



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

May 9, 2022

Turan Kayagil, MD, FACEP
Medical Officer

A. ACCIDENT INFORMATION

Identification: CEN21FA327

Location: Comstock, Texas

Date: July 17, 2021

B. GROUP IDENTIFICATION

No group was formed for the medical evaluation in this accident.

C. DETAILS OF INVESTIGATION

1. Purpose

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

2. Methods

The Federal Aviation Administration (FAA) medical case review and the pilot's autopsy and toxicology reports were reviewed. Selected National Transportation Safety Board (NTSB) investigator reports and relevant regulation and medical literature were also reviewed.

3. Findings

a. Medical Case Review

According to the FAA medical case review, the 34-year-old male pilot's last civilian aviation medical examination was on December 27, 2006. At that time, he reported 200 total civilian flight hours. He was 67 inches tall and weighed 122 pounds. He reported no medication use and no active medical conditions. No significant issues were identified, and he was issued a third-class medical certificate without limitation. This certificate was expired at the time of the crash. Notably, according to the NTSB investigator-in-charge, the pilot was an

active pilot and flight instructor with the United States Air Force. If the pilot was able to show evidence of a current United States Armed Forces medical examination authorizing pilot flight status, then FAA medical certification was not required for him to conduct domestic flights that otherwise would require third-class (or lesser) medical certification.¹

b. Autopsy

The Webb County Medical Examiner's Office performed the pilot's autopsy. According to the autopsy report, the cause of death was multiple traumatic injuries and the manner of death was accident. The autopsy was limited by the severity of injuries, with no major heart or brain structures described. Within this limitation, the autopsy did not identify significant natural disease.

c. Toxicology

The FAA Forensic Sciences Laboratory performed postmortem toxicological testing of specimens from the pilot.² Ethanol was detected in muscle at 0.182 g/dL, in heart at 0.065 g/dL, and in liver at 0.034 g/dL. Ethanol testing in brain was inconclusive. N-propanol and n-butanol were detected in muscle and heart. Diphenhydramine was detected in muscle and liver. No blood was available for testing.

d. Descriptions of Detected Substances

Ethanol is the intoxicating alcohol in beer, wine, and liquor. It can impair judgment, psychomotor performance, cognition, and vigilance.^{3,4} FAA regulation imposes strict limits on flying after consuming ethanol. This includes a prohibition on acting as a crewmember of a civil aircraft while having a blood ethanol level of 0.04 g/dL or greater.⁵ Ethanol can also be produced by microbes in a person's body tissues after death.^{3,6} N-propanol and n-butanol are other alcohols that can be produced by microbes in a person's body tissues after death.⁶

Diphenhydramine is a sedating antihistamine available over the counter in multiple cold and allergy products as well as sleep aids. Diphenhydramine can cause drowsiness and cognitive and psychomotor impairment. It typically

¹ [14 Code of Federal Regulations § 61.23\(b\)\(9\).](#)

² The FAA Forensic Sciences Laboratory tests specimens for over 1,300 substances including toxins, prescription and over-the-counter medications, and illicit drugs.

³ 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.

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

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

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.

carries a warning to be cautious with tasks like driving and operating machinery, and to avoid use with alcohol, which can increase its sedative effects.^{7,8} The FAA states that pilots should not fly within 60 hours of using diphenhydramine, to allow time for it to be eliminated from circulation.^{9,10}

D. SUMMARY OF MEDICAL FINDINGS

The 34-year-old male pilot's last civilian aviation medical examination was on December 27, 2006. At that time, he reported no medication use and no active medical conditions. No significant issues were identified, and he was issued a third-class medical certificate without limitation. At the time of the crash, the pilot did not hold current FAA medical certification; such certification may not have been required to operate a domestic personal flight, if the pilot had a current United States Armed Forces medical examination authorizing pilot flight status.

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Postmortem toxicological testing detected ethanol in muscle at 0.182 g/dL, in heart at 0.065 g/dL, and in liver at 0.034 g/dL. Ethanol testing in brain was inconclusive. N-propanol and n-butanol were detected in muscle and heart. Diphenhydramine was detected in muscle and liver.

⁷ National Institutes of Health National Library of Medicine. Benadryl. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=702f9786-7ce9-43e4-921d-e1db09612127>. Updated March 30, 2022. Accessed April 27, 2022.

⁸ Couper FJ, Logan BK. Drugs and Human Performance Fact Sheets. National Highway Traffic Safety Administration. DOT HS 809 725. April 2014 (Revised). <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>. Accessed April 27, 2022.

⁹ Federal Aviation Administration. Guide for aviation medical examiners: pharmaceuticals (therapeutic medications) do not issue - do not fly. Federal Aviation Administration website. <https://www.faa.gov/go/dni>. Updated February 19, 2021. Accessed April 27, 2022.

¹⁰ Federal Aviation Administration. Allergy – antihistamine & immunotherapy medication. Guide for Aviation Medical Examiners. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/media/AllergyAntihistamineImmunotherapyMedication.pdf. Updated July 28, 2021. Accessed April 27, 2022.