Aviation Investigation Final Report

Location:	BELLVILLE, Ohio	**Accident Number:**	BFO96FA032
Date & Time:	December 20, 1995, 20:50 Local	**Registration:**	N1269G
Aircraft:	Cessna 310R	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The airplane was cruising at 8,000 feet in night, IMC conditions, when the pilot requested and received clearance to climb to 10,000 feet. Radar data showed the airplane leveled off at 10,000 feet. Shortly thereafter, it made an abrupt right turn and descended through 8,300 feet, then radar contact was lost. Witnesses near the accident site heard and/or saw the airplane before it crashed. According to them, the engines revved as if the airplane went into a dive or the pilot 'throttled up.' Also, the airplane was reported to be maneuvering before it crashed. Wreckage was located in an open field, scattered over a distance of 550 feet. The horizontal stabilizers and elevators were found near the western end of the wreckage path, 184 feet west of the main impact crater. The left and right wing were found 60 and 101 feet east of the main crater, respectively. Also, the engines had separated from the main wreckage and were found in two craters about 50 feet apart. Examination revealed the horizontal stabilizers had failed down and aft, and the wings had failed downward. The airspeed indicator was found with a reading of over 260 knots. The airplane's never exceed speed was 227 KCAS. About 12 miles north of the accident site, the weather was in part: 2400 feet overcast with 7 miles visibility; witnesses reported that snow was falling. The pilot of another aircraft reported light icing conditions between 4,000 and 11,500 feet.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's in-flight loss of aircraft control for undetermined reason(s), which resulted in the airplane exceeding its design stress limitations and an in-flight breakup.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CRUISE

Findings
1. LIGHT CONDITION - DARK NIGHT
2. WEATHER CONDITION - CLOUDS
3. WEATHER CONDITION - SNOW
4. WEATHER CONDITION - ICING CONDITIONS
5. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND

Occurrence #2: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. (C) DESIGN STRESS LIMITS OF AIRCRAFT - EXCEEDED - PILOT IN COMMAND
7. HORIZONTAL STABILIZER - OVERLOAD
8. HORIZONTAL STABILIZER - SEPARATION
9. WING - OVERLOAD
10. WING - SEPARATION

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On December 20, 1995, at 2050 eastern standard time (EST), a Cessna 310R, N1269G, collided with terrain near Bellville, Ohio. The certificated flight instructor (CFI), the dual student, and the pilot rated passenger were fatally injured. The airplane was destroyed. Visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed. The dual instructional flight was conducted under 14 CFR Part 91, and originated in Philadelphia, Pennsylvania, at 1815 EST. The intended destination was Fort Wayne, Indiana.

The pilot departed Omaha, Nebraska, on the morning of December 20, on a dual cross country with his student and a pilot rated passenger. The intended destination was Philadelphia, Pennsylvania, with a planned stop for fuel in Ft. Wayne, Indiana. When the aircraft arrived in Philadelphia, the pilot rated passenger called his ex-roommate and reported that the aircraft, "...was leaking a fluid." One of the mechanics at Atlantic Aviation at the airport in Philadelphia, stated that the pilot, "...informed me that he had a red dye leak in the right prop hub area...I informed him that the nearest place for propeller tech work is Sensenich Prop Co...I gave him the phone number and told him they could better assist him."

The mechanic at Atlantic Aviation stated that, "...the pilot told me he had spoken to his Director of Maintenance...and they wanted me to remove the spinner and tell them what I saw...I removed the spinner and found a concentration of red dye at the base of one of the props, but I could not determine the exact point of origin...the pilot informed me that he noticed the red dye when he landed at Fort Wayne, Indiana...I questioned him as to what was done at Fort Wayne, and was told the dye was wiped down." The pilot told the mechanic to put the spinner back on the propeller. The mechanic reinstalled the propeller spinner before the aircraft departed Philadelphia.

According to telephone credit card calling records, the pilot placed a telephone call from Philadelphia to the telephone number he received from the Atlantic Aviation mechanic, to contact Sensenich Propeller Company. During a postaccident interview with Sensenich Propeller Company personnel, they indicated that there was no record of a conversation with the pilot, nor did any Sensenich employees recall speaking to the pilot of the accident airplane.

According to the Federal Aviation Administration (FAA) Inspector, the flight was returning to it's home base in Omaha, Nebraska, with a refueling stop in Indiana, reversing the route that was flown to Philadelphia earlier that day. According to Air Traffic Control (ATC) records, at 0012:28 EST the aircraft was in cruise flight at 8,000 feet Mean Sea Level (MSL). At 0140 EST, the pilot reported that he was in instrument meteorological conditions (IMC). According to the Cleveland Air Route Traffic Control Center (ARTCC) records, the pilot requested permission to

climb to 10,000 feet MSL at 0142 EST. At 0143:24 EST, ATC approved the pilot's request to climb to 10,000 feet.

According to the ARTCC controller, the flight climbed to 10,000 feet, and leveled off approximately 20 miles southeast of Mansfield. The controller then noted that the airplane's altitude changed to 9400 feet, then 8300 feet. At 0149:48 EST the ARTCC controller advised the pilot that the airplane's transponder signal was lost. No further reports or requests were made by the pilot. Four airplanes in the area tried to establish radio contact with the accident airplane, but there was no response. At 0200 EST, an airplane operating in the vicinity of the accident airplane, reported light icing between 4,000 feet and 11,500.

A witness who was working at the gas station near the crash site, stated, "I [saw] a bright light pass over the gas station, I heard the motor of the airplane it was making a loud whining noise. I seen the plane then go over the hill and then I heard a loud crash. The weather was cloudy and it was snowing at the time of the accident...and it was dark."

According to the National Transportation Safety Board's radar study specialist, examination of the National Tracking Analysis Program (NTAP) primary and secondary radar data from Cleveland ARTCC revealed that the airplane was tracking on a west-northwest heading at an altitude of approximately 8,000 feet MSL with ground speeds fluctuating, around 150 knots. The aircraft continued west-northwest for 22 seconds and the ground speed decreased to approximately 130 knots. Between 0144:22 EST and 0145:43 EST, the aircraft turned to a west-southwest heading, climbed from 8,100 to 9,300 feet MSL, and the ground speed increased to approximately 140 knots.

Radar data indicated that between 0145:43 EST and 0146:03 EST, the aircraft was on a south-southwest heading and it's altitude increased to 9,400 feet MSL while ground speeds remained at approximately 140 knots. Then the aircraft held a northwesterly heading for 51 seconds, increased its altitude to 9,900 feet MSL, and the ground speed decreased to approximately 120 knots. Radar data revealed that, between 0146:54 EST and 0147:24 EST, the aircraft was on a 270 degree heading, the altitude increased to 10,000 feet MSL, and ground speeds increased to approximately 140 knots.

According to the radar data study, for 41 seconds (between 0147:24 EST and 0148:05 EST), the aircraft was on a west south-westerly heading at an altitude of 10,000 feet MSL, with ground speed increasing to 150 knots. The radar data indicated that, between 0148:05 EST and 0149:06 EST, the aircraft made a sharp right turn, and descended through 8,300 feet MSL.

The aircraft impacted terrain during the hours of darkness at 40 degrees, 38 minutes, and 83 seconds north latitude and 82 degrees, 32 minutes, and 10 seconds west longitude. Witness statements, the radar data study, and excerpts from the FAA's ATC package are appended.

PERSONNEL INFORMATION

The CFI held a commercial pilot certificate with single engine and multi-engine land ratings. He also held certificated flight instructor and instrument airplane ratings. According to the CFI's log book, he had accumulated over 750 hours of total flight time, including 100 hours in the accident make and model airplane. The CFI had logged more than 33 hours of actual instrument time and 45 hours of night flight time. The last recorded actual instrument time and night time in the CFI's log book was October 4, 1995. The CFI held a valid FAA medical certificate, with no waivers/limitations, which was issued March 22, 1995.

The dual student held a private pilot certificate with a single engine land and instrument rating. According to his application for his third class medical certificate dated September 1, 1994, he had reported 250 hours of flight time. (See Supplement E, attached.)

The pilot rated passenger held a private pilot certificate with a single engine land rating. According to his application for his second class medical certificate dated May 18, 1995, he reported 5 hours of flight time. (See Supplement E, attached.)

AIRCRAFT INFORMATION

At the time of the accident, according to the airplane's maintenance log books, the aircraft had accumulated over 3,248 hours of flight time. It received a 100 hour inspection on August 4, 1995. The airplane accumulated over 50 hours of flight time since the most recent inspection.

METEOROLOGICAL INFORMATION

At 2045 eastern standard time, Mansfield Airport, Mansfield, located about 12 miles north of the accident site issued the following observation:

Sky condition, ceiling 2400 feet overcast; visibility, 7 miles in light snow; temperature, 17 degrees Fahrenheit (F); dew point, 14 degrees Fahrenheit (F); winds out of 240 degrees at 10 knots; and altimeter 29.91 inches Hg.

Witnesses reported that it was snowing on the ground at the time of the accident. Approximately 10 minutes after ATC lost radio and radar contact with the accident airplane, an airplane operating in the vicinity of the accident site reported light structural icing between 4,000 and 11,500 feet MSL. There were no other pilot reports of icing in the area.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was examined at the accident site on December 21, 1995. Examination of the accident site revealed the airplane impacted terrain in an open field, adjacent to a wooded area. The aircraft wreckage was distributed over an area approximately 550 feet long, oriented on an easterly magnetic heading.

The horizontal stabilizer was located 184 feet west of the main impact crater. The left wing

was located 60 feet east of the main impact crater, and the right wing was located 101 feet east of the main crater. Both engines were separated from the main wreckage, and were located in two craters about 50 feet apart. The engine cases were shattered. The propeller assemblies separated from their respective engines. The left propeller assembly was located about 72 feet east of the main wreckage, and the right propeller assembly was located about 78 feet south east of the main wreckage. See details of wreckage distribution in the wreckage diagram attached.

The wreckage was retrieved and stored at the Mansfield Airport, in Mansfield, Ohio. On January 24, 1996, the wreckage was reconstructed at the Mansfield Airport, Mansfield, Ohio, under the supervision of the NTSB. Examination of the left and right wing revealed downward bending of the main spars. Both ailerons had separated from their respective wings and were recovered in several pieces. The inboard upper section of the left wing and the fuselage skin were torn from their respective rivets.

Examination of the forward and aft spars of the left and right horizontal stabilizer disclosed evidence of failure in the down and aft direction. The stabilizer skin was torn. The elevators and vertical stabilizer had separated. The rudder separated from the vertical stabilizer. The rudder trim actuator measured 1.75 inches. According to Cessna Airplane Company representatives, this measurement corresponds to 10 degrees of left trim.

The top section of the fuselage and right door separated. The landing gear was in the retracted position. The right flap was located in an extended position. The flap motor was separated. Due to the extent of damage flight control continuity was not determined.

The airplane's airspeed indicator was located in the wreckage. The reading of the indicator showed a speed in excess of 260 knots.

MEDICAL AND PATHOLOGICAL INFORMATION

According to Dr. Stephen Banko, Medical Examiner of Richland County, Mansfield, Ohio, complete autopsy examinations were not performed on any of the airplane occupants, due to the massive traumatic injuries sustained in the accident.

Toxicological examination of specimens from all three airplane occupants, was conducted by the FAA Civil Aeromedical Institute (CAMI), in Oklahoma City, Oklahoma, on May 15, 1996. The CFI's toxicological report indicated that 12.000 mg/dl of ethanol was detected in lung fluid; however, the reported also indicated that there was no ethanol detected in the CFI's muscle tissue. All other toxicological results were negative for tested substances. According to medical personnel from CAMI, the positive results could be the result of postaccident bacterial alcohol generation in the specimen.

ADDITIONAL INFORMATION

Both propellers were sent to McCauley Accessory Division, in Dayton, Ohio. On January 23, 1996, a propeller examination was conducted under the supervision of the NTSB. According to McCauley representatives, the examination revealed that the damage to both propellers was symmetrical, and indicated they were rotating "...at a significantly high RPM at impact." The examination revealed that neither propeller was at or near the feather position at impact. The blade angle at impact of both propellers was determined to be higher than the normal operating range. According to McCauley representatives, the higher blade angle was probably due to the loss of oil pressure which occurred when the propellers departed the engine flanges. The McCauley Senior Project Engineer reported that the propeller damage appeared to be the "...result of impact. There were no indications of any type of propeller failure prior to impact." The propeller hubs were dye penetrant inspected with no cracks noted. See details of propeller examination attached.

The three airplane occupants held pilot certificates. Due to the destruction of the airplane, it was not possible to determine where the three occupants were seated when the accident occurred. Both control yokes were removed and sent to the Richland County Sheriff's office to attempt fingerprint identification. The results of the examination did not conclusively determine who was at the controls at the time of the accident.

According to the Cessna 310 Owner's Manual, the airplane's never exceed speed was 227 KCAS, and the maximum designed maneuvering speed (maximum speed at which you can use abrupt control travel) was 150 KCAS.

WRECKAGE RELEASE

The aircraft wreckage was released to Alan Fiedler, insurance representative for American Eagle Group Inc, on January 26, 1996.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	22,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	March 23, 1994
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	750 hours (Total, all aircraft), 100 hours (Total, this make and model), 600 hours (Pilot In Command, all aircraft), 90 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N1269G
Model/Series:	310R 310R	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	310R0689
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	August 4, 1995 100 hour	**Certified Max Gross Wt.:**	5300 lbs
Time Since Last Inspection:	50 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	3248 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	IO-520-M
Registered Owner:	SKY HARBOR AIR SERVICE	**Rated Power:**	285 Horsepower
Operator:		**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:**	Night/dark
Observation Facility, Elevation:	MFD ,1297 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	20:45 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Unknown	**Visibility**	7 miles
Lowest Ceiling:	Overcast / 2400 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	-8°C / -10°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	PHILADELPHIA (PHL)	**Type of Flight Plan Filed:**	IFR
Destination:	FORT WAYNE (FTW)	**Type of Clearance:**	IFR
Departure Time:	18:15 Local	**Type of Airspace:**	Class B

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Fatal	**Latitude, Longitude:**	40.619689,-82.509513(est)

Administrative Information

Investigator In Charge (IIC):	Drake-nurse, Beverley
Additional Participating Persons:	BOB TAYLOR; CLEVELAND , OH EMILE LOHMAN; WICHITA , KS GEORGE HOLLINGSWORTH; MOBILE , AL TOM KNOPP; VANDALIA , OH
Original Publish Date:	October 4, 1996
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=9094