National Transportation Safety Board
Aviation Accident Final Report

Location:	MANATI, PR	**Accident Number:**	MIA96FA078
Date & Time:	02/11/1996, 1638 AST	**Registration:**	N79NU
Aircraft:	Aero Commander 500S	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - Instructional		

Analysis

The flight was a dual instruction flight for the purpose of giving the dual student an orientation to the aircraft. Witnesses observed the aircraft flying from east to west at a slow speed. The right wing dropped and then returned to level. The right wing and nose dropped and the aircraft descended in a 45-60 degree nose down attitude. As the aircraft descended the wings rolled back and forth and something was observed moving on the outboard right wing area. The aircraft did not recover from the descent and crashed nose first at a slow speed into a swamp area. Post crash examination of the aircraft showed no evidence to indicate pre-crash mechanical malfunction or failure of the aircraft structure, flight controls, engines, propellers, or systems. The rudder trim was found in the neutral position and the elevator trim was found set for 70% of the aircraft nose up trim. Toxicology tests showed the dual student had .319 ug/ml of marihuana in urine, .010 ug/ml marihuana in blood, and 10.90 ug/ml of acetaminophen in blood. The pilot-in-command/flight instructor had 47.90 ug/ml acetaminophen and 89.20 ug/ml salicylate in urine. The pilot-in-command had hand injuries consistent with operating the aircraft's controls at the time of the accident. The dual student did not have hand injuries consistent with operation of the aircraft's controls.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Failure of the flight crew, for undetermined reasons, to recover from a stall and resulting uncontrolled descent. This resulted in the aircraft colliding with the terrain while in a 45-60 degree nose down attitude at a slow speed.

Findings

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

Findings
1. ELEVATOR TRIM - EXCESSIVE - FLIGHTCREW
2. IMPAIRMENT(DRUGS) - DUAL STUDENT
3. STALL - INTENTIONAL - FLIGHTCREW
4. DESCENT - UNCONTROLLED

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

Findings
5. TERRAIN CONDITION - SWAMPY
6. (C) PULL-UP - NOT PERFORMED - FLIGHTCREW
7. (C) REASON FOR OCCURRENCE UNDETERMINED

Factual Information

HISTORY OF THE FLIGHT

On February 11, 1996, about 1638 Atlantic standard time, an Aero Commander 500S, N79NU, registered to Hill Construction Company, crashed near Manati, Puerto Rico, while on a 14 CFR Part 91 instructional flight. Visual meteorological conditions prevailed at the time and no flight plan was filed. The aircraft was destroyed. The airline transport-rated instructor pilot, commercial-rated dual student, and one passenger were fatally injured. The flight originated from San Juan, Puerto Rico, on the same day about 1628.

The flight was being operated as a training flight for Hill Aviation, a 14 CFR Part 135 air taxi operator. The dual student was receiving orientation of the aircraft. The flight was receiving visual flight rules advisories from the FAA San Juan Approach Control.

Witnesses stated they observed the aircraft flying from east to west, at a slow speed, with the engines operating normally. The right wing of the aircraft dropped down and then returned to level. The right wing again dropped down along with the nose of the aircraft. The aircraft entered a descent and as it descended in a 45-60 degree nose down attitude the wings rolled back and forth. Something was observed to be moving on the outboard end of the right wing as the aircraft descended and the engines continued to operate normally. The aircraft impacted nose first in a swamp area and a postcrash fire erupted on top of the water.

Recorded radar data obtained from the San Juan FAA Approach Control showed the aircraft was identified on radar and was displaying a discrete transponder code. The aircraft climbed to about 2,500 feet after departing the Dominicci Airport at San Juan, and proceeded on a westerly heading. At about 1636, the flight began to slow and had climbed to 2,800 feet. At 1637:06, the flight was at 2,700 feet, at a groundspeed of 86 knots, on a heading of 216 degrees. At 1637:21, the flight was at 2,000 feet, at a groundspeed of 83 knots, on a heading of 202 degrees. At this time the aircraft was located at latitude 18 degrees 27' 58" north, longitude 66 degrees 27' 9" west, or about the coordinates of the crash site. No further radar data was obtained from the aircraft.

PERSONNEL INFORMATION

Information on the pilot-in-command/flight instructor and the dual student is contained in the First Pilot Information section of this report and in Supplement E to this report.

AIRCRAFT INFORMATION

Information on the aircraft is contained in the Aircraft Information section of this report.

METEOROLOGICAL INFORMATION

Visual meteorological conditions prevailed at the time of the accident. Meteorological information is contained in the Weather Information section of this report.

WRECKAGE AND IMPACT INFORMATION

The aircraft crashed in a swamp area of Laguna Tortugue near Manati, Puerto Rico. The wreckage was located at latitude 18 degrees 27' 70" N, longitude 66 degrees 27' 13" W.

Examination of the crash site showed the aircraft impacted the swamp at a slow speed, in a 45-60 degree nose down attitude, while on a 330-degree heading. All components of the aircraft were located on or around the main wreckage. After impact the aircraft became submerged in mud and water. A fire erupted on the water after impact and consumed the empennage and portions of the right horizontal stabilizer and elevator.

Continuity of all flight control system cables was established. The left and right ailerons separated due to impact forces and were located adjacent to the respective wings. All wing flaps were in place and continuity of the operating linkages was established. The left and right elevators and rudder were still attached to the aircraft. The rudder trim tab was found in the neutral position. The elevator trim tabs, 1 on each elevator, were found in the 18-degree tab down position, or 70 percent of aircraft nose up trim. No evidence to indicate precrash failure or malfunction of the aircraft structure or flight control systems was found.

Examination of the left engine after recovery from the crash site showed the engine assembly rotated normally. Continuity of the crankshaft, camshaft, valve train, and accessory drives was established. Each cylinder produced normal compression. Each magneto operated normally and each spark plug had deposit coloring consistent with normal engine operation. The engine fuel system operated normally during testing.

Examination of the left propeller showed it had blade and spinner damage consistent with rotation at the time of ground impact. Internal damage from impact showed the propeller blades were in a low pitch setting at the time of impact. No evidence of failure or malfunction of the left propeller or governor was found.

Initial attempts to recover the right engine and propeller from the swamp were unsuccessful. Divers who attempted to recover the engine stated the engine cowling was still in place around the engine. The propeller blades were twisted and bent aft around the engine similar to the damage on the left propeller. During several attempts to lift the engine from the swamp by helicopter, the lifting point on the engine failed and the engine sank deeper into the mud, to the point it was no longer accessible.

In September 1996, the right engine was recovered from the mud. Examination of the right engine showed the engine assembly rotated normally. Continuity of the crankshaft, camshaft, valve train, and accessory drives was established. Each cylinder produced normal compression. Each magneto had sustained damage to the housing due to corrosion. The internal shafts and gears of each magneto showed no evidence of failure or malfunction. Each spark plug had dirt and debris covering the electrodes. The engine fuel system was disassembled and showed no evidence of failure or malfunction. Examination of the right propeller showed it had blade and spinner damage consistent with rotation at the time of ground impact. The propeller blades were in a low pitch setting.

MEDICAL AND PATHOLOGICAL INFORMATION

Post-mortem examination of the pilot-in-command/flight instructor was performed by Dr. Maria S. Conte, Institute of Forensic Sciences, San Juan, Puerto Rico. The cause of death was attributed to severe traumatic injuries. Injuries to this pilot's hands were consistent with operating the aircraft's controls at the time of the accident. Post-mortem toxicology studies on specimens obtained from this pilot were performed by the Institute of Forensic Sciences, San Juan, and by the FAA, Civil Aeromedical Institute, Oklahoma City, Oklahoma. The studies were negative for ethanol alcohol, basic, acidic, and neutral drugs, carbon monoxide, and cyanide.

The studies were positive for 89.200 ug/ml salicylate and 47.900 ug/ml acetaminophen.

Post-mortem examination of the dual student was performed by Dr. Conte. The cause of death was attributed to severe traumatic injuries. This pilot had no injuries to his hands that would be consistent with operation of the aircraft's controls at the time of the accident. Post-mortem toxicology studies on specimens obtained from this pilot were performed by the Institute of Forensic Sciences and the FAA, CAMI, Oklahoma City, Oklahoma. The studies were positive for .010 ug/ml marihuana in blood, .319 ug/ml marihuana in urine, and 10.90 ug/ml acetaminophen in blood. The studies were negative for ethanol alcohol and cyanide.

Post-mortem examination of the passenger was performed by Dr. Yocasta Brugal, Institute of Forensic Science, San Juan. The cause of death was attributed to severe traumatic injuries. Post-mortem toxicology studies on specimens obtained from the passenger were performed by the Institute of Forensic Science. The studies were negative for ethanol alcohol, basic, acidic, and neutral drugs.

Additional medical and pathological information is contained in Supplements K and the toxicology reports attached to this report.

TEST AND RESEARCH

At the time the flight was lost from radar, the ground speed was observed to be about 83 knots. Meteorological information indicated the flight would have had about a 15 knot tail wind, making the indicated airspeed of the aircraft about 68 knots. The flight manual for the Aero Commander 500S, indicates the stall speed of the aircraft for the conditions and configuration at the time of the accident was 68 knots indicated airspeed.

ADDITIONAL INFORMATION

The aircraft wreckage was released to Charles G. Maynard, Sample International, Ormond Beach, Florida, on February 13, 1996. Components retained by NTSB for further examination were released to Mr. Maynard on June 6, 1996.

Pilot Information

Certificate:	Airline Transport; Flight Instructor	**Age:**	33, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land; Single-engine Sea	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Helicopter; Instrument Airplane; Instrument Helicopter	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	04/28/1995
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	6560 hours (Total, all aircraft), 50 hours (Total, this make and model), 180 hours (Last 90 days, all aircraft), 35 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Aero Commander	**Registration:**	N79NU
Model/Series:	500S 500S	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	3206
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	10/09/1995, Annual	**Certified Max Gross Wt.:**	6750 lbs
Time Since Last Inspection:	22 Hours	**Engines:**	2 Reciprocating
Airframe Total Time:	3323 Hours	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-540-E1B5
Registered Owner:	HILL CONSTRUCTION CORPORATION	**Rated Power:**	290 hp
Operator:	HILL CONSTRUCTION CORPORATION	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:	HILL AVIATION	**Operator Designator Code:**	QHAA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	SJU, 10 ft msl	**Distance from Accident Site:**	26 Nautical Miles
Observation Time:	1653 AST	**Direction from Accident Site:**	91°
Lowest Cloud Condition:	Scattered / 3500 ft agl	**Visibility**	15 Miles
Lowest Ceiling:	None / 0 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	14 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	28°C / 19°C
Precipitation and Obscuration:			
Departure Point:	SAN JUAN, PR (SIG)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	VFR on top
Departure Time:	1628 AST	**Type of Airspace:**	Class C

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	JEFFREY L KENNEDY	**Report Date:**	02/26/1997
Additional Participating Persons:	RAMON J RODRIGUEZ; SAN JUAN, PR ROGER J ADERMAN; ARLINGTON, WA EDWARD ROGALSKI; WILLIAMSPORT, PA ROGER W STALLKAMP; PIQUA, OH		
Publish Date:			
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