

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



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MEDICAL

Specialist's Factual Report

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A. ACCIDENT

Location: Grant, Nebraska
Date: July 25, 2020

B. MEDICAL SPECIALIST

Specialist Turan Kayagil, MD, FACEP
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C. DETAILS OF THE INVESTIGATION

1.0 Purpose

This investigation was performed to evaluate the pilot for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

2.0 Methods

The Federal Aviation Administration (FAA) medical case review and the pilot's autopsy and toxicology reports were reviewed. Relevant regulation and medical literature were also reviewed.

D. FACTUAL INFORMATION

1.0 FAA Medical Case Review

According to the FAA medical case review, the 31-year-old male pilot had his last aviation medical examination on January 7, 2020. At that time, he reported 3,357 total civilian flight hours. He was 68 inches tall and weighed 172 pounds. He reported no medication use or active medical conditions. No significant issues were identified and the pilot was issued a second-class medical certificate limited by a requirement to wear corrective lenses.

2.0 Autopsy

Western Pathology Consultants performed the pilot's autopsy. According to the autopsy report, the cause of death was multiple blunt force injuries and the manner of death was accident. The autopsy did not identify significant natural disease.

3.0 Toxicology

3.1 FAA Toxicology

The FAA Forensic Sciences laboratory performed toxicological testing of postmortem specimens from the pilot.¹ Ethanol was detected at 0.058 g/dL in cavity blood, 0.128 g/dL in muscle tissue, and 0.036 g/dL in brain tissue. N-butanol was detected at low levels in cavity blood and muscle tissue. N-propanol and methanol were also detected at low levels in cavity blood.²

3.2 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.³ 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.⁴ 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 can affect multiple specimens from the same individual to different degrees, which can result in the specimens having significantly different ethanol levels from one another.^{5,6}

N-propanol and n-butanol are other alcohols that can be produced by microbes in a person's body after death.^{6,7} Methanol is wood alcohol; it occurs naturally in the body at very low levels, is present in some foods and drinks, and is a

¹ 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>.

² According to information provided by an FAA forensic toxicologist about the thresholds used by the FAA for quantitative reporting, the qualitative positive results for n-butanol, n-propanol, and methanol in this case indicate that none of those substances exceeded a level of 0.0025 g/dL in the tested specimens.

³ Cook CCH. Alcohol and aviation. *Addiction*. 1997;92(5):539-555.

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

⁵ 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.

⁶ 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.

⁷ Boumba VA, Exadactylou P, Velivasi G, Ziavrou KS, Fragkouli K, Kovatsi L. The frequency of ethanol, higher alcohols and other low molecular weight volatiles in postmortem blood samples from unnatural deaths. *Forensic Sci Int*. 2022;341:111503. doi:10.1016/j.forsciint.2022.111503.

solvent in a variety of industrial products.^{7,8} At low levels, n-propanol, n-butanol, and methanol are not impairing.

E. SUMMARY OF MEDICAL FACTS

The 31-year-old male pilot had his last aviation medical examination on January 7, 2020. At that time, he reported no medication use or active medical conditions. He was issued a second-class medical certificate limited by a requirement to wear corrective lenses.

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 did not identify significant natural disease.

The pilot's postmortem toxicological testing detected ethanol at 0.058 g/dL in cavity blood, 0.128 g/dL in muscle tissue, and 0.036 g/dL in brain tissue. N-butanol was detected at low levels in cavity blood and muscle tissue. N-propanol and methanol were detected at low levels in cavity blood.

Submitted by:

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⁸ Centers for Disease Control and Prevention. Methanol: systemic agent. The National Institute for Occupational Safety and Health Emergency Response Safety and Health Database. https://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750029.html. Updated May 12, 2011. Accessed March 2, 2023.