Aviation Investigation Final Report

Location:	PISCATAWAY, New Jersey	**Accident Number:**	NYC99FA130
Date & Time:	May 30, 1999, 17:42 Local	**Registration:**	N4724F
Aircraft:	Cessna P206B	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	5 Serious, 2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The Cessna 206 was on a shallow cruise descent, when the engine lost power while operating over a residential area. An onboard witness reported the pilot was able to restart the engine twice, and after each restart the engine ran for a few seconds and quit again. During the forced landing, the airplane struck trees and the engine/firewall/instrument panel separated from the remainder of the airplane. The fuel lines separated, and several of the passengers were burned. The remainder of the fuel system was intact. Fuel was found in both wing tanks, and in all lines forward of the firewall. When the engine was placed in a test cell it performed satisfactorily. The day was warm with an outside air temperature of about 90 F, and a dewpoint of 52 F. Radar data revealed the airspeed was constant about 125 knots, and as the airplane descended through 1,500 feet, the airspeed decreased to a low of about 63 knots. Just prior to loss of radar contact, the airspeed had increased back to about 100 knots.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: was a power loss for undetermined reason(s) while operating over unsuitable terrain.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: CRUISE - NORMAL

Findings

1. (C) REASON FOR OCCURRENCE UNDETERMINED

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

Findings
2. (C) TERRAIN CONDITION - NONE SUITABLE

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - EMERGENCY

Findings
3. OBJECT - TREE(S)

Factual Information

HISTORY OF FLIGHT

On May 30, 1999, about 1742 Eastern Daylight Time, a Cessna P206B, N4724F, was destroyed during a forced landing in Piscataway, New Jersey. The certificated private pilot received serious injuries and subsequently died 50 days after the accident. The four passengers received serious injuries. Two persons on the ground received minor injuries. Visual meteorological conditions prevailed for the personal flight which had originated from Cape May County Airport (WWD), Cape May, New Jersey, and was destined for Morristown Municipal Airport (MMU), Morristown, New Jersey. No flight plan had been filed for the flight conducted under 14 CFR Part 91.

The flight had originated at MMU earlier in the day and landed at WWD. It was estimated that the airplane departed from WWD, about 1700.

At 1741:36, the pilot of N4724F made initial radio contact with the Federal Aviation Administration (FAA) control tower at MMU. The pilot transmitted, "morristown tower cessna four seven two four foxtrot we've got an engine problem we're fifteen miles south of you." The pilot was asked if he wanted a straight in to Runway 5, and the pilot replied that he was going to try for a straight in approach to Runway 30.

At 1741:58, the pilot transmitted, "thirty nix thirty were going to look for a place to land." The local controller inquired as to the number of people on board and was told five.

At 1742:22, the local controller transmitted, "cessna two four foxtrot say altitude now." The pilot replied, "eight, eight hundred feet." A horn was heard sounding in the background as the pilot transmitted.

At 1742:31, the local controller transmitted, "are you going to land now sir," to which the pilot replied, "were looking for a field yes two four foxtrot." Again the horn was heard in the background.

At 1742:36, the local controller transmitted, "and ah verify your position again." No reply was received from the airplane.

Several witnesses on the ground observed the airplane gliding with the engine not running. One witness reported that it sounded like the pilot was attempting to restart the engine.

One witness reported seeing the airplane strike a tree, after which the engine separated from the airplane and continued forward, while the remainder of the airplane fell to the ground next

to a residence.

Several local residents proceeded to the accident site and sprayed water on the burning portions of the airplane and occupants. Two local residents received minor injuries when they attempted to extinguish the fire and assist the occupants.

One of the passengers was interviewed on May 31, 1999. She reported the airplane was operating normally in a wings level attitude when the engine lost power. She was seated behind the pilot and made a fore and aft motion with her right arm mimicking the actions of the pilot's right arm. She was not certain what specific actions the pilot was doing. She remembered the airplane hitting a tree and then the airplane turned on its side.

In follow-up interviews conducted with the passengers, in December 1999, they reported the power loss was sudden and was not preceded by anything they remembered. None of passengers remembered seeing the pilot reach for the fuel selector or anything else in the cockpit prior to the power loss. One passenger reported that the pilot was able to restart the engine twice, after which it again lost power. The power losses were described as abrupt and not accompanied by sputtering.

The accident occurred during the hours of daylight at 40 degrees, 34.45 minutes north latitude and 74 degrees, 27.7 minutes west longitude.

OTHER DAMAGE

The residence at 124 Day Avenue, Piscataway, sustained damage to the side where the airplane came to rest and burned.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with ratings for airplane single engine land and instrument. According to the pilot's logbook, which was current through May 26, 1999, his total logged flight experience was 661.9 hours. The pilot-in-command time was 480.3 hours. He had logged a total of 18.4 hours as of May 26, in the Cessna 206. He had been signed off for solo in the airplane on April 25, 1999, after receiving 12.1 hours of dual instruction.

The pilot had logged 85.1 hours in the preceding 12 months, and 16 hours in the preceding 90 days with 14.3 hours in make and model.

The pilot was last issued a third class airman medical certificate on June 4, 1998, with a limitation to wear corrective lenses.

AIRCRAFT INFORMATION

The airplane was a 1967 Cessna P206B, was owned and operated by L & M Aviation, Inc, and

was maintained under an annual inspection program. The airframe had accumulated 7,841 hours. The engine had last been overhauled on April 4, 1989, with a total time of 1,700 hours. The engine had accumulated an additional 946 hours since overhaul.

The airplane was last serviced on May 29, 1999 with 46.8 gallons of 100 LL aviation grade gasoline.

According to the airplane Owner's Manual, the auxiliary fuel pump was a split switch with two sides. If the LOW side were turned on, the fuel pump would not operate unless the engine starter was engaged. The HIGH side was used for failure of the engine driven pump. In that position, the output of the pump was dependent upon the throttle position. With the throttle at high settings, the auxiliary fuel pump output was high. When the throttle was reduced or closed, the output of the auxiliary fuel pump was reduced to prevent flooding the engine.

RADAR AND OTHER REMOTELY RECORDED DATA

Radar data was received from the New York TRACON (Newark Antenna). The data included all codes in the area of the suspected flight path of the airplane. The data was sorted and a code 1200 return was found that was on a descending flight path over a period of 12 minutes. The first radar returns were about 3 miles east of Imlaystown, New Jersey, at 1730, with an altitude of 2,800 feet, and they terminated about .95 statute miles southwest of the accident site at 1742:26.31, with a recorded altitude of 800 feet.

The time of the initial radio contact with the Morristown control tower, corresponded to an altitude of 1,100 feet on the code 1200 target.

The radar data was forwarded to the Safety Board Vehicle Performance Division for plotting. The data revealed that about 1741:07, as the airplane was at 1,500 feet and descending, the calibrated airspeed began to decrease from around 127 knots. About 43 seconds later, the calibrated airspeed had decreased to about 63 knots, as the airplane descended through 1,200 feet. The airspeed then increased back to about 100 knots, as radar contact was lost at 1742:26.31.

WRECKAGE AND IMPACT INFORMATION

On-site examination revealed a large tree in a yard with a broken limb 36 feet above the ground. Scars were visible on the trunk between the broken limb, and 25 feet above the ground. The scars were on the northwest side of the tree.

The fuselage came to rest inverted and next to the northwest corner of the residence. Paint on the side of the house had been darkened by soot, and the gutter on the northwest side of the house had been torn loose.

The left wing was angled wing tip up about 50 degrees, and resting against the house and

bushes. The right wing was flat against the ground. The forward fuselage had separated from the remainder of the airplane about 6 inches aft of the instrument panel. The two fuel collector tanks, which were located under the floorboards, were split between the firewall and fuselage. Each collector tank had a capacity of over one-quart.

The engine, firewall, instrument panel, and nose landing gear came to rest inverted. There was no displacement between the instrument panel and the engine. There was no rotational damage to the propeller blades. The face of the instrument panel and interior was burned. The throttle and propeller controls were full forward. The mixture control was about 1/2 inch from full forward. The magneto switch was on both.

The interior floor of the fuselage cabin was darkened with soot aft to the middle seats.

Both wing fuel tanks contained fuel, and were defueled at the accident site. The left wing was estimated to contain about 15 gallons, and the right wing contained about 30 gallons. Samples taken from both wing tanks were bright, clear, light blue in color, and had a smell consistent with 100LL aviation grade gasoline.

The wreckage was moved to MMU for further examination.

Flight control continuity was verified. All control cables were attached to their respective attach points. Some control cables had been cut to remove the fuselage from the accident site. All the control cables between the instrument panel and aft fuselage had failed and their ends were puffed, similar to tension overload failures.

All fuel lines from the firewall to the fuel injection manifold contained fuel. The fuel filter in the main sump was absent of debris and contamination. The air filter and passage for air into the engine was unobstructed. All throttle and mixtures linkages were connected and tight. The magnetos were in place and secure.

The cockpit magneto switch and auxiliary fuel pump switches were removed and tested. Both switches had been burned; however, no defect was noted.

The fuel pump was removed from the fuselage and pumped water when electric power was applied.

The engine was removed from the fuselage attach points and transported to Mattituck Air Base, Mattituck, New York.

MEDICAL AND PATHOLOGICAL INFORMATION

The toxicological testing report from the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma, was negative for drugs and alcohol for the pilot. An additional test of all occupants including the pilot for carbon monoxide and cyanide was negative.

TESTS AND RESEARCH

On June 1, 1999, the engine was prepared for an engine run under the supervision of the Safety Board. The preparation included replacement of the left side intake manifold elbow due to a dent. In addition, the propeller governor was removed and the hole was plated over, and a 1/4 by 1/2-inch impact hole in the number six-cylinder intake port was also taped over. The engine started with no specific problems noted. After warm-up, the engine was accelerated to 2,100 RPM for a magneto check. The left magneto had a 300-RPM drop, and the right magneto had a 100-RPM drop. The ignition leads to the number four and six cylinders (left magneto position) had impact damage and were repaired. A subsequent magneto check revealed a drop of 100 RPM on each magneto. No hesitation was noticed in acceleration tests. The engine performed satisfactorily, and was able to make a sustained run at full throttle.

The engine test cell at Mattituck Air Base utilized an external electric fuel boost pump for starting which was set to an output pressure of 18 PSI. The pump pressure relief valve was reset to 26 PSI, to match the output pressure of the electric boost pump on the airplane. With the engine running at 2,400 RPM, the pump was turned on. Some slight roughness was noted. As the throttle was retarded, the roughness became more pronounced. As the RPM dropped below 1,500 RPM the blackness of the engine exhaust smoke increased. About 1,000 RPM, the engine quit.

During restart tests, a mixture cut was made with the throttle left in the mid-range position. With the propeller stopped, the engine would restart when the mixture was advanced and the starter engaged without movement of the throttle. If the boost pump was already on and the previous sequence tried, the engine would flood, and not start until the mixture was placed back in idle cut-off, and the engine rotated until it was not flooded.

ADDITIONAL INFORMATION

Interviews with the flight instructor who checked out the accident pilot in N4724F, and another flight instructor for the club revealed both people were familiar with the in-flight restarting procedures, and the need to use the mixture control in restarting the engine, particularly if the engine was flooded. In addition, interviews with four club members revealed they were aware of the need to lean the mixture if the engine did not initially start.

On April 30, 1979, Cessna issued service letter SE 79-25. This became the core of airworthiness directive (AD) 79-15-01, which was issued on July 26, 1979. Included in the AD was a placard on the instrument panel for fuel flow stabilization, and a card to be carried in the airplane with fuel flow stabilization, and in-flight engine restarting procedures. The burned remains of the card were found in the glove compartment of the airplane. An excerpt of the card stated:

"IN-FLIGHT ENGINE RESTARTNG PROCEDURES"

"In the very unlikely event of power interruption due to fuel vapor accumulation, immediately perform the following procedures."

"1. Switch auxiliary fuel pump to 'On' or 'Hi' position (as applicable for your model)." "2. Turn fuel selector to the opposite tank." "3. Position throttle at least half open." "4. When the fuel flow is in the green arc range with a windmilling propeller, turn the auxiliary fuel pump off." "5. Lean the mixture from full rich until restart occurs." "6. Reset mixture." "7. Adjust power as required."

"The other tank may be used again any time after vapor is eliminated and fuel flow is established."

A check of Safety Board records from 1983 through 1996 revealed 11 accidents with Cessna 206s where there was a power loss of undetermined origin. On three of the accidents, the airplane was not examined. However, on the remaining eight accidents, nothing was found which would have caused the power loss.

Additional Person Participating In Investigation

Leonard A. Levy L & M Aviation, Inc. Parsippany, New Jersey The airplane was released to the owner on June 2, 1999.

Pilot Information

Certificate:	Private	**Age:**	52,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	June 4, 1998
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	663 hours (Total, all aircraft), 19 hours (Total, this make and model), 481 hours (Pilot In Command, all aircraft), 19 hours (Last 90 days, all aircraft), 8 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N4724F
Model/Series:	P206B P206B	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	P206-0324
Landing Gear Type:	Tricycle	**Seats:**	6
Date/Type of Last Inspection:	September 5, 1998 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	91 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	7841 Hrs	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-520-A12B
Registered Owner:	L&M AVIATION, INC	**Rated Power:**	285 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MMU ,187 ft msl	**Distance from Accident Site:**	16 Nautical Miles
Observation Time:	17:45 Local	**Direction from Accident Site:**	22°
Lowest Cloud Condition:	Clear	**Visibility**	15 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	32°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	CAPE MAY , NJ (WWD)	**Type of Flight Plan Filed:**	None
Destination:	MORRISTOWN , NJ (MMU)	**Type of Clearance:**	None
Departure Time:	17:00 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	MORRISTOWN MMU	**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	4 Serious	**Aircraft Fire:**	On-ground
Ground Injuries:	2 Minor	**Aircraft Explosion:**	None
Total Injuries:	5 Serious, 2 Minor	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	Hancock, Robert
Additional Participating Persons:	FRED J GRILL; TETERBORO , NJ EMMETT O'HARE; TRENTON , NJ DALE CARTER; MOBIL , AL FRED LEEPER; WICHITA , KS
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Note:	
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