

# National Transportation Safety Board Aviation Accident Final Report

Location:	COLDWATER, MI	Accident Number:	CHI95FA328
Date & Time:	09/21/1995, 1145 EDT	Registration:	N14A
Aircraft:	Cessna 421B	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Executive/Corporate		

# Analysis

The pilot obtained a preflight briefing and indicated that he would obtain an IFR clearance after becoming airborne; however, he took off and did not activate a flight plan. Witnesses observed the airplane flying north (away from the destination) about 200 to 300 feet above the ground below a low overcast sky condition. One witness said the airplane was flying very slow; he said he was almost able to keep up with it in his vehicle. The witnesses said they saw the airplane roll rapidly to the right and descend toward the ground. It collided with the ground in an approximate 50 degree pitch down attitude. An on-scene examination did not reveal any airframe or control anomaly that would have resulted in the accident. The engines and propellers were disassembled for inspection. Examination of the engines revealed they were capable of producing power. Examination of the propellers revealed both were operating at low pitch settings. About 25 miles north-northwest at Battle Creek, MI, the 1145 edt weather was, in part: 500 feet overcast, visibility 2 miles with fog, wind from 050 degrees at 10 knots.

### **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 adequate airspeed, while maneuvering (turning) at low altitude, which resulted in an inadvertent stall and collision with the terrain. Factors relating to the accident were: the adverse weather conditions, and the lack of altitude for recovery from the stall.

#### Findings

Occurrence #1: IN FLIGHT ENCOUNTER WITH WEATHER Phase of Operation: CRUISE

Findings 1. (F) WEATHER CONDITION - LOW CEILING 2. (F) WEATHER CONDITION - FOG

Occurrence #2: LOSS OF CONTROL - IN FLIGHT Phase of Operation: CRUISE

Findings 3. MANEUVER - INITIATED - PILOT IN COMMAND 4. (C) AIRSPEED - INADEQUATE - PILOT IN COMMAND 5. (C) STALL - INADVERTENT - PILOT IN COMMAND

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

Findings 6. (F) ALTITUDE - INADEQUATE - PILOT IN COMMAND

### **Factual Information**

#### HISTORY OF FLIGHT

On September 21, 1995, at 1145 eastern daylight time (edt), a Cessna 421B, N14A, piloted by a commercial pilot was destroyed during a collision with the ground following an uncontrolled descent. Instrument meteorological conditions prevailed at the time of the accident. The positioning 14 CFR Part 91 flight was not operating on a flight plan. The pilot was fatally injured. The flight departed Coldwater, Michigan, at 1135 edt.

The manager of the fixed base operation (FBO) where N14A was based said he saw the pilot talking with his employer before he went to the FBO's flight planning room. The pilot's employer taxiied his airplane out for a takeoff and the accident pilot forwarded his IFR clearance via the local airport radio.

The FBO manager observed the pilot make "...a couple of more telephone calls prior to departing." He said that the accident pilot "...left the office in somewhat of a hurry after making the telephone calls."

The pilot made three telephone calls to the Federal Aviation Administration's (FAA) Flight Service Station (FSS) at Lansing, Michigan. During these calls he obtained IFR clearances for both his employer's airplane and his airplane. The FSS specialist advised him that there would be IFR traffic delays and that his planned departures would be delayed. The pilot spoke with the FSS specialist a short time later. He was told he'd have about an eight minute clearance void time. The pilot responded, "... I think I can do that, I'll [be] off by 1540 [1140 edt]." The specialist told the pilot he would have less than eight minutes due to their conversation. The pilot said, "Okay, I need to motate right now."

Two witnesses observed the airplane heading north between 200 and 300 feet above the ground. According to these witnesses, the airplane made a sharp turn toward the east. They said N14A's engines were running smoothly, but loud. They said the airplane pitched straight down as it began a recovery from its turn. The witnesses said the airplane appeared as though it did a half spin before they heard the crash.

A third witness said the airplane appeared to come straight out of the clouds. According to this witness he saw the top of the airplane with its nose pointed toward the ground. He said the airplane's wings yawed before it disappeared behind the trees.

A witness said he observed the airplane flying in an easterly direction at a low altitude. He said he believed the airplane to be too low and slow for maneuvering. This witness said his vehicle was almost able to keep up with the airplane as it flew in an easterly direction. The witness said the airplane's right wing was low. He said the airplane was about 200 to 300 feet above the ground in a continuous descent. According to this witness, the airplane made a steep right bank and descended vertically. He said he lost site of the airplane as it went behind the trees.

#### PERSONNEL INFORMATION

The pilot's logbook showed he had a total flight time of 1,983.7 hours as of September 5, 1995. This record showed he had 769.7 hours of multiengine airplane flight time. Of this multiengine time, the logbook showed he had logged 205.8 hours in the Cessna 421B between July 6, 1994, and September 5, 1995.

#### AIRCRAFT INFORMATION

N14A's airframe logbook showed its last annual inspection was completed on August 7, 1995. The logbook showed it had an airframe total time of 5,043.8 hours at the time of the inspection. N14A's right engine, serial number 231544-R, was overhauled on July 15, 1994, after 245.3 hours of operation. As of August 7, 1995, the right engine total time was 3,433.2 hours. The right engine's fuel pump serial number was (I207202R). A yellow tag showing a fuel pump had been overhauled was found with this engine's overhaul records. The serial number found the yellow tag was (A098005RB). This tag showed the fuel pump was overhauled on October 28, 1993.

The right engine logbook entry dated July 15, 1994, showed "Overhauled engine this date to factory new specifications per approved data." The engine logbook showed the engine driven fuel pump was change on July 15, 1994. There were no entries in the engine logbook that showed a fuel pump change after the overhaul date. According to the manufacturer's representative, the fuel pump did not have a life limit.

#### WRECKAGE AND IMPACT INFORMATION

The airplane's wreckage was at the base of a shallow angled hill on a 025 degree heading. The right wing was on the hill's incline, the left wing was on marshy, level, ground. The airplane had impacted the ground at an approximate 45 degree pitchdown angle.

The fuselage, from the cockpit forward, was crushed aft and outward. Vertical crush lines on the fuselage's right side began about one foot behind the cabin emergency exit. These went forward to the ruptured cockpit area. The angle of these lines varied between about 80 and 45 degrees from the fuselage's centerline. Similar crush lines were found on the left fuselage side. Both engines were positioned in the ground at an approximate 45 degree angle.

The throttle and mixture levers were in the full aft position. Each lever had a nick on its rear edge that matched the quadrant cover. The front edges of the knobs on the throttle and mixture levers had irregular indentations on them. The left and right propeller levers' were at the "Feather Detent" position. The propeller lever guides were bent downward at the "Feather Detent" position. Cable continuity between each lever and their respective control mechanism was established. The fuel selector levers were positioned on the right and left auxiliary fuel tanks. The left engine's cockpit fuel selector indicator plate was destroyed. The right engine cockpit fuel selector indicator plate had a circular scratch mark on it. This scratch began at the middle of the "50 GAL RIGHT MAIN" label and continued to the end of the selector handle point.

The left and right boost pump switches were positioned on "Low." The pilot's heading and attitude indicator gyro rotors and internal sections of the cases had rotational scuffing. The electrically powered attitude indicator gyro's rotor and case were also scuffed.

The empennage and tail cone had separated from the fuselage. This assembly and was positioned 90 degrees to the remaining fuselage. The vertical stabilizer's leading edge was crushed aft. The horizontal stabilizer and elevator had wrinkled skin at the outboard hinge points. Elevator and rudder control and trim tab cable continuity was established between each surface and the control yoke mechanism, rudder pedals, and trim tab control in the cockpit.

The wings leading edge skin had separated at the main spar rivet line and was ruptured

outward. The bladders were ruptured and torn. Soil in front of the left and right wings had an odor similar to 100 octane low lead aviation fuel. Vegetation in front of the left wing exhibited typical fuel blighting damage. The wingtip tanks forward sections were crushed aft and outward. Soil fuel odor and vegetation damage associated with the wing fuel tanks were also present around the wingtip tanks. The fuel tank bladders of the left and right wing locker auxiliary fuel tanks were ruptured.

The right wing was bent down about 10 degrees beginning at the midpoint between the fuselage and nacelle. The right aileron had separated from its outboard hinge. Wing skin was wrinkled on the top and bottom surfaces. The left wing was bent downward about 20 degrees starting at a point in line with the inboard side of the left aileron. This wing's upper and lower skins were wrinkled. The left aileron was separated at the outboard hinge point. The flaps were retracted. The aileron control and trim tab cables had continuity between the respective surfaces and control mechanisms in the cockpit.

The left and right propellers were partially buried in the ground in front of the engines. Both propellers had separated from the engine crankshaft flange. Seven of the eight left propeller mounting bolt holes in the flange were elongated. There were no lips found at the elongated side of the holes. The hole's axis of elongation varied between parallel with the flange's outside edge to perpendicular to it. The bottom of the flange was bent aft about 3/4 inch. Six of the eight right propeller mounting holes were elongated in the right engine's crankshaft flange. No lips were found on the elongated holes. The hole's axis of elongation varied between the right engine's crankshaft flange. No perpendicular to the flange's outer edge.

One of the left propeller blades was separated from its hub and was positioned under the engine. This blade had full span chordwise scratching on both surfaces. This blade had spanwise twisting and had three gouges in the leading edge. A second blade was bent 70 degrees aft at the midspan point. This blade was found above the ground in an approximate vertical position. The leading edge of the propeller had three gouges near the tip. The third blade was bent forward about 30 degrees beginning about 1/3 its span from the tip. The blade was lying on the ground, its leading edge was imbedded in the ground. Chordwise scratching was found from the hub outward about 12 inches. The left propeller's piston rod was extended 2-3/16 inch aft of the propeller hub housing.

One of the right propeller blades had separated from its hub and was positioned under the engine, pressed against the sump. This blade was bowed from its hub end to the tip. The first six inches of the tip was bent aft about 180 degrees. Both sides of the blade had multidirectional chordwise scratches on it. A second blade had full-span chordwise scratching on both surfaces. This blade was partially buried in the ground. The blade's tip was bent forward about five degrees beginning about six inches in from the tip. The third blade was bent forward about 20 degrees starting 12 inches in from the tip. This blade did not have any chordwise scratching on either surfaces. This blade was angled above the gropund at an approximate 30 degree angle. The right propeller's piston rod was extended 2- 7/16 inch aft of the propeller hub housing.

The right engine's fuel pump had separated from its mounting flange. Fuel was found in both engine-driven fuel pumps and fuel injector distribution blocks. Spark plugs for both engines were tan-gray in color. There were no remarkable deposits on the spark plug electrodes.

MEDICAL AND PATHOLOGICAL INFORMATION

The autopsy was conducted at the Community Health Center of Branch County, Coldwater, Michigan, on September 22, 1995. The toxicology report prepared by the Federal Aviation Administration's Civil Aeromedical Institute showed negative results.

#### ADDITIONAL INFORMATION

Both engines were examined at the manufacturer's facility. Both engine's were impact damaged. No mechanical anomalies were found that would prevent either engine from developing power. The right engine's boost pump was tested at the scene. When electrical power was applied the pump functioned.

The right engine's fuel pump drive shaft had seized within the carbon bearing (bearing). The shaft had to be driven out of the bearing to be removed. About 30 percent of the bearing's exposed outer face edges were chipped. About 75 percent of the shaft would pass into the bearing completely when it was placed back into the bearing hole. The pump's drive coupling end, opposite the spline and retaining ring, were not recovered.

The fuel pump was examined by the NTSB's Metallurgical Laboratory in Washington, D.C. The NTSB metallurgist's factual report on the right engine fuel pump stated "...the pump drive shaft showed wear to the shank portion of the shaft and impact damage to the input end of the shaft." The input end of the drive coupling shaft was separated from the splined end.

The fracture surface of the drive coupling assembly was rough on one side. The opposite side of the fracture surface was smoother in appearance. The underside of this side contained compression damage. This damage was on the frangible section of the drive coupling. Teeth on the drive coupling spline assembly had peaks with varying widths. Ten of these teeth were irregularly peened along their peak edges. Peening was also observed at the teeth bases.

Close examination of the right engine-driven fuel pump shaft revealed that about 5/8's of its exterior surface was pitted. The shaft section closest to the impeller drive end was pitted and reddish-brown in color. Portions of the shaft surface had a black material impregnated in the pitted surface. The material was scraped out and was similar to the carbon bearing material. The shaft's surface was circumferentially pitted along its length. The shaft's drive coupling end had a 9/32 inch slot cut into it. The edges of the slot were spalled. The shaft's drive coupling end was a dark metallic blue in color.

The right wing fuel selector valve's internal examination revealed it to be defect free. The inlet holes on the valve's inlet plate lined up with the respective inlets on the valve's body. Before disassembly, the valve was bench checked for flow. The valve operated according to the manufacturer's design.

Both propellers were examined at the manufacturer's facility. The results of that examination showed that both propellers were not at or near the feather position. The feather stop mechanisms were not damaged. Both propeller's piston rods showed that the pitch change mechanism for each propeller was operating at the low pitch position. Propeller blade counterweight impact marks were found on the propeller blade retention nuts for both propellers. The inspection revealed that both propellers were operating at or very near to the low pitch stop when the airplane collided with the ground.

Representatives of the propeller manufacturer were consulted about the propeller's piston rod extension difference (2-3/16 inch on left propeller versus 2-7/16 inch found on the right propeller). According to the representatives, the 2-7/16 inch extension showed a propeller in a

high RPM, the setting is normally a ground idle RPM. One of the representatives said the counterweight witness marks on the propeller blade retention nuts corresponded with the piston rod's location. The piston rod was bent. The representative said this showed its position at ground impact.

The wreckage was released to the Coldwater Airport Manager on September 24, 1995.

Certificate:	Commercial	Age:	37, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medicalno waivers/lim.	Last FAA Medical Exam:	07/19/1994
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	1984 hours (Total, all aircraft), 203 hours (Total, this make and model), 1647 hours (Pilot In Command, all aircraft), 114 hours (Last 90 days, all aircraft), 17 hours (Last 30 days, all aircraft)		

#### Pilot Information

#### Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N14A
Model/Series:	421B 421B	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	421B0373
Landing Gear Type:	Retractable - Tricycle	Seats:	8
Date/Type of Last Inspection:	08/07/1995, Annual	Certified Max Gross Wt.:	7200 lbs
Time Since Last Inspection:		Engines:	2 Reciprocating
Airframe Total Time:	5044 Hours	Engine Manufacturer:	Continental
ELT:	Installed, not activated	Engine Model/Series:	GTSIO-520
Registered Owner:	HANSEATIC AIR, INC.	Rated Power:	375 hp
Operator:	HANSEATIC AIR, INC.	Operating Certificate(s) Held:	None

### Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Day
Observation Facility, Elevation:	BTL, 952 ft msl	Distance from Accident Site:	25 Nautical Miles
Observation Time:	1145 EST	Direction from Accident Site:	345°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	2 Miles
Lowest Ceiling:	Overcast / 500 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	10 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	50°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	
Precipitation and Obscuration:			
Departure Point:	(D96)	Type of Flight Plan Filed:	None
Destination:	ELKHART, IN (EKM)	Type of Clearance:	None
Departure Time:	1135 EDT	Type of Airspace:	Class G

# Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	

### Administrative Information

Investigator In Charge (IIC):	FRANK S GATTOLIN	Report Date:	12/10/1996
Additional Participating Persons:	BOBBY HILBING; SOUTH TED WILLIS; SOUTH BEN JOHN HUY; WICHITA, K GEORGE M HOLLINGSWO	BEND, IN ID, IN S RTH; RESTON, VA	
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <u>publing@ntsb.gov</u> , or at 800-877-6799. Dockets released after this date are available at <u>http://dms.ntsb.gov/pubdms/</u> .		

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