleed air system turned off during takeoff to avoid de-icing fluid remnants being distributed in the cabin.

On final approach, the two pilots noticed an unusual smell in the cockpit. Just before the final turn on the extended runway center line and about 12 mi. outbound from Runway 14L, the first officer complained that his limbs were numb and he put on his oxygen mask. The captain felt similar symptoms and also put on a mask. He informed his first officer of his seriously compromised condition and the two decided to land even though they had not completed all pre-landing duties upon passing the 1,000-ft. mark.

The pilots were sent to a local hospital where two unusual blood parameters were identified during the first officer's check-up. He remained unfit to fly for six months following the incident.

Germanwings technicians noted the odor in a post-landing check and identified it as deriving from de-icing fluid. Engine checks did not reveal any unusual findings and the aircraft was returned to service a day later.

Cabin air is supplied through the bleed air system with the air being taken in from inside the compressor stage of the engines upstream of the combustion chamber.

The industry says that the system is safe, but lawsuits are mounting from cabin crew and pilots who claim to have suffered serious health problems allegedly due to toxic fumes.

In February, a workshop with representatives from across the industry and research institutions addressed the fume issue and concluded that there are no published peer-reviewed reports of acute organophosphate poisoning with analytical confirmation after fume exposure. Also, the group shared the view that the same applies for possible organophosphate-induced delayed neuropathy and that there was "no evidence" for a link "between cabin air fume exposure and short- or long-term nerve damage."

The group also noted a similarity between the reported symptoms—particularly when oxygen masks were

used—and the symptoms of hyperventilation.

Nonetheless the workshop members recommended harmonized and standardized international research on the occurrence and health effects of aircraft cabin bleed air contamination.

The European Aviation Safety Agency's (EASA) stance is: "Based on current reports and evidence, there is no safety case that would justify an immediate and general rulemaking action."

Airbus has done its own extensive research. Its staff noted an unusual smell particularly during early production flights of newly built aircraft, the first time many components such as engines or the environmental control system are tested to their operational limits.

The manufacturer installed a measurement system consisting of an online mass spectrometer and a multifunctional sampling system onboard several A330s and A340s. The sampling system, developed by the Fraunhofer Institute for Building Physics, comprises two trolleys that can be installed in common aircraft galleys. By using the system, a marker substance—and subsequently the root cause of the smell—could be identified. The unidentified supplier has since changed the design of the component that was found to be responsible for the odor, Airbus says.

Airbus is using the A380 flying testbed to conduct air cabin quality measurements for the Trent XWB engine designated for the A350.

Lufthansa has begun to install protective covers in front of the bleed air inlets inside Trent 900s to keep fumes from being circulated throughout the cabin. TCPs (tricresyl phosphates)—toxic substances added to engine oil to ensure a mostly consistent state—are suspects in the more serious fume events, although a 2011 Cranfield (U.K.) University study concluded that fume events in aircraft cabins do not pose a danger for passengers and crew.

TCPs comprise 3% of the engine oil content. Of the 3%, 0.2% are ortho tricresyl phosphates, which therefore are 0.006% of the oil. And industry sources say that limit has never been exceeded.

Nevertheless, there is concern that excessive amounts of the additive

Reports of toxic fumes in cabins of some Lufthansa A380s has investigators scrambling to discover a root cause and a solution.

