



Aviation Investigation Final Report

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| Location: | Westhampton Beach, New York | Accident Number: | ERA19LA012 |
| Date & Time: | October 13, 2018, 10:58 Local | Registration: | N593MS |
| Aircraft: | Piper PA34 | Aircraft Damage: | Destroyed |
| Defining Event: | Loss of control in flight | Injuries: | 3 Fatal |
| Flight Conducted Under: | Part 91: General aviation - Instructional | | |

Analysis

The flight instructor picked up the private pilot and passenger for a cross-country flight. The instructor requested visual flight rules (VFR) flight following services from air traffic control (ATC) and indicated a planned climb to 8,500 ft mean sea level (msl); however, the airplane continued to climb past that altitude. During the climb, the instructor indicated to the ATC controller, in separate transmissions, that he was climbing to reach "VFR on-top," that he was experiencing problems with an "unreliable" attitude indicator, and that the airplane was "in and out of IMC [instrument meteorological conditions]." Based on weather sounding and satellite imagery, it is likely that the airplane was operating in IMC above 4,100 ft.

About 20 minutes after the airplane departed, the controller declared an emergency on behalf of the pilot and provided multiple radar vectors for the airplane to return to visual meteorological conditions (VMC); however, the airplane's radar track showed that the airplane continued climbing to 19,400 ft msl before it entered a series of figure-eight turns followed by a steep, turning descent. A witness stated that the airplane sounded "as if it were a stunt plane doing spins (pitch changing)" and then heard a "pop" and saw large pieces of the airplane descending from the overcast sky. Examination of the recovered portions of the airplane revealed no evidence of preimpact mechanical anomalies and a wreckage distribution consistent with an in-flight breakup.

Both the instructor and the private pilot had low levels of ethanol in cavity blood but none in vitreous (instructor) or urine (private pilot). The absence of ethanol in the second specimen indicates it is likely the ethanol was not from ingestion and therefore it did not contribute to the accident circumstances. The private pilot also had evidence of use of morphine, an impairing opioid. However, the decision-making on this flight, including the route and response to weather conditions, was most likely performed by the instructor. Therefore, it is unlikely that effects from low levels of morphine in the private pilot contributed to the accident circumstances.

The instructor demonstrated several lapses in judgment associated with conducting the flight.

Specifically, the instructor did not appear to recognize the significance of widespread ceilings along his route of flight and planned a cruise altitude that took him into instrument conditions. The instructor likely did not carry supplemental oxygen onboard the nonpressurized airplane and continued to climb the airplane to altitudes that required the use of oxygen; without oxygen he risked becoming susceptible to the effects of hypoxia. Further, another pilot who had flown the accident airplane before the accident flight stated that the airplane had a known problem with the directional gyro, yet the instructor flew the airplane in instrument conditions; based on the instructor's failure to follow the controllers' directional instructions, it is likely the directional gyro was still not working. Lastly, review of the instructor's logbook and an interview with another flight instructor indicated that the instructor was likely not instrument current, so his ability to safely maneuver the airplane in the clouds that were prevalent during the flight would have been negatively impacted by the broken gyro and his lack of currency.

In summary, the instructor's decision to continue the flight in instrument conditions with a known flight instrument anomaly greatly increased his workload and likely resulted in his eventual loss of airplane control due to spatial disorientation. The rapidly descending turn (graveyard spiral) depicted on radar and the in-flight breakup due to overstress during the ensuing uncontrolled descent were consistent with the known effects of spatial disorientation. Further, the airplane had been operating above 16,000 ft msl for more than 10 minutes at the time of the upset; there was no evidence that the airplane was equipped with supplemental oxygen. Therefore, the instructor was operating the airplane above altitudes in which supplemental oxygen is required, and without it, his performance and decision-making would have likely been degraded to some extent due to hypoxia. The flight's erratic flight track away from the intended destination and the instructor's inability to successfully maneuver the airplane in response to ATC instructions that he acknowledged are consistent with the effects of hypoxia.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The instructor's decision to conduct and continue a visual flight rules flight into instrument meteorological conditions with a known flight instrument anomaly, which resulted in spatial disorientation, causing a loss of airplane control and subsequent in-flight breakup. Contributing to the accident were the instructor's lack of recent instrument flight experience and degraded airplane control and decision-making due to hypoxia.

Findings

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| Environmental issues | Below VFR minima - Decision related to condition |
| Personnel issues | Decision making/judgment - Instructor/check pilot |
| Aircraft | (general) - Malfunction |
| Personnel issues | Spatial disorientation - Instructor/check pilot |
| Personnel issues | Aircraft control - Pilot |
| Aircraft | (general) - Not attained/maintained |
| Personnel issues | Recent instrument experience - Instructor/check pilot |
| Personnel issues | Hypoxia/anoxia - Instructor/check pilot |

Factual Information

History of Flight

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| Enroute | Loss of visual reference |
| Enroute | Loss of control in flight (Defining event) |
| Enroute | Part(s) separation from AC |
| Uncontrolled descent | Collision with terr/obj (non-CFIT) |

On October 13, 2018, at 1058 eastern daylight time, a Piper PA-34-200T, N593MS, was destroyed when it was involved in an accident near Westhampton Beach, New York. The flight instructor, a private pilot and a passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (CFR) Part 91 instructional flight.

The flight instructor departed Waterbury Oxford Airport (OXC), Oxford, Connecticut, and landed at Danbury Municipal Airport (DXR), Danbury, Connecticut, to pick up the private pilot and passenger for the flight to Charleston Executive Airport (JZI), Charleston, South Carolina. Text messages from the flight instructor to another student indicated that the instructor planned to fly back alone after dropping off the private pilot and the passenger. Radar and voice communication information from the Federal Aviation Administration (FAA) showed that the airplane departed DXR around 1025. At 1026:47, the instructor requested visual flight rules (VFR) flight following from the air traffic controller and announced a planned climb to 8,500 ft mean sea level (msl), and an on-course heading of 219°. At 1037:06, the instructor checked in with the controller at 9,200 ft msl, and radar data showed the airplane's ground track still in a southeasterly direction. When queried by the controller, the instructor replied that he was climbing to 11,500 ft msl, and that his heading would be 223°. The airplane's ground track continued southeast.

At 1042:51, the instructor indicated to the controller that he was climbing another 1,000 ft to be "VFR-on-top," but the airplane continued to climb after passing through 12,500 ft msl. At 1045:33, the instructor checked in with the controller at 15,000 ft msl and the controller responded, "Just be advised that where you are, right at your altitude, I've had numerous reports that it's currently IMC [instrument meteorological conditions]," and asked the instructor to confirm that the airplane was in visual meteorological conditions (VMC). The instructor responded that they were in VMC and trying to maintain VMC and requested vectors due to an "unreliable" attitude indicator. The instructor then added that the airplane was "in and out of IMC." At 1046, the controller declared an emergency on behalf of the pilot and attempted to locate VFR conditions.

At 1048:05, the controller advised the instructor to start a left turn to a heading of 300° because VFR conditions were below 10,000 ft msl in that direction. The instructor confirmed the heading; however, radar data indicated that the airplane's ground track continued southeast; the airplane was at an altitude of 16,525 ft msl.

At 1049:47, the controller noted that the airplane was in a slow right turn and queried the instructor, who

responded, "We are maintaining straight and level. We do have the sun above us and we're using the sun as (unintelligible)." The controller responded, "3MS, roger, looks like you are in a little bit of a righthand turn. I know you said your attitude indicator was bad. Do you have a turn and slip that you could level off the wings with?" The instructor responded affirmatively. The controller suggested that the instructor level the wings and advise when ready to make a turn toward the west, and the instructor acknowledged. Radar data indicated that the airplane was climbing through 17,000 ft msl about this time.

At 1051:14, the controller suggested that the instructor commence a standard rate turn either left or right for 1 minute to head toward a nearby airport, and the instructor asked the altitude of the cloud tops. The controller responded that the last report had indicated the cloud tops were about 19,000 ft msl, and the instructor responded that he was going to climb to 19,000 ft msl.

At 1052:23, the instructor reported that the airplane was "VFR-on-top" and again requested radar vectors. The controller directed a turn to 300°; however, the instructor did not acknowledge this vector, responded that he would not be able to descend into the clouds and that they were "VFR-on-top"; then the instructor again requested a vector to VFR conditions.

At 1053:19, the controller again suggested a turn to the west, and the instructor replied that they were turning west. Nearly 2 minutes later, at 1055:08, the instructor indicated that they were starting to turn to the west; the airplane was at an altitude of about 19,400 ft msl. The controller suggested that the instructor establish a standard rate turn; however, radar data showed that the airplane began a sequence of turns in the shape of a figure eight.

At 1056:59, the airplane entered an abrupt, descending turn. The controller advised the instructor that the airplane was in a sharp, turning descent and recommended that the instructor try to level the wings using the turn and slip indicator. The instructor responded that the airplane was in a descent. The controller again advised the instructor to try to level the wings using the turn and slip indicator; the instructor responded that the airplane was descending. There were no further transmissions from the airplane and radar contact was lost shortly thereafter, about 1058.

A witness near the accident site reported seeing the airplane "nosedive" from out of the clouds and into the ocean after hearing the engine "throttle up severely and wind back down" several times. A second witness stated that the airplane sounded "as if it were a stunt plane doing spins (pitch changing)," then heard a "pop" and saw pieces of metal descending from the sky.

Flight instructor Information

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| Certificate: | Airline transport; Commercial; Flight instructor | Age: | 47,Male |
| Airplane Rating(s): | Single-engine land; Single-engine sea; Multi-engine land | Seat Occupied: | Right |
| Other Aircraft Rating(s): | None | Restraint Used: | Unknown |
| Instrument Rating(s): | Airplane | Second Pilot Present: | Yes |
| Instructor Rating(s): | Airplane multi-engine; Airplane single-engine; Instrument airplane | Toxicology Performed: | Yes |
| Medical Certification: | Class 3 None | Last FAA Medical Exam: | July 18, 2018 |
| Occupational Pilot: | Yes | Last Flight Review or Equivalent: | December 16, 2016 |
| Flight Time: | (Estimated) 4000 hours (Total, all aircraft), 3500 hours (Pilot In Command, all aircraft) | | |

Pilot Information

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|----------------------------------|---|--|-----------------|
| Certificate: | Private | Age: | 53,Male |
| Airplane Rating(s): | Single-engine land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | Unknown |
| Instrument Rating(s): | None | Second Pilot Present: | Yes |
| Instructor Rating(s): | None | Toxicology Performed: | No |
| Medical Certification: | None | Last FAA Medical Exam: | August 26, 1986 |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | |
| Flight Time: | (Estimated) 0 hours (Total, all aircraft), 0 hours (Total, this make and model) | | |

Passenger Information

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| Certificate: | | Age: | 45,Female |
| Airplane Rating(s): | | Seat Occupied: | Rear |
| Other Aircraft Rating(s): | | Restraint Used: | Lap only |
| Instrument Rating(s): | | Second Pilot Present: | Yes |
| Instructor Rating(s): | | Toxicology Performed: | No |
| Medical Certification: | | Last FAA Medical Exam: | |
| Occupational Pilot: | No | Last Flight Review or Equivalent: | |
| Flight Time: | | | |

Flight Instructor

The instructor held a flight instructor certificate with ratings for airplane single- and multi- engine, and instrument airplane. He also held an airline transport pilot certificate with a rating for airplane single-engine land, with commercial privileges for airplane multi-engine land and single-engine sea, and a mechanic certificate with ratings for airframe and powerplant. He owned and operated Oxford Flight

Training in Oxford, Connecticut. His most recent FAA third-class medical certificate was issued July 18, 2018, at which time he reported 4,000 total hours of flight experience. Review of the instructor's logbook showed that his most recent instrument proficiency check flight was on December 16, 2016. No logbook entries after that date included simulated or actual instrument flight time. Examination of FAA airman records revealed that his pilot and instructor certificates were revoked in 2011 for falsifying logbook entries and that his mechanic certificate was suspended in 2011 for the "careless and reckless" operation of an airplane in an unairworthy condition.

A flight instructor at Oxford Flight Training stated that he did not believe that the accident instructor was instrument current at the time of the accident. He stated that the instructor was "always about getting VFR-on-top" because he did not like being vectored around New York by ATC. Several other pilots who had flown with the accident instructor stated that they had requested special VFR clearances when flying with the instructor. One pilot reported multiple flights during which the instructor disregarded required cloud clearances and instrument-approach minima.

Private Pilot

The private pilot held a private pilot certificate with a rating for airplane single-engine land. His most recent FAA third-class medical certificate was issued August 27, 1986, and he reported no flight experience at that time.

Aircraft and Owner/Operator Information

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| Aircraft Make: | Piper | Registration: | N593MS |
| Model/Series: | PA34 200T | Aircraft Category: | Airplane |
| Year of Manufacture: | 1978 | Amateur Built: | |
| Airworthiness Certificate: | Normal | Serial Number: | 34-7870391 |
| Landing Gear Type: | Retractable - Tricycle | Seats: | 7 |
| Date/Type of Last Inspection: | September 10, 2018 Annual | Certified Max Gross Wt.: | 4570 lbs |
| Time Since Last Inspection: | | Engines: | 2 Reciprocating |
| Airframe Total Time: | 3761.5 Hrs as of last inspection | Engine Manufacturer: | Continental |
| ELT: | C91 installed | Engine Model/Series: | LTSIO-360-EB1 |
| Registered Owner: | | Rated Power: | 200 Horsepower |
| Operator: | On file | Operating Certificate(s) Held: | None |

The airplane was registered to the flight instructor in June 2018. Review of maintenance records showed that when the most recent annual inspection was completed by the flight instructor on September 10, 2018, the left engine had accrued 2,337.8 hours of flight time and the right engine had accrued 1,097.5 hours of flight time. The maintenance record included the statement, "replaced right vacuum pump with overhauled." Other maintenance records showed that the left engine vacuum pump was replaced on May 21, 2012; however, examination of the left engine vacuum pump revealed that the half of the data plate

with the model number and serial number was missing, thus the logbook information could not be confirmed.

A flight instructor at Oxford Flight Training stated that, in August 2018, several weeks before the accident, one of the accident airplane's vacuum pumps had been not working. In addition, he said that it was necessary to reset the directional gyroscope every 10 minutes by flying straight and level and resetting it to match the magnetic compass. He stated that the accident instructor was aware of this issue and would "just compensate for it."

Between the annual inspection and the accident flight, there were no maintenance entries associated with the right vacuum pump.

Meteorological Information and Flight Plan

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| Conditions at Accident Site: | Visual (VMC) | Condition of Light: | Day |
| Observation Facility, Elevation: | FOK,66 ft msl | Distance from Accident Site: | 3 Nautical Miles |
| Observation Time: | 10:53 Local | Direction from Accident Site: | 20° |
| Lowest Cloud Condition: | | Visibility | 10 miles |
| Lowest Ceiling: | Broken / 4600 ft AGL | Visibility (RVR): | |
| Wind Speed/Gusts: | 7 knots / | Turbulence Type Forecast/Actual: | Unknown / Unknown |
| Wind Direction: | 300° | Turbulence Severity Forecast/Actual: | Unknown / Unknown |
| Altimeter Setting: | 29.87 inches Hg | Temperature/Dew Point: | 9°C / 7°C |
| Precipitation and Obscuration: | Light - None - Rain | | |
| Departure Point: | Danbury, CT (DXR) | Type of Flight Plan Filed: | None |
| Destination: | Charleston, SC (JZI) | Type of Clearance: | VFR flight following |
| Departure Time: | 10:25 Local | Type of Airspace: | Class A |

The northeast section of the National Weather Service (NWS) Surface Analysis Chart for 1100 depicted a low-pressure system off the New York Long Island coast with a cold front extending southwest to another low off the North Carolina coast. The station models in the area depicted a west-to-northwest wind of about 10 knots, overcast cloud cover with multiple stations reporting light continuous rain, and temperature dew point spreads of 2° F or less.

The NWS Storm Prediction Center (SPC) constant pressure chart for 500 hPa for 0800 depicted the conditions at 18,000 ft msl as an upper-level trough of low pressure extending south from Canada, across western New York and Pennsylvania, and into West Virginia. This upper-level disturbance was referenced in NWS advisories as the principle reason for clouds and precipitation that were expected over the region during the period.

The ceiling at DXR, the departure airport, at the time of departure was broken at 4,100 ft above ground level (agl) and overcast at 4,900 ft agl.

A High Resolution Rapid Refresh (HRRR) sounding for 1100 supported multiple layers of clouds from

the lifted condensation level of 1,157 ft msl through 18,700 ft msl, where the relative humidity exceeded 90%.

Satellite imagery depicted an extensive area of clouds obscuring the accident site, consistent with nimbostratus-type clouds that supported light-to-moderate rain. The infrared radiative cloud top temperature over the accident site was -22.16°C, which corresponded to cloud tops near 21,000 ft msl based on the HRRR sounding.

Pilot reports in the area of the accident flight indicated cloud tops to 23,000 ft msl with no mention of multiple layers. Pilots reported instrument conditions and light rime to mixed-type ice.

The instructor did not file a flight plan, and there was no record of him having obtained a weather briefing from Leidos Flight Services or ForeFlight before departure.

Wreckage and Impact Information

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| Crew Injuries: | 2 Fatal | Aircraft Damage: | Destroyed |
| Passenger Injuries: | 1 Fatal | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 3 Fatal | Latitude, Longitude: | 40.470001,-72.36(est) |

A portion of the right-wing outboard of the engine was found floating shortly after impact and was recovered on the day of the accident. The left wing, including the engine and propeller, was recovered from the Atlantic Ocean on November 18, 2018, from about 25 ft of water. The fuselage, tail, inboard right wing, and engine were no longer at their previous coordinates; therefore, the examination included only the left wing and a portion of the right wing.

The left wing's forward fuselage attach point was separated from the fuselage. Its aft attach point was separated from the wing and was not recovered. The wing spar was deformed downward, separated at the attach bolts, and displayed a fracture surface consistent with overload. The flap was separated from the wing and displayed impact damage. The outboard and interconnect fuel tanks, and no major impact damage or deformation was noted to the inboard fuel tank. The fuel vent was clear of obstruction. The gascolator bowl and filter were clear of debris, although the gascolator housing contained material consistent with sand. The fuel selector was in the "ON" position. About 3 ft of inboard aileron remained intact, and about 3 ft of the outboard aileron was not recovered. The separated aileron cable ends displayed a broomstrawed appearance consistent with tension overload.

Examination of the outboard 10 1/2 ft of the right wing without the wingtip showed forward deformation aft of the main wing spar and a "W"-shaped deformation of the leading edge. The top and bottom of the wing spar were fractured and deformed downward. The fracture surfaces were consistent with overload separation. The fuel tank displayed hydraulic deformation. The pick-up screen and fuel tank vent were clear of obstructions and the fuel cap was secured. No fuel was observed in the tank. The aileron was attached with "W"-shaped deformation. The aileron's control rod was attached to the deformed

bellcrank. The bellcrank's drive cable attach point arm was fractured and not recovered. The bellcrank's cable end displayed a broomstrawed appearance consistent with overload. The bellcrank's flap was separated from its outer two hinges and was not recovered.

Examination of the left engine showed no evidence of preaccident anomalies that would have precluded normal operation. The crankshaft could not be rotated. Borescope examination of the cylinders revealed no anomalies. The fuel pump drive coupling was intact. Disassembly of the fuel manifold revealed a blue fluid and a strong fuel smell at the base of the manifold housing. The vented side contained debris consistent with saltwater immersion. The magneto points and distributor gear were intact. No inductor or exhaust system anomalies were noted. The turbocharger impeller and turbines were intact and impacted with debris and sand.

The left engine vacuum pump was submitted to the NTSB Materials Laboratory. Examination revealed a fractured rotor, two fractured vanes, and a missing drive coupling. The fracture pattern on the rotor emanated from the fin slots to the central hole and the fins and the vane faces showed some wear. The data plate on the vacuum pump indicated that the manufacturer was Airborne; however, the half of the data plate with the model and serial numbers was missing.

Examination of the left propeller revealed that it remained attached to the engine and in the feathered position. The spinner was crushed and torn adjacent to one blade. There was no indication of rotational deformation. External corrosion was consistent with saltwater immersion. One blade was bent forward, one was bent aft, and one showed no damage. There was no remarkable blade twisting or leading-edge damage. Examination revealed no anomalies with the pitch change mechanism. All damage was consistent with high-impact forces.

No oxygen tanks or oxygen masks were recovered in the wreckage.

Additional Information

Oxygen on Board

FAA regulation 14 CFR 91.211, Supplemental Oxygen, prohibits the operation of an aircraft *at cabin pressure altitudes above 12,500 feet (MSL) up to and including 14,000 feet (MSL) unless the required minimum flight crew is provided with and uses supplemental oxygen for that part of the flight at those altitudes that is of more than 30 minutes duration; (2) At cabin pressure altitudes above 14,000 feet (MSL) unless the required minimum flight crew is provided with and uses supplemental oxygen during the entire flight time at those altitudes; and (3) At cabin pressure altitudes above 15,000 feet (MSL) unless each occupant of the aircraft is provided with supplemental oxygen.*

Interviews with fixed-based operators and maintenance facilities at the airports located in Oxford, Danbury, New Haven, and Simsbury, Connecticut, revealed that none of the operators or maintenance shops serviced or sold oxygen to the flight instructor or saw any oxygen systems or canisters in the accident airplane. Interviews with students and instructors at Oxford Flight Training revealed no evidence that the instructor used oxygen on the accident airplane.

Physiological Factors

Hypoxia

According to section 8-1-2 of the FAA's Aeronautical Information Manual, "the effects of hypoxia are usually quite difficult to recognize, especially when they occur gradually." The manual further states:

"1. Hypoxia is a state of oxygen deficiency in the body sufficient to impair functions of the brain and other organs. Hypoxia from exposure to altitude is due only to the reduced barometric pressures encountered at altitude, for the concentration of oxygen in the atmosphere remains about 21 percent from the ground out to space.

2. Although a deterioration in night vision occurs at a cabin pressure altitude as low as 5,000 feet, other significant effects of altitude hypoxia usually do not occur in the normal healthy pilot below 12,000 feet. From 12,000 to 15,000 feet of altitude, judgment, memory, alertness, coordination and ability to make calculations are impaired, and headache, drowsiness, dizziness and either a sense of well-being (euphoria) or belligerence occur. The effects appear following increasingly shorter periods of exposure to increasing altitude. In fact, pilot performance can seriously deteriorate within 15 minutes at 15,000 feet.

3. At cabin pressure altitudes above 15,000 feet, the periphery of the visual field grays out to a point where only central vision remains (tunnel vision). A blue coloration (cyanosis) of the fingernails and lips develops. The ability to take corrective and protective action is lost in 20 to 30 minutes at 18,000 feet..."

Spatial Disorientation

The FAA's Airplane Flying Handbook (FAA-H-8083-3B) describes some hazards associated with flying when the ground or horizon are obscured. The handbook states, in part:

A VFR pilot is in IMC conditions anytime he or she is unable to maintain airplane attitude control by reference to the natural horizon regardless of the circumstances or the prevailing weather conditions. Additionally, the VFR pilot is, in effect, in IMC anytime he or she is inadvertently or intentionally for an indeterminate period of time unable to navigate or establish geographical position by visual reference to landmarks on the surface. These situations must be accepted by the pilot involved as a genuine emergency requiring appropriate action.

The vestibular sense (motion sensing by the inner ear) can and will confuse the pilot. Because of inertia, the sensory areas of the inner ear cannot detect slight changes in airplane attitude, nor can they accurately sense attitude changes that occur at a uniform rate over a period of time. On the other hand, false sensations are often generated, leading the pilot to believe the attitude of the airplane has changed when, in fact, it has not. These false sensations result in the pilot experiencing spatial disorientation.

According to the FAA's publication "Spatial Disorientation: Why You Shouldn't Fly By the Seat of Your Pants" (AM-400-03/1):

"The graveyard spiral... is associated with a return to level flight following an intentional or unintentional prolonged bank turn. For example, a pilot who enters a banking turn to the left will

initially have a sensation of a turn in the same direction. If the left turn continues (~20 seconds or more), the pilot will experience the sensation that the airplane is no longer turning to the left. At this point, if the pilot attempts to level the wings this action will produce a sensation that the airplane is turning and banking in the opposite direction (to the right). If the pilot believes the illusion of a right turn (which can be very compelling), he/she will reenter the original left turn in an attempt to counteract the sensation of a right turn. Unfortunately, while this is happening, the airplane is still turning to the left and losing altitude. Pulling the control yoke/stick and applying power while turning would not be a good idea—because it would only make the left turn tighter. If the pilot fails to recognize the illusion and does not level the wings, the airplane will continue turning left and losing altitude until it impacts the ground.

Medical and Pathological Information

Flight Instructor

The Chief Medical Examiner of the Suffolk County, New York, Office of the Medical Examiner, Hauppauge, New York, performed an autopsy of the flight instructor on October 14, 2018. The autopsy report indicated that the instructor died as a result of multiple blunt force injuries.

The FAA's Forensic Sciences Laboratory performed toxicological testing. Fluid and tissue specimens were tested and 13 mg/dL of ethanol were identified in cavity blood, but no ethanol was identified in liver tissue. In addition, an unspecified level of Rosuvastatin was identified in the liver, and Metoprolol was identified in the liver and cavity blood.

According to the FAA Forensic Toxicology Drug Information, Rosuvastatin is a prescription medication used to reduce blood cholesterol and triglycerides levels. Metoprolol is a blood pressure medication that also can be used to control the rate of fast arrhythmias like atrial fibrillation. Neither are considered impairing. Ethanol may be produced in body tissues by microbial activity after death.

Private Pilot

The Chief Medical Examiner of the Suffolk County, New York, Office of the Medical Examiner, Hauppauge, New York, performed an autopsy of the Private Pilot on October 15, 2018. The autopsy report indicated that the cause of death was multiple blunt force injuries.

The FAA's Forensic Sciences Laboratory performed toxicological testing. Fluid and tissue specimens were tested and 10 mg/dL of ethanol was identified in cavity blood. In addition, 0.01 (µg/mL, ug/g) Morphine was identified in cavity blood and 0.137 µg/mL Morphine was identified in urine.

According to the FAA Forensic Toxicology Drug Information, morphine is a prescription medication used to relieve moderate to severe pain and can also be an active metabolite of codeine. This medication has the potential to impair mental or physical ability required for the performance of potentially hazardous tasks, such as flying, driving, operating heavy machinery.

Administrative Information

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| Investigator In Charge (IIC): | Spencer, Lynn |
| Additional Participating Persons: | Matthew Cady; FAA/FSDO; Farmingdale, NY William Attridge; FAA/FSDO; Farmingdale, NY Les Doud; Hartzell Propeller; Piqua, OH Damian Galbraith; Piper Aircraft, Inc; Vero Beach, FL Nicole L Charnon; Continental Motors; Mobile, AL |
| Original Publish Date: | August 11, 2020 |
| Note: | The NTSB did not travel to the scene of this accident. |
| Investigation Docket: | https://data.nts.gov/Docket?ProjectID=98483 |

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).