

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



DCA22MA193

MEDICAL

Specialist's Factual Report

June 22, 2023

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A. ACCIDENT

Location: Freeland, Washington

Date: September 4, 2022

B. MEDICAL SPECIALIST

Specialist Turan Kayagil, MD, FACEP
National Transportation Safety Board
Washington, DC

C. DETAILS OF THE INVESTIGATION

1.0 Purpose

This investigation was performed to evaluate the pilot for potentially impairing substances and potentially impairing medical conditions.

2.0 Methods

The Federal Aviation Administration (FAA) medical case review, the pilot's FAA medical certification file, and the pilot's autopsy and toxicology reports were reviewed. Selected investigator reports and relevant regulation and medical literature were also reviewed.

D. FACTUAL INFORMATION

1.0 FAA Medical Certification

According to FAA medical certification information, the 43-year-old male pilot had his last aviation medical examination on May 31, 2022. At that time, he reported 4,686 total civilian flight hours. He was 69 inches tall and weighed 152 pounds. He reported no medication use, no active medical conditions, and no visits to health professionals in the previous 3 years. No significant issues were identified, and he was issued a second-class medical certificate without limitation.

2.0 Autopsy

The Island County Coroner's Office ordered the pilot's autopsy, which was performed by a forensic pathologist. According to the pilot's autopsy report, his cause of death was multiple blunt force injuries and his manner of death was accident. His autopsy report noted that his body had been recovered from submerged wreckage 25 days after the crash date. Decompositional changes were

present and prevented structural evaluation of the brain. The autopsy examination did not identify significant natural disease.

3.0 Toxicology

3.1 NMS Labs Toxicology Results

The Island County Coroner's Office submitted postmortem toxicological specimens from the pilot to the Washington State Toxicology Laboratory - Washington State Patrol. At the request of the Washington State Toxicology Laboratory, NMS Labs performed toxicological testing of postmortem liver tissue from the pilot. No tested-for substances were identified.¹

3.2 FAA Toxicology Results

The FAA Forensic Sciences laboratory also performed toxicological testing of postmortem specimens from the pilot.² Ethanol was detected at 0.058 g/dL in urine, 0.048 g/hg in liver tissue, and 0.048 g/hg in brain tissue.³ N-propanol was detected in urine (but not in liver tissue or brain tissue). Oxymetazoline was detected in liver tissue and urine. Sildenafil was detected in liver tissue, and the sildenafil metabolite desmethylsildenafil was detected in liver tissue and urine. No blood was available for FAA testing.

3.3 Descriptions of Detected Substances

Ethanol is a type of alcohol. It is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance.⁴ FAA regulation imposes strict limits on flying after consuming ethanol, including prohibiting pilots from flying with a blood ethanol level of 0.04 g/dL or greater.⁵ However, consumption is not the only possible source of ethanol in postmortem specimens. Ethanol can sometimes be produced by microbes in a person's body after death. Postmortem ethanol production is made more likely by

¹ The NMS Labs report listed tested-for substances as: amphetamines, barbiturates, benzodiazepines, buprenorphine/metabolite, cannabinoids, cocaine/metabolites, fentanyl/acetyl fentanyl, methadone/metabolite, methamphetamine/MDMA, opiates, oxycodone/oxymorphone, phencyclidine, ethanol, methanol, isopropanol, and acetone. The NMS Labs report listed the ethanol reporting limit as 0.08 g/hg.

² The FAA Forensic Sciences laboratory has the capability to test for around a thousand substances including toxins, prescription and over-the-counter medications, and illicit drugs. Some of these substances are listed at <https://jag.cami.jccbi.gov/toxicology>.

³ In tissue, concentrations in g/hg are approximately equivalent to concentrations in g/dL.

⁴ Cook CCH. Alcohol and aviation. *Addiction*. 1997;92(5):539-555.

⁵ [14 Code of Federal Regulations § 91.17](#).

severe trauma and delayed recovery of remains.^{6,7} N-propanol is another alcohol that can be produced by microbes in a person's body after death.⁷

Sildenafil is a prescription medication commonly used to treat erectile dysfunction, or as a sexual enhancement aid.⁸ Sildenafil is not generally considered impairing, although the FAA states that pilots should wait 8 hours after using it before flying, to monitor for side effects such as symptomatic low blood pressure.⁹ Desmethylsildenafil is an active metabolite of sildenafil.¹⁰ Oxymetazoline is a medication commonly used as a nasal decongestant spray, widely available over the counter.¹¹ Oxymetazoline is not generally considered impairing.

E. SUMMARY OF MEDICAL FACTS

The 43-year-old male pilot had his last aviation medical examination on May 31, 2022. At that time, he reported no medication use and no active medical conditions. He was issued a second-class medical certificate without limitation.

According to the pilot's autopsy report, his cause of death was multiple blunt force injuries and his manner of death was accident. His autopsy report noted that his body had been recovered from submerged wreckage 25 days after the crash date. Decompositional changes were present and prevented structural evaluation of the brain. The autopsy examination did not identify significant natural disease.

⁶ Spitz WU. Forensic aspects of alcohol. In: Spitz WU, Spitz DJ, eds. *Spitz and Fisher's Medicolegal Investigation of Death: Guidelines for the Application of Pathology to Crime Investigation*. 4th ed. Springfield, IL: Charles C Thomas; 2006:1218-1229.

⁷ Kugelberg FC, Jones AW. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Sci Int*. 2007;165(1):10-29. doi:10.1016/j.forsciint.2006.05.004.

⁸ National Institutes of Health National Library of Medicine. Viagra. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=0b0be196-0c62-461c-94f4-9a35339b4501>. Updated July 9, 2021. Accessed May 31, 2023.

⁹ Federal Aviation Administration. Guide for aviation medical examiners: pharmaceuticals (therapeutic medications) erectile dysfunction and benign prostatic hyperplasia medications. Federal Aviation Administration website. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/pharm/ed/. Updated August 25, 2017. Accessed May 31, 2023.

¹⁰ Federal Aviation Administration Civil Aerospace Medical Institute. Desmethylsildenafil. Forensic Toxicology's WebDrugs. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=136>. Updated January 16, 2019. Accessed May 31, 2023.

¹¹ National Institutes of Health National Library of Medicine. Afrin Original. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=0b0be196-0c62-461c-94f4-9a35339b4501>. Updated February 27, 2023. Accessed May 31, 2023.

The pilot's postmortem toxicological testing detected ethanol at 0.058 g/dL in urine, 0.048 g/hg in liver tissue, and 0.048 g/hg in brain tissue. N-propanol was detected in urine.

Submitted by:

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