



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report **January 3, 2022**

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Medical Officer

A. ACCIDENT: WPR21LA111; Tehachapi, California

Date/Time: February 13, 2021; 4:27 p.m. (PST)
Aircraft: Piper PA46R-350T; N40TS
Injuries: 1 Fatal
Flight Conducted under Part 91 personal flight

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.

Methods

The Federal Aviation Administration (FAA) medical case review and the pilot's autopsy and FAA Forensic Sciences Laboratory toxicology¹ reports were reviewed. Other pertinent scientific and regulatory issues were reviewed.

FAA Medical Case Review

According to the FAA medical case review, the 56-year-old male pilot held a third class medical certificate with the limitation that he must have available glasses for near vision. His most recent FAA medical certification exam was on 6/5/20 and at that time he reported he had accrued 1,820 total flight hours. He was 70 inches tall and weighed 175 pounds. He reported no medication use and no medical conditions. In 2014 he reported a DUI arrest after a car accident that was later discharged; he reported having a T-7 vertebral compression and two broken ribs from the car accident.

¹ See <https://jag.cami.jccbi.gov/toxicology/> for a complete list of tested-for substances.

Autopsy

According to the autopsy report from the Sheriff-Coroner-Public Administration Office, Bakersfield, California, the pilot's death was caused by multiple injuries and the manner of death was accident. The examination was limited by extensive injuries and destruction from the post-crash fire. The coroner reported no other conditions contributing to his death.

Toxicology

FAA Forensic Sciences Laboratory toxicology testing detected the antianxiety medication diazepam and its psychoactive metabolites nordiazepam, oxazepam, and temazepam in the pilot's muscle and lung tissue. The synthetic opioid butorphanol, the muscle relaxant carisoprodol, its active metabolite meprobamate, the antidepressant citalopram, and its active metabolite n-desmethylocitalopram were also detected in his muscle and lung tissue.

Relevant Toxicological and Medical Information

Diazepam, commonly marketed as Valium, is a sedating benzodiazepine available by prescription as a controlled substance and used to treat anxiety; it is also useful to help treat muscle spasms, alcohol withdrawal, and seizures. It is metabolized to the active metabolites *nordiazepam* or *temazepam*. These compounds are further metabolized to the active metabolite *oxazepam*. Diazepam and its metabolites carry the warning that they may impair the mental and physical ability to perform hazardous tasks. Drowsiness, fatigue, and muscle weakness are commonly reported side effects. Concomitant use of benzodiazepines and opioids can result in profound sedation. Diazepam has a half-life of 21 to 82 hours; nordiazepam has a half-life of 25 to 200 hours.^{2,3}

Butorphanol is a synthetic opioid prescribed for severe pain management. As an opioid, butorphanol carries a warning for its high risk of addiction, abuse, and misuse. It is an impairing medication and carries the warning that patients should not drive or operate dangerous machinery until they know how they will react to the medication. Adverse reactions on the central nervous system from butorphanol include drowsiness and dizziness. Concomitant use of opioids with benzodiazepines and other central nervous system depressants such as muscle relaxants and alcohol can result in profound sedation. Butorphanol had a half-life of about 5 hours.⁴

Carisoprodol, commonly marketed as Soma, is a muscle relaxant prescribed to relieve acute, painful musculoskeletal conditions and muscle spasms. It is metabolized to its active metabolite *meprobamate*. Both have sedative properties and can impair the mental and physical abilities required for performing hazardous tasks such as driving. The sedative effects from the use of carisoprodol with other central nervous system depressants such as benzodiazepines, opioids,

² FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Diazepam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=44>

Nordiazepam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=85>

Oxazepam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=93>

Temazepam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=193>

³ National Institutes of Health (NIH). U.S. National Library of Medicine (NLM). [DailyMed - DIAZEPAM tablet \(nih.gov\)](#) Updated 9/13/18.

⁴ NIH. NLM. [DailyMed - BUTORPHANOL TARTRATE- butorphanol tartrate spray \(nih.gov\)](#) Updated 1/6/21

and alcohol may be additive. Carisoprodol has a half-life of 2 hours; meprobamate has a half-life of 10 hours.^{5,6}

Citalopram is a prescription antidepressant medication marketed under the trade name Celexa. *N-desmethylocitalopram* is the active metabolite of citalopram. Both carry the warning that their use may impair mental or physical ability for performing hazardous tasks. The therapeutic range for citalopram is 50 to 110 ng/mL and its half-life is 25 to 35 hours.⁷ The FAA will consider a special issuance of a medical certificate for depression after six months of treatment if the applicant is clinically stable and using only one approved treatment medication. Citalopram is one of the FAA approved antidepressant medications.⁸

D. SUMMARY OF MEDICAL FINDINGS

The 56-year-old male pilot held a third class medical certificate with the limitation that he must have available glasses for near vision. At his most recent FAA medical certification examination on 6/5/20, he reported no medication use or medical conditions. He reported a back injury from a car accident in 2014. According to the autopsy report from the Sheriff-Coroner-Public Administration Office, Bakersfield, California, the pilot's death was caused by multiple injuries and the manner of death was accident. The coroner reported no other conditions contributing to his death; however, the examination was limited by extensive injuries and destruction from the post-crash fire.

Toxicology testing detected diazepam, its metabolites nordiazepam, oxazepam, and temazepam, butorphanol, carisoprodol, its active metabolite meprobamate, citalopram, and its metabolite n-desmethylocitalopram in the pilot's muscle and lung tissue.

⁵ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Carisoprodol. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=226>

Meprobamate. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=159>

⁶ NIH. NLM. [DailyMed - CARISOPRODOL- carisoprodol tablet \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/201111111/) Updated 11/1/21.

⁷ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Citalopram. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=208>

Desmethylocitalopram (N-). <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=178>

⁸ FAA. Last modified 7/23/18. Guide for Aviation Medical Examiners, Item 47. Psychiatric Conditions - Use of Antidepressant Medications.

https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/app_process/exam_tech/item_47/amd/antidepressants/