Aviation Investigation Final Report

Location:	FORT COLLINS, Colorado	**Accident Number:**	FTW98FA378
Date & Time:	August 29, 1998, 15:55 Local	**Registration:**	N377X
Aircraft:	Mooney M20F	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was returning from a cross-country flight and was observed by witnesses to enter the traffic pattern downwind at an estimated 450 feet agl and very close to the runway. One witness reported that when the aircraft turned base it 'appeared to be a kind of wing-over maneuver.' Another witness said that he 'turned left to the base leg of an approach to runway 11, and [he] quickly increased the bank so that in less than five seconds I could see a full plan view of the airplane at an altitude of approximately 200 feet.' Post-accident investigation indicated that the airplane's bank angle was approximately 30 degrees to the left and 30 degrees nose down upon ground impact. The airport (elevation 4,935 feet, density altitude 7,844 feet) had a local published traffic pattern altitude of 800 feet agl. Post-accident examination of the airplane's altimeter revealed a Kollsman Window setting of 29.96 inches. The closest recorded weather station (7 nautical miles distant and 81 feet above the destination airport elevation) was reporting a barometric pressure of 30.21 inches of mercury. The pilot's altimeter read approximately 250 feet higher than the airplane's actual altitude.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadvertent stall/mush due to his excessive angle of bank during his traffic pattern turn to base. Factors were the pilot's improper downwind altitude, the pilot not properly setting his Kollsman Window in his altimeter, and the high density altitude.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: APPROACH - VFR PATTERN - BASE TURN

Findings
1. (F) WEATHER CONDITION - HIGH DENSITY ALTITUDE
2. (F) ALTIMETER - NOT SET - PILOT IN COMMAND
3. (F) ALTITUDE - IMPROPER - PILOT IN COMMAND
4. (C) LOW ALTITUDE FLIGHT/MANEUVER - EXCESSIVE - PILOT IN COMMAND
5. (C) STALL/MUSH - INADVERTENT - PILOT IN COMMAND

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

Findings
6. (C) STALL/MUSH - INADVERTENT - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On August 29, 1998, approximately 1555 mountain daylight time, a Mooney M20F, N377X, was destroyed following impact with terrain while turning onto the base leg in the traffic pattern at Fort Collins Downtown Airpark, Fort Collins, Colorado. The commercial pilot and his pilot-rated passenger were fatally injured. The airplane was owned/operated by the pilot under Title 14 CFR Part 91. Visual meteorological conditions prevailed for the personal cross-country flight which originated from Chadron, Nebraska, approximately 70 minutes before the accident. No flight plan had been filed.

According to witnesses, the pilot had left that morning to visit relatives at several locations, and the last city was Chadron, Nebraska. According to a witness in Chadron, the pilot had his fuel tanks "topped-off" with 100LL (14 gallons) before his departure back to Fort Collins (his homeport airport for the last 30 years).

Two witnesses flying in the traffic pattern for runway 11 (elevation 4,935 feet, density altitude 7,844 feet) reported hearing a Mooney calling for Fort Collins airport advisories twice, but gave no position report (Fort Collins unicom did not respond). The two witnesses were flying on downwind in a Piper Cub at approximately 650 feet agl when they observed a Mooney "over the Budweiser brewery flying directly at them at a high rate of speed with the [landing] gear up." The one witness in the back seat of the Piper Cub reported that the airplane entered the traffic pattern behind them and approximately 200 feet below them. This witness performed a right 360 degree turn and rejoined the downwind leg behind the Mooney. The two witnesses reported that they were flying a "tight pattern suitable for the Cub, and the Mooney was flying at approximately the same distance from the runway." Another witness described the down wind leg of the Mooney as "unusually close," and yet another witness described the down wind leg as "[it] appeared to be about 50% closer to the runway than what I consider to be normal." This last witness reported that the landing gear was down when he saw the Mooney on down wind; he could not remember if any wing flaps had been extended.

The back seat witness in the Piper Cub reported seeing the Mooney "[do] what appeared to be a kind of wing-over maneuver and [I] thought the Mooney pilot was perhaps hotdogging." He further observed that "then I realized how low it was and how nose-down the attitude was. A fraction of a second later, it impacted in this nose-low attitude, with the left wing slightly lower." Another witness on the ground (standing in front of a hangar located approximately 800 feet from the approach end to runway 11) observed the airplane as it "turned left to the base leg of an approach to runway 11, and quickly increased the bank so that in less than five seconds I could see a full plan view of the airplane at an altitude of approximately 200 feet." The witness on the ground further observed "the nose began to fall, and the airplane continued

to fall until I saw [it] impact with the earth."

PERSONNEL INFORMATION

The pilot's flight logbook was destroyed in the postimpact fire, except for a few pages. These pages, along with other personal records of the pilot, indicate that he had approximately 3,210 hours of flight experience in airplanes and helicopters. His records suggest that he had approximately 1,466 hours in Mooney aircraft and 1,150 hours in turbine helicopters. He had surrendered his helicopter license approximately a year earlier to the FAA, after an accident in his helicopter.

FAA records indicate that the pilot-rated passenger received his private pilots license in 1977 and had accumulated approximately 276 hours of flight experience as of his last FAA medical in 1979. His FAA flight medical would have expired in December, 1981. AIRCRAFT INFORMATION

The airplane was a propeller-driven, four seat airplane, which was manufactured by Mooney Aircraft Corporation in 1967. It was certificated for a maximum gross takeoff weight of 2,740 pounds. The airplane was powered by a Textron Lycoming, four cylinder, reciprocating, horizontally opposed, fuel-injected engine which had a maximum takeoff rating of 200 horsepower. The pilot records recovered from the postimpact fire indicate that the last annual inspection was completed on March 12, 1998 and the airframe had accumulated approximately 1,054 hours by the time of the accident.

The airplane had a manually operated landing gear system which was extended by lowering a handle (approximately 30 inches in length) between the two front seats. The airplane's wing flaps are spring loaded up, with a manually pumped hydraulic extension system.

METEOROLOGICAL INFORMATION

At 1556, the weather conditions at Fort Collins-Loveland Municipal Airport (elevation 5,016 feet), located 170 degrees for 7 nm from accident site, were as follows: wind 140 degrees for 4 knots; visibility 10 statute miles; sky condition clear; altimeter setting 30.21 inches of mercury; temperature 90 degrees F.; dew point 39 degrees F. National Climatic Data Center records indicate that the barometric pressure was falling throughout the day; starting at 30.30 inches of mercury and decreasing to 30.19 inches of mercury.

AERODROME INFORMATION

Fort Collins Downtown Airport is an uncontrolled airport which provides airport advisories (active runway, current winds, and altimeter settings) for pilots at the availability and/or discretion of ground personnel.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located in an open field approximately 1,760 feet from the approach end of runway 11, north of the runways extended centerline approximately 300 feet, and east of Lemay Avenue approximately 40 feet. The ground scar was approximately 150 feet long, parallel to Lemay Avenue, on a magnetic heading of 185 degrees. The north end of the ground scar had red lens glass in it. Vegetation slashes and earth disturbances suggest that the airplane's bank angle was approximately 30 degrees to the left and nose down was approximately 30 degrees.

The airplane was found upright and longitudinally aligned magnetically approximately 80 degrees. The left wing had separated from the fuselage and folded back onto the fuselage; the left fuel tank was found compromised and the subsequent fire consumed the left wing and fuselage. One landing gear was found separated from the airplane and undamaged by postimpact fire; photographs suggest that it had been moved from its postimpact location by unknown persons. The occupants were extricated from the airplane by witnesses before the postimpact fire consumed the fuselage.

All the airplane's flight control components were accounted for, and control continuity was established for the elevator and the rudder. The landing gear was found in the down position. The hydraulically actuated wing flaps were in the up position, but they are spring loaded up if hydraulic pressure is compromised. The fuel selector was found on the right fuel tank. The right fuel tank was not compromised, and it contained an estimated 14 gallons of fuel.

The propeller remained attached to the crankshaft flange. One propeller blade was bent aft at the mid-span nearly 45 degrees with chordwise striations and leading edge gouges on the outboard 16 inches. The second blade was bent slightly forward approximately 2/3 out from the hub with "S" twisting and chordwise striations. The engine exhibited continuity by rotating the vacuum pump drive; thumb compression was obtained on all cylinders and both magnetos produced spark. The throttle control was found out approximately 1 inch and bent up; the propeller control was full forward; and the mixture control was full forward.

All major components of the airplane were accounted for at the accident scene. No preimpact engine or airframe anomalies, which might have affected the airplane's performance, were identified.

The airplane's altimeter was found; although extensively damaged by postimpact fire, its Kollsman Window read 29.96 inches.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies on the pilot and the pilot-rated passenger were performed by Dr. Patrick C. Allen, Coroner, at the Larimer County's Office of the Coroner/Medical Examiner, on August 29, 1998, at McKee Medical Center, in Loveland, Colorado.

Toxicology screens were performed on Robert C. Fugate (the pilot) and Bill L. Buyher (the right seat pilot-rated passenger) by FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma. According to CAMI's report on Robert C. Fugate (#9800241001), carbon monoxide and cyanide tests were not performed due to lack of suitable specimens, and no ethanol was detected in the vitreous. The pilot's test for drugs was positive for Triamterene, which according the FAA Northwest Regional Flight Surgeon is an flight approved drug for high blood pressure. CAMI's report on Bill L. Buyher (#9800241002) indicated that no carbon monoxide, cyanide, or drugs were detected in the blood, and no ethanol was detected in the vitreous.

TESTS AND/OR RESEARCH

The Aeronautical Information Manual (AIM), in Chapter 4., Section 3. - Airport Operations, recommends a traffic pattern altitude of 1,000 feet agl unless established otherwise (see attached AIM document). The Colorado State Airport Directory recommends a traffic pattern altitude for Fort Collins Downtown Airport of 5,735 feet, or 800 feet agl.

The Kollsman Window in the airplane's altimeter was found set at 29.96 inches, whereas the closest recorded weather station was reporting an altimeter setting of 30.21 inches of mercury. A 1 inch setting differential in the Kollsman window equates to 1,000 feet, subsequently .25 inches equals 250 feet differential. Therefore, an altimeter with a 29.96 setting, in this situation, would read 250 feet lower than the actual altitude.

ADDITIONAL INFORMATION

The airplane, including all components and logbooks (those not destroyed by fire), was released to a representative of the owner's insurance company on September 2, 1998.

Pilot Information

Certificate:	Commercial	**Age:**	77,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	July 22, 1998
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	3210 hours (Total, all aircraft), 1455 hours (Total, this make and model), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N377X
Model/Series:	M20F M20F	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	670360
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	March 12, 1998 Annual	**Certified Max Gross Wt.:**	2740 lbs
Time Since Last Inspection:	17 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1053 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-360-A1A
Registered Owner:	R.C. FUGATE ENTERPRISES	**Rated Power:**	200 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:**	Day
Observation Facility, Elevation:	FNL ,5016 ft msl	**Distance from Accident Site:**	7 Nautical Miles
Observation Time:	15:56 Local	**Direction from Accident Site:**	165°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	32°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	CHADRON , NE (CDR)	**Type of Flight Plan Filed:**	None
Destination:	(3V5)	**Type of Clearance:**	None
Departure Time:	13:45 Local	**Type of Airspace:**	Class G

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:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	40.590606,-105.129142(est)

Administrative Information

Investigator In Charge (IIC):	Struhsaker, James
Additional Participating Persons:	RANDY HOLDER; DENVER , CO JEFFREY R POSCHWATTA; WILLIAMSPORT , PA
Original Publish Date:	March 30, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=43816