

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR22FA254

MEDICAL

Specialist's Factual Report

October 18, 2022

A. ACCIDENT

Location: Topeka, Kansas
Date: July 16, 2022
Time: 11:53 Local
Airplane: Stucky Seven D RV-7; N283S

B. MEDICAL SPECIALIST

Specialist Michelle Watters, MD, PhD, MPH
National Transportation Safety Board, RE-1
Washington, DC

C. DETAILS OF THE INVESTIGATION

Purpose

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

Methods

The Federal Aviation Administration (FAA) medical case review and the pilot's autopsy and FAA Forensic Sciences Laboratory toxicology reports¹ were reviewed. Other relevant medical and regulatory issues were reviewed.

D. FACTUAL INFORMATION–PILOT

1.0 FAA Medical Case Review

According to the FAA medical certification file, at the time of the accident, the 74-year-old male pilot held a second class medical certificate with the limitation that he must wear corrective lenses. At the time of his most recent exam (4/5/21), the pilot was 71 inches tall and weighed 185 pounds. He reported having 2,090 total flight hours and taking rosuvastatin to treat high cholesterol.

2.0 Autopsy

According to the autopsy report from the Shawnee County Coroner, Topeka, Kansas, the pilot's cause of death was multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified.

¹ The FAA Forensic Sciences Laboratory has the capability to test for more than 1,300 substances including toxins, common prescription and over-the-counter medications, and illicit drugs. <https://jag.cami.jccbi.gov/toxicology/>

3.0 Toxicology

Toxicology testing performed for the coroner's office on the pilot's heart blood was positive for ethanol at 0.090 grams per deciliter (gm/dL). Toxicology testing performed by the FAA Forensic Sciences Laboratory detected ethanol in the pilot's cavity blood at 0.069 gm/dL, vitreous fluid at 0.077gm/dL, gastric contents at 0.390 gm/dL, liver tissue at 0.026 grams per hectogram (gm/hg)², kidney tissue at 0.067 gm/hg, and muscle tissue at 0.083 gm/hg; results were inconclusive for ethanol in brain tissue.

Ethanol

Ethanol is a social drug commonly consumed by drinking beer, wine, or liquor. Ethanol acts as a central nervous system depressant; it impairs judgment, psychomotor functioning, and vigilance. Effects of ethanol on aviators are generally well understood; it significantly impairs pilot performance, even at very low levels.³ While the acute effects of ethanol can vary depending on an individual's frequency of use, body weight, and tolerance, in general, at blood ethanol concentrations as low as 0.02 gm/dL there is relaxation and some loss of judgment and at 0.05 gm/dL there is further degradation of judgment, psychomotor functioning, and alertness. At blood ethanol concentrations above 0.10 gm/dL, there is prolonged reaction time, altered perception of the environment, lack of coordination, slowed thinking, and mood and behavioral changes. Above 0.15 gm/dL, individuals may have significant loss of muscle control and major loss of balance.⁴ FAA regulation Section 91.17 (a) prohibits any person from acting or attempting to act as a crewmember of a civil aircraft (1) within 8 hours after the consumption of any alcoholic beverage and (4) while having an alcohol concentration of 0.04 or greater in a blood or breath specimen.⁵

Ethanol is water soluble, and after absorption it quickly and uniformly distributes throughout the body's tissues and fluids. The distribution pattern parallels water content and blood supply of the tissue. Post-absorption, the alcohol concentration in vitreous fluid is larger than blood by about 12%. There is a one to two hour delay in the balance between vitreous fluid and blood.^{6,7} Ethanol can be produced after death by microbial activity often in conjunction with other alcohols;

² Grams per hectogram in tissue samples are directly comparable to grams per deciliter in liquid samples.

³ Cook, C.C.H. 1997. Alcohol and aviation. *Addiction* (Abingdon, England). 92(5):539-555.

⁴ Centers for Disease Control and Prevention. Blood Alcohol Concentration (BAC). <https://www.cdc.gov/motorvehiclesafety/pdf/bac-a.pdf>. Accessed 10/6/22

⁵ National Archives. eCFR- Code of Federal Regulations. Current as of 10/4/22. Available at: [eCFR :: 14 CFR 91.17 -- Alcohol or drugs](https://www.ecfr.gov/current/title-49/chapter-I/subchapter-B/part-91/subpart-1/section-91.17).

⁶ Penetar, DM, JF McNeil, ET Ryan, and SE Lukas. 2008. Comparison among plasma, serum, and whole blood ethanol concentrations: Impact of storage conditions and collection tubes. *Journal of Analytical Toxicology* 32(7):505-510.

⁷ Ioan, BG, V Jitaru, R Damian, and SI Damian. 2015. Study on the relationship between the concentration of ethanol in the blood, urine, and vitreous humor. *Rom J. Leg Med* 23:211-216.

vitreous humor does not suffer from postmortem production to any significant extent.⁸

E. SUMMARY OF MEDICAL FACTS

The 74-year-old male pilot held a second class medical certificate with the limitation that he must wear corrective lenses. He reported taking rosuvastatin to treat high cholesterol. According to the autopsy report, the pilot's cause of death was multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified.

Toxicology testing detected ethanol in the pilot's heart blood at 0.090 grams per deciliter (gm/dL), cavity blood at 0.069 gm/dL, vitreous fluid at 0.077gm/dL, gastric contents at 0.390 gm/dL, liver tissue at 0.026 grams per hectogram (gm/hg), kidney tissue at 0.067 gm/hg, and muscle tissue at 0.083 gm/hg; results were inconclusive for ethanol in brain tissue.

Submitted by:

Michelle Watters, MD, PhD, MPH
Medical Officer, RE-1

⁸ Canfield, DV, TC Kupiec, and EF Huffine. July 1992. Postmortem alcohol production in fatal aircraft accidents. U.S. Department of Transportation. FAA. Washington, D.C. Report # DOT/FANAM-92/24.