



National Transportation Safety Board Aviation Accident Final Report

Location:	ORLANDO, FL	Accident Number:	MIA94FA020
Date & Time:	11/12/1993, 0629 EST	Registration:	N27687
Aircraft:	PIPER PA-31-350	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal, 2 Minor
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

CARGO WAS NOT WEIGHED AND WEIGHT AND BALANCE CALCULATIONS WERE NOT PERFORMED. THE AIRPLANE WAS ABOUT 321 POUNDS OVER GROSS. WHILE TAXIING, A WITNESS REPORTED SEEING BLACK SMOKE TRAILING THE LEFT ENGINE WHICH HAD BEEN WORKED ON THE NIGHT BEFORE THE ACCIDENT. 2 CYLINDERS WERE WORKED ON AND A FUEL INJECTOR NOZZLE WAS CLEANED. THE CLIMB AFTER TAKEOFF WAS 'LOW AND SLOW' DURING WHICH THE AIRPLANE ROLLED LEFT, PITCHED NOSE DOWN, AND IMPACTED THE GROUND COMING TO REST ADJACENT TO A HOUSE. EXAMINATION OF EACH ENGINE REVEALED NO EVIDENCE OF INTERNAL MECHANICAL FAILURE OR MALFUNCTION. HEAT DAMAGE PRECLUDED TESTING OF THE MAGNETOS, TURBOCHARGER COMPONENTS, AND FUEL SERVOS OF EACH ENGINE. EXAMINATION OF EACH PROPELLER REVEALED NO EVIDENCE OF PREIMPACT FAILURE OR MALFUNCTION. THE FUEL NOZZLES FROM THE LEFT ENGINE WERE EXAMINED WHICH REVEALED THAT THEY WERE BLOCKED IN VARIOUS PLACES DUE TO CONTAMINANTS. AFTER THE ACCIDENT THE FAA PERFORMED A FOCUSED INSPECTION OF THE OPERATOR REVEALING THAT THE CARGO WAS NOT BEING WEIGHED, THE CHIEF PILOT OF THE COMPANY WAS IN NAME ONLY, AND LOAD MANIFESTS WERE NOT BEING KEPT BY THE COMPANY.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: WAS IN FLIGHT LOSS OF CONTROL FOR FAILURE OF THE PILOT-IN-COMMAND TO MAINTAIN VMC SHORTLY AFTER TAKEOFF. CONTRIBUTING TO THE ACCIDENT WAS PARTIAL LOSS OF ENGINE POWER FROM THE LEFT ENGINE DUE TO PARTIAL BLOCKAGE OF SEVERAL OF THE FUEL INJECTOR NOZZLES. ALSO CONTRIBUTING TO THE ACCIDENT WAS WEIGHT AND BALANCE EXCEEDED BY THE PILOT-IN-COMMAND AND INADEQUATE SURVEILLANCE BY THE COMPANY AND BY THE FAA.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (F) FUEL SYSTEM,NOZZLE - BLOCKED(PARTIAL)

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: OTHER

Findings

2. (C) AIRSPEED(VMC) - NOT MAINTAINED - PILOT IN COMMAND

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

Findings

3. TERRAIN CONDITION - GROUND
4. (F) AIRCRAFT WEIGHT AND BALANCE - EXCEEDED - PILOT IN COMMAND
5. (F) INADEQUATE SURVEILLANCE OF OPERATION - FAA(ORGANIZATION)
6. (F) INADEQUATE SURVEILLANCE OF OPERATION - COMPANY/OPERATOR MGMT

Occurrence #4: FIRE/EXPLOSION
Phase of Operation: OTHER

Factual Information

HISTORY OF FLIGHT

On November 12, 1993, about 0629 eastern standard time, a Piper PA-31-350, N27687, registered to Cherokee Leasing, Inc., operated by Cherokee Express, crashed into a residential area shortly after takeoff from the Orlando Executive Airport, Orlando, Florida. The flight was operating under 14 CFR Part 135 as a nonscheduled, domestic, cargo flight, call sign Blue Max 500. Visual meteorological conditions prevailed at the time and a VFR flight plan was filed for the flight to Tampa, Florida. The airplane was destroyed by a postcrash fire and the pilot was fatally injured. One house was fire damaged and one of the two occupants received minor injuries. The flight was originating at the time of the accident.

Before takeoff the airplane was loaded with checks and bank documents and the pilot-in-command did not complete the required load manifest nor did she leave a copy with the company as required by the FAA approved company operations manual.

At 0622.49, Blue Max 500 was cleared to taxi to runway 7. While taxiing to takeoff, the accident airplane passed in front of another airplane which gave the other pilot an unobstructed view of the left side of the Blue Max 500 airplane. The pilot stated that he observed "a lot" of black smoke trailing from the exhaust of the left engine. He further stated that the Blue Max 500 airplane was at the runup area for about 1-2 minutes, but he couldn't hear whether the pilot had performed an engine runup of each engine before departure. His attention was diverted and he did not witness the takeoff roll or accident.

At 0626.28, the pilot of the Blue Max 500 flight contacted the tower controller and advised that the flight was ready for departure, southwest. At 0626.35, the tower controller advised the pilot that the flight was cleared for takeoff, which the pilot acknowledged 8 seconds later. At 0628.53, the pilot of the Blue Max 500 flight advised the controller "... i i need to come back round and land on uh runway 25 here." At 0628.58, the controller advised the pilot that the flight was cleared to land on runway 25. There was no further radio contact with the pilot of the Blue Max 500 flight.

According to one witness who observed the takeoff roll and initial climb, the takeoff roll seemed slower than normal and the pilot seemed to use more runway than normal for this type of airplane. He also stated that he heard popping sounds from the engines during the takeoff roll. He observed the airplane climbing slowly maintaining runway heading but then observed the airplane descending after which the airplane began to bank to the left losing altitude during the turn. After 180 degrees of turn had been completed the wings were observed to level with respect to the horizon, then the nose of the airplane was observed to pitch down and the airplane banked to the left in about a 90- degree angle of bank. The airplane then descended nose and left wing low until he lost sight of the airplane due to obstructions. He then observed black smoke.

According to numerous other witnesses near the accident site, the airplane was observed flying east-northeast bound after takeoff low and slow and was observed to bank to the left in what one witness described as the right wing was nearly vertical. The airplane then descended through several trees, impacted the ground, and came to rest adjacent to a house. The airplane was destroyed by a postcrash fire and the house was damaged by the fire.

PERSONNEL INFORMATION

Information pertaining to the first pilot is contained in the NTSB Factual Report-Aviation, and Supplement U. According to company personnel, she was provided a place to sleep at her last stop earlier that morning at the Tampa, Florida, location.

AIRCRAFT INFORMATION

Information pertaining to the airplane is contained in the NTSB Factual Report-Aviation, and Supplements A and B. Additionally, according to a company pilot, 3 days before the accident he was scheduled to fly the accident airplane but aborted the flight during the takeoff roll due to a rough running engine. He also stated that both inboard and outboard fuel tanks were filled before he received the airplane.

Review of company maintenance work order No. 2742 opening date November 9, 1993, closing date November 11, 1993, revealed that the Nos. 3 and 5 cylinder differential compression readings were 34/80 and 54/80 respectively. The corrective action was to remove Nos. 3 and 5 cylinders. The No. 5 cylinder was honed and the exhaust valve, valve springs, and valve keepers were replaced along with the installation of a new ring set. The No. 3 cylinder was removed and the cylinder was honed and new rings were installed. Several other nonengine related discrepancies were corrected. The left engine was then operated and it was discovered that at full throttle the tachometer was indicating 2,200 rpm. Full throttle rpm should be 2,575 according to the engine run in limits table in the Lycoming overhaul manual. The engine was shutdown and the cowling was removed. Based on the temperature of the No. 3 cylinder valve cover, the fuel injector nozzle and line were "blown clear and reinstalled." The engine was restarted and determined to develop full-rated power. The right engine cowling was removed and the engine was checked for leaks, none were found. Both engine cowlings were reinstalled and the Director of Maintenance stated that he flew the airplane around the traffic pattern, a flight which lasted according to company personnel about 18 minutes. Both engines reportedly operated normally during the test flight with no discrepancies noted. This was the last flight before the accident flight.

According to a letter by the President of Cherokee Express to the FAA, Orlando, Florida, based on fuel receipts, a statement from a company pilot, the pilot's operating handbook, and aircraft records, all fuel tanks were full before the accident flight departed.

METEOROLOGICAL INFORMATION

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

COMMUNICATIONS

Two-way radio contact had been established with the Orlando Executive Airport Air Traffic Control Tower.

WRECKAGE AND IMPACT

Examination of the airplane at the accident site revealed that the airplane first impacted the ground while on a heading of about 160 degrees, collided with several small trees, rotated to the right and came to rest upright on a heading of about 270 degrees adjacent to a duplex. The accident site was located about 1.6 nautical miles on the 048-degree radial from the Orlando Vortac. Both engines were separated from the airframe and the airplane was destroyed by a postcrash fire. The right wing which separated from the airplane was located along the flight path of the airplane.

Examination of the cargo section of the airplane revealed several cargo net metal hooks remaining engaged in the tie down rings. The cargo was removed from the airplane and the weight was determined to be about 1,675 pounds. The CG location was not determined.

Examination of the aileron, rudder, and elevator flight controls revealed no evidence of preimpact failure or malfunction. No fuel system components for the right engine were located. The fuel crossfeed valve was determined to be in the off position and the left engine fuel selector valve was determined to be between the off position and the outboard tank position. The left engine firewall shutoff valve was determined to be in the "off" position. Both engines were removed from the airframe for further examination.

Examination of the left engine revealed crankshaft, camshaft, and valve train continuity. The mixture and throttle cables were attached to the fuel servo which was heat damaged precluding testing. The mixture control arm at the fuel servo was in the idle-cutoff position and the throttle control arm was in the idle position. The control cable for the propeller governor was connected to the propeller governor which was installed on the engine. Heat damage to the magnetos precluded testing. The fuel injection nozzles for each cylinder were removed and visual examination of the cylinder Nos. 1, 3, and 5 nozzles revealed that they were free of obstructions. Visual examination of the nozzles for cylinders Nos. 2, 4, and 6 revealed blockage. All nozzles were sent to a facility for examination which revealed multiple locations of blockage by chemical elements. A report was prepared which is an attachment to this report. Examination of the engine-driven fuel pump revealed no evidence of preimpact failure or malfunction. Examination of the plugs from cylinder Nos. 1, 3, and 5 revealed that they were sooty. The plugs for cylinder Nos. 2, 4, and 6 were oil soaked. Heat damage to the turbocharger components precluded testing. The propeller was removed for further examination.

Examination of the left propeller revealed that four start lock bracket screws were stripped from the attach point inside of the nose cylinder. Additionally, only the pitch change knob of propeller blade No. 3 was failed but examination revealed signatures consistent with overload failure. Propeller blade angles were determined to be based upon impact signatures for propeller blades Nos. 1, 2, and 3, 11-12 degrees, 39 degrees, and 23 degrees respectively. The low pitch range is 13.4 degrees + or - .1 degree and the feather range is 82.0 degrees + or - 1.0 degree.

Examination of the right engine revealed crankshaft, camshaft, and valve train continuity. The fuel servo, magnetos, engine-driven fuel pump, and turbocharger components were heat damaged precluding testing. The throttle, mixture, and propeller control cables were attached to their respective controls at the fuel servo and propeller governor respectively. Thumb compression was verified for cylinder Nos. 1, 3, and 5. Thumb compression was not verified for cylinder Nos. 2, 4, and 6 due to open intake and exhaust valves, open exhaust valve, and open exhaust valve respectively. Examination of piston crowns for cylinder Nos. 2, 4, and 6 revealed no evidence of impact with the open valves. All fuel injector nozzles were examined visually and found to be free of obstructions. The propeller was removed for further examination.

Examination of the right propeller revealed no evidence of preimpact failure or malfunction. Additionally, only the pitch change knob of propeller blade No. 1 was failed but examination revealed signatures consistent with overload failure. Propeller blade angles for blades Nos. 1, 2, and 3 were determined to be 11 degrees, undetermined, and about 10 degrees respectively. The low pitch angle is 13.4 degrees + or - .1 degree, and the feather position is 82.0 degrees, +

or - 1.0 degree.

MEDICAL AND PATHOLOGICAL

A post-mortem examination was conducted on the pilot by Jesse C. Giles, M.D., Associate Medical Examiner District Nine, Orlando, Florida. The cause of death was listed as blunt force injuries of head, chest, and legs with perimortem burns due to air crash.

Toxicological testing of specimens from the pilot was performed by the FAA Accident and Research laboratory. The results were negative for carbon monoxide, cyanide, volatiles, and tested drugs.

FIRE

The airplane was destroyed by a postcrash fire and a house was damaged by the postcrash fire.

SURVIVAL ASPECTS

The accident was not survivable.

ADDITIONAL DATA/INFORMATION

Review of FAA provided Integrated Safety Information System (ISIS) Inspections Performance Tracking and Reporting System (PTRS) Reports pertaining to the accident operator from October 15, 1992, to November 3, 1993, revealed that there were 90 reports. The results were documented as being 13 complete, 17 cancelled, 13 terminated, 2 information, and 45 satisfactory. Of the 90 reports only two specifically state information pertaining to weight and balance. The first stating that dispatch weight and balance records for October 1993, were examined. The second indicates that a pilot was having difficulty completing weight and balance.

Between November 17-23, 1993, the Orlando Flight Standards District Office (FSDO) personnel conducted a "focused inspection" of the operator and discovered several discrepancies. The FAA report is an attachment to this report. The discrepancies in part are; in August 1993, the FAA Principal Operations Inspector (POI) was aware that the chief pilot listed in the company operations manual was not performing the functions and duties of his position. The Director of Operations (D.O.) was in fact performing both duties as the D.O., and as the chief pilot. The FAA POI notified the company of this but this discrepancy was allowed by the FAA to exist until the date of the accident. It was also noted that the company was not weighing cargo to determine actual weight as prescribed by their FAA approved company operations manual.

The FAA failed to provide requested information pertaining to FAA-based inspections performed at the operators' facilities before and after the accident; however, the operator provided the information.

Because of firefighting response the cargo was wet with foam and water. As a result, weighing of the cargo was delayed. Once the cargo was dry, a vehicle was weighed at a fruit company with scales certified by the State Department of Agriculture. The cargo was then loaded in the vehicle and the difference in weight was determined to be 1,660 pounds. About 15 pounds of cargo was dry immediately following the accident and was not weighed in the vehicle. The empty weight of the airplane according to a March 3, 1993, document indicates 4,402.00 pounds. The certificated maximum gross takeoff weight according to the pilot's

operating handbook is 7,000 pounds. Full usable fuel is 1,092 pounds and the pilot's weight according to her last medical on October 18, 1993, indicates 152 pounds. The gross takeoff weight was calculated to be 7,321 pounds.

The wreckage and all retained components were released to Mr. Craig T. Walker of Loss Management Services on September 30, 1994.

Pilot Information

Certificate:	Airline Transport; Flight Instructor; Commercial	Age:	30, Female
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
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 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	10/18/1993
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	2465 hours (Total, all aircraft), 69 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	PIPER	Registration:	N27687
Model/Series:	PA-31-350 PA-31-350	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	31-7852107
Landing Gear Type:	Retractable - Tricycle	Seats:	2
Date/Type of Last Inspection:	10/30/1993, Continuous Airworthiness	Certified Max Gross Wt.:	7000 lbs
Time Since Last Inspection:	5 Hours	Engines:	2 Reciprocating
Airframe Total Time:	8393 Hours	Engine Manufacturer:	LYCOMING
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	TIO-540-J2BD
Registered Owner:	CHEROKEE LEASING, INC.	Rated Power:	350 hp
Operator:	CHEROKEE EXPRESS, INC.	Operating Certificate(s) Held:	On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	HZTA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Dawn
Observation Facility, Elevation:	ORL, 113 ft msl	Distance from Accident Site:	225 Nautical Miles
Observation Time:	0640 EST	Direction from Accident Site:	2°
Lowest Cloud Condition:	Unknown / 500 ft agl	Visibility	7 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	2 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	10°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	14° C / 13° C
Precipitation and Obscuration:			
Departure Point:	(ORL)	Type of Flight Plan Filed:	VFR
Destination:	TAMPA, FL (TPA)	Type of Clearance:	VFR
Departure Time:	0627 EST	Type of Airspace:	Class D

Airport Information

Airport:	ORLANDO EXECUTIVE (ORL)	Runway Surface Type:	
Airport Elevation:	113 ft	Runway Surface Condition:	
Runway Used:	7	IFR Approach:	
Runway Length/Width:	5998 ft / 150 ft	VFR Approach/Landing:	

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	TIMOTHY W MONVILLE	Report Date:	12/19/1994
Additional Participating Persons:	ROGER W STALLKAMP; PIQUA, OH PETER STRUNK; ORLANDO, FL DANIEL B FLETCHER; WILLIAMSPORT, PA DENNIS M PETERSON; KENNEDY SPACE, FL		
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](#).