



National Transportation Safety Board Aviation Accident Final Report

Location:	Agua Dulce, CA	Accident Number:	LAX03FA013
Date & Time:	10/20/2002, 1300 PST	Registration:	N700US
Aircraft:	Piper Aerostar 601	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	3 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The airplane crashed into rising terrain after departure from an uncontrolled public airport. The runway used by the pilot is 4,600 feet long and has a 1.8 percent upward gradient. The density altitude was 4,937 feet msl, and a slight quartering tailwind existed at the time. The pilot held in position, powered up the engines, and started his departure. The airplane was observed using most of the runway length before rotation and then it assumed a higher than normal pitch attitude in the initial climb. Witnesses watched the airplane turn left following the route of a canyon and into rising terrain. The reciprocal runway departs towards decreasing elevations. In the area of the crash, two witnesses reported the airplane was at a low altitude, nose high, and wallowing just before it descended into a drainage area 0.69 miles from the runway. Post accident examination of the engines revealed worn camshaft lobes and tappets, which would negatively affect the ability of the engines to produce full rated power. One engine exhibited severe rust on the entire crankshaft. The accident site was located in a canyon, and the wreckage and ground scars was confined to an area about the diameter of the wing span. Major portions of the airframe and most of the engine accessories were consumed by a post accident fire. Examination of the wreckage established that all major components of the airframe and powerplants were at the site.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's failure to attain and maintain a sufficient airspeed, which led to an inadvertent stall mush. The pilot's selection of the wrong runway for departure, considering the uphill gradient, the wind direction, and a takeoff path into rising terrain are also causal. The high density altitude and the degraded internal condition of the engines were factors.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (F) ENGINE ASSEMBLY,CAMSHAFT - WORN
2. (F) POWERPLANT - OUTPUT LOW
3. (F) TERRAIN CONDITION - RISING
4. (F) AIRPORT FACILITIES,RUNWAY/LANDING AREA CONDITION - UPHILL
5. (F) WEATHER CONDITION - TAILWIND
6. (F) WEATHER CONDITION - HIGH DENSITY ALTITUDE
7. (C) WRONG RUNWAY - SELECTED - PILOT IN COMMAND
8. (C) AIRSPEED - NOT OBTAINED/MAINTAINED - PILOT IN COMMAND
9. (C) STALL/MUSH - INADVERTENT - PILOT IN COMMAND

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

Factual Information

HISTORY OF FLIGHT

On October 20, 2002, about 1300 Pacific daylight time, a Piper Aerostar 601, N700US, collided with terrain after departure from Agua Dulce, California. The airplane was operated by the owner/pilot under 14 CFR Part 91. The private rated pilot, a passenger who held a student certificate, and rear seated passenger were all fatally injured. The airplane was destroyed. Visual meteorological conditions prevailed for the personal flight, and no flight plan was filed. The flight was originating and destined for Bullhead City, Arizona.

According to witnesses, the airplane had landed, possibly to pickup a passenger, parked, and remained on the ground for a short period of time. Subsequently, the airplane was seen to taxi out for departure on runway 04. The pilot held in position, powered up the engines, and started his departure. The airplane was observed using most of the runway, rotate, and assume a higher than normal attitude. Witnesses watched the airplane turn left following the route of a canyon and rising terrain. In the area of the crash, two witnesses reported the airplane was low, nose high, and wallowing just before it descended into a drainage area 0.69 miles from the runway.

PILOT INFORMATION

The pilot held a private certificate with ratings for airplane single and multiengine land and instruments limited to single engine land. The pilot's last documented third-class flight physical occurred on June 13, 2001. According to a recovered damaged flight logbook, the pilot had accrued about 685 total flight hours. The accident airplane first appeared in the pilot's logbook about March 1, 2001, about 500 hours into his total flight time.

According to Federal Aviation Administration (FAA) records, on July 28, 1999, the pilot obtained a student pilot certificate with the issuance of a third-class flight physical examination. On April 19, 2000, he applied for, and received, a private pilot certificate, having accrued 265 flight hours, with 240 hours of dual flight instruction and 25 hours of solo time.

On August 4, 2000, the pilot applied for an airplane multiengine rating. He was reporting 315 total hours, with 265 hours of dual flight instruction and 25 hours in multiengine type. The pilot failed the check ride and was reexamined and issued the multiengine rating on August 5, 2000.

On October 17, 2001, the pilot applied for an instrument rating and was reporting 639 total hours and 517 dual flight hours. The pilot failed the check ride and was reexamined and issued the rating for single engine only on October 18, 2001.

On October 20, 2001, the pilot applied for a multiengine instrument rating and was reporting a total flight time of 640 hours with 522 dual instruction on the application. The pilot failed the flight test.

STUDENT PILOT PASSENGER

The right front seat passenger obtained a student pilot certificate on October 10, 2001.

AIRPLANE INFORMATION

An annual inspection was performed by Able Air Corporation and repairs were finalized on December 6, 2001. The airplane was signed off as unairworthy, with a list of discrepancies

given to the pilot/owner. Subsequently, another maintenance organization at Long Beach, California, approved the airplane for return to service on December 12, 2001, at 14,235 total flight hours.

The most recent maintenance performed on the airplane was at Lloyd's Aircraft Maintenance, Bakersfield, California. On September 25, 2002, Lloyd's invoice 9472 documents the adjusting of engine operating limits, at the request of the customer, about 29 hours since the last annual inspection.

The engines' turbocharger exhaust system is designed to maintain sea level manifold pressure (MAP) to a given altitude. It does not provide MAP boost to the engines. According to the Aerostar model 601 flight manual, takeoff power is at 2,575 rpm and 29.5 inches of MAP.

The pilot's home base airport manager was asked about fueling record information and an unidentified fuel truck observed at the pilot's hangar a few days before the accident. The manager stated that the pilot had made allegations to the Los Angeles Department of Weights and Measures that employees of Raytheon Aircraft Company, Van Nuys, California, were manipulating the fuel log and overcharging on fuel quantity, and consequently on price.

METEOROLOGICAL INFORMATION

The nearest official weather reporting site was Palmdale, California, 14 miles northeast of the accident site. At 1253, Palmdale was reporting: variable wind at 4 knots; visibility 10 miles; temperature 75 degrees Fahrenheit; dew point 37 degrees Fahrenheit; and the altimeter was 29.93 inHg.

According to witnesses, the active runway was 04 as determined by the windsock and traffic. About the time of the accident airplane's departure, the wind had started to favor runway 22. A witness estimated the temperature to be about 85 degrees Fahrenheit at the time of the accident.

A pilot landed on runway 04 about 15 minutes behind the accident airplane. He reported a direct headwind with the windsock deflected at 45 degrees. The witness/pilot also observed the accident departure and reported that the wind was now calm, and the engines were in sync and sounded very smooth. He was concerned about the rate of acceleration.

According to a Safety Board density altitude computer program, using the witness estimate of 85 degrees Fahrenheit, the airport elevation, and the Palmdale altimeter of 29.93 inHg, the density altitude was calculated at 4,937 feet mean sea level (msl).

WRECKAGE AND IMPACT INFORMATION

The wreckage site was located in a canyon/wash, and was confined to about the diameter of the wing span. Major portions of the airframe were consumed by a post accident fire. A Safety Board examination of the remains provided indicators that all major components of the airframe and powerplants were at the site. Portions of the exterior skins revealed the airplane to be stripped of paint and exterior placarding.

The wreckage was recovered to a secure storage area for detailed examination by the Safety Board and parties to the investigation. The airframe was examined for control continuity where possible. The braking and parking brake system was examined. The landing gear was found in the retracted position with the flaps up. Trim tab positions were not recovered.

The Safety Board witnessed the disassembly of both engines. Extensive rust was found on the

right engine crankshaft. The interior of both crankshafts were heavily laden with sludge, as were portions of the propeller shafts. The camshafts in both engines displayed worn lobes with spalling type damage to the tappets. The magnetos were fire damaged, as were all other accessories.

MEDICAL AND PATHOLOGICAL INFORMATION

On October 21, 2002, the Los Angeles County Medical Examiner performed an autopsy on the pilot and student rated passenger. During the course of the procedure samples were obtained for toxicological analysis by the FAA Civil Aeromedical Institute, Oklahoma City, Oklahoma. The results of the analysis were negative for carbon monoxide, cyanide, and ethanol for both pilots. The analysis for the private pilot operator was positive for Butalbital, which was detected in the blood at 0.796 (ug/ml, ug/g) and 2.214 (ug/ml,ug/g) in the liver. Fluoxetine was detected in kidney and liver samples. Norfluoxetine was detected in kidney and liver samples.

The Los Angeles County Department of Coroner also performed a toxicological analysis. The analysis of Femoral blood samples was positive for Fluoxetine at 0.48 (ug/ml) and Norfluoxetine at 0.50 (ug/ml). Blood samples obtained from the heart were positive for Butalbital at 0.72 (ug/ml), Fluoxetine at 1.2 (ug/ml), and Norfluoxetine at 0.76 (ug/ml).

Pilot medical records were obtained from the FAA Civil Aerospace Medical Institute, Oklahoma City. Examination of the records revealed no FAA approvals for the use of the prescription drugs found during the toxicology analysis.

AIRPORT INFORMATION

The Agua Dulce Airpark is a privately owned public airport. The elevation is estimated at 2,660, feet msl. The available runway length is listed as 4,600 feet. There are landing displaced thresholds for obstruction clearance on both runway 04 and 22. According to an FAA Airport Master Record of site survey dated June 20, 1995, runway 04 has a 1.8 percent upward runway gradient. Two other sources of airport information, FAA Airport/Facility Directory and Flight Guide for western states, did not note a gradient. Runway 04 departs towards rising terrain and runway 22 departs towards lower terrain. The airport is uncontrolled with a midfield windsock. A Common Traffic Advisory Frequency of 122.9 is available for pilots to share information.

TESTS AND RESEARCH

The damaged camshafts and tappets were shipped to Lycoming for examination. The parts were identified by Lycoming as not being their parts and returned to the Safety Board. A Lycoming representative stated that the camshafts may be a product of Air Support International.

Examination of the right engine revealed five tappets were spalled, or worn, in a concave pattern from a 0.0005 to 0.006-inch depth. The cam lobe point wear was measured about 1.475 inches high to a low of about 1.348 inches. Large areas of rust were noted on the camshaft bearing surfaces.

Examination of the left engine revealed one worn tappet, with a concave measured wear depth of 0.004 inches. The highest camshaft lobe measured about 1.480 inches, and the lowest lobe point was 1.420 inches.

According to a Lycoming publication, the cause of unusual camshaft and tappet wear is corrosion, and commonly seen in low use airplanes. The low usage causes corrosion from the loss of oil coverage. The moisture is a product of combustion, as are the acids in the oil. The corrosion pitting destroys the case hardening surface of the lobes and tappets. Once the case hardening is destroyed, the softer metal wears quickly. The same type wear will also occur from an improperly reground camshaft. As the lobes wear down or lose their profile, optimum engine performance is less likely. A factory representative stated that the only way to quantify a loss of engine power is to install the defective parts into a new engine and run it in a test cell. In turbo charged or turbo normalized installations, the affects of cam lobe wear can be compensated for by ground adjustments.

ADDITIONAL INFORMATION

The wreckage was released to the insurance company representative on July 24, 2003.

Pilot Information

Certificate:	Private	Age:	59, 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 3 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	06/13/2001
Occupational Pilot:		Last Flight Review or Equivalent:	10/17/2002
Flight Time:	685 hours (Total, all aircraft), 185 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N700US
Model/Series:	Aerostar 601	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	6106527962140
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	12/12/2001, Annual	Certified Max Gross Wt.:	6000 lbs
Time Since Last Inspection:		Engines:	2 Reciprocating
Airframe Total Time:	14235 Hours as of last inspection	Engine Manufacturer:	Avco Lycoming
ELT:	Installed, not activated	Engine Model/Series:	IO-540-S1A5
Registered Owner:	George G. Willard	Rated Power:	290 hp
Operator:	George G. Willard	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	PMD, 2543 ft msl	Distance from Accident Site:	14 Nautical Miles
Observation Time:	1253 PST	Direction from Accident Site:	42°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	Variable	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.93 inches Hg	Temperature/Dew Point:	24° C / 3° C
Precipitation and Obscuration:			
Departure Point:	Agua Dulce, CA (L70)	Type of Flight Plan Filed:	None
Destination:	Bullhead City, AZ (IFP)	Type of Clearance:	None
Departure Time:	1300 PDT	Type of Airspace:	Class G

Airport Information

Airport:	Agua Dulce Airpark (L70)	Runway Surface Type:	Asphalt
Airport Elevation:	2660 ft	Runway Surface Condition:	Dry
Runway Used:	04	IFR Approach:	None
Runway Length/Width:	4600 ft / 50 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	2 Fatal	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 Fatal	Latitude, Longitude:	34.502500, -118.313889

Administrative Information

Investigator In Charge (IIC):	GEORGE E PETTERSON	Report Date:	03/30/2004
Additional Participating Persons:	Victor L Goodell; Federal Aviation Administration; Van Nuys, CA Mark Platt; Textron-Lycoming; Williamsport, PA Charles Little; The New Piper Aircraft Co.; Vero Beach, 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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