



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

July 14, 2016

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Medical Officer

A. ACCIDENT: ERA15FA003 - Palm Coast, Florida

On October 3, 2014, about 9:35 a.m. eastern daylight time, an experimental amateur-built Sonex Waix, N461MM, owned and operated by a private individual, was substantially damaged when it impacted terrain about 10 minutes after takeoff from the Flagler County Airport (XFL), Palm Coast, Florida. The private pilot was fatally injured. Visual meteorological conditions prevailed and no flight plan had been filed for the local personal flight that was conducted under the provisions of 14 *Code of Federal Regulations* Part 91.

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 any medical conditions, the use of any medications/illicit drugs, and the presence of any toxins.

Methods

The FAA medical case review, FAA toxicology report, autopsy report, and the investigator's report were reviewed.

FAA Medical Case Review

According to the FAA medical case review, the 77-year-old male private pilot had no records in the current FAA medical certification electronic records system. Of note, inactive FAA medical certification records with no identified pathology from prior to about 1998 were not uploaded into the current electronic system.

Autopsy

According to the Florida District 23 Medical Examiner's autopsy report, the cause of death was multiple blunt force injuries and the manner was accident. The autopsy was limited due to the extent of injury and decomposition but no natural disease was identified.

Toxicology

FAA Bioaeronautical Research Laboratory toxicology analysis detected ethanol in the muscle (0.082 gm/dl) and liver (0.082 gm/dl), as well n-butanol and n-propanol in liver and muscle. Additionally, diphenhydramine, citalopram, and its metabolite n-desmethylocitalopram were detected in liver and muscle.

Ethanol is primarily a social drug with 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. The effects of ethanol on aviators are generally well understood; it significantly impairs pilots' performance, even at very low levels.¹ Federal Aviation Regulations, Section 91.17 (a) prohibits any person from acting or attempting to act as a crewmember of a civil aircraft while having 0.040 gm/dL or more ethanol in the blood.²

Ethanol may also be produced in the body after death by microbial activity.³ N-propanol and n-butanol are other types of alcohol that can also be produced after death.^{4,5}

Diphenhydramine is a sedating antihistamine used to treat allergy symptoms and as a sleep aid. It is available over the counter under the trade names Benadryl and Unisom. Diphenhydramine's carries the following FDA warning: may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery).⁶ Compared to other antihistamines, diphenhydramine causes marked sedation; it is also classed as a CNS depressant and this is the rationale for its use as a sleep aid. Altered mood and impaired cognitive and psychomotor performance may also be observed. In fact, in a driving simulator study, a single dose of diphenhydramine impaired driving ability more than a blood alcohol concentration of 0.100%.⁷

Citalopram is a prescription medication marketed as Celexa that is used to treat a number of conditions including depression and panic disorder.⁸

¹ Cook, C.C., Alcohol and aviation. Addiction (Abingdon, England), 1997. 92(5): p. 539-555.

² US Government Printing Office. eCFR- Code of Federal Regulations. 91.17. Accessed 6/16/2015. Available from: <http://www.ecfr.gov/cgi-bin/text-idx?rgn=div8&node=14:2.0.1.3.10.1.4.9>.

³ Federal Aviation Administration. Forensic Toxicology Drug Information. Ethanol. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=60> Accessed 03/02/2015

⁴ Federal Aviation Administration. Forensic Toxicology Drug Information. Propanol (N-). <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=179> Accessed 06/06/2016

⁵ Federal Aviation Administration. Forensic Toxicology Drug Information. Butanol (N). <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=130> Accessed 06/06/2016

⁶ Federal Aviation Administration. Civil Aerospace Medical Institute. Toxicology Drug Information: Diphenhydramine. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=50>. Accessed 5/26/2016.

⁷ Weiler JM, B.J., Woodworth GG, Grant AR, Layton TA, Brown TL, McKenzie DR, Baker TW, Watson GS., Effects of fexofenadine, diphenhydramine, and alcohol on driving performance. A randomized, placebo-controlled trial in the Iowa Driving Simulator. Ann Intern Med 2000. 132(5): p. 354-63.

⁸ Drugs.com. FDA prescribing information, side effects, and uses: Citalopram. <http://www.drugs.com/pro/citalopram-capsules.html> Accessed 6/6/2016

D. SUMMARY OF FINDINGS

The pilot had no available record of an FAA medical certification examination. The autopsy was limited due to the extent of injuries but identified no natural disease.

FAA toxicology identified ethanol in the muscle (0.082 gm/dl) and liver (0.082 gm/dl), as well n-butanol and n-propanol in liver and muscle. Additionally, diphenhydramine, citalopram, and its metabolite n-desmethyleitalopram were detected in liver and muscle.