# Troubles in the Cockpit

*In recent weeks, multiple news reports have surfaced about airplanes experiencing foul odors and smoke in the cabin and cockpit. One incident even tragically resulted in a fatality. This is horrific. As long as these aircraft defects persist, we must continue research into Aerotoxic Syndrome. Only then can we help those who fall ill from the toxic gases released in and around airplanes.*

**News Report 1**
**NOS News – Tuesday, December 24**
**Swiss Aircraft Makes Emergency Landing in Austria After Smoke and Engine Problems**

*A Swiss aircraft made an emergency landing yesterday at Austria's Graz airport due to engine issues and smoke in the cockpit and passenger cabin.*

*The plane had departed late afternoon from the Romanian capital Bucharest, with Zurich as its final destination. On board were 74 passengers and 5 crew members, according to airline Swiss.*

*One crew member was airlifted to a hospital in Graz. Swiss expressed concern about the crew member's condition. Eyewitnesses told Austrian media that the individual was unconscious when transported.*

*The cause of the smoke remains unclear.*

**News Report 2**
**December 31, 2024**
**Swiss Crew Member Dies a Week After Emergency Landing**

*The Swiss airline SWISS is in deep mourning. A week after an Airbus A220 had to make an emergency landing in Graz, a cabin crew member has passed away, the company reports. "We are deeply saddened by the loss of our young colleague," said CEO Jens Fehlinger.*

*Out of respect for the bereaved family, SWISS has refrained from disclosing personal details or the exact cause of death.*

*An investigation into the incident is ongoing.*

TRANSPORTATION

**A stinky flight in every way: The stench of 100 pigs in cargo prompts diversion of a passenger plane and 26-hour delay**

Pete Syme  Share  Save


**News Report 4**
**December 16, 2024**
**Unbearable Pig Stench Forces KLM Flight to Make Stopover**

There are also stranger incidents, as evidenced by this news report from the AD.

*Pigs in the cargo hold of a KLM flight caused an unexpected issue. The Boeing 787 Dreamliner had to make an unscheduled stop to ventilate the aircraft because the stench in the cabin and cockpit was unbearable.*

*The aircraft was en route from Amsterdam to Mexico City on Friday, carrying 259 passengers. The cargo hold also contained 100 pigs, which caused significant discomfort halfway across the Atlantic. The unbearable odor permeated the cabin and even the cockpit, prompting the captain to make an unplanned stop in Bermuda.*

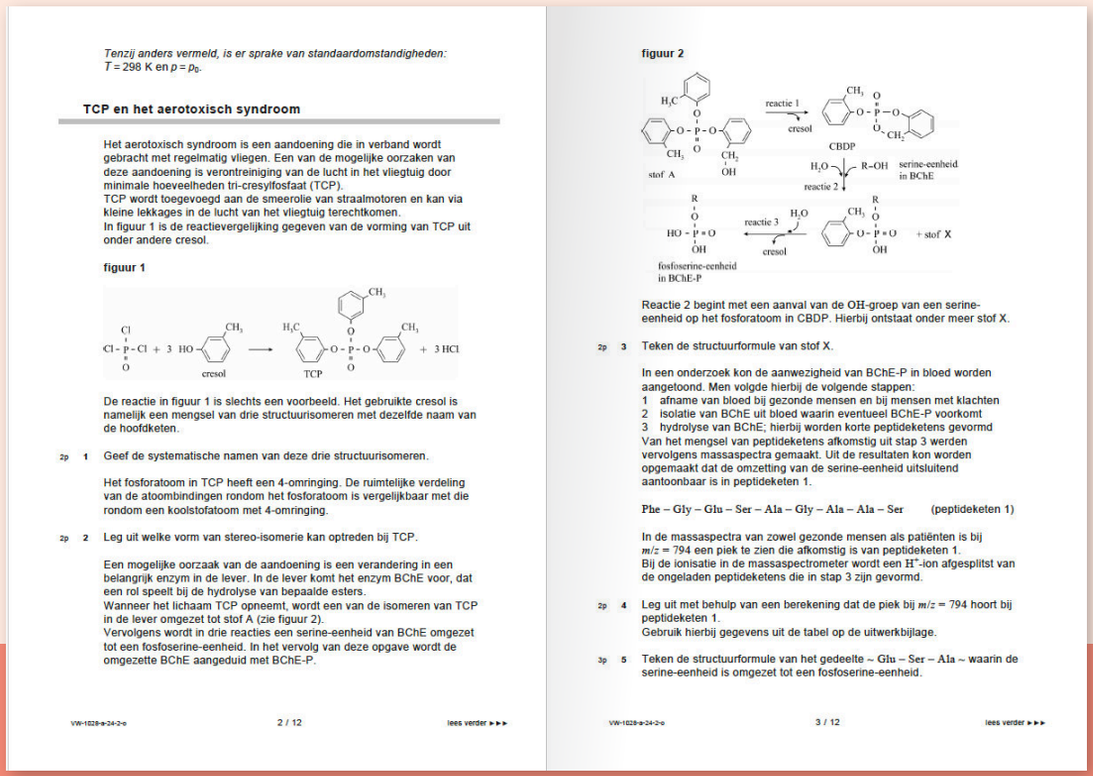
*The pilot informed air traffic control at L.F. Wade International Airport that it was not a medical or technical emergency. However, an additional stop was necessary because the air quality on board had deteriorated significantly, and the oxygen supply was limited.*

This report might sound like an annoying inconvenience or—if you weren't there—even humorous, but pig waste releases ammonia gases. Exposure to ammonia can lead to health problems. High concentrations cause eye irritation, shortness of breath, coughing, and respiratory inflammation. This time, it wasn't the aircraft engine causing unhealthy cabin air but the living cargo. How air from the hold reached the cabin remains a mystery.

# Aerotoxic Syndrome as VWO Exam Material!

*Edition 1 - january 2025*

Although we sometimes feel disheartened by the aviation industry's and other stakeholders' denial of the existence of Aerotoxic Syndrome, there are bright spots. For example, the first question of the chemistry exam last summer was about Aerotoxic Syndrome. And to be honest: that gives us hope and highlights the urgency of this issue once again!



*Tenzij anders vermeld, is er sprake van standaardomstandigheden:*
*$T$ = 298 K en $p = p_b$.*

**TCP en het aerotoxisch syndroom**

Het aerotoxisch syndroom is een aandoening die in verband wordt gebracht met regelmatig vliegen. Een van de mogelijke oorzaken van deze aandoening is verontreiniging van de lucht in het vliegtuig door minimale hoeveelheden tri-cresylfosfaat (TCP).
TCP wordt toegevoegd aan de smeerolie van straalmotoren en kan via kleine lekkages in de lucht van het vliegtuig terechtkomen.
In figuur 1 is de reactievergelijking gegeven van de vorming van TCP uit onder andere cresol.

**figuur 1**

cresol TCP

De reactie in figuur 1 is slechts een voorbeeld. Het gebruikte cresol is namelijk een mengsel van drie structuurisomeren met dezelfde naam van de hoofdketen.

2p 1 Geef de systematische namen van deze drie structuurisomeren.

Het fosforatoom in TCP heeft een 4-omringing. De ruimtelijke verdeling van de atoombindingen rondom het fosforatoom is vergelijkbaar met die rondom een koolstofatoom met 4-omringing.

2p 2 Leg uit welke vorm van stereo-isomerie kan optreden bij TCP.

Een mogelijke oorzaak van de aandoening is een verandering in een belangrijk enzym in de lever. In de lever komt het enzym BChE voor, dat een rol speelt bij de hydrolyse van bepaalde esters.
Wanneer het lichaam TCP opneemt, wordt een van de isomeren van TCP in de lever omgezet tot stof A (zie figuur 2).
Vervolgens wordt in drie reacties een serine-eenheid van BChE omgezet tot een fosfoserine-eenheid. In het vervolg van deze opgave wordt de omgezette BChE aangeduid met BChE-P.



**figuur 2**

stof A reactie 1 cresol CBDP reactie 2 serine-eenheid in BChE reactie 3 cresol + stof X fosfoserine-eenheid in BChE-P

Reactie 2 begint met een aanval van de OH-groep van een serine-eenheid op het fosforatoom in CBDP. Hierbij ontstaat onder meer stof X.

2p 3 Teken de structuurformule van stof X.

In een onderzoek kon de aanwezigheid van BChE-P in bloed worden aangetoond. Men volgde hierbij de volgende stappen:
1 afname van bloed bij gezonde mensen en bij mensen met klachten
2 isolatie van BChE uit bloed waarin eventueel BChE-P voorkomt
3 hydrolyse van BChE; hierbij worden korte peptideketens gevormd
Van het mengsel van peptideketens afkomstig uit stap 3 werden vervolgens massaspectra gemaakt. Uit de resultaten kon worden opgemaakt dat de omzetting van de serine-eenheid uitsluitend aantoonbaar is in peptideketen 1.

**Phe – Gly – Glu – Ser – Ala – Gly – Ala – Ala – Ser** (peptideketen 1)

In de massaspectra van zowel gezonde mensen als patiënten is bij $m/z$ = 794 een piek te zien die afkomstig is van peptideketen 1.
Bij de ionisatie in de massaspectrometer wordt een $H^+$-ion afgesplitst van de ongeladen peptideketens die in stap 3 zijn gevormd.

2p 4 Leg uit met behulp van een berekening dat de piek bij $m/z$ = 794 hoort bij peptideketen 1.
Gebruik hierbij gegevens uit de tabel op de uitwerkbijlage.

3p 5 Teken de structuurformule van het gedeelte ~ Glu – Ser – Ala ~ waarin de serine-eenheid is omgezet tot een fosfoserine-eenheid.



# Your Help Is Urgently Needed!

The NeuroToxicity Research Foundation conducts various studies on how our bodies react to toxic substances we are unknowingly exposed to daily. At present, our focus is on Aerotoxic Syndrome. We aim to investigate in depth what happens at the cellular level in our bodies when we inhale toxic substances in and around airplanes.

This subject is especially important to us because a significant number of aviation personnel are at home sick with "unclear complaints." They are often dismissed with a diagnosis of burnout, while entirely different issues are at play. Unbearable headaches, dizziness, memory loss, and difficulty focusing are just a few examples of symptoms. In more severe cases, vital bodily functions shut down, which can even result in death.

We cannot wait any longer—this research is needed now. But such research is costly. The government and major aviation players refuse to fund this, leaving us dependent on you. Will you support us with a donation?

Our foundation holds ANBI status. Donations can be made to bank account number: NL15TRIO0320573613. For more information, visit neurotoxicityresearch.org or contact us at neuro-toxicity@fninstitute.com.

Neuro Toxicity Research Foundation

NEUROTOXIC NEWS

*Aviation Captain Thorsten Busch*

# "I Could No Longer Form a Sentence"

***Captain Thorsten Busch was a Captain for 23 years and logged more than 14,000 flight hours. His life was forever changed by a fume event. Thorsten developed Aerotoxic Syndrome, which profoundly altered his life. During the Aircraft Cabin Air event in London last September, he delivered a lecture. Here are his words.***

Thorsten: "Let me take you back to an earlier time in your life. Go all the way back to when you were 7 years old. Who was your best friend? What was your favorite game? What did you want to be when you grew up?

My 7-year-old wants to be an artist, and my 10-year-old dreams of becoming a LEGO designer. As for me, I always wanted to fly airplanes. When I was 7, I got to sit in the cockpit during an entire PanAm flight from my hometown of Berlin to visit my grandparents in Cologne. The pilot was fantastic—he answered all of my countless 7-year-old questions, like: 'How do you see through the clouds?' 'What keeps the plane in the air?' From that first moment, I was hooked on flying.

I was fortunate and determined enough to make my childhood dream a reality and become a pilot. Being a pilot was a big part of my identity and sense of self, as it is for many other pilots I know. And that's what I want to talk about today: the loss of self, the loss of mental capacities, and the loss of physical functions that many crew members, including myself, experience after fume events.

**Accident**

I experienced two fume events on the same Airbus A320: one in 2019 and the other in 2022. I documented the 2019 event in the logbook, filled out all the required paperwork, and 30 minutes later, I was in an ambulance on my way to the emergency room. I had smelled that dirty-sock odor from the APU for only a minute, but 30 minutes later, I could no longer form a sentence. My blood pressure was 170/110, I felt severely intoxicated, and for the next three weeks, I didn't feel capable of driving a car. For the first few months, I slept 10-12 hours a night, plus 2-3 hours of napping. It was debilitating.

*Unfortunately, this was only the beginning of my problems*—it took me 842 days, extensive occupational and physical therapy, and comprehensive cognitive testing to regain my first-class medical certification and return to work as a pilot.

My second fume event occurred in April 2022, again on the same aircraft, and I ended up in the emergency room once more—this time in Mexico.

Since these two fume incidents, I frequently suffer from memory loss. My partner has to remind me of things throughout the day that I would normally know, like my daughter's teacher's name, what I was just planning to do, who I met with last week, and so on.

I've developed severe vision problems—my eyesight rapidly declined from 20/20 to blurry double vision with convergence insufficiency*, *and I lost peripheral vision*** in my right eye.

I experience regular hand tremors, daily chronic headaches, and after any physical therapy or cognitive effort, my brain becomes so exhausted that I have to sleep immediately before I can do anything else. I went from being a very active, energetic man to someone my children jokingly call Snorlax—a Pokémon character known for always sleeping. While that might sound funny, it deeply pains me to miss out on time with my family and life in general because I feel so dizzy and fatigued.

**Legal Battles**

In 2020, I won my workplace injury lawsuit in Boston, which required jetBlue to pay weekly compensation and cover medical bills following the first fume event.

However, after the second fume event, I am still fighting jetBlue in court more than two years later to have my medical bills paid.
Tragically, my story, like those of many colleagues who have experienced fume events, has only worsened. The company I devoted my career to claims there is no causal link between my symptoms and the fume event. But where else would I have been exposed to toxic oil fumes?

**FAA*****
Despite airlines denying the devastating effects and frequency of fume events, numerous documented cases and recent court rulings worldwide prove that fume events:
1) occur regularly and
2) are toxic.

This year alone, there have been 685 reported fume events in the U.S. and 441 fume events involving Airbus aircraft.

**My Actions**
I filed a complaint with the FAA in September 2023 and waited more than four months for a response. When they finally contacted me, the conversation was extremely brief and lacked any follow-up questions.
They told me:
a) they couldn't find my fume event in their database, and
b) no FAA regulations had been violated, so they considered the matter closed.

*Does that sound like an investigation to you?*
*To me, it certainly didn't.*

**Commitment**
Aerotoxic Syndrome must be recognized as an occupational illness so that crews can receive necessary medical support from a network of informed doctors, and so that their condition is covered by insurance.

We are fighting for a fair and essential cause. We are fighting to ensure that an aircraft that is built and certified is genuinely safe and does not harm its crews or passengers.

*How many more people need to get sick before manufacturers implement changes?*

Together, we can achieve much more than prioritizing the value of a machine part over the value of a life.

**In Conclusion**
Thank you so much for being here and for your contribution to this fight. Knowing that so many brilliant and influential minds are here to address this issue gives me hope for the future.
Thank you."

***Convergence insufficiency** is an eye problem where the eyes struggle to turn inward (converge) when focusing on something close, like a book or computer screen. Normally, both eyes work together to see a single image, but with this condition, it can be challenging, leading to symptoms such as:

- Blurred vision during close work.
- Double vision.
- Eye strain or headaches after reading or close work.It is often caused by weakness in the muscles that pull the eyes inward or by problems in the coordination between the eyes.

*** Peripheral vision** (also known as side vision) is what you can see at the edges of your visual field, outside your direct focus.

**** The Federal Aviation Administration** (FAA) is the United States aviation authority. It falls under the U.S. Department of Transportation and is authorized to regulate all aspects of civil aviation in the United States.