National Transportation Safety Board
Aviation Accident Final Report

Location:	Bern Township, PA	**Accident Number:**	NYC01FA223
Date & Time:	09/05/2001, 1313 EDT	**Registration:**	N8PK
Aircraft:	Piper PA-31-350	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Positioning		

Analysis

After takeoff, the pilot reported "an engine problem," but did not elaborate. A witness on the ground saw that the left engine was trailing smoke, but the engine was still operating, and did not sound like it was "missing". When asked by the tower controller if he required assistance, the pilot answered "no". The controller cleared the pilot for left traffic to a landing, and provided the current weather. There were no further transmissions from the pilot. Smoothed radar tracking data revealed that the airplane turned toward a left downwind, and leveled off at 1,400 feet msl (about 1,050 feet agl) and 156 knots. During the next 14 seconds, the airplane descended to 1,100 feet and increased airspeed to 173 knots. Then radar contact was lost. Witnesses observed the airplane variously in a right snap roll and a left wingover, followed by a sharp dive to the ground. The airplane had just undergone maintenance. During maintenance, unused oil was found in the left engine cowling, which the pilot admitted he had previously spilled. Following maintenance, the pilot was observed adding 3 additional quarts of oil to the left engine. The engine oil dipsticks were calibrated on both sides, with each side pertaining to the oil level in a specific engine. The side for the right engine was calibrated to read 1 3/4 quarts lower than the left engine. The airplane's wreckage was fragmented. No evidence of mechanical defect was found, nor was there any evidence of an extreme out-of-trim condition. There was also no evidence of engine failure, detonation, or pre-impact failure. The pilot held an airline transport pilot certificate. He reported 3,210 hours of flight time to the operator, and had recently been cleared to fly the airplane on 14 CFR Part 91flights. The flight to the maintenance facility was the pilot's first solo flight in the airplane. An autopsy of the pilot revealed the presence of a prostate adenocarcinoma; however, according to his physician, the pilot was unaware of it.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's loss of control for undetermined reasons, which resulted in a high speed dive to the ground.

Findings

Occurrence #1: ABRUPT MANEUVER
Phase of Operation: APPROACH - VFR PATTERN - DOWNWIND

Findings
1. REASON FOR OCCURRENCE UNDETERMINED
2. AIRCRAFT PREFLIGHT - IMPROPER - PILOT IN COMMAND
3. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On September 5, 2001, at 1313 eastern daylight time, a Piper PA-31-350, N8PK, operated by Panda Air, Limited, Ferndale, New York, was destroyed when it impacted terrain in Bern Township, Pennsylvania. The airplane was returning for landing, shortly after takeoff from Reading Regional/Carl A. Spaatz Field (RDG), Reading, Pennsylvania. The certificated airline transport pilot was fatally injured. Visual meteorological conditions prevailed, and no flight plan had been filed for the flight to Orange County Airport (MGJ), Montgomery, New York. The positioning flight was conducted under 14 CFR Part 91.

The Reading Air Traffic Control Tower was operating a combined ground/local controller position. At 1301, the pilot called for ground taxi, and was advised to taxi to runway 36. At 1310, the pilot called "ready to go three six, be a right turnout." He was then cleared to take off from runway 36, and make a right turnout on course. At 1312, while a ground vehicle was talking to the tower controller on the ground frequency, the pilot called the tower on the local frequency and stated "...tower, i gotta return, i got an engine problem eight papa kilo."

About 10 seconds after the pilot's initial call, the tower controller asked him if he required any assistance. When the pilot did not respond, the controller transmitted that he understood the pilot was returning for a landing, and again asked the pilot if he required any assistance. The pilot's response was, "(unintelligible) ah no, no (unintelligible)." At 1313, the controller told the pilot to fly left traffic for runway 36. He also gave the pilot the current weather, and stated that runway 31 was available. There were no further communications from the pilot.

In a subsequent radio transmission to a ground vehicle, the tower controller stated that the airplane had disappeared behind a hill in a vertical descent.

According to one witness, a former air crash/rescue airport employee and current police officer, he was in his house about 1/4 mile from the departure end of runway 36, when he heard the airplane fly overhead. One of the engines sounded "strange", as if it was not making full power. The witness went outside, and saw that the airplane was about 200 feet in the air, and puffs of white smoke were coming from the rear of the left engine. The engine, however, was still operating, and did not sound like it was "missing". The airplane then turned to the left, toward the northwest, and eventually began a left bank as if to land on runway 13. It then entered a "snap roll real hard to the right" followed by a nose-dive, and disappeared below a tree line. The next thing the witness saw, was a plume of black smoke rise from the area. The witness remembered thinking that if the left engine had lost power, he would have expected the airplane to roll to the left. He could not understand why it rolled to the right.

Another witness was in his car and stopped at a traffic light, heading northwest, just northwest of Reading Airport. He saw the airplane come into view from his right, and move to his left while climbing. The witness estimated that the airplane was about 1,000 feet in the air and was "really moving, like it was under full power." The airplane then flew over a tree line, banked hard to the left, "like going into a left hand wingover," and entered a sharp dive towards the ground. The dive was not straight down, but the airplane was "very nose down." The witness lost sight of the airplane as it went below the tree line, but shortly thereafter, he saw a huge round ball of smoke rise from the area.

A third witness reported that he was standing in an athletic complex, about five football fields away from the accident site, when the accident occurred. The airplane was between the witness and the airport. The witness stated that his attention was drawn to the airplane because he was used to the sounds of other airplanes and this one just didn't sound right. The airplane didn't have the regular hum of a normal airplane; "it sounded like a giant saw in a saw mill." It was louder than normal, and "not in rhythm." It sounded like "a 'putt-putt-putt;' like it was running out of gas." The witness saw smoke coming out of the airplane. He originally thought the airplane was single-engine, because when he first saw it, it was in an angle of bank, and he could not see two engines. Then he saw it make a "real quick" nose-dive, and lost sight of it as it went below a tree line. The witness was sure that the pilot had no control of the airplane when it suddenly dropped.

A fourth witness was an engine mechanic who heard, but did not see the accident. He stated that he heard one engine running smoothly, and the other engine "popped." It sounded like a "lean pop," like an automobile engine not getting enough gas; it did not sound like an ignition problem.

According to smoothed radar tracking data, the airplane turned toward a left downwind, and leveled off at 1,400 feet msl (about 1,050 feet agl) and 156 knots. During the next 14 seconds, the airplane descended to 1,100 feet and increased airspeed to 173 knots. Then radar contact was lost.

The accident occurred during the hours of daylight, and in the vicinity of 40 degrees, 22.84 minutes north latitude, 75 degrees, 59.87 minutes west longitude.

PILOT INFORMATION

The pilot held an airline transport pilot certificate, with ratings for single engine and multi-engine airplanes. He was also a certificated flight instructor in single and multi-engine airplanes, and instrument-airplane. His latest Federal Aviation Administration (FAA) second class medical certificate was dated December 15, 2000.

On his medical certificate application, the pilot did not list any visits to health professionals within the previous 3 years. He also did not report being diagnosed with any illnesses, "ever" or "presently". The aviation medical examiner was not the pilot's personal physician.

The pilot's personal physician reported that the pilot had last visited him on May 9, 2001, for "evaluation of inguinal hernia and prostate check.... Prostate was enlarged somewhat, without modularity." The physician indicated that a PSA test was ordered but the results were never received. The physician also noted that the pilot did not present any condition that would have resulted in headaches, dizziness, unconsciousness, heart or vascular problems, neurological disorders, depression, or any other afflictions that might have led to incapacitation. The physician did not know if the pilot had been seeing another health care professional.

The president of Panda Air had been in contact with the pilot on and off for about 15 years. The pilot had previously sought employment with his company, but until recently, the timing had not worked out. The pilot was engaged to be married, and had a young child and two older children. The pilot did not appear to be financially well off, and supplemented his flying income with work as a carpenter.

The pilot's logbook was not recovered. On his resume provided to Panda Air, he stated that he had 3,210 hours of flight time, including 1,385 hours in multi-engine airplanes and 1,150 hours as a flight instructor. According to company records, he began flying the PA-31-350 on July 30, 2001, and completed 7 flights with 20.2 hours' duration prior to the accident flight. Company personnel also stated that the week before the accident flight, the pilot had practiced numerous simulated engine-out scenarios. He had also been deemed proficient by the company's training captain to begin flying solo 14 CFR Part 91 flights, in preparation for a 14 CFR Part 135 checkride. The flight to Reading was his first solo flight in the airplane.

The company's training captain described the accident pilot as "smooth, conscientious and capable." In addition:

"At no time did I observe the control or safe operation of the aircraft to be in doubt. [The accident pilot] was familiar with the POH of this aircraft and was fluent in the emergency procedures. He had a calm presence in the cockpit and was also a person of humor and wit."

The training captain also noted that the accident pilot was a freelance writer, and "had recently published a work on cancer cure research (as he related to me.)" The accident pilot had also been looking forward to being with his fiancee and child during an upcoming vacation. "He seemed to have a love for life and a developed spiritual dimension as well."

AIRCRAFT INFORMATION

The Piper PA-31-350 was equipped with Lycoming TIO-540 and LTIO-540 counter-rotating engines. A vortex generator (VG) kit was also installed.

Prior to the accident flight, the airplane was at Aerodynamics of Reading, Incorporated, for maintenance. Aerodynamics operated two PA-31-350's of its own, and maintained three more for companies other than Panda Air.

According to work orders, 50-hour and 100-hour maintenance inspections were completed on August 24, 2001. A maintenance technician noted that, among the maintenance items addressed, personnel at Panda Air had reported that the right engine had a higher oil consumption than normal, but that the oil consumption of the left engine was "very low and of no concern." Oil leaks from the right engine's #1, #2, and #4 cylinder pushrod tubes were corrected, and subsequent engine runs confirmed a lack of oil leakage from either engine.

The airplane returned for additional maintenance on September 4, 2001, which included the adjustment of the left engine manifold air pressure, the alignment of both engines' breather tubes, the fabrication and installation of a new fuel drain tube for the left engine, the removal and replacement of the left elevator to install rivets at the inboard hinge, and the removal and replacement of the right elevator to dress an area where a bolt had caught on the spar.

The maintenance technician reported that upon removal of the left engine's cowling, he observed oil puddled inside the lower left side. In addition:

"This oil was obviously unused oil; very clear in appearance, with no engine-contaminated discoloration. [The pilot] was standing nearby as we uncowled the LH engine. He informed us that he had spilled oil over the engine while servicing [it]...prior to taking off from New York. Upon closer inspection, I noticed the same clean-appearing oil in the vicinity of the oil filler neck."

A line service employee reported that on the morning of the accident, he refueled the airplane

with 80 gallons of 100LL aviation gasoline at the pilot's request. The employee spoke to the pilot in the customer service office, and "noticed he was very nervous, kind of spacey, and his hands were shaking a bit." Later, at the maintenance hangar, the pilot asked the employee for a funnel to add oil to an engine. A mechanic procured the funnel and the service employee watched as the pilot added 3 quarts of 15w50 oil to the left engine. The employee thought, "Why is he adding more oil if the airplane just got out of maintenance?" He then heard someone behind him make the same comment.

The two-sided oil dipstick used in both engines had ruled markings on each side. One side of the dipstick measured the oil quantity in the right engine, the other side, the left engine. The side for the right engine was calibrated to read about 1 3/4 quarts lower than the left engine due to dipstick/oil sump location. According to representatives from the engine and airframe manufacturers, as well as the maintenance facility and airplane operator, excess oil in an engine would have been discharged from the engine breather tube, and could have hit the exhaust pipes.

METEOROLOGICAL INFORMATION

Reading Regional Airport weather, recorded at 1254, included clear skies, winds from 360 degrees true, varying between 330 and 030, at 7 knots, 10 statute miles visibility, temperature 70 degrees F, dewpoint 54 degrees F, and a barometric pressure of 30.13 inches Hg.

WRECKAGE AND IMPACT INFORMATION

The wreckage was located in a residential area, about 290 degrees magnetic and 1 1/2 nm from the center of Reading Regional Airport. Except for the tail section and other major components such as the engines, the wreckage was fragmented. The initial ground scar, about 1 foot wide and 6 inches deep, was oriented along a 200-degree magnetic axis. Parts of the counterweight assembly from the right aileron were found in, and near the beginning of the ground scar. About 35 feet from the beginning of the ground scar, there was a 2-foot-deep hole which contained the hub and propeller blades from the right engine. About 15 feet beyond the first hole, there was another 2-foot-deep hole, which contained the separated propeller blades from the left engine.

About 55 feet beyond the left engine propeller assembly was the right engine. After the right engine, the axis of the wreckage path angled about 30 degrees to the right. The left engine was about 70 feet beyond the right engine, and the majority of the fuselage and empennage was about 50 feet beyond that. The wiring bundle from the cockpit was rolled up, and about 120 feet beyond the main wreckage. Additional wreckage and parts fanned out for about another 200 feet.

All flight control surfaces were accounted for at the accident scene. Control continuity could not be confirmed due to the extent of fire and impact damage to the airplane. The ends of separated control cables were broom-strawed in appearance. The flaps and landing gear were up, and the aileron trim was set to 1/4 right.

The airplane's cockpit and instrument panel were destroyed by fire and ground impact. Parts of a graphic engine monitor were recovered; however, the computer memory chip containing stored engine information was not found.

Two of the three propeller blades remained attached to the right engine propeller assembly, while the third blade was broken off at the hub. Of the two propeller blades remaining

attached, one had leading edge damage, including a missing blade tip, chordwise scoring, and was bent aft about 20 degrees. The second propeller blade had no significant damage. The third propeller blade, the one broken off the hub, had about an 80-degree bend. The hub had some evidence of rotational scoring; however, the major deformations of the hub face were in an aft direction, consistent with a flush impact with the ground.

All three propeller blades were separated from the left engine propeller assembly hub, and were about 80-percent buried in the ground, with the blade tips sticking out almost vertically. One propeller blade was bent aft about 60 degrees. The blade tip leading edge was missing, and there was some leading edge damage. The second propeller blade had part of the de-ice strip missing; however, there was very little damage to the blade. The third propeller blade had slight s-bending, no leading edge damage, and some chordwise scratching. The hub face was deformed in an aft direction, consistent with a flush impact with the ground. The hub was found 4 1/2 feet underground, facing downwards.

The engines were moved to a hangar for further examination. Crankshaft continuity was confirmed, and compression was confirmed on all cylinders of both engines except the number 1 (right, most forward) cylinder of the right engine, which was impact-damaged. Piston movement was observed on that cylinder. The engines were also bore-scoped, with no evidence of detonation or non-impact internal damage.

The turbochargers from both engines were examined. The right engine turbocharger had been separated from the engine, and its impeller blades were obliterated. The impeller blades from the left engine turbocharger were intact, with outboard tip bending of some of the blades. The exhaust pipes from both engines were bent and folded.

On December 17, 2001, a second examination was conducted on the airplane's tail section at a storage facility in Clayton, Delaware. During that examination, no evidence of improper rigging was found. The rudder and elevator stops were in place, and undamaged. The elevator trim drum measurement was 3/8 inch, and displayed three threads. According to a representative from The New Piper Aircraft Company, the measurements equated a "neutral to nose up position." The rudder trim measurement was 1 inch, and displayed seven threads, which equated a "neutral to nose right position."

MEDICAL AND PATHOLOGICAL INFORMATION

On September 6, 2001, an autopsy was performed on the pilot's remains at The Reading Hospital and Medical Center, Department of Pathology, Reading, Pennsylvania. According to the autopsy report, the pilot had an adenocarinoma of the prostate, "a high grade lesion, relatively likely to progress and spread beyond the prostate if it had already not done so."

Toxicological testing was conducted by the Federal Aviation Administration's Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma.

ADDITIONAL INFORMATION

According the Pilot's Operating Handbook, the "air minimum control speed", Vmca, was defined as the minimum flight speed at which a twin-engine airplane was directionally controllable. Configuration conditions included one engine inoperative and windmilling, not more than a 5-degree angle of bank toward the operative engine, landing gear and flaps up, and the most rearward center of gravity. Vmca for the PA-31-350 was determined to be 76 knots indicated airspeed.

On September 7, 2001, the wreckage was released to a representative of the owner's insurance company.

Pilot Information

Certificate:	Airline Transport	**Age:**	53, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	12/15/2000
Occupational Pilot:		**Last Flight Review or Equivalent:**	04/10/2001
Flight Time:	3230 hours (Total, all aircraft), 20 hours (Total, this make and model), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N8PK
Model/Series:	PA-31-350	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	31-8152141
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	08/24/2001, 100 Hour	**Certified Max Gross Wt.:**	5668 lbs
Time Since Last Inspection:	18 Hours	**Engines:**	2 Reciprocating
Airframe Total Time:	6204 Hours at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	TIO-540
Registered Owner:	Panda Air, Ltd	**Rated Power:**	350 hp
Operator:	Panda Air, Ltd	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	RDG, 344 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	1254 EDT	**Direction from Accident Site:**	110°
Lowest Cloud Condition:	Clear	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.13 inches Hg	**Temperature/Dew Point:**	21°C / 12°C
Precipitation and Obscuration:			
Departure Point:	Reading, PA (RDG)	**Type of Flight Plan Filed:**	None
Destination:	Montgomery, NY (MGJ)	**Type of Clearance:**	VFR
Departure Time:	1311 EDT	**Type of Airspace:**	Class D

Airport Information

Airport:	Reading Regional/Carl A.Spaatz (RDG)	**Runway Surface Type:**	Asphalt
Airport Elevation:	344 ft	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	5151 ft / 150 ft	**VFR Approach/Landing:**	Precautionary Landing; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	40.380556, -75.997222

Administrative Information

Investigator In Charge (IIC):	Paul R Cox	**Report Date:**	01/16/2003
Additional Participating Persons:	Robert Martellotti; New Piper Aircraft; Vero Beach, FL Aaron Spotts; Textron Lycoming; Williamsport, PA Philip Criscenzo; Panda Air; Ferndale, NY Thomas Benn; Aerodynamics of Reading; Reading, PA Donald Boorda; FAA/FSDO; Allentown, PA		
Publish Date:			
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