# Aviation Investigation Final Report

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| **Location:** | FORT LAUDERDALE, Florida | **Accident Number:** | MIA00LA049 |
| **Date & Time:** | December 13, 1999, 15:04 Local | **Registration:** | N21312 |
| **Aircraft:** | Piper PA-32RT-300T | **Aircraft Damage:** | Substantial |
| **Defining Event:** | | **Injuries:** | 3 Minor |
| **Flight Conducted Under:** | Part 91: General aviation - Personal | | |

## Analysis

At about 150 feet agl, during takeoff climb, the flight experienced a partial engine power loss due to an intermittently operative right-hand magneto condenser. The pilot stated the airplane stalled and collided with trees, eventually coming to rest partially submerged in a marina basin. Disassembly examination of the core engine and all fuel components revealed no mechanical abnormalities. Bench testing and disassembly examination of the right-hand magneto condenser revealed no damage attributable to the submersion and a short to ground that would have rendered the magneto inoperative. Using the pilot's estimate of fuel aboard, the occupant's weights, and the FAA's estimate of the baggage and cargo aboard, computations revealed the aircraft was about 272 pounds over maximum gross takeoff weight. The pilot was not BFR current, nor was the conversion to a three-bladed propeller properly documented in the maintenance records.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the pilot to maintain minimum flying airspeed, (Vso) during takeoff following a partial loss of engine power resulting in the aircraft stalling, an uncontrolled descent, and collision with trees. A factor in the accident was the failure of the right-hand magneto condenser and the pilot's operation of the aircraft in excess of its maximum gross takeoff weight.

## Findings

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

Findings
1. (F) IGNITION SYSTEM,IGNITION COIL - SHORTED
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF

Findings
2. (F) AIRCRAFT WEIGHT AND BALANCE - EXCEEDED - PILOT IN COMMAND
3. (C) AIRSPEED(VS) - NOT MAINTAINED - PILOT IN COMMAND
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Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
4. OBJECT - TREE(S)

## Factual Information

On December 13, 1999, about 1504 eastern standard time, a Piper PA-32RT-300T, N21312, registered to a private individual, operating as a Title 14 CFR Part 91 personal flight, crashed on takeoff in the vicinity of Hollywood, Florida. Visual meteorological conditions prevailed and a VFR flight plan was filed. The airplane received substantial damage and the private-rated pilot and two passengers sustained minor injuries. The flight was originating at the time of the accident.

According to the pilot, he departed from Fort Lauderdale-Hollywood International Airport's runway 27L, abeam of "E" taxiway intersection, and lifted off at the 9R numbers. (The distance remaining for takeoff from "E" intersection is 4,000 feet vs. total runway length of 5,276 feet). At about 150 feet agl and 90 knots, as he reached to raise the gear handle, the manifold pressure indication started dropping. He applied full throttle, but the airspeed fell below 60 knots, the stall warning sounded, and the cowling was shaking. The advent of a forced landing into a residential area straight ahead or a parking lot to the right necessitated his trying for a closer-in location left of runway centerline. He collided with trees and came to rest in a boat marina about 1/4 mile southwest of the airport. The pilot estimated that the airplane's fuel tanks held 70 to 75 gallons of fuel on departure, (fuelling records show that 66.11 gallons of 100LL was charged to the pilot's credit card from Fort Pierce Air Center, Fort Pierce, Florida, at 12:38 on December 13,1999).

The airplane came to rest nose down, upright, submerged except for about the aft 7 feet of fuselage and the empennage. The wing fuel tanks had ruptured. Propeller damage revealed tree scarring on two of three blades. One blade had fractured near the propeller hub and was not found.

The Lycoming TIO-540-S1AD engine, serial no. RL-5598-61A, was removed from the wreckage and disassembly examined by NTSB and FAA personnel. Magneto firing order to piston/valve relationships were proper. Drive train continuity was established and all gears showed a proper relationship. The cylinders, drive case, and all driven components were removed and examined with no irregularities noted. The engine-driven fuel pump and oil pump functionally tested normally, and their mechanical components revealed no damage. The oil filter and screen were free of metal particles or other contaminants. The fuel servo's filter screen was clean and smelled of 100LL aviation fuel. The flywheel, propeller governor, and turbocharger intercooler had broken loose due to tree collision. The turbocharger turbine blades revealed tree FOD damage.

The fuel servo and magnetos were removed for further repair station examination. The fuel servo disassembly inspection revealed no significant mechanical defects that would have caused precrash engine instability; however, proof of water containment was evident. The

single drive dual magnetos, Teledyne Continental model no. D6LN-3000, part no. 10-682560-13, were bench test operated through an rpm range between 598 rpm and 5,000 rpm. The initial test run revealed normal intensity sparking at all ignition towers with no irregularities; however, after about five minutes of test run, between 1,231 rpm and 5,000 rpm, spark arcing was observed at the right-hand set of breaker points. Following the test run, the accident condensers were replaced with another, shop-supplied set and the arcing ceased. The accident condensers were tested for capacitance against the specified .32 to .43 micro-farads. The left condenser tested .30 micro-farads. The right condenser showed no reading at all, and was subsequently sent to the Teledyne Continental Motors factory for further examination, with FAA oversight. Factory testing revealed the condenser had not been submersion damaged, and that the internal windings were shorted to ground. See the FAA and Teledyne Continental Motors Engine/Component Investigation Report, an attachment to this report.

Metallurgical analysis of the separated propeller blade's fracture site was performed by a metallurgical testing service. The fracture revealed evidence of single overload failure due to impact. No evidence of fatigue or corrosion was present. The metallurgical laboratory analysis report is an attachment to this report. The propeller found on the wreckage is a Hartzell three-blade model no. HC-E3YR-1RF with blade model no. F7673DR. The type certificate data sheets for the PA-32T-300T indicate that a two-blade model no. HC-E2YR-1RF with blade model no. F8477-4 was factory installed and must be used unless STC 3181NM, (three-blade propeller substitution for two-blade) is complied with. There is no reference to the STC in the airplane's maintenance records.

A computation of the airplane's weight and balance, using the pilot's estimate of fuel on board and the FAA inspector's statement of the weight and loading of the cargo and passengers aboard, revealed that the airplane departed in an over loaded condition of about 272 pounds at a center of gravity location 1.85 inches within the aft limit.

The pilot did not produce documentation verifying that he was biennial flight review, (BFR) current. The pilot entered January 28, 2000, as his BFR date on his NTSB Form 6120.1/2, (date of accident, December 13, 1999). Federal Air Regulation Part 61.56 states that no person may act as pilot-in -command of an aircraft unless, since the beginning of the 24th calendar month before the month in which that pilot acts as pilot-in-command, that person has had a flight review and a logbook entry to that effect entered by an authorized flight instructor.

## Pilot Information

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| **Certificate:** | Private | **Age:** | 42,Male |
| **Airplane Rating(s):** | Single-engine land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | |
| **Instrument Rating(s):** | None | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | None | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 3 Valid Medical--no waivers/lim. | **Last FAA Medical Exam:** | April 1, 1999 |
| **Occupational Pilot:** | No | **Last Flight Review or Equivalent:** | |
| **Flight Time:** | 723 hours (Total, all aircraft), 222 hours (Total, this make and model), 723 hours (Pilot In Command, all aircraft), 113 hours (Last 90 days, all aircraft), 28 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | Piper | **Registration:** | N21312 |
| **Model/Series:** | PA-32RT-300T PA-32RT-30 | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 32R7887199 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | 7 |
| **Date/Type of Last Inspection:** | June 2, 1999 Annual | **Certified Max Gross Wt.:** | 3600 lbs |
| **Time Since Last Inspection:** | 266 Hrs | **Engines:** | 1 Reciprocating |
| **Airframe Total Time:** | 2997 Hrs | **Engine Manufacturer:** | Lycoming |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | TIO-540-S1AD |
| **Registered Owner:** | MONTE POLLOCK | **Rated Power:** | 300 Horsepower |
| **Operator:** | | **Operating Certificate(s) Held:** | None |
| **Operator Does Business As:** | | **Operator Designator Code:** | |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual (VMC) | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | FLL ,11 ft msl | **Distance from Accident Site:** | 1 Nautical Miles |
| **Observation Time:** | 15:30 Local | **Direction from Accident Site:** | 25° |
| **Lowest Cloud Condition:** | Scattered / 3500 ft AGL | **Visibility** | 10 miles |
| **Lowest Ceiling:** | Broken / 10000 ft AGL | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 14 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 190° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 29 inches Hg | **Temperature/Dew Point:** | 28°C / 19°C |
| **Precipitation and Obscuration:** | No Obscuration; No Precipitation | | |
| **Departure Point:** | FT.LAUDERDALE , FL (FLL ) | **Type of Flight Plan Filed:** | VFR |
| **Destination:** | WALKERS CAY , OF (MYAW) | **Type of Clearance:** | VFR |
| **Departure Time:** | 15:00 Local | **Type of Airspace:** | Class C |

## Airport Information

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| **Airport:** | | **Runway Surface Type:** | Asphalt |
| **Airport Elevation:** | 11 ft msl | **Runway Surface Condition:** | Dry |
| **Runway Used:** | 27L | **IFR Approach:** | None |
| **Runway Length/Width:** | 5276 ft / 100 ft | **VFR Approach/Landing:** | Forced landing |

## Wreckage and Impact Information

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| **Crew Injuries:** | 1 Minor | **Aircraft Damage:** | Substantial |
| **Passenger Injuries:** | 2 Minor | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 3 Minor | **Latitude, Longitude:** | 26.090574,-80.150421(est) |

## Administrative Information

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| **Investigator In Charge (IIC):** | Stone, Alan |
| **Additional Participating Persons:** | JAMES RAMNANAN; FT. LAUDERDALE , FL<br>LLOYD MORGAN; FT. LAUDERDALE , FL |
| **Original Publish Date:** | August 13, 2001 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class |
| **Note:** | |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=47899 |