

# **Aviation Investigation Final Report**

Location:	BEALETON, Virgini	а	Accident Number:	IAD00FA053
Date & Time:	June 23, 2000, 18:	18 Local	Registration:	N311SB
Aircraft:	Piper	PA-28-140	Aircraft Damage:	Destroyed
Defining Event:			Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional			

### Analysis

The flight instructor and student pilot landed to the south on the north/south-aligned runway. The airplane then taxied to the end of the runway, turned, and departed to the north. The sod runway had grass about 3 to 4 inches high and was about 2,200 feet long. One hundred foot high power lines and 60-80 foot tall trees were at the immediate north end of the runway. A witness, who had heard the airplane land, then saw the airplane as it turned around at the departure end of the north runway. He was concerned when the airplane departed, since 'Cherokees do not fly well in and out of this airport.' He saw the airplane's wings rock back and forth after it became airborne, and feared the airplane would crash. The airplane struck the trees and crashed beyond the trees and power lines. Examination of the airplane and engine revealed that there were no mechanical discrepancies. Airplane performance data indicated that the airplane would have required about 2,100 feet of take-off distance on a hard surface to clear a 50-foot obstacle.

### **Probable Cause and Findings**

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the flight instructor's improper pre-flight plan and decision to land and depart an airport with insufficient runway. A factor in the accident was the short grass runway with a 100-foot obstruction at the end.

### **Findings**

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT Phase of Operation: TAKEOFF

Findings

- 1. OBJECT TREE(S)
- 2. (C) PREFLIGHT PLANNING/PREPARATION IMPROPER PILOT IN COMMAND(CFI)
- 3. (F) TERRAIN CONDITION SHORT RUNWAY/LANDING AREA
- 4. (F) TERRAIN CONDITION GRASS5. (F) TERRAIN CONDITION HIGH OBSTRUCTION(S)

### **Factual Information**

#### HISTORY OF FLIGHT

On June 23, 2000, at 1818 Eastern Daylight Time, a Piper PA-28-140, N311SB, was destroyed after colliding with trees and terrain shortly after take-off from Flying Circus Airport, Bealeton, Virginia. The certificated flight instructor and student pilot were fatally injured. The flight originated at Culpeper County Airport (CJR), Culpeper, Virginia, between 1730 and 1745 with an intended destination of Orange County Airport (W93), Orange, Virginia. Visual meteorological conditions prevailed and no flight plan was filed for the flight conducted under 14 CFR Part 91.

A pilot, who had operated out of the Flying Circus airport for 30 years, was working in his hangar when he heard the airplane land. He said:

"I heard the airplane land and I walked out of my hangar to see who it was. I saw the Cherokee at the end of the runway, and it was starting to turn around. I thought they were taxiing in and I went back inside my hangar. As I walked back in the hangar, I heard the airplane go to full throttle. I was concerned that they were taking off, since I knew that Cherokees do not fly well in and out of this airport. I ran around the other side of my hangar so I could see the airplane. There is a dip in the runway and I did not see the airplane at first. When I did see the airplane, it was airborne and I knew it was not going to clear the trees. I saw the wings rocking back and forth and I ran inside and called 911. I knew the airplane was going to crash. I later saw the plumes of smoke rising on the opposite side of the tree line."

The witness estimated the airplane had approximately between 2,000 and 2,200 feet of runway available for take-off, and the wind was calm.

A second witness had just arrived at a golf course, which was adjacent to the Flying Circus airport. In a written statement, he said:

"I was walking around the clubhouse toward the first tee when I heard a crashing sound ahead of me. I looked up quickly and saw a small plane coming through the trees toward the golf course from the Flying Circus. The plane immediately began to flip over and went straight down into the ground on the golf course. I could not see the plane hit the ground because of the grassy mounds. I immediately saw flames and ran to the clubhouse to call 911. I was about a 1/4 mile away from the plane when it went down. I believe this was the same plane I had seen go in for landing at the Flying Circus a few minutes earlier."

With a model of an airplane in his hand, the witness demonstrated the airplane's change in attitude as it contacted the trees, rolled inverted, and struck the ground nose down.

A third witness in a written statement said:

"As I was walking into Kastle Green's Golf Club, I saw a small plane clip the tree tops. There was a thunking sound. I saw the plane hit the ground then burst into flames."

The airplane came to rest on the sixth hole of the golf course. There were no ground injuries.

The accident occurred during the hours of daylight about 38 degrees, 33 minutes north latitude, and 77 degrees, 42 minutes west longitude.

#### PERSONNEL INFORMATION

The flight instructor was a citizen of the United Kingdom. He held a Federal Aviation Administration (FAA) commercial pilot certificate with ratings for airplane single and multiengine land, and instrument airplane. He also held an FAA flight instructor certificate for single and multi-engine land airplane, and instrument airplane.

His most recent FAA second-class medical certificate was issued on July 22, 1998.

Examination of his logbook revealed that he had accrued 1,103 total flight hours of which 9 hours were in make and model. Further review of the flight instructor's logbook indicated that there were no remarks or endorsements that indicated he had ever landed or taken off from the Flying Circus airport. Also, there were no endorsements or remarks for previous flights with the student pilot.

The student pilot held an airframe and power plant certificate and was employed by the operator as an aircraft mechanic. He had accrued about 84 total flight hours of which 10 hours were in make and model. He logged several dual instructional flights into and out of the Flying Circus airport in a Stearman PT-17. However, there were no entries made for flights into or out of the Flying Circus airport in a PA-28-140. There was no logbook endorsements made by the flight instructor in the student pilot's logbook.

#### WRECKAGE AND IMPACT INFORMATION

The airplane was examined at the site on June 23rd and 24th, 2000. The examination revealed that all major components of the airplane were accounted for at the scene. The airplane was found inverted, approximately 100 feet north of the tree line. Between the trees and the airplane were several broken tree branches. These branches were aligned on a heading of 342 degrees. The nose of the airplane was on a heading of 020 degrees. The post-impact fire destroyed the cockpit, fuselage, and empennage. The main cabin door was still hinged and appeared open.

The right wing exhibited extensive leading edge to trailing edge impact damage and the wing root was destroyed by fire. The wing tip was partially separated from the wing. The aileron

remained attached to the wing, but the flap was destroyed by fire.

The left wing was relatively intact, but the fuel tank, wing tip, aileron, and flap were destroyed by fire. The leading edge of the wing tip was deflected downward.

The elevator and trim tab were destroyed by fire. A section of the rudder was partially destroyed by fire, but the elevator bell crank appeared intact.

Control cable continuity was established for all flight control surfaces from the control surface to the cockpit. The manual flap handle assembly was separated from the floor mounts, and was found in the zero degree position.

The propeller was intact and secure to the engine. One propeller blade appeared straight, and the other blade exhibited a slight s-bend. Chord wise scratches were noted on the front face of both blades. Leading edge nicks were noted along the entire length of both blades.

The engine was inverted, but control continuity was established from the cockpit to the engine. The throttle was found approximately 3 inches out. The carburetor heat and mixture controls were found full forward. The carburetor exhibited impact damage and the bowl was separated. The single venturi was intact, and one metal float was missing. The other float appeared intact. The throttle valve was found in the full open position.

The engine was removed from the airframe and examined. Tree leaves were jammed into the cylinder cooling fins. Engine and valve train continuity were established by manual rotation of the propeller flange. Compression was produced on all but the #4 cylinder.

All spark plugs were removed and appeared gray in color. The #4 cylinder's bottom spark plug's center electrode was flush with the grounding electrode. The barrel of the plug was slightly deformed.

The oil filter was removed from the engine and opened. No evidence of contamination was found in the oil filter and the oil sump screen was absent of debris.

The fuel selector valve was found separated from the airplane and was set to the left fuel tank.

During the compression check, the left magneto impulse coupling was heard clicking when the crankshaft was rotated. However, spark could not be produced due to the fire damage of the contact points. The right magneto produced spark on all four-distributor towers when manually rotated.

The #4 cylinder and piston were removed from the engine and shipped to the Textron Lycoming facility in Williamsport, Pennsylvania. The components were examined at the manufacturer's facility on July 12, 2000, under the supervision of the FAA. The intake valve and spring were intact. The exhaust valve was intact and found in the open position, and fit loose in its seat. The spring was heat damaged and there was no tension to hold the valve in the closed position. No anomalies were found with the piston or the rings.

#### AIRCRAFT INFORMATION

Examination of the airplane's logbooks revealed that the airplane and engine underwent an annual inspection on April 4, 2000. The total airframe time at this inspection was 7,173.24 hours. Total engine time since major overhaul was 730.92 hours. The airplane's tachometer was destroyed by fire.

The airplane was serviced with 18.5 gallons of fuel prior to departure from Culpeper Airport, which filled the tanks (50 gallons total/48 gallons usable).

#### AIRPORT INFORMATION

The Flying Circus Airport was a private airport adjacent to the Kastle Green Public Golf Course, Bealeton, Virginia. Trees, power lines, and a small creek made up the boundary of the two properties.

The Flying Circus Airport was primarily used for air shows during the summer. The runway was a rolling 2,200-foot long grass strip that was aligned north and south. The grass height was estimated to be approximately 3-4 inches. At the immediate end of the north runway was a tree line. Behind the tree line was a set of power lines. Beyond the power lines was another tree line. The power lines had two sets of multiple wires; the lower set was approximately 50 feet high, and the top set was approximately 100-feet high. The height of both tree lines was estimated between 60-80 feet.

Approximately 20 degrees to the left of the north runway was a clearing where the power lines were visible, and the second tree line was beyond the power lines. Beyond that tree line on an approximate 342 degree heading was the location of the wreckage.

During the on-scene investigation, there was no damage observed to the power lines. Additionally, both sets of power lines were equipped with red marker balls.

#### MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies were performed on June 26, 2000, on both the flight instructor and student pilot by the Office of the Chief Medical Examiner, Fairfax, Virginia.

Toxicological testing was performed on July 27, 2000, for both the flight instructor and student pilot, by the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma.

#### METEOROLOGICAL INFORMATION

Weather at Manassas/Davis Airport, Manassas, Virginia, about 14 NM northeast of the Flying Circus Airport, at 1755, was reported as sky clear, visibility 7 miles, altimeter 30.01 in HG, temperature 84 degrees F, 61 degrees F, wind 330 degrees at 8 knots.

#### ADDITIONAL INFORMATION

According to the United States Department of Transportation Regulations from Title 14 of the Code of Federal Regulations (CFR), Federal Aviation Regulation (FAR) Part 61.89 (a), General Limitations:

"A student pilot may not act as pilot in command of an aircraft: (1) That is carrying a passenger."

According to FAR 14 CFR Part 1, Definitions and Abbreviations:

"Pilot in Command means the person who:

(1) Has final authority and responsibility for the operation and safety of the flight; (2) Has been designated as pilot in command before or during the flight; and (3) Holds the appropriate category, class, and type rating, if appropriate, for the conduct of the flight."

According to FAR 14 CFR Part 91.103 (b), Preflight Action:

"Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include-

(b) For any flight, runway lengths at airports of intended use, and the following take-off and landing distance information: (1) For civil aircraft for which an approved Airplane or Rotorcraft Manual containing take-off and landing distance data is required, the take-off and distance data contained therein; and (2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature."

Interpolation of the Piper Cherokee PA-28-140 Pilot Operating Handbook (POH) 2150 lbs. Maximum Gross Weight Take-off Performance Chart, revealed that at the take-off gross weight and existing atmospheric conditions, the airplane would have required about 2,100 feet of takeoff distance to clear a 50 foot obstacle from a paved level runway. This performance chart assumed the airplane departed with zero degree of flaps, and the application of full power was made before brake release.

A weight and balance calculation revealed that the airplane, at the time of the accident, weighed approximately 2,064 pounds, and was within the published center of gravity limitations.

In a telephone interview, a friend of the student pilot's said:

"I talked with [the student pilot] the day of the accident. He told me that [flight instructor] was going to sign him off for his private pilot certificate. He mentioned they were going to fly that evening, and that he was going to fly into the Flying Circus. I told him that it was not a good idea, because of the temperature, and type of airplane they were flying. I warned him not to go there. He told me that he had done it before and that it would be okay."

The airplane was released on June 24, 2000, to the owner's of the Kastle Green Golf Course.

Certificate:	Commercial; Flight instructor	Age:	43,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
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 2 Valid Medicalno waivers/lim.	Last FAA Medical Exam:	July 22, 1998
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	1103 hours (Total, all aircraft), 9 hours (Total, this make and model), 965 hours (Pilot In Command, all aircraft), 59 hours (Last 90 days, all aircraft), 27 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

#### **Pilot Information**

### Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N311SB
Model/Series:	PA-28-140 PA-28-140	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	28-24695
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	April 4, 2000 Annual	Certified Max Gross Wt.:	2150 lbs
Time Since Last Inspection:	7173 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	7173 Hrs	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	0-320-EZA
Registered Owner:	SUPERIOR AVIATION, INC	Rated Power:	140 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
<b>Observation Facility, Elevation:</b>	HEF ,193 ft msl	Distance from Accident Site:	14 Nautical Miles
Observation Time:	17:55 Local	Direction from Accident Site:	45°
Lowest Cloud Condition:	Clear	Visibility	7 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	8 knots / None	Turbulence Type Forecast/Actual:	/
Wind Direction:	330°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	29°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	FLYING CIRCUS (3VA3)	Type of Flight Plan Filed:	None
Destination:	ORANGE COUNTY (ORH)	Type of Clearance:	None
Departure Time:	18:18 Local	Type of Airspace:	Class E

### **Airport Information**

Airport:	FLYING CIRCUS 3VA3	Runway Surface Type:	Grass/turf
Airport Elevation:	300 ft msl	Runway Surface Condition:	Dry;Soft
Runway Used:	36	IFR Approach:	None
Runway Length/Width:	2200 ft / 50 ft	VFR Approach/Landing:	None

# Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	On-ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	

#### **Administrative Information**

Investigator In Charge (IIC):	Yeager, Leah
Additional Participating Persons:	BARRY BARBINI; DULLES , VA DAVID MOORE; ARDSLEY , PA ROBERT MARTILOTTI; BURKE , VA
Original Publish Date:	December 4, 2001
Last Revision Date:	
Investigation Class:	<u>Class</u>
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=51167

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.