

Airline worker union concerns and questions re. FACTS II research

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Who we represent



- **ETF** – European Transport Workers’ Federation (cabin crew, maintenance workers)
- **GCAQE** – Global Cabin Air Quality Executive (pilots, cabin crew, maintenance workers)
- **BECA** – Belgian Cockpit Association
- **SEPLA** – Sindicato de Pilotos de España



Early reports of fume events

- Since the **1950s**, crewmembers have documented ill health – esp. neurological deficits – after breathing oil fumes that contain a mixture of organophosphate additives, including tricresyl phosphates (TCPs).
- Industry and military teams investigated reported symptoms, patterns of exposure, chemical constituents of the fumes, and control measures
 - **1953**: Boeing investigated reports from B-52 pilots
 - **1955**: US Air Force investigated reports from RB-57A pilots and conducted human exposure studies
 - **1955**: British Air Ministry exposed test animals and human volunteers to oil fumes

Practical, candid observations in early industry reports

- “The critical relationship between temperature and oil breakdown has been demonstrated.” - **Gutkowski, 1953**
- “In most instances, the worst contamination was noted immediately after the air conditioning system was turned on.” - **Gutkowski, 1953**
- “[Oil] odor returned intermittently during engine power changes.” - **Gutkowski, 1953**
- “On ground and after landing, haze and strong odor were observed.” - **Gutkowski, 1953**
- “[Oil] fogs generated at temperatures 600-700°F were found to be toxic to experimental animals, but when generated at temperatures of 400°F, they were tolerated well.” (Fumes at 900°F were most toxic.) – **Esso, 1957**

Industry focused on engineering solutions

- The industry response was, initially, swift. Boeing researched **bleed air filtration options** (Gutkowski, 1953) and applied for a **patent for bleed-free air** supply design (Boeing, 1954).
- North American Aviation did a two-year investigation into reports of flight deck fumes and recommended **bleed-free ventilation** or **bleed air filtration** (Reddall, 1955).

Response shifted from finding solutions to rationalizing reality

- When volunteers reported symptoms after being exposed to oil fumes: “There were no complaints of nausea, and all were able to carry out normal functions...[so] it is believed that **no serious hazard** is associated with the seepage of oil fog into the cabin of planes using compressor bleed air...” – **Esso, 1957**
- Regarding whether FAA should certify DC-9 given oil fumes in supply air: “Humble Oil states that...eye irritation is encountered by humans. Thus...**adequate warning of [oil fumes] is given**. The crew can, in a very few minutes, isolate the bleed...irritation will cease, and no further effects will remain.” - **DAC, 1965**

More rationalizations...claim that chemical exposure limits assure safety.

- Exposure limits and airworthiness standards for selected individual compounds **are being met** (so fumes can't be especially toxic) (COT, 2007; Crane, 1983;)
- For the TCPs in oils, only the ortho isomers are toxic, and they will not comprise more than 0.2% of TCP blend added to oils, so **“toxic content” is too low to be a problem** (Howard, 2020; Craig & Barth, 1999)

Even EASA-funded CAQ1 report shows outdated thinking and bias against validity of crew reports.

- “Taking into account the current data situation which indicates a very low [organophosphate] incidence [sic] in aircraft, the still ongoing discussion about the so-called ‘aerotoxic syndrome’ remains completely incomprehensible.” (EASA, 2017, CAQ1, p.109)
- "A human exposure study is the long-needed tool to provide an unequivocal and sound dataset to end the misguided discussion on cabin air quality once and for all." (EASA, 2017, CAQ1, p.113)

Fast-forward to 2023...

- Crews **continue to report fume events**, ill health, flight safety issues
- Only one **bleed-free air supply system** design (B787)
- No **bleed air filters** on cabin air (only one option for B757 flight deck)
- No **sensors** to alert crews to oil fumes
- Limited **training** for crews to recognize/respond to fume events
- No standardized fume event **reporting** system
- **Note:** Exposure control measures are described in detail in **CEN Technical Report 17904**; available for purchase online from many national CEN Standardization Bodies.

Comment/question about CAQ3 Call for Tender (1)

- Title of project is “Cabin air quality assessment of long-term effects of contaminants.”
(EASA.2020.HVP.17) – crews support this!
- **Concern:** None of the defined work packages appear to assess long-term effects of exposure to oil fumes onboard aircraft.
- **Question:** What are you doing to assess long-term effects of contaminants like oil fumes?

Comment/question about CAQ3 Call for Tender (2)

- Call for tender requires “regular involvement of aviation stakeholders” and “regular consultation of the main stakeholders... with a view to inform them and incorporate their feedback on the project plans and results.” (EASA.2020.HVP.17)
- Crews support this, but the project is one year in and unions have not been invited to consult or been asked for feedback. No labour input on Project Team or Advisory Board, despite our expertise and the importance of including the people who do the work.
- **Question:** What opportunities will there be for labour to get more involved you and provide feedback?

Comments/question – WP1

- **Goal:** Collect measurement data for fumes and review toxicity of “main” chemical constituents, assess hazards.
- **Crew concern:** Crews aren’t exposed to individual chemical constituents; they are exposed to complex mixture.
- For example: In one post-flight engine tear down, more than **100 individual compounds** were identified in the fumes (Michaelis, 2017). The accident investigation report concludes that aircraft **design limits for carbon monoxide were not exceeded** (SHK, 2001). But the captain had been **temporarily incapacitated** by asphyxiant symptoms during the descent phase of the flight and he then lost his license to fly because of chronic neurological symptoms. Even just the **TCP blend added to oils is complex** (Mackerer & Ladov, 2000)
- **Question:** What new information will WP1 produce that will help to assess long-term effects of exposure to chemical mixtures in fumes?

Comment/question – WP2

- **Goal:** Create oil fume events in bleed air simulator (200/350°C)– analyze fumes, load HEPA filters for analysis.
- **Crew concern:** Oil fumes have been generated and characterized at these and higher temperatures since the 1950s.
- **Question:** What new information will WP2 contribute compared to what has already been done? How will WP2 assess long-term effects of exposure to fumes?

Comment/question – WP3

- **Goal:** Expose mice to oil fumes (200/350°C) generated in bleed air simulator for four weeks (sub-chronic), followed by neurobehavioral tests, brain/lung pathology.
- **Crew concern:** How is this test different from what has been done before? How will the animal exposure mimic crew exposure re. particle size, decomposition products, exposure duration? What about effects of chronic low-level exposure followed by acute higher-level exposure? How will WP3 assess long-term effects?

Comment/question – WP4

- **Goal:** Collect HEPA filters from actual aircraft, ground aircraft test, and bleed air simulator (WP2); identify contamination patterns.
- **Crew concern:** TCPs on aircraft filters could be from multiple low-level exposures, single high-level exposure, or combination. **Filters have been analyzed for TCPs previously** (Kelso, 1988; van Netten, 2005; Solbu et al., 2011; Eckels et al, 2014).
- **Question:** What new information/insights will this produce? How will this assess long-term effects or prevent onboard exposure to fumes?

Recommendations

- Worker representatives should be **formally involved** as a stakeholder for consultation/feedback, not just listening to results. (Thank you for listening today.)
- We are concerned that **long-term effects** of exposure to fumes are not being assessed in CAQ3. Study does not seem to move field forward.
- It is very important that the **focus of the project is on exposure control** – back to 1950s – not on collecting more of the type of data that has already been collected many times. No mention of **exposure control measures** in CAQ3 and only sparingly addressed in “FACTS” project.

Exposure control measures --

1. Bleed free designs
2. Less toxic oils and hydraulic fluids
3. Effective bleed air filtration / air cleaning technology
4. Real-time detection systems
5. Mandatory crew education and training
6. Standardized fume event reporting systems
7. Disease recognition

Thank you – danke schön
for listening to our comments and
answering our questions today.

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Summary of crew questions:

1. Which of the WPs assess the long-term effects of exposure to oil fumes?
2. What opportunities are there for labour to be formally involved and to provide feedback (Project Team, Advisory Board)?
3. What new information will WP1 (lit review, toxicity review) produce that will help to assess long-term effects of exposure to chemical mixtures in fumes?
4. What new information will WP2 contribute compared to what has already been done? How will WP2 assess long-term effects of exposure to fumes?
5. How is WP3 animal testing different from what has been done before? How will the animal exposure mimic crew exposure re. particle size, decomposition products, exposure duration? What about testing effect of chronic low-level exposure followed by acute higher-level exposure? How will WP3 assess long-term effects?
6. What new information/insights will WP4 (HEPA testing) produce? How will this assess long-term effects or prevent exposure?
7. CAQ1, CAQ2, FACTS have all collected information. How does this project build on what those projects have found? Why is the focus still on repeating data collection instead of defining exposure control measures?

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