Aviation Investigation Final Report

Location:	PRAIRIE CITY, South Dakota	**Accident Number:**	CHI96FA133
Date & Time:	March 21, 1996, 18:40 Local	**Registration:**	N5563X
Aircraft:	BEECH F-33A	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane and pilot had been missing for about 30 days after departing on a late afternoon cross-country flight. Weather during the flight was marginal VFR. The surface analysis charts showed a cold front in the vicinity of the accident site. The airframe and engine examination revealed no anomalies that would prevent flight. The airplane's attitude indicator's gyro rotor and case had rotational scaring. The pilot's son stated his father had complained to him about being very fatigued about 24 hours before the flight. He said his father was very concerned about not having enough energy to make the flight. The son said his father had a habit of falling asleep when he was fatigued.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's failure to maintain control of the airplane. A factor was pilot fatigue.

Findings

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

Findings
1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. (F) FATIGUE - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On March 21, 1996, at 1840 mountain standard time (mst), a Beech F33A, N5563X, piloted by a private pilot, was destroyed when it collided with terrain. The 14 CFR Part 91 personal flight was not operating on a flight plan. Local residents reported visual meteorological conditions at the time of the accident. The pilot was fatally injured. The flight departed Malta, Montana, at 1655 mst.

The airplane was reported missing by the pilot's family at 0220 mst on March 21, 1996. The airplane was found at 1800 mountain daylight time on April 15, 1996.

On March 21, 1996, at 1638 mst, the pilot contacted the Federal Aviation Administration (FAA) Flight Service Station (FSS) at Great Falls, Montana. After telling the FSS specialist (specialist) his route of flight the specialist said, "...can you go IFR if you have to?" The pilot replied, "Yeah, I'd rather not."

The specialist told the pilot he'd be skirting an "...area that's forecast IFR due to fog... ." The pilot was told that Nebraska's panhandle would have rime icing in the clouds. The specialist advised the pilot to "...stay away from all that." The FSS specialist gave the pilot surface weather reports for his route of flight. The reporting stations along his route of flight showed ceilings between 1,500 feet overcast and clear at North Platte, Nebraska, his destination.

During the weather brieifng the pilot said he should "...just pull... to the east a little bit... ." The specialist replied, "Ya, a little better if you head that way. Of course a lot can be going on between the different airports, but it's certainly better the farther east you go." The pilot replied, "Right." The specialist advised the pilot of broken to scattered clouds in eastern Montana between 1,000 and 2,000 feet above ground level (agl). He told the pilot of icing in clouds along his route, and isoloated areas of light rain and snow showers for Wyoming, the eastern plains, and panhandle of Nebraska.

After receiving the weather briefing the pilot said, "Well, I think I'll be okay, I'll just kind of watch from... [sentance not completed]." The specialist interrupted him and said, "So right, just kind of deviate a little east if you have to and... [sentance not completed]." The pilot entered the conversation and said, "Get down that way before it gets night." The preflight briefing ended at 1644 mst.

METEOROLOGICAL INFORMATION

The weather for the pilot's route of flight was forecast to be broken to scattered clouds

between 1,000 and 2,000 feet above the ground for eastern Montana. The specialist said the forecast ceilings were what was being reported. The specialist advised the pilot of isolated areas of light rain and snow for the State of Wyoming, and the eastern plains.

The 1652 mdt surface weather observation for Miles City, Montana, showed an estimated 1,700 foot overcast. This was the pilot's approximate departure time from Malta, Montana. Malta is about 145 nautical miles northwest of Miles City. About one hour later the visibility at Miles City went to 30 miles. The ceiling remained the same. No cloud tops were reported in the hourly weather reports. The surface temperature at Miles City was 33 degrees Fahrenheit at 1652 mdt. One hour later it was reported to be 32 degrees. Miles City is about 30 miles west of the estimated direct line flight path between Malta and Prairie City, South Dakota.

Dickinson, North Dakota, lies about 50 miles east of the projected flight path between Malta and Priarie City. The 1652 mdt weather was shown to be an estimated 2,400 foot overcast and a surface temperature of 33 degrees' Fahreheit. At 1750 mdt the ceiling was an estimated 2,200 foot overcast and a temperature of 31 degrees Fahrenheit. The 2,200 foot overcast was reported at 1851. Cloud tops for Dickinson, South Dakota, were not given on any of the reports.

According to the National Oceanic and Atmospheric Administration, Climatic Records Center, the 1700 mst Surface Analysis Chart showed a cold front located over Lemmon, South Dakota. This frontal system was oriented in a northeast-southwest direction. The 2000 mst Surface Analysis Chart showed the front near Mobridge, South Dakota, oriented in the same direction as it was earlier in the day. The 1700 mst Weather Depiction Chart showed the eastern half of Montana and the northwestern quarter of South Dakota as having marginal meteorological conditions.

WRECKAGE AND IMPACT INFORMATION

N5563X's wreckage was found on an approximate 170 degrees magnetic heading. The ground scar was made up of three parts: One scar, was located on the west edge of a 3 foot deep hole in the ground. It was oriented on a heading of 080 degrees magnetic. This scar was about 15 feet long and varied in depth. The depth at its starting point was about 3 inches. Its depth at the point it connected to the hole was 6 inches deep. A second ground scar originated at the hole's east side. This scar was about 12 inches deep at its junction point with the hole. This scar was about 10 feet long. Its depth at the end opposite the hole was about 3 inches.

N5563X's wings, engine, and most of its forward fuselage were contained at one location. The top of the fuselage cabin was found about 150 feet south of the main wreckage. Sections of the wing fuel bladders were found around the south side of the main wreckage. Pieces of flight instruments, radios and the airplane's interior were scattered in a fan shaped pattern south of the wreckage within 300 feet.

The front seats were located within this fan shaped area. The cockpit area was destroyed. The rear cabin area was crushed aft and down. The aft fuselage between the rear seats and tail cone was crushed aft to the separation point of the tail cone. The left side of the cabin/cockpit area was found about 100 feet south of the main wreckage.

The right wing was crushed aft beyond the main spar. This wing was bowed aft about 20 degrees beginning near the wheel well. The aileron had separated and was found next to the wing's outboard structure. The top and bottom wing skins were accordianed and ruptured outward. The left wing was straight, but crushed aft beyond the main spar. This wing's top and bottom skin were ruptured outward.

The horizontal stabilizers were bent upward about 5 degrees. The elevator had small cuts on its top leading edge next to the hinges. The cuts matched the spacing of the hinges. The vertical stabilizer's tip had its leading edge crushed aft about 3 inches. Control continuity was established for all three flight controls. Elevator trim cable continuity was established to the trim mechanism's sprocket and chain. The sprocket had separated from its mount. Fractures on the sprocket's mounting shaft had shear lips and a granular surface appearance. The metal components making up the flight control system in the cockpit were destroyed. The faces of the fractured component surfaces were granular and with shear lips.

The wing flaps and main landing gear were retracted. Due to the damage sustained at the front of the airplane, the position of the nose landing gear could not be determined. The nose landing gear strut and doors were partially buried at the bottom of the hole in the center of the wreckage scar. The radios, autopilot controller, and servos were destroyed.

The propeller hub was found about 2 feet below the bottom of the wreckage scar's hole. The hub was broken into 5 pieces. The fracture surfaces of the hub had a granualr appearance. One propeller blade was next to the hub. This blade did not have chordwise scoring or scrathing on its face and front surface. A gouge about 2 inches long was located on the blade's face, beginning about 17 inches from the tip. The blade was bent in a zig-zag pattern at the midspan point.

A second propeller blade was found in the hole. It was buried foot first up to the midspan point. The blade had two "L" shaped scars near its foot. There was no chordwise scoring or scratching on this blade. The leading edge had several gouges in it. The gouges ranged from 1/2 to 1/4 inch deep and were about 1 inch wide. This blade was bent aft about 5 degrees and twisted between its midspan location and the tip. The third blade was found on the edge of the ground scar's center hole. It was bent forward about 45 degrees starting at a point about 2/3rds the way in from the tip. It had no scoring or sratches on either of its surfaces.

The engine sump and pan were destroyed and pieces of both were found in and around the ground scar hole. Both magnetos were found separated from their mounts. The fuel servo was destroyed. The engine driven vacuum pump rotor was cracked and its vanes were intact. The engine crankshaft was rotated about 30 degrees.

During the rotation of the crankshaft the magneto drive gears moved. The valve covers for cylinders number 2 and 5 were removed. During the crankshaft movement the rocker arms on these two cylinders moved. The left magneto was rotated and created spark at the end of one spark plug lead. The right magneto would not turn fast enough to produce spark at a spark plug lead. The unit's internal components were intact, attached, and did not show signs of arcing within the case.

The electrically driven vacuum pump was disasembled. It was cracked at the ends of three vane guide slots. The only instrument that was found was the attitude indicator and it was partially disassembled. The rotor was free of its case, Rotational scaring was observed on the rotors vanes. Rotational scuffing was observed in two areas within the rotor's case.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was conducted on the pilot at the Clinical Laboratory of The Black Hills, Rapid City, South Dakota, on April 17, 1996. The FAA Civil Aeromedical Institute in Oklahoma City, Oklahoma, toxicological test report stated, "...blood and urine ethanol's above 20mg/dL were confirmed by Radiative Energy Attenuation. 18.000 (mg/dL, mg/hg) Ethanol detected in muscle [and] 53.000 (mg/dL, mg/hg Ethanol detected in Liver. Note: The ethanol found in this case is most likely from postmortem ethanol production."

ADDITIONAL INFORMATION

The pilot's son met with the investigator-in-charge. He said his father had complained to him about being very fatigued about 24 hours before the flight. He said his father was very concerned about not having enough energy to make the flight. The son said his father had a habit of falling asleep when he was fatigued. He said he offered to make the trip but the father declined saying he thought he'd be okay. The son said his father had a condition called sleep apnea. The son said his father flew about 150 hours per year. He said his total time was between 10,000 and 15,000 hours.

Pilot Information

Certificate:	Private	**Age:**	70,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	November 30, 1994
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	12500 hours (Total, all aircraft), 774 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	BEECH	**Registration:**	N5563X
Model/Series:	F-33A F-33A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	CE1423
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 12, 1996 Annual	**Certified Max Gross Wt.:**	3200 lbs
Time Since Last Inspection:	10 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	784 Hrs	**Engine Manufacturer:**	CONTINENTAL
ELT:	Installed, not activated	**Engine Model/Series:**	IO-520-BB
Registered Owner:	JAMES D. PRICE	**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:	Visual (VMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	DIK ,2590 ft msl	**Distance from Accident Site:**	96 Nautical Miles
Observation Time:	18:51 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Unknown	**Visibility**	20 miles
Lowest Ceiling:	Broken / 2200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	20°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	-1°C / -7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	MALTA , MT (MLK)	**Type of Flight Plan Filed:**	None
Destination:	NORTH PLATTE , NE (LBF)	**Type of Clearance:**	None
Departure Time:	16:55 Local	**Type of Airspace:**	Class E

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	
Runway Length/Width:		**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	45.530265,-102.800376(est)

Administrative Information

Investigator In Charge (IIC):	Gattolin, Frank
Additional Participating Persons:	LARRY BROWN; RAPID CITY , SD
Original Publish Date:	February 2, 1998
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=10079