

Why Fumes in Aircraft Cabin Air can make you forget

Some aircrew members affected by bleed-air fumes report "epileptic" type symptoms after exposure. Seizures (*aka "epileptic type" or similar to*) are generally regarded as a manifestation of carbon monoxide poisoning. A case is described in which a seizure attributable to carbon monoxide poisoning occurred in a small child at a level not thought to be associated with serious neurological toxicity. (*very low-level*)

A literature review of the occurrence of seizures in carbon monoxide poisoning found that no particular degree of carboxyhemoglobin was correlated with the presence of seizures. A seizure with no other apparent cause occurring in circumstances in which carbon monoxide (CO) toxicity would be suspected can be attributed to carbon monoxide (CO) poisoning.

Professor Dr.-Ing. Dieter Scholz /Hamburg University of Applied Sciences states that *„Aircraft air contamination is due to fluids such as engine oil, hydraulic fluid or anti-icing fluid. Typical symptoms are experienced by passengers and crew or by related measurements of CO, CO₂, ozone or other "harmful or hazardous concentrations of gases or vapours (CS-25.831).“* (Source 1)

Note: Other neurotoxic substances in visible and "invisible" fumes that keep being re-circulated can also include insecticide killing substances contained in the specially developed sprays used when flying to certain countries.

Long-term effects of Carbon Monoxide poisoning

Like other types of anoxic brain injury, acute CO poisoning may lead to severe long-term neurological problems, with disturbances in memory, language, cognition, mood and behaviour. The damage to the basal ganglia, which is a particular feature of CO poisoning, may lead to a movement disorder resembling Parkinson's disease. An unusual feature of acute CO poisoning is the delayed deterioration in neurological condition which may be seen in some cases, occurring anything from a few days to as long as five to six weeks after the initial exposure. This may be the result of demyelination, in which there is loss of the fatty, insulating myelin sheath of the nerve axons, therefore impairing their ability to conduct electrical nerve impulses.

Chronic Carbon Monoxide (CO) exposure

Chronic (persistent and long-term) exposure to lower levels of CO, can go unrecognised. The symptoms include milder versions of those seen in acute CO poisoning, with headache, nausea, dizziness, light-headedness, fatigue and sleepiness, difficulty concentrating and memory problems, as well as changes in mood.

Passengers or crew members may be aware that something is wrong, but unable to identify exactly what is the matter, or may attribute the problems to overwork, stress or "jet-lag". If symptoms disappear while away from work/flight and reappear on returning to flying, or if other crew members develop similar symptoms, it may become more obvious that there is a cabin air quality issue.

Although most people seem to recover following chronic low level CO exposure when the source is removed, it can still lead to "anoxic" (depletion in the level of oxygen) brain

injury. There have been some documented cases of subtle Magnetic Resonance Imaging (MRI) abnormalities and long-term neuropsychological effects.

What are the Symptoms of Carbon Monoxide poisoning?

In acute carbon monoxide (CO) poisoning (rapid onset, with short-term exposure), the symptoms will depend on the degree of exposure and possible previous presence of toxic body burden in an individual:

Mild

Headache, nausea and vomiting are the features of mild CO exposure, often along with a general feeling of malaise. These non-specific symptoms may be misdiagnosed as more common illnesses, such as flu, gastroenteritis or food poisoning. This may lead to CO poisoning being overlooked initially, unless there is a clear history of exposure or unless the crew member or passenger tells the physician that they have been exposed to polluted indoor air in an aircraft. *(see free links/ downloads at the end of the page*)*.

Moderate

As the degree of CO poisoning becomes more marked, there may be a generalised feeling of weakness, with dizziness, unsteadiness and problems with concentration and thinking. More obvious changes in behaviour, confusion and drowsiness develop and there may be shortness of breath and chest pains.

Severe

In severe CO exposure, serious deterioration can occur quite quickly, with seizures, coma and death. MRI scans may show changes in the basal ganglia and the white matter.

The Poisoning of the Brain and Central Nervous system

Injury to the central nervous system is a well-documented effect after exposure to many chemical substances and combinations, yet doctors often fail to recognize it. A person who has suffered a serious chemical injury is likely to have sustained considerable damage to his or her brain and nervous system.

A multitude of chemical substances is present in the aircraft cabin air. The fumes can be visible or invisible, they can leave behind certain 'smells' or not. Measurements have to date summed up (ca) 127 substances by the European Union Aviation Safety Agency (EASA). In the past the focus has been on tricresyl phosphate (TCP), an organophosphate contained in the engine oil which emigrates in the bleed-air fumes, as the main health damaging substance. However, the case is more complex. The mixture of the various chemical fumes present in the cabin air, from the engine oils to hydraulic oils, kerosene fumes to solvents, flame retardants to residue from insecticide spraying (disinsection) must be taken into account; their interaction and apparent constant 'low level' presence in the closed environment of an aircraft must be taken into consideration.

Chronic exposure to „low levels“ of (many) chemicals can be worse than a single acute exposure because brain damage is cumulative over time and can leave behind life long irreparable injuries.

References:

Note: Portions of texts are used on the premise of „Fair use for educational purposes.“ taken with thanks from the following links.

- Scholz, Dieter: Contaminated Aircraft Cabin Air –A Summary of Engineering Arguments:
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- EXXON Mobile MSDS
https://www.aerotoxicteam.com/uploads/6/0/3/8/6038702/exxon_mobile_msds_743589.pdf?fbclid=IwAR1x5mjcuGFUAknQvjvRBiM0kMLyhlmpo21vdd3WG7i8gDm_EmfWHW2vp0
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- Jones, Byron - The Nature of Particulates in Aircraft Bleed Air Resulting from Oil Contamination – 2017
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Note: This does not represent medical advice. Please visit your licensed medical practitioner or specialist – you are welcome to use the free downloads and print-outs here >
<https://www.aerotoxicteam.com/medical.html>

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