# Aviation Investigation Final Report

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| **Location:** | Ponce, Puerto Rico | **Accident Number:** | MIA01FA072 |
| **Date & Time:** | February 8, 2001, 08:10 Local | **Registration:** | N181MM |
| **Aircraft:** | Piper PA-30 | **Aircraft Damage:** | Destroyed |
| **Defining Event:** | | **Injuries:** | 1 Fatal |
| **Flight Conducted Under:** | Part 91: General aviation | | |

## Analysis

Witnesses observed the pilot having trouble starting the right engine after refueling. Once the right engine was started it made a popping sound. The pilot proceeded to taxi to the runway and takeoff with the right engine still making a popping sound. The airplane was observed to climb to about 250 to 300 feet with the landing gear still extended. The airplane then began to descend and turn to the right. After turning to a downwind position, the airplane rolled rapidly to the right and descended, impacting the ground in a near vertical attitude. Postcrash examination showed the left propeller was rotating during impact and there was no evidence of failure or malfunction of the left engine. The right propeller showed no evidence of rotating under power at ground impact and the propeller blades were locked on the start latches at the 18 degree position. No evidence of failure or malfunction of the right propeller or propeller governor was found. The right engine assembly showed no evidence of precrash failure or malfunction. The right engine fuel servo had a bent regulator stem which caused sticking of the fuel regulator and abnormal fuel mixtures. The right fuel selector was found off after the accident and the mixture, throttle and propeller controls for the right engine were found in the low midrange position. The landing gear and landing gear control were found in the landing gear extended position. The wing flaps were retracted. The checklist for engine failure requires the pilot to retract the landing gear, maintain at least the single engine minimum control speed, and shutdown the failed engine and feather the propeller.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's decision to attempt flight with known deficiencies in the airplanes right engine, his failure to feather the right propeller after the engine failed , his failure to retract the landing gear following the engine failure, and his failure to maintain minimum single engine control

speed (Vmc), resulting in loss of control of the airplane and impact with the ground during an uncontrolled descent.

## Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. FUEL SYSTEM,FUEL CONTROL - BENT
2. FUEL SYSTEM,FUEL CONTROL - ERRATIC
3. (C) OPERATION WITH KNOWN DEFICIENCIES IN EQUIPMENT - CONTINUED - PILOT IN COMMAND
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
4. (C) PROPELLER FEATHERING - NOT PERFORMED - PILOT IN COMMAND
5. (C) GEAR RETRACTION - NOT PERFORMED - PILOT IN COMMAND
6. (C) AIRSPEED(VMC) - NOT MAINTAINED - PILOT IN COMMAND
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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
7. TERRAIN CONDITION - GROUND

## Factual Information

History of the Flight

On February 8, 2001, about 0810 Atlantic Standard Time, a Piper PA-30, N181MM, registered to MAJ, LLC, and operated by the pilot, as a 14 CFR Part 91 business flight, from Ponce, Puerto Rico to St. Thomas, Virgin Islands, crashed shortly after takeoff from Ponce. Visual meteorological conditions prevailed at the time and a visual flight rules flight plan was filed. The airplane was destroyed and the commercial rated pilot was fatally injured. The flight was originating at the time of the accident.

Witnesses stated the pilot had trouble starting the right engine while at the fueling ramp. After he got the right engine started it made a popping noise. The pilot taxied the airplane to runway 12 and proceeded to take off with the right engine still making a popping sound. After takeoff the airplane climbed to between 250-300 feet, with the landing gear still extended. The airplane then began to lose altitude and it was observed turning to the right. As the airplane turned right onto a downwind leg, it suddenly rolled to the right inverted and pitched down, making a descending right turn until ground impact.

Personnel Information

The pilot, age 55, held a FAA commercial pilot certificate with airplane single engine land, airplane multiengine land, and instrument airplane ratings, last issued on May 5, 1993. The pilot held a FAA flight instructor certificate with airplane single engine and instrument airplane ratings, issued on September 7, 1999, when the pilot received the instrument airplane rating. The pilot held a FAA class 2 medical certificate issued on October 2, 1999, with the limitation that the holder must wear corrective lenses for near and distant vision when flying. Pilot logbook records show that at the time of the accident the pilot had accumulated 1,574 total flight hours, with 353 flight hours in multiengine airplanes. The total flight time in the Piper PA-30 could not be determined. The last entry in the pilot logbook was on July 17, 2000. (See pilot logbook records.)

Aircraft Information

The airplane was a Piper Aircraft Corporation, model PA-30, registration number N181MM, serial number 30-197, manufactured in 1963. The airplane was equipped with Lycoming model IO-320, 160 horsepower, counter rotating engines with Rayjay turbochargers installed. At the time of the accident the airplane had accumulated 5,202 total flight hours. The airplane was last inspected on February 1, 2000, 70 flight hours before the accident, when it received an annual inspection.

The left engine, a Lycoming model IO-320-B1A, serial number L-3789-55A, was installed new in 1970. In June 1982 the engine was overhauled. At the time of the accident the left engine had accumulated 3,454 total flight hours and 1,440 flight hours since overhaul. The left propeller was removed from the airplane and shipped to a propeller shop in August 2000, for repair of bending damage to the No. 1 blade. The propeller was returned to the pilot's maintenance company in January 2001 and reinstalled on the airplane. At the time of the accident the airplane had accumulated about 1 flight hours since the installation of the left propeller.

The right engine was a Lycoming LIO-320-C1A, serial number L-197-66A, installed new in 1970. In June 1982 the engine was overhauled. At the time of the accident, the right engine had accumulated 3,414 total flight hours, and 1,440 flight hours since overhaul. The right propeller was overhauled on January 17, 1991, 641 flight hours before the accident. Logbook records show the right engine fuel servo was installed new on October 6, 1970, 3,414 flight hours before the accident. No record of overhaul or repair of the fuel injector after this date is shown in the logbook records. (See logbook records.)

Two persons who work for the repair company that installed the left propeller, after repair and overhaul , stated that they flew with the accident pilot after the propeller was installed. They stated that during engine runup, the propellers were exercised and that they operated normally. During the first takeoff, the right engine made popping noises, but cleared after several minutes. The airplane and engines operated normally after this, except for a piece of tape that migrated over the pitot tube during flight and caused the airspeed to become inoperative. (See statement.)

Meteorological Information

Visual meteorological conditions prevailed at the time of the accident. The Mercedita International Airport, Ponce, Puerto Rico, 0750 surface weather observation was wind 040 degrees at 5 knots, clouds 4,000 feet scattered, visibility 12 statute miles, temperature 73 degrees F., dew point temperature 70 degrees F., altimeter setting 30.08 inches HG.

Wreckage and Impact Information

The airplane crashed about 1 mile southeast of the approach end of runway 30 at the Mercedita International Airport, Ponce, Puerto Rico. The crash coordinates were 17 degrees, 59 minutes, 47.3 seconds, north latitude, and 66 degrees, 33 minutes, 14.7 seconds, west longitude. The airplane was lying upright on a 150 degree heading. Initial impact had occurred while the airplane was in a nose down, near vertical descent. After initial impact the left propeller separated from the left engine and remained imbedded in the ground. The airplane then bounced backward about 50 feet, where it came to rest. All components the airplane, which are necessary for flight, were located on or around the main wreckage. Continuity of the flight control system was confirmed. There were no separation points in the flight control system. The landing gear was extended on impact, and the wing flaps were retracted.

Examination of the cockpit showed that the left fuel tank selector was on the left main tank position. The right fuel tank selector was off. After the accident, a laptop computer case was found lying over the fuel selectors on the floor between the pilot seats. The left engine throttle control was in the full increase position, and the right engine throttle control was in the low power position. The left and right propeller controls were in the midrange position. The left engine mixture control was in the high midrange position, and the right engine mixture control was in the low midrange position. Continuity of the engine control cables was confirmed. The landing gear control was in the down position and the wing flap control was in the retracted position. Both engine alternate air controls were in the closed position. The engine magneto switches were destroyed by impact forces. All airframe fuel system lines were unobstructed and no contamination was found in the airframe fuel system. The left fuel selector valve would shutoff fuel flow when in the off position. The right fuel selector valve allowed some fuel to pass when in the off position due to a rusted ball in the valve.

Examination of the left engine showed that the left propeller separated from the engine during ground impact when the attaching bolts separated from the crankshaft propeller flange. The engine rotated and continuity of the crankshaft, camshaft, valve train, and accessory drives was confirmed. Each cylinder produced compression when the engine was rotated. The engine assembly contained oil and the engine fuel system contained uncontaminated fuel. Each magneto operated normally when rotated by hand. The spark plugs had deposits with color consistent with normal engine operation. The vacuum pump operated when turned by hand. Disassembly of the damaged propeller governor showed no evidence of failure or malfunction. The engine-driven fuel pump operated normally.

Examination of the right engine showed that the right propeller remained attached to the engine. The engine rotated and continuity of the crankshaft, camshaft, valve train, and accessory drives was confirmed. Each cylinder produced compression when the engine was rotated. The engine assembly contained oil and the engine fuel system contained uncontaminated fuel. Each magneto operated normally when rotated by hand. The spark plugs had dark colored deposits and some oil fouling. The vacuum pump operated when turned by hand. The propeller governor was tested and showed no evidence of failure or malfunction. The engine-driven fuel pump operated normally.

Examination of the left propeller showed that the propeller remained embedded in the ground vertically after initial ground impact. The propeller spinner had damage consistent with rotation under power at the time of ground impact. Each blade had some twisting damage and was bent aft about 25 degrees. Disassembly of the propeller showed damage consistent with the propeller being in the low pitch position during ground impact. Dome pressure was 46 psi. The pitch change knobs had sheared due to over stress. No evidence of precrash failure or malfunction was found.

Examination of the right propeller showed that it remained attached to the right engine after the initial impact. The propeller spinner displayed torsional damage consistent with a slow rotation speed during ground impact.. Ground impact occurred in a near vertical descent. One

blade was bent aft about 20 degree. The other blade was bent aft slightly, near the root, and bent forward near the tip. Neither blade had any twisting damage. The blades were locked on the start latches at the 18 degree angle. The propeller was actuated from the 18 degree position down to the low pitch position with no evidence of failure or malfunction. Disassembly of the propeller showed no internal damage. The start latches moved freely. Dome pressure was 42 psi. No evidence of precrash failure or malfunction was found.

Postcrash testing of the left engine fuel system showed that the fuel servo operated normally on a test bench and no contamination was present in the servo. The left fuel flow divider and fuel injectors operated normally on a test bench.

Postcrash testing of the right engine fuel system showed the right servo did not operate until a higher than normal meter pressure was applied to the regulator. Once the regulator began to move it would stick in the high fuel flow range. Disassembly of the fuel servo showed the fuel regulator stem was bent about 20 to 30 degrees from the normal position, causing the regulator to stick. Bendix Service Bulletin SB-RS-86, dated December 23, 1983, which required replacement of the fuel regulator with a regulator with a harder stem had not been complied with. Technicians stated the fuel regulator stem is susceptible to bending during engine over boost or backfire and the bent stem and sticking regulator would cause abnormal fuel mixtures and poor engine operation. No contamination was found in the fuel servo. The right fuel flow divider and injectors operated normally on a test bench.

Medical and Pathological Information

Postmortem examination of the pilot was performed by Francisco Cortes, MD, Forensic Pathologist, Institute of Forensic Science, San Juan, Puerto Rico. The cause of death was attributed to severe blunt trauma. No findings which could be considered causal to the accident were reported. Post mortem toxicology testing and specimens obtained from the pilot was performed by the Institute of Forensic Science, and Dennis Canfield, PhD, Manager, FAA Toxicology Laboratory, Oklahoma City, Oklahoma. The tests were negative for carbon monoxide, cyanide, ethanol, and drugs.

Tests and Research

The pilot operating checklist for the Piper PA-30 (Twin Commanche) lists the following procedure for emergency feathering of a propeller on a failed engine: mixture controls full rich, propeller controls high rpm, throttle controls full open, flaps up, landing gear up, maintain minimum single engine control speed of 80 mph and best single engine rate of climb speed of 105 mph, throttle closed on failed engine, propeller control on failed engine to feather, mixture control on failed engine to idle cutoff, fuel to failed engine off (if required), ignition to failed engine off (if required), rudder trim adjusted, control temperature with cowl flaps. (See checklist.)

The airplane did not fly from August 2000 until about 2 weeks before the accident, due to the

left propeller being repaired and overhauled. Fueling records from the Mercedita International Airport showed the pilot did not purchase any fuel during that time, until the day of the accident. Just prior to the accident flight the airplanes fuel tanks were filled, taking 70.7 gallons of fuel. The airplanes fuel tanks holds 84 usable gallons of fuel, and the airplane had flown approximately 1 hour since the propeller repair, indicating the airplane sat with about 35 gallons of fuel in the tanks from August 2000 until late January 2001. Airport personnel stated they inspected the fueling facilities after the accident and found no contamination in the fuel, and that they received no reports of fuel contamination from other pilots that received fuel from the facility.  (See fueling receipt.)

Additional Information

The NTSB released the airplane wreckage on February 10, 2001, to Ramon E. Alberto-Rio, President, REA Aviation, Ponce, Puerto Rico. Components retained by NTSB for further examination were released to Ramon E. Alberto-Rio.

## Pilot Information

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| **Certificate:** | Commercial; Flight instructor | **Age:** | 55,Male |
| **Airplane Rating(s):** | Single-engine land; Multi-engine land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | | **Restraint Used:** | |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | No |
| **Instructor Rating(s):** | Airplane single-engine; Instrument airplane | **Toxicology Performed:** | Yes |
| **Medical Certification:** | Class 2 Valid Medical--w/ waivers/lim | **Last FAA Medical Exam:** | October 2, 1999 |
| **Occupational Pilot:** | UNK | **Last Flight Review or Equivalent:** | September 7, 1999 |
| **Flight Time:** | 1574 hours (Total, all aircraft), 1295 hours (Pilot In Command, all aircraft), 1 hours (Last 90 days, all aircraft), 1 hours (Last 30 days, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Make:** | Piper | **Registration:** | N181MM |
| **Model/Series:** | PA-30 | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 30-197 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | |
| **Date/Type of Last Inspection:** | February 1, 2000 Annual | **Certified Max Gross Wt.:** | 3600 lbs |
| **Time Since Last Inspection:** | 70 Hrs | **Engines:** | 2 Reciprocating |
| **Airframe Total Time:** | 5202 Hrs at time of accident | **Engine Manufacturer:** | Lycoming |
| **ELT:** | Installed, activated, did not aid in locating accident | **Engine Model/Series:** | IO-320 |
| **Registered Owner:** | MAJ, LLC | **Rated Power:** | 160 Horsepower |
| **Operator:** | Mario Rodriguez-Mattei | **Operating Certificate(s) Held:** | None |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual (VMC) | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | PSE,29 ft msl | **Distance from Accident Site:** | 1 Nautical Miles |
| **Observation Time:** | 07:50 Local | **Direction from Accident Site:** | 330° |
| **Lowest Cloud Condition:** | Scattered / 4000 ft AGL | **Visibility** | 12 miles |
| **Lowest Ceiling:** | None | **Visibility (RVR):** | |
| **Wind Speed/Gusts:** | 5 knots / | **Turbulence Type Forecast/Actual:** | / |
| **Wind Direction:** | 40° | **Turbulence Severity Forecast/Actual:** | / |
| **Altimeter Setting:** | 30.07 inches Hg | **Temperature/Dew Point:** | 23°C / 21°C |
| **Precipitation and Obscuration:** | No Obscuration; No Precipitation | | |
| **Departure Point:** | Ponce, PR (PSE ) | **Type of Flight Plan Filed:** | VFR |
| **Destination:** | (STT ) | **Type of Clearance:** | None |
| **Departure Time:** | 08:00 Local | **Type of Airspace:** | Class G |

## Airport Information

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| **Airport:** | Mercedita International PSE | **Runway Surface Type:** | Asphalt;Concrete |
| **Airport Elevation:** | 29 ft msl | **Runway Surface Condition:** | Dry |
| **Runway Used:** | 12 | **IFR Approach:** | None |
| **Runway Length/Width:** | 6904 ft / 150 ft | **VFR Approach/Landing:** | Precautionary landing |

## Wreckage and Impact Information

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| **Crew Injuries:** | 1 Fatal | **Aircraft Damage:** | Destroyed |
| **Passenger Injuries:** | | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 1 Fatal | **Latitude, Longitude:** | 17.996389,-66.553886 |

## Administrative Information

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| **Investigator In Charge (IIC):** | Kennedy, Jeffrey |
| **Additional Participating Persons:** | John B Butler; Lycoming Engines; Williamsport, PA<br>Michael McClure; The New Piper Aircraft, Inc; Vero Beach, FL<br>Frank Morales; FAA FSDO; San Juan, PR |
| **Original Publish Date:** | January 2, 2002 |
| **Last Revision Date:** | |
| **Investigation Class:** | Class |
| **Note:** | |
| **Investigation Docket:** | https://data.ntsb.gov/Docket?ProjectID=51458 |