



Aviation Investigation Final Report

Location:	ROXBORO, North Carolina	Accident Number:	ATL97FA029
Date & Time:	December 28, 1996, 10:09 Local	Registration:	N7773M
Aircraft:	Mooney M20C	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Shortly after takeoff in instrument meteorological conditions (IMC), the pilot made an initial radio call to approach control (ATC), then about 35 seconds later, he announced, 'I've just lost my vacuum.' Air traffic controllers attempted to assist the pilot, but were unable to communicate with him further. Radar data showed the airplane made a left turn and climbed to 1,400 ft. After about 270 degrees of turn, the airplane's flight path became erratic. The airplane was last depicted at 1,300 ft and 2 miles south of the airport. About 4 minutes after takeoff, it collided with wooded terrain in uncontrolled flight. During the investigation, no specific reason was found for the reported loss of vacuum; however, during impact, extensive damage of the airplane occurred. Toxicology tests of the pilot's liver fluid showed 0.345 mcg/ml codeine, 0.134 mcg/ml dextromethorphan, 0.249 mcg/ml dextropran, and an undetermined amount of morphine. A test of the pilot's blood indicated undetermined quantities of opiates, a class of drugs which includes codeine and morphine. Tests of kidney fluid showed 0.349 mcg/ml codeine, 0.027 mcg/ml dextromethorphan, and 0.191 mcg/ml dextropran. The finding of these substances is consistent with prior ingestion of codeine-containing cough syrup. Codeine, a narcotic pain reliever and cough suppressant, can produce impaired judgment, disorientation, and delayed reactions.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: failure of the pilot to maintain control of the airplane, due to spatial disorientation. Factors relating to the accident were: the pilot's use of an unapproved drug, low ceiling, restricted visibility (fog), and an undetermined anomaly with the vacuum system.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: CLIMB

Findings

1. (F) WEATHER CONDITION - LOW CEILING
2. (F) WEATHER CONDITION - FOG
3. (F) VACUUM SYSTEM - UNDETERMINED
4. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
5. (F) IMPAIRMENT(DRUGS) - PILOT IN COMMAND
6. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: DESCENT - UNCONTROLLED

Findings

7. OBJECT - TREE(S)

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On December 28, 1996, about 1009 eastern standard time, a Mooney M20C, N7773M, collided with the ground during uncontrolled flight in Roxboro, North Carolina. The airplane was operated by the pilot under the provisions of Title 14 CFR Part 91, and visual flight rules. Instrument meteorological conditions prevailed. An instrument flight plan was filed for the personal flight, but not activated. The private pilot and his passenger were fatally injured, and the airplane was destroyed. The flight to Mt. Airy, North Carolina was originating at the time of the accident.

Witnesses observed the airplane depart runway 24 at the Person County Airport. A flight instructor on the airport taxiway estimated that the visibility was less than one mile, with an indefinite ceiling of about 200 feet above ground level. At 1005:41, the flight made an initial radio call to Raleigh approach control. At 1006:16 the pilot announced "I've just lost my vacuum." There was no further radio contact with N7773M. Initial radar data indicated that the airplane was in a left turn about 1/2 mile southwest of Person County Airport. The radar data initially depicted the airplane at 900 feet mean sea level (msl). Airport elevation is 609 feet msl. The airplane climbed to a maximum of 1,400 feet msl, while in a left turn. The left turn lasted until the airplane had turned about 270 degrees. After that point, the flight path became erratic. The last altitude depicted was 1,300 feet, about 2 miles south of the airport. The wreckage was located about 1/2 mile south of Person County Airport in a wooded area.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with a single engine and instrument airplane rating. His certificate was issued July 20, 1995. His last medical certificate, a second class, was dated November 11, 1996, and contained the limitation that the pilot needed to wear corrective lenses in order to exercise the privileges of the airman's certificate. A pilot logbook provided by the family was numbered as Logbook Number 2 and was dated November 11, 1996. It had no information on total time. All information on total time and currency was taken from this logbook and a flight instructor's statement.

The pilot was issued his instrument rating on July 20, 1995. According to the flight instructor's statement and FAA records, at the time of his application, the pilot had flown approximately fifty hours in simulated instrument conditions, and had no actual time. Since that time, there is no evidence of either simulated or actual instrument time. An attempt was made to recover any evidence of currency and proficiency, but none was found.

Additional personnel information is contained in this report on page 3 under the First

Pilot Information.

AIRCRAFT INFORMATION

A witness, a certified flight instructor, stated that he had spoken with the pilot on the 29th or 30th of September, 1996, and the pilot had indicated that he had a vacuum pump failure while on a cross-country flight. The pilot did not indicate when this failure occurred or if repairs had been made. The maintenance logs indicated a maintenance record from May 10, 1996, when the vacuum pump was replaced. In a letter from the pilot, he stated he believed this pump replacement was actually an overhauled pump and asked the mechanic for confirmation of the pump's status. The only other vacuum related repair was to a vacuum pump hose that connected the pump to the firewall. This repair was made on August 16, 1996 and the airplane was approved for service on August 30, 1996. The airplane log indicated that an annual inspection was completed on April 21, 1996, at an aircraft total time of 2403.1 hours. At the accident site, the aircraft total time was 2748.1 hours.

The airplane was within its maximum gross weight and center of gravity range. The calculated weight of this aircraft was 2054 lbs. which was below the maximum gross weight of 2575 lbs. The center of gravity was also within limits. The calculated center of gravity was 43.3 inches and the limits were between 42.0 inches and 49.0 inches. There was approximately 24 gallons of fuel on board the airplane.

METEOROLOGICAL INFORMATION

A witness stated he saw the pilot check the weather radar before he went flying. The witness, a certified flight instructor, indicated to the pilot that the weather was clear above 2,400 feet. The weather at the airport was instrument meteorological conditions, and the pilot filed an instrument flight plan which was not activated.

The visibility on the ground was reported to be two miles, but a witness estimated it was closer to one mile. Another witness stated he checked the weather 45 minutes after the accident, and it was less than one mile visibility. The ceiling was missing from the weather report at the Person County Airport because the equipment had been inoperative for some time. It has since been repaired.

Additional information about the weather is contained on pages 3 and 4 under the section titled Weather Information.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located in a wooded area about 1/2 mile south of the Person County Airport. There was a great deal of fallen leaves and other detritus covering the ground in the areas surrounding the wreckage. The trees in the area were over 80 feet above ground level (AGL). Around these trees, pieces of the airplane were scattered. Seven trees showed obvious

damage, including scrape marks and freshly made breaks. The first tree to be damaged was broken off at 50 feet, the next 49 feet, followed by a scrape mark at a height of 43 feet on the next tree. After that, additional scrape marks or damage was noted on four trees at heights of 45 feet, 25 feet, 13 feet, and 6 feet.

The airplane wreckage was distributed along 053 degree azimuth for a total distance of about 160 feet. The right side pieces of the aircraft were located on the right side of the path, and the left side pieces were located on the left of the wreckage trail. The initial piece of debris was a 4 foot section of the elevator with the elevator pitch trim hinge and jack screw attached. Continuing northeast, the left wing tip was located with the left aileron. Next, the right wing was located. The remainder of the left wing was the next piece of wreckage. A major section of the empennage, including the vertical stabilizer and rudder, was located about 60 feet further to the northeast. Next, the propeller and the main section of fuselage could be observed. The engine was 110 feet further northeast, followed by the pilot seat and restraint system.

The jack screw on the tail section was extended to expose five screws, and the rod was fractured. The fracture face was rough, granular, and irregular in appearance. The tail tie down ring was still attached.

The left wing was separated about 3/4 of the way down from the tip of the aileron. This part of the wing was crushed aft throughout the chord line, except for about one foot of the tip of the wing. The midsection of the left wing, which contained the pitot tube and the stall warning vane, was to the left of the left wing tip. The inboard end of the left wing midsection has a concave indentation. The left flap separated from the wing in one piece, but was bent span wise about 10 degrees at the outboard end.

. The right wing separated about 5 feet from the root outboard of the fuel filler cap. The leading edge was crushed aft at the point of separation with tree bark transferred to the wing in the crush indentation. The aileron was still attached to the right wing, but it had wrinkles. The right wing flap was located in a tree.

The main pieces of the empennage, including the rudder with rudder counterweights, vertical stabilizer, horizontal stabilizer, and the elevators were found together and separated as one unit. The left horizontal stabilizer separated at the root, and the elevator and rudder control rods were bent towards the left. Also, the left elevator counterweight was absent from the assembly, with tree bark in the resulting metal folds. Examination of the wreckage showed evidence of bark and other tree debris in the empennage.

The main portion of the fuselage, minus the engine and empennage, was located together. The main landing gear was extended but not locked in place. The right main landing gear had broken off the mounts at the top of the trunnion where it mates with the wing.

The ground around the engine was burned, and the engine accessory section was

sooted and blackened. The fuel selector was found broken out of the structure.

The engine was removed and taken to a hangar for further examination. It was found that the spark plugs exhibited no signs of fouling, and had a gray discoloration. There was engine mechanical continuity. The left magneto timing was set at 25 degrees before top dead center, and the right magneto was separated from the engine.

The Hartzell propeller was also damaged. One blade was "S" curved and broken in the hub, and the opposing blade was "S" curved with about six inches of the tip absent.

The vacuum pump was separated from the engine. Its shear connector was intact, and the engine pad spline was absent. The vacuum pump was disassembled, and it was noted that the carbon block was broken at the center, with one blade broken off at the top corner and the others intact. The airplane had both high and low vacuum indicator lights. Both bulbs were destroyed.

The directional gyro was disassembled. Score marks were observed on the interior of the housing. The case was not heavily damaged. The attitude indicator housing was located on the site, but the gyro was absent and not located.

MEDICAL AND PATHOLOGICAL INFORMATION

A post mortem examination of the pilot was conducted by the Office of the Chief Medical Examiner, Chapel Hill, North Carolina, 27599-7580.

Toxicological examinations of the pilot were conducted by the Toxicology and Accident Research Laboratory, FAA. The reports were positive for ethanol in the heart fluid, but it was noted that this ethanol was associated with post mortem ethanol production.. The toxicology also indicated the presence of codeine, morphine, and dextromethorphan within the pilot's system. Medical personnel indicated these findings were consistent with cough syrup ingestion.

Codeine is classified as a narcotic analgesic by the Physicians Desk Reference, and is considered a central nervous system (CNS) depressant. Codeine produces symptoms such as disorientation, slowed reactions, euphoria, sedation, impaired judgment, and respiratory depression.

A blood sample was tested to determine if the levels of codeine present would indicate physical impairment. The levels were considered consistent with normal therapeutic levels. When asked if these levels would impair a pilot, medical personnel stated "he would not be unconscious, but his performance would definitely be degraded."

ADDITIONAL INFORMATION

The wreckage was released at the accident site to the Vice President of Causey Aviation Services, the Fixed Base Operator on the Person County Airport.

Pilot Information

Certificate:	Private	Age:	47, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):		Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medical-w/ waivers/lim	Last FAA Medical Exam:	November 27, 1996
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	389 hours (Total, all aircraft), 17 hours (Total, this make and model), 221 hours (Pilot In Command, all aircraft), 17 hours (Last 90 days, all aircraft), 17 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	Registration:	N7773M
Model/Series:	M20C M20C	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	20-0019
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	April 21, 1996 Annual	Certified Max Gross Wt.:	2575 lbs
Time Since Last Inspection:	345 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	2748 Hrs	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	IO-360-A1D
Registered Owner:	WAYNE A. FLEMING	Rated Power:	200 Horsepower
Operator:	WAYNE A. FLEMING	Operating Certificate(s) Held:	None
Operator Does Business As:		Operator Designator Code:	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Day
Observation Facility, Elevation:	TDF ,609 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	09:45 Local	Direction from Accident Site:	180°
Lowest Cloud Condition:	Unknown	Visibility	2 miles
Lowest Ceiling:	200 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	210°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	7°C / 7°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	(TDF)	Type of Flight Plan Filed:	IFR
Destination:	MT AIRY , NC (MWK)	Type of Clearance:	None
Departure Time:	10:05 Local	Type of Airspace:	Class G

Airport Information

Airport:	PERSON COUNTY TDF	Runway Surface Type:	Asphalt
Airport Elevation:	609 ft msl	Runway Surface Condition:	Wet
Runway Used:	24	IFR Approach:	None
Runway Length/Width:	5000 ft / 100 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	36.400875,-78.979743(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Preston
Additional Participating Persons:	EDWARD L MURNANE; REGAN H CAMPBELL; ATLANTA , GA
Original Publish Date:	January 30, 1998
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=3771

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).