National Transportation Safety Board
Aviation Accident Final Report

Location:	MIAMI, FL	**Accident Number:**	MIA98FA200
Date & Time:	07/17/1998, 1431 EDT	**Registration:**	N7578L
Aircraft:	Piper PA-31-310	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

An aircraft mechanic working abeam of the point on the runway that the airplane lifted off was attracted by the sound of engine roughness, and observed black smoke trailing from the left engine. The airplane continued to climb to about 150 feet above ground level, entered a series of shallow left turns at about the airport's east boundary at a slow speed, and then entered a rapid left roll and pitched down. The pilot transmitted an unreadable call on FAA tower frequency, but the words, 'we got a..' and 'engine' were clearly discernable. The airplane crashed in dense brush about 1.25 miles northeast of the airport. Contamination was found in the left engine fuel system. Post crash testing of the left fuel servo revealed it would not sustain a steady state fuel flow above about one half throttle due to contamination.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadequate preflight inspection which led to fuel contamination and subsequent loss of engine power. Also causal was the pilot's failure to maintain single engine flying speed (VMC).

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - MECH FAILURE/MALF
Phase of Operation: TAKEOFF

Findings
1. FUEL SYSTEM,FUEL CONTROL - CONTAMINATION
2. (C) PREFLIGHT PLANNING/PREPARATION - INADEQUATE - PILOT IN COMMAND

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - UNCONTROLLED

Findings
3. (C) AIRSPEED(VMC) - NOT MAINTAINED - PILOT IN COMMAND

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: MANEUVERING - TURN TO LANDING AREA (EMERGENCY)

Findings
4. TERRAIN CONDITION - HIGH VEGETATION

Factual Information

HISTORY OF FLIGHT

On July 17, 1998, about 1431 eastern daylight time, a Piper PA-31-310, N7578L, registered to a private individual, operating as a Title 14 CFR Part 91 personal flight, crashed after takeoff from Kendall-Tamiami Executive Airport (TMB), Miami, Florida. Visual meteorological conditions prevailed and no flight plan was filed. The airplane was destroyed, and the commercial-rated pilot, the sole occupant, was fatally injured. The flight was originating at the time of the accident.

According to the FAA control tower communication tapes, N7578L called for, and was given, clearance for takeoff and a downwind departure from runway 9L at about 1429. About 2 minutes later, a radio transmission from N7578L that included some unintelligible words, but clearly mentioned the words, "we got a.." and "engine", was made.

The airplane impacted the terrain about 1 mile northeast of the geographic center of the airport in heavy underbrush of scrub pines and palmetto. Several witnesses observed the airplane in its departure turn at an altitude below 100 feet agl, and hearing unusual engine sounds seconds before the accident. An aircraft mechanic, standing abeam of the departure runway, observed most of the takeoff roll and the airplane's gyrations before it went out of sight into the brush. He states that he was first attracted to the sound of a rough running engine, and saw that the left engine was trailing black smoke. He states that the airplane never got above about 150 feet agl, and its airspeed seemed slow. The last thing he observed was a rapid left roll, and a marked pitch down of the nose.

PERSONNEL INFORMATION

Although requested of the family numerous times, the pilot's logbooks were not recovered. At the time of the pilot's application for his second class medical certificate on December 5, 1996, he listed his flight time as 6,700 hours. According to numerous sources from the airport community at TMB, the pilot tried to maintain the airplane as economically as possible, and in fact, did some of his own maintenance.

AIRCRAFT INFORMATION

The airplane and engine logbooks were not located after the accident. An interview with the owner/operator of a local engine repair station revealed that the right engine had undergone a recent major overhaul by the repair station and certified "zero time" on November 4, 1997. The owner/operator of the repair station was told at that time that the left engine would be brought in for a major overhaul in "a couple of months". The pilot had previously mentioned to a friend and co-worker that the left engine was 400 hours over factory recommended time for overhaul.

METEOROLOGICAL INFORMATION

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

WRECKAGE AND IMPACT INFORMATION

Examination of the crash site revealed the airplane crashed on county property adjacent to Boystown of Florida, a foster care facility, at coordinates, N25.39.65 and W80.25.07 or

about 1.26 miles/072 degrees from the airport's center. The site roughly corresponds to a point in the departure traffic pattern off runway 9L at TMB about the 110-degree point of a 180-degree down wind departure turn. The wreckage path and tree and foliage scars indicated the twin engine airplane was rolling left about its longitudinal axis and was about 70 degrees nose down, inverted, near wings level with both propellers turning, at ground impact. The nose of the airplane was crushed along a line from about 2 feet behind the two pilots' seats on the top of the airplane to about 1 foot aft of the rudder pedals on the bottom. Wing leading edges were deformed backward and toward the top of the airplane and matched the fuselage crush line. From the point of initial impact, where the propellers and nose pieces were found buried in the hard packed sand, the airplane bounced, became upright, and slid tail first to its final resting place. Extensive wing trailing edge damage was done as the wings encountered small trees in the backward slide. The aft fuselage from the third cabin window, aft sustained little damage. There was no explosion or fire, although the site revealed heavy fuel leakage. The wreckage came to rest heading about 030 degrees. Everything forward of the crush line, including the instrument panel and radios was demolished. Both engines were broken away from their mounts and both propellers had broken away at the crankshaft flange. The site smelled strongly of aviation fuel.

Postcrash examination of the wreckage revealed that the pilot's seatbelt was buckled and had been cut by rescue personnel. The shoulder harness had not been used. All flight control surfaces were present at impact. Complete continuity of primary flight control path was impossible due to damage to the cockpit floor/center section area. Aileron control rods had separated at the wing bellcrank, but control cable path was confirmed from center section to the bellcrank. Rudder and elevator controls were confirmed intact and operable from the control surfaces to about the rear baggage compartment. Rudder cables were attached at the pedals. Measured at the rudder trim jackscrew, the rudder was trimmed for 1/4 of full range for nose right. Similarly measured, the elevator was trimmed for 1/2 of full nose up range for nose up. Landing gear and flaps were retracted and cowl flaps were closed. Both fuel cells, (main and auxiliary) on both wings had been compromised and contained no fuel. The cockpit fuel management panel was found with left engine selected to left main tank, right engine to right main, and crossfeed selector to "off". The left and right fuel filters were removed and a small amount of fuel in each was tested negatively for water content, however, the left filter cartridge contained aluminum and brown colored sediment, and the cartridge housing had sediment crusted at it's bottom and was showing evidence of its own corrosion. The right fuel filter cartridge contained a smaller amount of the same sediment and the cartridge housing held a small amount in it's bottom.

Postcrash examination of the engines and propellers revealed that both propellers were turning at impact and both broke off at the crankshaft flange. The left propeller showed all three blades bent aft from a point about 10 inches outward from the hub. Two blades bent aft about 15 degrees and the third blade about 40 degrees. All showed chordwise scoring on the front of the blades, no marking on the aft sides, and little leading edge damage. The spinner was crushed against the hub, which was bent at about a 15 degree angle and showed less rotational scoring that the right spinner. The blades showed signs of surface corrosion. The right propeller had one blade broken at its retention radius with little blade bending and heavy leading edge scoring, and two blades bent aft, one about 20 degrees from a point 10 inches from the hub, and the third about 45 degrees from its midspan point. The two bent blades had extensive rotational scoring on front and aft sides with heavy leading edge burnishing and

scoring. The spinner was crushed against the hub, and showed moderate rotational scoring. The propeller appeared to have been recently overhauled. Both propellers were removed for further examination. Both propeller governors revealed no evidence of precrash malfunction.

Both engines had broken loose from their engine mounts, both exhaust systems and turbochargers had been displaced rearward, and the aft mounted accessories sustained severe crushing damage. Both drive trains were manually rotated and revealed no malfunctions of the rotating group, valve train, and accessory section. Both engine's spark plugs were checked for security and removed, revealing good compression in the proper firing order at all cylinders, and no cylinder wall scoring could be seen. The left engine spark plug electrodes showed a black coloration consistent with a rich fuel/air mixture combustion. The right engine spark plug electrodes showed the ash-brown coloration of a normal fuel/air mixture combustion, (Champion Spark Plugs Check-A-Plug chart AV-27). The ignition harnesses had been severed in several places, but the connections at the magneto and spark plug terminals were secure. The left engine magneto to engine timing could not be confirmed due to magneto impact damage. One magneto sustained a shattered housing and could not be field tested for spark. The other sustained a broken hold down clamp, and it tested good for spark at all six terminals. Both right engine magnetos also sustained impact damage that shattered their housings and precluded checking magneto to engine timing or testing for spark.

The fuel injection servos and induction systems for both engines were free of obstructions, and all engine compartment fuel lines were in place with connections secure. The fuel inlet filter screens for both servos were found properly installed and were free of contamination. The left servo was removed for further testing. Both engine driven fuel pumps showed no sign of precrash malfunction. The injector nozzles and all fuel feed and upper deck reference lines were found in place and all fittings and connections were secure. All nozzles and lines were then removed and found unobstructed. Both exhaust systems, although severely deformed, were unobstructed. The turbocharger wastegates showed no evidence of precrash malfunction. The turbochargers were removed for further testing.

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examination and toxicological testing of the pilot was performed by Bruce A. Hyma, M.D. at the Medical Examiner's Department, Miami, Florida, and revealed cause of death to be blunt force trauma to head and chest. Their toxicology test results showed 9.5 percent saturation for carbon monoxide in the blood and a finding of "detected" for morphine in the urine. Because morphine was found "undetected" in the blood specimens, it is not considered relevant to the accident. Toxicological tests were also conducted at the Federal Aviation Administration Research Laboratory, Oklahoma City, Oklahoma. The tests were negative for ethanol, basic, acidic, and neutral drugs. They did not test for carbon monoxide due to unsuitability of specimen.

TEST AND RESEARCH

Records from the pilot's fixed-base operator revealed that 35 gallons of 100 LL aviation fuel was pumped into the airplane's fuel tanks just prior to the accident. Records show the fuel farm had been inspected the day before and the fuel truck filtration equipment had been inspected the day of the accident, with no negative entries noted.

The magnetos for the right engine were impact damaged to the point that they were not removed, but the left engine magnetos were removed and shop examined. Points, point gap,

coils, coil lead insulation, condensers, magnets, and teflon drive gears showed no discrepancies. No areas of carbon tracking were found. The block and points for the left engine, left magneto looked newly changed.

The left engine fuel servo was removed from the engine and subjected to repair station operation and disassembly examination. It was revealed that three mandatory updates to the servo had not been accomplished. Flow testing of the servo revealed a steady fuel flow could not be sustained at high power settings. Disassembly inspection of the servo revealed a bent diaphragm stem and aluminum oxide sediment on and adjacent to the diaphragm. This matched the appearance of the sediment found in the left fuel filter container and fuel filter cartridge assembly.

Subsequent disassembly examination of the three bladed, hydraulically operated constant speed, feathering propellers by NTSB and factory investigators revealed that the left propeller's condition and attached decals indicated it had been operated at least 10 years since overhaul. Two of the left propeller blades showed impact marks on the hub base plates corresponding to about 45 degrees of blade angle, and the 3rd blade at about 7 degrees. Impact forces on the propeller hub's pitch control piston showed it was driven forcibly by ground impact to the low pitch stop and was further confirmed by one blade's pitch knob being broken in the direction of low pitch. For this reason, all three blades had to be at an angle higher than the impact marks revealed, precrash. The blade angle of 7 degrees was a result of impact damage because the physical limit of low pitch is 13 degrees. The conclusion stated by the factory investigative report was, "The left propeller was rotating with little or no power at impact and was very possibly feathered or moving toward feather."

The right propeller's condition indicated it had undergone a recent overhaul. Impact marks on the 3 hub base plates revealed impressions at 24 degrees, 30 degrees and 37 degrees. At maximum power, according to the factory report, the blades should be between 17 degrees and 20 degrees of pitch, depending on airspeed. The right propeller hub sustained crushing of the pitch control cylinder and the opposite effect than with the left propeller resulted, that is, the blades had been ground impact driven toward high pitch. This was confirmed by one blade's pitch knob being broken off in the direction of high pitch. In this case the blades had to be at an angle less than shown by the impact marks, precrash. The conclusion stated by the factory report was, "The right propeller was rotating with power, more power than the left engine."

The turbochargers were shipped to the manufacturer for disassembly examination. Analysis of internal rotational score marks and contour rub marks showed that both compressors and turbines were turning at impact. Neither wastegate could be functionally tested due to impact damage. The report concluded, "No pre-accident conditions were found that would have interfered with normal operation." The examiner added, "both turbochargers exhibited surface rust in areas that suggest possible infrequent operation and/or maintenance."

A copy of the audio tape of radio transmissions between the pilot and TMB control tower was sent to the NTSB Vehicles Recorder Laboratory in Washington, D.C. for sound spectrum analysis in an effort to substantiate engine speeds. Duration of N7578L's transmissions were insufficient to determine separate engine speeds. The analysis did, however determine that one or both engines were running at 2,440 rpm during the pilot's last transmission, (takeoff rpm, according to flight manual is 2,575 rpm).

ADDITIONAL INFORMATION

The wreckage was subsequently released, less the components listed on the NTSB Release of Aircraft Wreckage form, to a representative of the operator's estate, on August 20, 1998. All components retained by the NTSB for further examination were shipped to the representative of the operator's estate on April 8, 1999.

Pilot Information

Certificate:	Commercial; Flight Engineer	**Age:**	57, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	12/05/1996
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	6700 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N7578L
Model/Series:	PA-31-310 PA-31-310	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	31-7401201
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	Annual	**Certified Max Gross Wt.:**	6500 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	TIO-540 SER
Registered Owner:	JON SPEISMAN	**Rated Power:**	310 hp
Operator:	JON SPEISMAN	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	TMB, 10 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	1445 EDT	**Direction from Accident Site:**	72°
Lowest Cloud Condition:	Scattered / 3500 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	Broken / 10000 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	33°C / 26°C
Precipitation and Obscuration:			
Departure Point:	(TMB)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	1430 EDT	**Type of Airspace:**	Class D

Airport Information

Airport:	KENDALL-TAMIAMI EXECUTIVE (TMB)	**Runway Surface Type:**	Asphalt
Airport Elevation:	10 ft	**Runway Surface Condition:**	Wet
Runway Used:	9L	**IFR Approach:**	None
Runway Length/Width:	5002 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	ALAN C STONE	**Report Date:**	08/10/2000
Additional Participating Persons:	AL KIMBALL; MIAMI, FL MARK PLATT; WILLIAMSPORT, PA PAUL LEHMAN; VERO BEACH, FL		
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/.		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.