



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

MEDICAL FACTUAL REPORT

March 20, 2019

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Medical Officer

A. ACCIDENT: CEN18FA266 - Alma, Colorado

On April 2, 2018, a Cessna 210A airplane, N68640, crashed into mountainous terrain 5 miles west of Alma, Colorado. The airplane was substantially damaged. The pilot was fatally injured. Visual meteorological conditions prevailed at the time of the accident. The flight was conducted under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91 without a flight plan. The flight departed Erie Municipal Airport (KEIK) Erie, Colorado, about 0815, and was en route to Richmond Municipal Airport (KRIF) Richmond, Utah.

The airplane was initially reported missing and an ALNOT was subsequently issued on April 2, 2018, at 1702. The wreckage of the airplane was found by hikers on July 13, 2018.

B. GROUP IDENTIFICATION:

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

C. DETAILS OF INVESTIGATION

Purpose

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

Methods

The FAA medical case review, autopsy reports, FAA Bioaeronautical Sciences Research Laboratory toxicology reports, and personal medical records were reviewed. Other pertinent scientific and regulatory issues were reviewed.

FAA Medical Case Review

According to the FAA medical case review, at the time of his most recent FAA medical certification exam dated June 27, 2006, the 67-year-old male pilot was 73 inches tall, weighed 245 pounds, and reported he had accrued 650 total flight hours. The pilot reported he used no medication and had no medical concerns. The aviation medical examiner found no abnormalities on examination and issued the pilot a third class medical certificate with a limitation that he must have available glasses for near vision. The pilot's certificate was not

valid for all classes of flying after June 30, 2008 and the FAA had no record of a BasicMed application. The airplane he was operating required medical certification or BasicMed.

Autopsy

The Jefferson County Coroner's Office's autopsy documented the cause of death was blunt force trauma and the manner was consistent with accident. The autopsy was limited due to injury and prolonged exposure to the elements. The autopsy documented the identified coronary arteries were widely patent with areas of calcific atherosclerosis. There was no identified evidence of heart muscle scarring in a limited specimen. The brain could not be examined.

Toxicology

The FAA Bioaeronautical Sciences Research Laboratory toxicology testing detected ethanol at 0.050 g/dl in liver and at 0.070 g/dl in muscle. The primary psychoactive compound in marijuana, delta-9-tetrahydrocannabinol (THC) was detected in muscle at 0.0042 µg/mL. Its inactive metabolite 11-nor-9-carboxy-delta 9-tetrahydrocannabinol (THC-COOH) was detected in muscle at 0.001µg/ml and liver at 0.0317 µg/ml.

Description of Identified Psychoactive Substances

Ethanol the active intoxicant in beer, wine, and spirits is primarily a social drug is a powerful central nervous system depressant. After absorption, ethanol is quickly distributed throughout the body's tissues and fluids fairly uniformly. The distribution pattern parallels the water content and blood supply of each organ. Ethanol may also be produced in the body after death by microbial activity.¹

THC is the primary psychoactive compound in marijuana. Interpreting post mortem blood and tissue results for THC is complex for several reasons. First, the drug is lipophilic and gets stored in fatty tissues; it may leech back into blood from liver, lung, and brain after death. Thus, post mortem testing may not indicate ante-mortem levels. Marijuana has been demonstrated to have clinical effects at levels as low as 0.001 µg/ml in plasma.² Significant performance impairments are usually observed for at least 1-2 hours following marijuana use and residual effects have been reported up to 24 hours, even when the blood level is undetectable.³ Finally, the pattern and frequency of use effect levels in blood and various tissues.

Personal Medical Records

Personal medical records from a hospital admission between January 18 and February 8, 2018 were reviewed. The 67-year-old patient, who at that time had no reported significant medical history, was admitted to the hospital on January 18, 2018 following symptoms of shortness of breath and confusion. He was diagnosed with hypovolemic shock, respiratory failure requiring intubation, and acute renal failure associated with new onset diabetic ketoacidosis. His altered mental status was attributed to metabolic encephalopathy.⁴ Finally, during his hospital stay, he developed atrial fibrillation with rapid ventricular response. That patient was treated with medications and short term dialysis. He responded well to treatment, was extubated and

¹ Federal Aviation Administration. Forensic Toxicology Drug Information. Ethanol. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=60> Accessed 03/18/2019

² Federal Aviation Administration. Civil Aerospace Medical Institute Toxicology Drug Information: Marijuana <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=154> Accessed 03/18/2019.

³ National Highway Traffic Safety Administration. Drugs and Human Performance Fact Sheets. Cannabis/Marijuana. <https://one.nhtsa.gov/About-NHTSA/Traffic-Techs/current/Drugs-and-Human-Performance-Fact-Sheets> Accessed 3/18/2019.

⁴ Temporary or permanent altered brain function due to a chemical imbalance in the blood. The prognosis varies depending on the cause.

transferred to a rehabilitation facility January 29, 2018. He tolerated rehabilitation well and achieved a high level of independence before discharge. However, he exhibited oxygen desaturation with exercise and was discharged home on supplemental oxygen as well as medications for his atrial fibrillation and insulin for his diabetes. Post discharge records were not available for review.

D. SUMMARY OF MEDICAL FINDINGS

The 67-year-old male pilot was last medically certified in June 2006. At that time, he reported he had accrued 650 total flight hours. According to the FAA medical case review, at the time of the accident flight he did not have a valid medical certificate or a pilot certificate.

The Jefferson County Coroner's Office's autopsy documented the cause of death was blunt force trauma and the manner was consistent with accident. The autopsy was limited due to injury and prolonged exposure to the elements. The autopsy documented the identified coronary arteries were widely patent with areas of calcific atherosclerosis. There was no identified evidence of heart muscle scarring in a limited specimen. The brain could not be examined.

The FAA Bioaeronautical Sciences Research Laboratory toxicology testing detected ethanol at 0.050 g/dl in liver and at 0.070 g/dl in muscle. The primary psychoactive compound in marijuana, THC was detected in muscle at 0.0042 µg/mL; its inactive metabolite THC-COOH was detected in muscle at 0.001 µg/ml and liver at 0.317 µg/ml.

About two months prior to the accident, the pilot was hospitalized for respiratory and renal failure with associated metabolic encephalopathy due to diabetic ketoacidosis. During the hospital stay, he experienced atrial fibrillation with rapid ventricular response. He was successfully treated with insulin, cardiovascular medications, and dialysis and was released home with a requirement for supplemental oxygen secondary to persistent oxygen desaturation during exercise. Records post discharge were not available.