

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ERA22FA153

MEDICAL

Specialist's Factual Report

November 2, 2022

A. ACCIDENT

Location: Bay Minette, Alabama
Date: 3/11/22
Time: 14:30 Local
Airplane: Grumman AA1

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 certification file, autopsy report, and FAA toxicology report¹ for the pilot were reviewed. Other relevant medical and regulatory issues were reviewed.

D. FACTUAL INFORMATION

1.0 FAA Medical Certification File

According to the FAA medical certification file, at the time of the accident, the 74-year-old male pilot had an expired medical certificate. His most recent medical certification examination was in May 2004. On that exam, he reported he had depression but was okay after treatment; he reported taking no medications. A letter from the FAA in April 2008 discussed a hotline call about the pilot's failure to report his bipolar disorder, which was medically disqualifying for airmen medical certification. His examinations dated back to 1976; none listed medication use or mental health conditions.

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/>

2.0 Autopsy

According to the autopsy report from the Alabama Department of Forensic Sciences, Mobile, Alabama, the pilot's cause of death was traumatic asphyxia and the manner of death was accident. The medical examiner reported that the pilot had 70-80% atherosclerosis in his left anterior descending coronary artery and 50-60% atherosclerosis in his right coronary artery.

3.0 Toxicology

Toxicology testing performed by the FAA Forensic Sciences laboratory detected the primary major psychoactive compound of cannabis, delta-9-tetrahydrocannabinol (THC), in the pilot's iliac blood at 2.2 nanograms per milliliter (ng/mL) and his urine at 1.6 ng/mL. THC's psychoactive metabolite 11-hydroxy-delta-9-THC (11-OH-THC) was detected in his iliac blood at 1.1 ng/mL and in his urine at 13.1 ng/mL. THC's inactive metabolite, carboxy-delta-9-tetrahydrocannabinol (THC-COOH), was detected in his iliac blood at 16.4 ng/mL and in his urine at 178.4 ng/mL. Toxicological testing performed by the Alabama Department of Forensic Sciences on the pilot's cardiac blood detected THC, 11-OH-THC, and THC-COOH at 2.1 ng/mL, 1.1 ng/mL, and 23 ng/mL, respectively.

Cannabis

The marijuana plant (*Cannabis species*) contains chemicals called cannabinoids; delta-9-tetrahydrocannabinol (THC) is the primary psychoactive cannabinoid compound. THC's mood-altering effects include euphoria and relaxation. In addition, marijuana causes alterations in motor behavior, time and space perception, and cognition. 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. Peak concentrations are often 100 to 200 ng/mL.² A study of 14 frequent and 11 occasional users found that cannabis significantly impaired psychomotor function up to 3.5 hours after smoking, although more impairment was reported in occasional smokers.³

THC is rapidly metabolized but the rate of metabolism is not linear and depends on the means of ingestion (smoking, oil, and edibles), potency of the product, frequency of use, and user characteristics. Concentrations of THC peak at the end of smoking and often are below 5 ng/mL at three hours. The primary metabolite of THC, 11-OH-THC, is equally psychoactive, but is rapidly metabolized to the non-psychoactive metabolite THC-COOH. THC is fat soluble, so is stored in fatty tissues and can be released back into the blood long after consumption. So, while the

² National Highway Traffic Safety Administration. April 2014 (revised). Drugs and Human Performance Fact Sheets. Cannabis/Marijuana.

<https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>

³ Desrosiers, NA, JG Ramaekers, E Chauchard, DA Gorelik, and MA Huestis. 2015. Smoked cannabis' psychomotor and neurocognitive effects in occasional and frequent smokers. *Journal of Analytical Toxicology* 39:252-261.

psychoactive effects may last a few hours, THC can be detected in the body for days or weeks. Very little THC is excreted in urine. Instead, THC-COOH can be found in urine days to weeks after the last use of the drug. Thus, both blood and urine test results do not necessarily reflect recent use and cannot be used to prove that the user was experiencing effects of the drug at the time of testing.⁴

E. SUMMARY OF MEDICAL FACTS

The 74-year-old male pilot had an expired medical certificate. His most recent medical certification examination was in May 2004 where the pilot reported prior treatment for depression. In 2008, the FAA determined the pilot was medically disqualified for airmen medical certification because of bipolar disorder. According to the autopsy report, the pilot's cause of death was traumatic asphyxia and the manner of death was accident. The medical examiner reported that the pilot had 70-80% atherosclerosis in his left anterior descending coronary artery and 50-60% atherosclerosis in his right coronary artery.

Toxicology testing detected delta-9-tetrahydrocannabinol (THC) in the pilot's blood at 2.1 ng/mL and 2.2 nanograms per milliliter (ng/mL) and his urine at 1.6 ng/mL, 11-hydroxy-delta-9-THC (11-OH-THC) in his blood at 1.1 ng/mL and in his urine at 13.1 ng/mL, and carboxy-delta-9-tetrahydrocannabinol (THC-COOH) in his blood at 16.4 ng/mL and 23 ng/mL and in his urine at 178.4 ng/mL.

Submitted by:

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⁴ Compton, R. July 2017. Marijuana-Impaired Driving - A Report to Congress. (DOT HS 812 440). Washington, DC: National Highway Traffic Safety Administration.
<https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf>