



National Transportation Safety Board Aviation Accident Final Report

Location:	LANTANA, FL	Accident Number:	MIA94FA167
Date & Time:	06/24/1994, 0905 EDT	Registration:	N27872
Aircraft:	PIPER PA-31-325	Aircraft Damage:	Substantial
Defining Event:		Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

THE AIRPLANE WAS OBSERVED TO ROTATE ABOUT 3,217 FT DOWN THE 3,746-FT RUNWAY. ONE OR BOTH ENGINES WERE HEARD RUNNING ROUGH. THE AIRPLANE CLIMBED TO ABOUT 300 FT AGL, BANKED LEFT, PITCHED NOSE DOWN AND IMPACTED THE GROUND. DURING THE INVESTIGATION, THE LEFT ENG OPERATED TO FULL RATED RPM AFTER REPLACEMENT OF THE DAMAGED IGNITION HARNESS, ADJUSTMENT OF THE TURBOCHARGER DENSITY CONTROLLER, AND ADJUSTMENT OF THE MAGNETO-TO-ENG TIMING. THE RIGHT ENG ALSO OPERATED NORMALLY AFTER REPLACEMENT OF THE MAGNETO, IGNITION HARNESS, AND ENG-DRIVEN FUEL PUMP. THE DENSITY CONTROLLER REQUIRED ADJUSTMENT TO OBTAIN FULL RATED RPM. THE #3 CYL FUEL INJECTOR NOZZLE WAS ALSO PARTIALLY BLOCKED BY CONTAMINANT. THE RIGHT ENG MAGNETO CONTACT ASSEMBLIES OPERATIONALLY CHECKED OK. THE CAPACITORS WERE HEAT DAMAGED. RIGHT ENG MAGNETO-TO-ENG TIMING AND INTERNAL TIMING OF THE MAGNETO WERE NOT DETERMINED. PILOT'S TOXICOLOGICAL RESULTS WERE POSITIVE FOR BUTALBITAL (1.768 UG/ML BLOOD, 0.553 UG/ML URINE), AND ALSO POSITIVE FOR ACETAMINOPHEN & SALICYLATE (ASPIRIN) IN URINE. BUTALBITAL IS A PRESCRIPTION MEDICATION (BARBITURATE) NOT APPROVED FOR FLYING.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: THE PILOT'S IMPAIRMENT OF JUDGMENT AND PERFORMANCE DUE TO DRUGS, HIS FAILURE TO ABORT THE TAKEOFF AFTER EXPERIENCING REDUCED TAKEOFF PERFORMANCE, AND HIS FAILURE TO MAINTAIN MINIMUM CONTROL SPEED. FACTORS IN THE ACCIDENT WERE: A PARTIAL LOSS OF ENGINE POWER DUE TO IMPROPER MAGNETO-TO-ENGINE TIMING, AND A PARTIALLY BLOCKED FUEL NOZZLE.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: TAKEOFF - ROLL/RUN

Findings

1. 1 ENGINE
 2. AIRCRAFT PREFLIGHT - INADEQUATE - PILOT IN COMMAND
 3. (F) IGNITION SYSTEM,MAGNETO - TIMING IMPROPER
 4. (F) FUEL SYSTEM,NOZZLE - BLOCKED(PARTIAL)
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

5. (C) ABORTED TAKEOFF - NOT PERFORMED - PILOT IN COMMAND
 6. (C) IMPAIRMENT(DRUGS) - PILOT IN COMMAND
 7. USE OF INAPPROPRIATE MEDICATION/DRUG - PILOT IN COMMAND
 8. (C) AIRSPEED(VMC) - NOT MAINTAINED - PILOT IN COMMAND
-

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On June 24, 1994, about 0905 eastern daylight time, a Piper PA-31-325, N27872, registered to Roscoe M. Thorne, crashed shortly after takeoff from the Palm Beach County Park Airport, Lantana, Florida, while on a 14 CFR Part 91 personal flight. Visual meteorological conditions prevailed at the time and no flight plan was filed. The airplane was substantially damaged by impact and a postcrash fire and the private-rated pilot and one passenger were fatally injured. The flight originated about 0900.

Before departure about 0845, the pilot requested fuel and stated that he was in a hurry. After the fuel truck arrived per the pilot's request, the outboard fuel tanks were filled and 20 gallons of fuel were added to each of the inboard fuel tanks. The fuel quantity in each inboard fuel tank before fueling was not determined. The fueler stated that he did not observe the pilot check the fuel tank for contaminants and while he was reeling in the hose after fueling, the pilot and passenger were in the left and right front seats respectively and the entry door was closed. A total of 70.2 gallons of fuel were added.

The airplane was then taxied to the approach end of runway 21 and according to one witness, the airplane remained there for 2-3 minutes, but no determination could be made as to whether the pilot performed an engine runup before departure. According to another witness, the airplane rotated just beyond a taxiway which is south of runway 9/27. Calculations based on an airport map indicate that at the point of rotation about 529 feet of runway remained. The total length of runway available to the accident pilot based on reports of his using all available paved surface is 3,746 feet. The witness also stated that one or both of the engines were running rough. Witnesses reported that the airplane climbed no higher than 300 feet above ground level and banked to the left during which the nose of the airplane pitched down. During the descent the airplane collided with trees then the ground and a postcrash fire damaged the cockpit, part of the fuselage, and part of the wings.

According to several witnesses, one or both of the engines were heard to be running rough or not developing what they thought to be full power.

PERSONNEL INFORMATION

Information pertaining to the first pilot is contained in the NTSB Factual Report-Aviation. Review of his pilot logbook revealed that the last flight logged was on August 24, 1991. At that time his total time logged was 438.9 hours. The total multi-engine flight time logged was 89.2 hours, of which 28.5 hours were logged as pilot-in-command of multi-engine airplanes. The last entry in the pilots' logbook was for a Biennial Flight Review. A certified flight instructor provided a copy of a page from his pilot logbook which indicates that the accident pilot was given a biennial flight review in the accident airplane on August 6, 1993, on a flight which lasted 1.7 hours.

AIRCRAFT INFORMATION

Information pertaining to the airplane is contained in the NTSB Factual Report-Aviation and Supplements A and B. Additionally, the week of the accident the accident pilot/owner asked a FAA certificated mechanic for an estimate to replace the right inboard fuel cell bladder. He inspected the tank and observed that the fuel vent nipple was "ripped out" of the tank

bladder. The day before the accident flight he advised the pilot/owner by telephone that "...fuel would slush [sic] out near the engine and electrical wires."

METEOROLOGICAL INFORMATION

Information pertaining to the weather is contained in the NTSB Factual Report-Aviation.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site revealed that the right wing of the airplane collided with a tree about 30 feet above ground level and the left wing collided with a tree about 2 feet above ground level while on a heading of about 360 degrees. The attitude of the airplane at impact was determined to be about 45 degrees nose low and about a 30-degree left bank. The airplane then impacted the ground, rotated to the right and came to rest about 81 feet from the first impact with the trees on a heading of about 085 degrees. A postcrash fire damaged the fuselage and both wings. Examination of the aileron, elevator, and rudder flight controls revealed no evidence of preimpact failure or malfunction. Examination of the left and right fuel selector valves revealed that they were positioned to the "inboard" tanks. The crossfeed valve was determined to be closed, and examination of the left engine firewall shutoff valve revealed that it was in an intermittent position, but the push/pull rod was impact damaged. Examination of the right engine firewall shutoff valve also revealed that it was in the intermittent position. Examination of the left and right fuel delivery systems from the fuel selector valve forward to the fitting at the engine firewall revealed no evidence or blockage. Additionally, both the fuel boost pump and emergency fuel pump from the left and right fuel systems were operationally checked from a battery power source and no evidence of failure or malfunction was noted from either system. A fuel sample obtained from the left engine fuel filter was analyzed and found to contain 100-low lead fuel, water with a high chloride content, and foam used by the fire department. No sample was obtained from the right wing fuel system. The crew entry door was closed and locked when examined.

Examination of the left engine at the accident site revealed that the oil quick drain was impact damaged and open. There was a residual quantity of oil in the dirt underneath the engine assembly. Examination of the engine compartment revealed no evidence of oil leakage in the cowling. The oil filler dipstick which was installed and secured was removed which revealed no evidence of oil contacting the dipstick. Examination of the left side of the airplane revealed no evidence of oil on the fuselage or left horizontal stabilizer. The flaps were determined to be symmetrically extended about 16 degrees. The propeller was removed for further examination.

Examination of the left propeller revealed no evidence of preimpact failure or malfunction. The propeller blade angles for the three blades were determined to be 10 degrees, 12 degrees, and 18 degrees. The low pitch position is 13.2 degrees + or .1 degree. The feather position is 82.0 degrees + or - 1.0 degree. One of the three propeller blades pitch change knobs was failed but examination revealed evidence of overload failure.

Examination of the right engine at the accident site revealed that the right engine sustained more heat damage than the left engine. The oil dipstick when removed indicated that the engine contained 12 quarts of oil. Both engines were removed from the airframe and sent to the manufacturer's facility.

The left engine was examined before being placed in a test cell for an attempted engine run which revealed that about 1 ounce of oil was recovered. The magneto to engine timing was

determined to be 15 degrees before top dead center(BTDC). The specification is 20 degrees BTDC. Several components were removed, a new oil filter was installed, oil was added, and the engine was started. During the initial run, the engine-driven fuel pump vent started leaking. The engine was shut down, and the pump was removed to reseal the drive. The pump was reinstalled and the engine was restarted eventually operating only using the engine-driven fuel pump. During the magneto check of the left magneto, an excessive drop was noted and the engine was again shutdown. The ignition harness was examined and found to be cut and abraded in several places. The ignition harness was replaced and the engine was restarted. The magneto drops were then within limits. The density controller was required to be adjusted to obtain rated speed of 2,575 rpm. Before the adjustment at full throttle the maximum engine rpm was 2,450. Additionally, the No. 3 cylinder fuel injector nozzle was partially blocked by contaminant and an incorrect washer was installed on the No. 6 cylinder fuel injector nozzle assembly. No other discrepancies were noted. Following the engine run the engine oil was drained through a filter which revealed only carbon. No metal particles were noted. The No. 6 cylinder was removed and examination of the associated connecting rod bearings and crankshaft journal revealed no evidence of oil starvation or overheat condition.

Examination of the right engine revealed that magneto to engine timing and internal timing of the magneto was not determined. Several components of the right engine were replaced for the attempted engine run including the magneto, ignition harness, fuel injector nozzle vent hoses, and fuel injector nozzle vent manifold which was damaged during replacement of the vent hoses. The engine was started and operated normally but the engine-driven fuel pump started leaking. The engine was shut down, the engine-driven fuel pump was replaced, and the engine was restarted. The density controller was adjusted to obtain full rated 2,575 rpm. The engine-driven fuel pump was bench tested which revealed that it met specification at idle and full rated rpm; however, leakage was noted around the diaphragm for the pump cover and valve housing. Leakage was also noted from the gasket for the valve housing and pump housing. Disassembly of the pump revealed that all preformed packings, a gasket, and packing with retainer were worn. Additionally, the seal disk and plate were worn. Measurements of the four blades revealed that they were in specification. The magneto which was installed on the engine at the time of the accident was examined which revealed that the capacitors were heat damaged and the left, right, and retard contact clearances were measured and found to be .008, .005, and .002 respectively. The specification gap for the left and right contact assemblies is .016 +/- .002 and .016 +/- .004 respectively. The coils were tested and found to operate normally. The contact assemblies and capacitors from the right engine magneto were sent to the manufacturer's facility for further examination.

Examination of the left and right capacitors revealed heat damage due to the postcrash fire. Testing of the left and right contact assemblies revealed that the right point surfaces were contaminated but there was no metal transfer signatures of either the left or right points contact surfaces. The right point surfaces were cleaned and the left and right points were determined to be functional. The accident capacitors and contact assemblies were placed in a test magneto, the contact assemblies adjusted to specification, and the magneto was operated to 4,000 rpm. No magneto output was noted. The heat damaged capacitors were replaced and the magneto was operated to 150 magneto rpm. The voltage output met specification. The contact assemblies were adjusted to the as found setting and the magneto was again operated at 150 magneto rpm. The voltage output was less than specification, however, at the 500 and 1,000 magneto rpm position, the voltage output met specification.

Examination of the right propeller revealed that two of the three propeller blades pitch change knobs were broken but examination of the fracture surfaces revealed signatures consistent with overload failure. Propeller blade angles for the three blades were determined to be 16 degrees, 9 degrees, and 10 degrees. The low pitch blade angle is 13.2 degrees + or - .1 degree. The high pitch blade angle is 82.0 + or - 1.0 degree. Examination of the propeller revealed no evidence of preimpact failure or malfunction.

MEDICAL AND PATHOLOGICAL

Post-mortem examinations were conducted on the pilot and passenger by Michael D. Bell, M.D., Associate Medical Examiner of the Palm Beach County Medical Examiner's Office, West Palm Beach, Florida. The cause of death for both was listed as inhalation of products of combustion.

Toxicological testing was performed on specimens of the pilot by the FAA Toxicology and Accident Research Laboratory. The results were negative for cyanide and ethanol. Carbon monoxide analysis was not performed due to a lack of a suitable specimen. The results were positive in the blood for butalbital 1.768 ug/ml, ug/g. Butalbital, acetaminophen, and salicylate were detected in the urine .553 ug/ml, ug/g; 133.0 ug/ml, ug/g; and 53.600 ug/ml, ug/g respectively.

Toxicological testing was also performed on specimens of the pilot and passenger by the Palm Beach County Crime Laboratory. With respect to the pilot the results were negative for ethanol. The results were positive in the blood for butalbital (.6 MG/L) and carbon monoxide saturation was determined to be greater than 90 percent. With respect to the passenger the results were negative for ethanol. The carbon monoxide saturation was determined to be 61 percent.

According to literature titled Disposition of Toxic Drugs and Chemicals in Man, Third Edition 1989, regarding blood concentrations of butalbital, "A single oral dose in 5 adults resulted in an average peak blood butalbital concentration of 2.1 mg/L (range 1.7-2.6) at 2 hours, with a decline to 1.5 mg/L (range 1.3-1.7) by 24 hours. The half life of the drug is 35-88 hours."

FIRE

The Palm Beach County Fire Rescue Station 35 received the 911 call about 0910.52, dispatched at 0912.36, and arrived on scene about 0918.06. The fire was reportedly extinguished about 5 minutes after arrival.

ADDITIONAL DATA/INFORMATION

A weather observation taken at 0856 from the Palm Beach International Airport located about 6 nautical miles north of the crash site revealed that the temperature was 83 degrees F, the wind was from 190 degrees at 9 knots, and the altimeter setting was 30.06 inHg. Based on information provided by the weight and balance form dated 11/24/92, the aircraft empty weight was 4,667.3 pounds. Weights for the pilot and passenger, 237 and 125 pounds respectively, are based on autopsy reports. Fuel quantity was based on each outboard fuel tank being full (40 gallons) and 20 gallons each in each of the inboard tanks. The elevation at the accident airport is 17 feet and the headwind component was computed to be about 8 knots. Based on the above information the ground run was calculated to be about 800 feet and the total distance to clear a 50 foot obstacle was determined to be about 1,800 feet using the short

field takeoff distance over 50 feet chart and the notes and conditions specified in the chart. Additionally, based on the above information and the notes and conditions contained in the short field accelerate/stop distance chart, the accelerate/stop distance was calculated to be about 2,000 feet.

The wreckage and all retained components were released to Mr. Charles Maynard on November 23, 1994.

Pilot Information

Certificate:	Private	Age:	63, 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:	10/28/1992
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	1000 hours (Total, all aircraft), 3 hours (Total, this make and model), 193 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	PIPER	Registration:	N27872
Model/Series:	PA-31-325 PA-31-325	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	31-7912031
Landing Gear Type:	Retractable - Tricycle	Seats:	7
Date/Type of Last Inspection:	06/12/1993, Annual	Certified Max Gross Wt.:	6500 lbs
Time Since Last Inspection:		Engines:	2 Reciprocating
Airframe Total Time:		Engine Manufacturer:	LYCOMING
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	TIO-540-F2BD
Registered Owner:	THORNE, ROSCOE M.	Rated Power:	325 hp
Operator:	THORNE, ROSCOE M.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	PBI, 19 ft msl	Distance from Accident Site:	6 Nautical Miles
Observation Time:	0856 EDT	Direction from Accident Site:	360°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	9 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	190°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	28° C / 26° C
Precipitation and Obscuration:			
Departure Point:		Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	0900 EDT	Type of Airspace:	Class G

Airport Information

Airport:	PALM BEACH COUNTY PARK (LNA)	Runway Surface Type:	Asphalt
Airport Elevation:	17 ft	Runway Surface Condition:	Dry
Runway Used:	21	IFR Approach:	None
Runway Length/Width:	3496 ft / 75 ft	VFR Approach/Landing:	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	Unknown
Total Injuries:	2 Fatal	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	TIMOTHY W MONVILLE	Report Date:	10/31/1995
Additional Participating Persons:	ROGER W STALLKAMP; PIQUA, OH DONALD W POUST; VERO BEACH, FL TOM LAIRD; FT LAUDERDALE, FL TIM DAVIS; ATLANTA, GA		
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.nts.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](#).