National Transportation Safety Board
Aviation Accident Final Report

Location:	PAHOKEE, FL	**Accident Number:**	MIA99FA043
Date & Time:	12/08/1998, 1902 EST	**Registration:**	N788SP
Aircraft:	Cessna 402B	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - Instructional		

Analysis

The flight departed Fort Lauderdale's Executive Airport (FXE) at about 1833 on a northwesterly heading for the co-located Pahokee VOR/airport (PHK) on the second training session of the day for the 2 front seat occupants. This particular flight had a dual purpose, in that the left seat occupant/new-hire was getting a 'pre-check ride' by the right seat occupant/instructor/PIC, and the instructor was being observed by the air taxi's director of operations in anticipation of an endorsement for an FAA designation as a company check airman. The flight was not in contact with any ATC facility and was squawking a transponder code consistent with non-controlled, VMC flight. At 1902, the Miami ARTCC lost radar contact at the 334 degree radial/12 nmi from the PHK VOR at 1,300 feet agl. Eight days later, the wreckage with its 3 occupants still inside, was located and recovered from the lake bottom. The location roughly corresponds with the radial of the PHK VOR that would have to be tracked while performing the VOR Runway 17 approach. The wreckage was intact except for 2 nacelle doors, the nose cone, and the left propeller, and revealed no engine, airframe, or component failure or malfunction. There was no evidence of a bird strike. Evidence revealed that both engines were developing power and the airplane was wings level in the approach configuration and attitude at water contact.

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 adequate altitude during the approach.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: APPROACH

Findings
1. (C) ALTITUDE - INADEQUATE - PILOT IN COMMAND(CFI)
2. TERRAIN CONDITION - WATER

Factual Information

HISTORY OF FLIGHT

On December 8, 1998, about 1902 eastern standard time, a Cessna 402B, N788SP, registered to Southern Pride Aviation, Inc., operated by Bimini Island Air as a 14 CFR Part 91 training flight, crashed into Lake Okeechobee about 6 miles northwest of the Pahokee Airport and colocated VOR (PHK), Pahokee, Florida. Visual meteorological conditions prevailed and no flight plan was filed. The ATP-rated pilot, CFI-rated copilot, and an ATP-rated observer/director of operations (DO) were fatally injured. The flight originated from Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida, about 1833.

According to the president and chief operating officer (COO) of the air taxi, the dual purpose training flight was being conducted as a precheck-ride preparatory to the left pilot seat occupant's FAA pilot-in-command, (PIC) check-ride the next day, and as an observation ride by the air taxi's DO preparatory to the right seat occupant/instructor's designation by the FAA for a company check-airman qualification. The COO and another instructor stated the typical training scenario was a round robin flight from FXE to PHK, perform VOR approaches, return to FXE for the precision approaches (ILS), and perform the air-work while en route in both directions.

According to Miami ARTCC, the flight departed FXE to the northwest, with a 1200 code on their transponder, and was maneuvering at 5,500 feet msl, proceeding directly to PHK, when they were observed to descend and cross overhead PHK at 2,500 feet msl. The flight continued out the 334-degree radial, still in a descent. The last radar contact was observed at 1901:51, at an altitude of 1,300 feet agl, at 12 nmi on the 334-degree radial, which is overhead Lake Okeechobee.

The published VOR approach for PHK depicts passing overhead the PHK VOR and tracking outbound on the 342-degree radial, descending to 1,500 feet msl, and a left procedure turn to the inbound course of 162 degrees within 10 nmi. Once established inbound on the 342-degree radial, descent to minimums of 540 feet msl for a straight-in approach and 620 feet msl for a circling approach is authorized. The PHK airport has no control tower, and the FBO monitoring the unicom frequency was closed at the time of the accident.

There were no witnesses to the accident, and the first notification of an overdue airplane came from the company's COO at 0120 on the morning of December 9, 1998, to FXE tower. FXE tower subsequently notified the Air Force Rescue Coordination Center (RCC) at 0231 the same morning. The CAP began an airborne search on December 9, as mission no. 98M2734 and ceased their search on December 13, 1998, at 2045, when the airplane's nose cone was recovered and a positive identification was made by the COO. The airplane was located on December 15, by a search and recovery boat, confirmed by Palm Beach Sheriff Department divers, and recovered from the bottom of the lake at an approximate depth of 12 feet, on December 16. The RCC and Coast Guard reported not receiving an ELT signal throughout their individual searches, however, the ELT did transmit a weak signal that could be received by helicopter or boat-borne handheld radio near the wreckage.

PERSONNEL INFORMATION

Information pertaining to the PIC is contained on page 3, of this report. Information pertaining to the SIC is contained in Supplement E, of this report.

AIRCRAFT INFORMATION

The airplane was configured for single pilot, Part 135 operation, in that there were no duplicate flight instruments on the right side panel. The airplane was configured with 8 passenger seats. The Hobbs meter aboard the airplane recorded only airborne time, in that the recording started when a ground-sensing switch on the landing gear sensed weight-off-gear. The circuit breaker to that circuit was not found popped during wreckage examination, and it is believed the Hobbs meter may have continued running for some time after water impact.

The fuel tank configuration for the airplane consisted of two wing tip tanks called main fuel tanks, holding 50 gallons each, and two wing auxiliary tanks holding 31.5 gallons each. According to fuelling receipts and the air-taxi chief operating officer's statement, the airplane was last fuelled to full mains, (100 gallons, total) before the flight previous to this training flight. From data extracted from the FXE tower tapes, that previous flight lasted 1 hour 18minutes, (1.3) hours, and the accident flight lasted about 29 minutes, for a total flight time of 1 hour 47 minutes, (1.8) hours. Teledyne/Continental Engines factory personnel stated that a reasonable fuel consumption estimation for a training scenario would be about 40 gallons per hour, including both engines, or about 2.5 hours total endurance. Before the filling of the main fuel tanks to a total of 100 gallons, (the only mention of auxiliary fuel tank loading was that "it was standard procedure to carry at least 'slosh' fuel") the Hobbs reading recorded on the airplane's log sheets was 1961.8 flight hours. The Hobbs reading from the wreckage was 1964.4 flight hours, for a total elapsed flight time of 2.6 hours. A reasonable explanation for the apparent discrepancy between the 1.8 actual flight time and the Hobbs recorded time of 2.6 could be in the sensing for the Hobbs meter discussed above. Both engines were developing power at water impact. METEOROLOGICAL INFORMATION

Visual meteorological conditions prevailed at the time of the accident. Sunset for the day and area of the accident was 1728, and end of civil twilight was 1753. About 1/4 of the moon was visible; however, there was a ceiling reported at 20,000 feet agl. (For additional information see, Weather Information of page 4 of this report).

WRECKAGE AND IMPACT INFORMATION

The airplane lay submerged in about 12 feet of water on the bottom of Lake Okeechobee for 7 days before it was located. It came to rest, upright, on a northwest heading. The airplane was recovered intact except for two engine cowling doors, the fiberglass nose-cone, and the left propeller, at coordinates N 26.52.00 and W 080.43.36 degrees or about 4.5 miles from the lake's eastern shore. The location coincides closely with the 342-degree radial of the PHK VOR. The fuselage exhibited no definite crush line, however, examination of the forward fuselage and each wing's bottom skin panels showed inward deformation, with the left wing exhibiting slightly deeper indentations than the right. The plastic windows and cockpit windshields were intact and not broken. The flaps had been extended to the approach flap setting and the landing gear were up. Both wing tip tanks exhibited impact damage to their leading edges as well as their trailing edges. Both engine cowling doors had been "blown" off at water impact. Police divers returned to the accident site at a later date, but did not recover the left propeller.

All cockpit engine controls were found full forward and no abnormal rudder trim was noted, as in a simulated single engine approach. Content of samples taken from the three fuel tanks revealed 90 percent water. The left main tank was compromised. Testing for water contamination of the fuel in both fuel flow dividers was negative. The left propeller mounting

studs had pulled out of the hub and remained on the crankshaft flange. Due to the placement of the hoisting slings near the wing roots during recovery, the wing leading and trailing edges had been squeezed and deformed during hoisting, and the controls running along these edges sustained cable stretching and rod deformation. Similarly, the flaps were forced to the retracted position by impingement of their control linkage by the hoist slings. Fuel tank selector positions, both in the cockpit and at the wing-mounted valve, were undeterminable due to the control-rod deformation. Flap position placement was determined by chain and sprocket position at the flap motor.

All airframe components were found in the immediate area. Flight controls and airframe components showed no signs of precrash failure or malfunction. Control integrity of all flight controls was established. The trim tab positions were within normal limits for the regime of flight.

The approach plate being used by the crew contained the warning, "Birds in vicinity of airport". No evidence of bird strike was found in either engine induction system. Left and right windshields revealed no evidence of bird strike.

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examinations of the left pilot seat occupant, the right pilot seat occupant, and the observer were performed by Jacqueline M. Martin, M.D., District Medical Examiner, Florida District-15, West Palm Beach, Florida. The cause of death was reported as probable drowning in all cases. No findings that could be considered causal were noted.

Postmortem toxicology testing on specimens obtained from the left and right pilot seat occupant were performed by Dennis V. Canfield, Ph.D., Manager, FAA Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma. Tests revealed that 122 mg/dL of ethanol was detected in the brain of the left seat occupant and 146 mg/dL of ethanol in the brain of the right seat occupant. In both cases, it was stated that the specimens were putrefied and readings may be the result of postmortem ethanol production.

TEST AND RESEARCH

The engines were removed and transported to an engine overhaul facility where the cylinders and induction system were examined for evidence of bird strike, blown free of water and silt, the oil changed, and the magnetos and ignition harnesses dried out. The engines were mounted on a test stand, fitted with a club propeller, and run up to takeoff power. No engine defects were noted.

Examination of photographs taken of the left engine propeller mounting flange by the propeller manufacturer's investigators revealed that the left engine was developing power when the propeller encountered the water. Examination of the right propeller by manufacturers investigators revealed: (1) all damage was a result of water impact and there was no evidence of propeller malfunction prior to impact, (2) propeller was rotating at impact, developing power, very near its low pitch stop.

Miami ARTCC's military liaison specialist stated that three missions were being flown by the military at the time of the accident, (1) Avon Park restricted area, from 44 to 98 miles northwest of the crash site was being used, (2) a AWACS (airborne warning and control) aircraft was west of Fort Myers, over the Gulf of Mexico and, (3) a missile firing was being conducted in Eglin AFB's airspace in the northern Gulf of Mexico.

The aircraft had been fueled by World Jet, Inc., located on the FXE airport at about 1330, on the day of the accident . The amount of fuel pumped was 31 gallons of 100 LL and the fuel slip was signed by the right seat occupant. The fuel farm filters and pumps and the fuel truck filters and pumps had been checked for operation and contamination before fueling N788SP the day of the accident.

ADDITIONAL INFORMATION

The aircraft wreckage, minus the right propeller and aircraft and engine maintenance records, was released to a representative of the operator on December 28, 1998. The propeller and aircraft and engine maintenance records were returned to the operator on April 1, 1999.

Pilot Information

Certificate:	Flight Instructor; Commercial	**Age:**	25, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
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 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	03/31/1998
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	1440 hours (Total, all aircraft), 8 hours (Total, this make and model), 1350 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N788SP
Model/Series:	402B 402B	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	402B1312
Landing Gear Type:	Retractable - Tricycle	**Seats:**	10
Date/Type of Last Inspection:	11/06/1998, Continuous Airworthiness	**Certified Max Gross Wt.:**	6300 lbs
Time Since Last Inspection:	39 Hours	**Engines:**	2 Reciprocating
Airframe Total Time:	7940 Hours	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, aided in locating accident	**Engine Model/Series:**	TSIO-520-E
Registered Owner:	SOUTHERN PRIDE AVIATION,INC.	**Rated Power:**	300 hp
Operator:	BIMINI ISLAND AIR	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night/Dark
Observation Facility, Elevation:	PBI, 19 ft msl	**Distance from Accident Site:**	40 Nautical Miles
Observation Time:	1853 EST	**Direction from Accident Site:**	130°
Lowest Cloud Condition:	Scattered / 8000 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	Broken / 20000 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	90°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	24°C / 20°C
Precipitation and Obscuration:			
Departure Point:	FT. LAUDERDALE, FL (FXE)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	1833 EST	**Type of Airspace:**	Class E

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	ALAN C STONE	**Report Date:**	02/16/2001
Additional Participating Persons:	JAMES R PICCOLI; FT. LAUDERDALE, FL TOM L MOODY; WICHITA, KS ANDREW HALL; WICHITA, KS DALE CARTER; MOBILE, AL		
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 pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		