



National Transportation Safety Board Aviation Accident Final Report

Location:	Sommerville, TN	Accident Number:	ERA15FA066
Date & Time:	12/01/2014, 1930 CST	Registration:	N8607W
Aircraft:	PIPER PA28	Aircraft Damage:	Destroyed
Defining Event:	VFR encounter with IMC	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

According to a family member, the noninstrument-rated private pilot was planning to refuel the airplane on the evening of the accident. After purchasing fuel, he subsequently departed in night instrument meteorological conditions, which included low clouds and mist. A witness heard the airplane flying overhead and then sounds associated with increased engine power, followed by a loud crash. The airplane impacted a heavily wooded area about 0.75 mile from the departure airport and was destroyed by impact forces and a postcrash fire. Examination of the airframe and engine did not reveal any anomalies that would have precluded normal operation. Dark night instrument meteorological conditions can lead to spatial disorientation, particularly for a noninstrument-rated pilot. In addition, the wreckage distribution and the witness observation of increasing engine noise and the wreckage are consistent with the pilot losing control of the airplane due to spatial disorientation.

The pilot's toxicology results identified ethanol at 0.109% in muscle tissue and 0.039% in brain tissue. Although some of the ethanol may have been produced postmortem, it is likely that some was ingested before the accident. In addition, chlordiazepoxide (a prescription medication for the treatment of anxiety) and its metabolite, nordiazepam, were detected in the liver. It is likely the combined effects of chlordiazepoxide and ethanol significantly impaired the pilot's executive functioning, judgment, and decision-making, leading to his decision to fly in weather that he was unprepared to manage.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The noninstrument-rated pilot's improper decision to attempt visual flight in instrument meteorological conditions, which resulted in an in-flight loss of airplane control due to spatial

disorientation. Contributing to the accident was the pilot's impaired decision-making due to the effects of ethanol and chlordiazepoxide.

Findings

Personnel issues	Decision making/judgment - Pilot (Cause)
	Spatial disorientation - Pilot (Cause)
	Aircraft control - Pilot (Cause)
	Alcohol - Pilot (Factor)
	Prescription medication - Pilot (Factor)
Environmental issues	Clouds - Effect on operation (Cause)
	Drizzle/mist - Effect on operation (Cause)

Factual Information

History of Flight

Takeoff	VFR encounter with IMC (Defining event)
Maneuvering	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On December 1, 2014, at 1930 central standard time, a privately owned and operated Piper PA-28-235, N8607W, collided with terrain after takeoff from Fayette County Airport (FYE), Somerville, Tennessee. The private pilot was fatally injured, and the airplane was destroyed. Night instrument meteorological conditions prevailed around the time of the accident and no flight plan was filed. The personal flight departed FYE about 1915, and was conducted under the provisions of 14 Code of Federal Regulations Part 91.

According to the wife of the pilot, she last saw the airplane in their hangar on the night of the accident. She believed that her husband was going to taxi over to the fuel pumps to refuel the airplane for a trip he was planning. When he did not come home that evening, she contacted the local authorities to report that her husband was missing. The local sheriff's department searched the airport and did not locate the airplane. The Federal Aviation Administration (FAA) was contacted by the local sheriff's department and an Alert Notice (ALNOT) was issued.

A witness stated that, on the night of the accident, it was dark and misting. He heard an airplane flying overhead, and then heard the engine "rev up" before hearing a loud crash. The witness said that although he heard a crash, he was not sure what caused the sound and did not report it to the authorities. On the following day, after hearing about a missing airplane, he contacted the authorities and directed them in the direction of the sound he heard. A search ensued and the airplane was located 3/4 mile from FYE, at 0930.

Pilot Information

Certificate:	Private	Age:	53, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Unknown
Other Aircraft Rating(s):	None	Restraint Used:	Unknown
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last Medical Exam:	03/27/2014
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	(Estimated) 505 hours (Total, all aircraft), 505 hours (Total, this make and model)		

The pilot, age 53, held a private pilot certificate with an airplane single-engine land rating. He did not possess an instrument rating. The pilot was issued an FAA third-class medical certificate on March 27, 2014, with a limitation, "Must wear corrective lenses and possess

glasses for near vision." At that time the pilot reported no medical problems or use of medications. In addition, he listed a total flight time of 505 hours. The pilot's logbook was not retrieved and the status of his last flight review was not determined.

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	PIPER	Registration:	N8607W
Model/Series:	PA28 235	Aircraft Category:	Airplane
Year of Manufacture:	1963	Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	28-10122
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	10/01/2013, Annual	Certified Max Gross Wt.:	2400 lbs
Time Since Last Inspection:	2958 Hours	Engines:	1 Reciprocating
Airframe Total Time:		Engine Manufacturer:	LYCOMING
ELT:	Installed, not activated	Engine Model/Series:	O-540 SERIES
Registered Owner:	On file	Rated Power:	250 hp
Operator:	On file	Air Carrier Operating Certificate:	None

The airplane was manufactured in 1963 by Piper Aircraft, as a model PA-28-235, and was designated serial number 28-10122. It was powered by a 250-horsepower Lycoming O-540 series engine, and equipped with a two-bladed, metal, fixed pitch McCauley PFA8069 propeller. The last annual inspection of the airframe and engine occurred on October 1, 2013, at a tachometer time of 2,557.7 hours. A review of FYE fueling records revealed that the pilot purchased 39 gallons of 100 Low-Lead aviation gasoline at 1907, on the evening of the accident.

Meteorological Information and Flight Plan

Observation Facility, Elevation:	OLV, 436 ft msl	Observation Time:	1850 CST
Distance from Accident Site:	25 Nautical Miles	Condition of Light:	Night
Direction from Accident Site:	200°	Conditions at Accident Site:	Instrument Conditions
Lowest Cloud Condition:	Unknown	Temperature/Dew Point:	1°C / 1°C
Lowest Ceiling:	Overcast / 400 ft agl	Visibility	4 Miles
Wind Speed/Gusts, Direction:	9 knots, 20°	Visibility (RVR):	
Altimeter Setting:	30.42 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	Light - Mist; Light - Drizzle		
Departure Point:	Sommerville, TN (FYE)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1915 CST	Type of Airspace:	Class G

The most recent weather observation at FYE was recorded about 4 hours after the accident; however, a weather observation at the Olive Branch Airport (OLV), approximately 24 nautical miles from FYE, at 1850 reported the following weather conditions: wind from 020 degrees at 9 knots, visibility 4 statute miles with mist, cloud conditions were overcast at 400 feet above ground level (agl), temperature 1 degree Celsius, dew point 1 degree Celsius, and altimeter setting 30.42 inches of mercury.

Airport Information

Airport:	Fayette County Airport (FYE)	Runway Surface Type:	N/A
Airport Elevation:	436 ft	Runway Surface Condition:	Unknown
Runway Used:	N/A	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal		

The airplane crashed in a heavily wooded area adjacent to FYE, and the debris path was on a 160-degree magnetic heading and was approximately 100 feet in length. Throughout the debris path there were several freshly-cut tree limbs. A postimpact fire consumed most of the airplane. The propeller was separated from the engine, but was found in close proximity to the main wreckage.

Examination of the fuselage revealed the forward cabin area was separated from the aft section at the main spar carry through. The forward cabin section was completely destroyed by fire. The instrument panel and all instruments were destroyed by ground impact and fire. All circuit breakers and switches were destroyed. The firewall was separated and the engine was partially separated from the firewall. The nose gear was attached at the engine mount and the tire assembly was separated from the strut tube. Flight control cables were located within the wreckage and displayed overload failure signatures.

The rudder bar was in place and was impact and fire damaged. The T-Bar had the aileron and stabilator cables attached. Rudder and stabilator control continuity was verified. The control wheels and shafts were destroyed by fire. The stabilator and rudder trim position indicators were destroyed. The flap lever was noted to be in the 10-degree position. Trim cable continuity was established to the forward cabin area. The engine power and carburetor heat levers were destroyed by ground impact and fire. The fuel control valve was impact and fire damaged. The fuel tank selector position could not be determined due to valve damage.

Examination of the left wing revealed it was separated and fragmented. The flap and aileron were destroyed by fire. The main fuel tank and the tip tank were breached and destroyed by fire. The fuel caps were found in the debris field adjacent to the main wreckage. The left main landing gear was impact and fire damaged. The stall warning vane switch was separated, lying in the debris field, and was free to move up and down. The pitot mast was not located and all pitot/static lines were impact and fire damaged. Aileron control cable continuity was established through the frayed cable breaks to the fuselage. The flap actuating rod was separated from the attachment points.

Examination of the right wing revealed it was destroyed by fire. The flap and aileron were separated and fire damaged. The main landing gear was destroyed by fire. Both fuel tanks were breached and destroyed fire.

Examination of the left and right stabilator halves revealed they were destroyed by ground fire. The stabilator trim tab was attached to a portion of the stabilator fragments. Control cable continuity was established forward to the control "T-Bar". A portion of the vertical fin leading edge section with a portion of the rudder attached was in a tree at the initial impact point.

No preimpact airframe anomalies were noted during the examination.

Examination of the engine revealed that it remained partially attached to the firewall by the control cables and was laying forward and right side low. The carburetor, left magneto, vacuum pump, alternator, and part of the starter were impact separated from the engine. The exhaust and induction tubes were impact damaged. The engine was rotated by turning a tool inserted in the vacuum pump drive pad. Continuity of the crankshaft to the rear gears and to the valve train was observed. Compression and suction were observed from all six cylinders. The No. 3 intake tube was impact separated and the intake port was packed full of dirt. The Nos. 2, 3, 4, 5 and 6 top spark plugs were removed and displayed normal signatures when compared to the Champion Aviation Check-A-Plug chart. The No. 1 top and Nos. 2, 3, 4, 5, and 6 bottom spark plugs were not removed. The ignition harness was destroyed. The left magneto was impact

damaged and sparked at all ignition towers when rotated. The right magneto was rotated and sparked at all ignition towers when rotated.

Examination of the propeller revealed it was separated from the crankshaft and located about 8 feet from the engine. Pieces of wood from impact damaged trees with angular cuts and paint transfers consistent with propeller strikes were observed along the path. Both propeller blades displayed chordwise scoring and one blade was bent forward.

The carburetor was fractured across the throttle bore and separated from the engine. The Throttle, mixture and carburetor heat controls were separated and their preimpact positions could not be determined. The fuel hose was separated from the carburetor fuel inlet screen assembly and the screen was open to the elements. The carburetor was partially disassembled and no damage to the internal components was noted. The engine driven fuel pump remained attached to the engine. The pump was removed and produced air when operated by hand. No preimpact engine anomalies were noted during the examination.

Medical And Pathological Information

An autopsy was performed on the pilot by the Office of the Medical Examiner, West Tennessee Regional Forensic Center, Memphis, Tennessee.

Toxicology testing performed by the FAA's Bioaeronautical Research Laboratory identified ethanol at 0.109 gm% in muscle and 0.039 gm% in brain. In addition, chlordiazepoxide and its metabolite, nordiazepam, were detected in liver (0.203 ug/g).

Ethanol is a social drug that acts as a central nervous system depressant. After ingestion, at low doses, it impairs judgment, psychomotor functioning, and vigilance; at higher doses alcohol can cause coma and death. 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 (gm%) or more alcohol in the blood. Ethanol may also be produced by microbial action in post mortem tissues.

Chlordiazepoxide is a long acting benzodiazepine indicated for the treatment of anxiety disorders, the short-term relief of symptoms of anxiety, withdrawal symptoms of acute alcoholism, and preoperative apprehension. Generally, treatment for more than 4 months is not recommended. It carries the following warning, "Chlordiazepoxide may impair the mental and/or physical abilities required for the performance of potentially hazardous tasks such as driving a vehicle or operating machinery." In addition, "The concomitant use of alcohol or other central nervous system depressants may have an additive effect. PATIENTS SHOULD BE WARNED ACCORDINGLY." Chlordiazepoxide is a Schedule IV controlled substance, commonly marketed with the name Librium. Nordiazepam is one its psychoactive metabolites.

Additional Information

FAA Advisory Circular (AC) 60-4A, "Pilot's Spatial Disorientation," states, in part: "The attitude of an aircraft is generally determined by reference to the natural horizon or other visual references with the surface. If neither horizon nor surface references exist, the attitude of an aircraft must be determined by artificial means from the flight instruments. Sight, supported by other senses, allows the pilot to maintain orientation. However, during periods of low visibility, the supporting senses sometimes conflict with what is seen. When this happens, a pilot is particularly vulnerable to disorientation. The degree of disorientation may vary considerably with individual pilots. Spatial disorientation to a pilot means simply the inability to tell which way is "up." The AC notes that a disoriented pilot may place an aircraft in a dangerous attitude. The AC recommends that pilots obtain training and maintain proficiency in aircraft control by reference to instruments and to "not attempt visual flight rules flight when there is a possibility of getting trapped in deteriorating weather."

False visual reference illusions may cause you to orient your aircraft in relation to a false horizon. These illusions are caused by flying over a banked cloud, night flying over featureless terrain with ground lights that are indistinguishable from a dark sky with stars or night flying over a featureless terrain with a clearly defined pattern of ground lights and a dark starless sky.

Administrative Information

Investigator In Charge (IIC):	Eric Alleyne	Adopted Date:	12/15/2016
Additional Participating Persons:	Warren Travis; FAA/FSDO; Memphis, TN Mike Childers; Lycoming; Williamsport, PA Ronald Maynard; Piper Aircraft Inc.; Vero Beach, FL		
Publish Date:	12/15/2016		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=90444		

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