



National Transportation Safety Board Aviation Accident Final Report

Location:	Gypsum, CO	Accident Number:	FTW02FA222
Date & Time:	08/01/2002, 0855 MDT	Registration:	N6444J
Aircraft:	Piper PA-28-180	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal, 2 Serious
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

Approximately 19 nm northwest of the departure airport (elevation 6,535 feet), the airplane impacted the rising mountainous terrain at an elevation of 10,050 feet. Prior to departure, the pilot calculated the airplane's gross weight to be approximately 2,270 pounds (maximum gross weight 2,400). After a takeoff roll of approximately 5,000 feet, the airplane departed the runway, and the pilot executed a right turn toward the rising terrain. Approximately 5 minutes into the flight, the right front seat passenger commented to the pilot that "we're going kinda low." The pilot stated that after climbing about 10 to 15 minutes up a valley, he noticed that the vertical climb rate had decreased to about 100-200 feet per minute, which was half the climb rate that he expected at full throttle power. During the impact with the terrain, the fuel tanks ruptured and the airplane was destroyed by a post-impact fire. The engine was test run according to the manufacturer specifications. No discrepancies or anomalies were noted during the engine test run that would indicate the engine was not capable of operating and producing power prior to the accident. No anomalies or discrepancies were noted with the airframe. The density altitude at the accident site was calculated to be approximately 12,000 feet.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to perform remedial action and maintain clearance with the rising mountainous terrain. Contributing factors were the pilot's poor planning/decision, the rising terrain, and the high density altitude.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: MANEUVERING

Findings

1. (F) PLANNING/DECISION - POOR - PILOT IN COMMAND
2. (F) TERRAIN CONDITION - RISING
3. (F) WEATHER CONDITION - HIGH DENSITY ALTITUDE
4. (C) ALTITUDE/CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND
5. (C) REMEDIAL ACTION - NOT PERFORMED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On August 1, 2002, approximately 0855 mountain daylight time, a Piper PA-28-180 airplane, N6444J, impacted the terrain while maneuvering near Gypsum, Colorado. The private pilot and one passenger sustained serious injuries and two passengers sustained fatal injuries. The airplane was registered to and operated by the Glenwood Flyers L.L.C. of Glenwood Springs, Colorado. Visual meteorological conditions prevailed, and a visual flight rules (VFR) flight plan was filed for the 14 Code of Federal Regulations Part 91 personal flight. The flight departed the Eagle Regional Airport (EGE), Eagle, Colorado, approximately 0840, and was destined for Idaho Falls, Idaho.

According to the NTSB Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1/2), the pilot reported he departed the Glenwood Springs Municipal airport approximately 0700 en route to EGE, as the sole occupant of the airplane for that flight. The pilot reported the visibility was good; however, the flight encountered soot and smoke-haze from forest fires in the area. At 0715, the flight landed at EGE, and the pilot instructed a refueler at the fixed based operator (FBO) to "fill the tanks to the tabs."

Prior to departing EGE for Idaho Falls, the pilot performed a "standard pre-flight and weight and balance checks." The pilot reported the "plane's gross weight was approximately 2,270 pounds. The certified maximum gross weight is 2,400 pounds." At 0830, the luggage was stowed, and the pilot and the three passengers boarded the airplane. The luggage consisted of a back pack, a lap top computer, and four other pieces of the luggage. The pilot completed a flight plan, and "per the flight plan, the planned cruising speed was 85 [miles per hour] mph, with a planned climb rate of about 300-400 feet per minute. The plan called for a climb to a cruising altitude of 12,500 feet."

The airplane departed EGE runway 25, which is 8,000 feet in length, and the pilot then turned to a heading of 296 degrees due to hot air balloon activity south of the airport. After departure, the pilot contacted the Denver flight service station (FSS) and activated the VFR flight plan. The pilot reported that "after climbing about 10 to 15 minutes heading about 290 [degrees] up a valley I noticed that the vertical climb rate had decreased to about 100-200 feet per minute, half the climb rate that was expected at full power. The pilot added that the aircraft seemed not to be performing with the power that should be expected at full throttle." The pilot did not recall any events immediately preceding or following the impact with the terrain.

In a telephone interview with the surviving female passenger conducted by the NTSB investigator-in-charge (IIC), the passenger, who was seated in the right front seat, reported approximately 5 minutes into the flight, she commented to the pilot that "we're going kinda low." The pilot responded that the "[vertical speed indicator] was at 1, [it] should have been at 6." Approximately 10 minutes later into the flight, the passenger noticed that the airplane was close to the tree tops, and felt like the airplane struck a tree top. The passenger looked at the windscreen, saw a plateau in front of the airplane, and thought "was [the pilot] trying to land the airplane...we're going down." The airplane impacted the terrain, became airborne again and possibly spinning, struck the ground again, and "everything kind of exploded." She reported that during the flight, the pilot did not mention any problems with the airplane or engine. The accident flight was the first flight the passenger flew with the pilot.

A flight instructor, who departed with a student pilot in an airplane from EGE behind the accident airplane, reported that the pilot and his passengers departed runway 25. The instructor stated the accident airplane's takeoff roll, prior to rotation, was approximately 5,000 feet in length. The accident airplane departed the runway and turned to an estimated 305-degree magnetic heading toward the rising terrain. The flight instructor and student then departed runway 25 and executed a climbing 270-degree turn to the left, which was the recommended VFR departure pattern due to a noise abatement policy over the town of Gypsum. The instructor commented to the student that he did not feel the accident airplane would clear the rising terrain. The instructor was able to maintain visual contact with the accident airplane from departure to the Sweetwater Lake area. The flight instructor stated that the accident airplane altitude was 200-300 feet agl during his observation of the flight.

After the accident, the flight instructor visited the passenger in the hospital. The passenger stated to the flight instructor that the pilot mentioned "that in the flight from Glenwood Springs to Eagle (earlier) he had been climbing at 600 feet per minute but that now they were only climbing at 100 feet per minute. [The pilot] said that it would not be a problem because they would just continue toward the higher terrain and find some updrafts."

Local authorities received a 9-1-1 call from the Sweetwater Resort approximately 1200. Two ranchers on horseback located the pilot who had left the airplane to search for assistance. A helicopter from the Colorado Army National Guard located the accident site approximately 1235, and then transported the two surviving passengers and the pilot to a medical facility. The wreckage was located 19 nautical miles northwest of EGE at latitude 39 degrees 48 minutes North, and longitude 107 degrees 16 minutes West, and at an elevation of approximately 10,050 feet msl. The Colorado Army National Guard flightcrew reported the sky clear and temperature 72 degrees Fahrenheit.

PERSONNEL INFORMATION

The pilot received his private pilot certificate, with an airplane single-engine land rating, on December 4, 2000. The pilot was issued a third-class medical certificate on June 12, 2002, with no restrictions or limitations. According to the NTSB Form 6120.1/2, the pilot reported he had accumulated approximately 260 total flight hours with 50 flight hours in the accident airplane make and model. The pilot's most recent biennial flight review was conducted in December, 2002. The pilot's logbook was destroyed by the post-impact fire.

AIRCRAFT INFORMATION

The 1968-model Piper PA-28-180, serial number 28-4862, was a single-engine, low wing, fixed landing gear, semi-monocoque design airplane. The airplane was powered by a four cylinder, air-cooled, horizontally opposed, normally aspirated Lycoming O-360-A4A (serial number L-12490-36A) engine, rated at 180 horsepower. The airplane was configured to carry a maximum of four occupants.

The airplane was issued a standard airworthiness certificate on April 4, 1968, and was certificated for normal category operations. The airplane's current registration was issued on August 30, 2000. A review of the airframe logbooks revealed that the airframe underwent its most recent annual inspection on November 9, 2001, at a total airframe time of 2,755.25 hours

and a tachometer time of 1,530.15 hours. There were no subsequent entries in the airframe logbook. A review of the engine logbook revealed that the engine underwent its most recent 100-hour inspection on November 9, 2001, at a total engine time since new of 2,755.25 hours, and at a tachometer time of 1530.15 hours. On July 21, 2002, the engine underwent an oil and filter change, at a tachometer time of 1,777.02 hours. The total airframe and engine times at the time of the accident could not be determined.

The most recent airplane weight and balance was calculated on February 20, 1989. The airplane's basic empty weight and center of gravity (CG) were 1,364.9 pounds (lbs) and 85.39 inches, respectively. According to the approved aircraft flight manual, the maximum allowable gross weight for the accident aircraft was 2,400 lbs, with an approximate CG range between 90.6 - 95.9 inches.

Considering the weight of the occupants, baggage, and full fuel, the aircraft's gross weight at the time of departure from EGE was calculated approximately 2,270 lbs with a CG of 91.33 inches. The following weights were used for the weight and balance calculation: pilot (front left seat) - 200 lbs, passenger (front right seat) - 170 lbs, passenger (rear left seat) - 35 lbs, passenger (rear right seat) 200 lbs, baggage - 60 lbs, and fuel - 240 lbs (40.0 gallons total / 6 lbs per gallon). The weights used for the occupants and baggage were estimated by the IIC.

According to fueling records provided by the Vail Valley Jet Center, Gypsum, Colorado, the airplane was topped-off with 16.9 gallons of 100LL aviation grade fuel on the morning of the accident.

METEOROLOGICAL INFORMATION

According to the NTSB Form 6120.1/2, the pilot reported the visibility was 10+ miles, sky clear, temperature 60 degrees Fahrenheit, no restrictions to visibility and no turbulence.

At 0655, the EGE Automated Surface Observation System (ASOS) reported the wind calm, 10 statute miles visibility, sky clear, temperature 52 degrees Fahrenheit, dew point 28 degrees Fahrenheit, and an altimeter setting of 30.29 inches of Mercury.

At 1055, the EGE ASOS reported the wind calm, 10 statute miles visibility, sky clear, temperature 75 degrees Fahrenheit, dew point 32 degrees Fahrenheit, and an altimeter setting of 30.25 inches of Mercury.

For 0655 and 1055, the density altitude (DA) at EGE was calculated by the NTSB IIC to be 7,255 feet and 8,834 feet, respectively, and the DA at the accident site was calculated to be 11,596 feet and 13,175 feet, respectively. The DA calculations were based on the EGE ASOS reports, the airport/facilities directory (A/FD) published airport elevation of 6,535 feet, and the accident site elevation, recorded with a global positioning satellite (GPS) receiver at 10,050 feet.

For 0830, the estimated DA at EGE was calculated to 7,885 feet, and at the accident site was calculated to 12,226 feet. The estimated DA calculations were based on the pilot's temperature report of 60 degrees Fahrenheit, the A/FD's airport elevation, the accident site elevation, and an altimeter setting of 30.25 inches of Mercury.

AERODROME INFORMATION

The Eagle County Regional Airport, EGE, is a public, controlled airport located approximately 4 miles west of Eagle, Colorado, at 39 degrees 38 minutes north latitude, and 106 degrees 55 minutes west longitude, at a surveyed elevation of 6,535 feet. The airport features a single asphalt runway, runway 7/25, which is 8,000 feet in length and 150 feet in width. According to the airport/facilities directory, "Recommend all aircraft departing runway 25 initiate a left turn as soon as altitude and safety permit to avoid high terrain."

COMMUNICATIONS AND RADAR DATA

According to the Eagle Control Tower communication transcript, at 0839:42, the pilot contacted the tower and reported he was ready for takeoff. At 0839:54, N6444J was cleared for takeoff and advised of hot air balloon activity and possibly a hang glider southwest of the airport. At 0843:56, the controller approved a frequency change for N6444J. The pilot did not acknowledge the transmission, and that was the last radio communication transmission between the Eagle controller and the accident airplane.

At 0848:55, the pilot contacted Denver Automated FSS and requested activation of his VFR flight plan. The controller acknowledged the request and advised the pilot of reduced visibility due to smoke and the temporary flight restrictions (TFRs) along the intended route of flight. There were no further communications between air traffic control services and the accident airplane.

The Denver Air Route Traffic Control Center (ARTCC) radar data depicted the airplane departing EGE and executing a right turn to the north-northwest. The radar data indicated that the flight path followed the mountainous valley known as the "Sweetwater drainage", which featured rising terrain. The last radar position of the accident airplane was recorded at 0853:45, at 39 degrees 48 minutes 37 seconds north latitude and 107 degrees 11 minutes 32 seconds west longitude, at an altitude of 9,100 feet msl, and 4.29 nautical miles on a bearing of 266.5 degrees to the accident site.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted rolling grass and terrain and came to rest upright near two small groups of trees, at an elevation of approximately 10,050 feet. The wreckage energy path measured approximately 100 feet in length on a measured magnetic heading of 240 degrees. The initial ground scar contained aluminum fragments and the adjacent rocks to the right of the ground scar displayed aluminum transfers. Near the initial impact area was the right wing tip which came to rest on the right side of the energy path. A second ground scar, which contain underside fuselage components and a main landing gear strut, was located 45 feet from the initial impact point along the energy path. The airplane came to rest on a measured magnetic heading of 090 degrees. The main wreckage consisted of the fuselage, the left and right wings, the engine, and the empennage.

The left wing remained attached to the fuselage and the control surfaces remained attached to their respective attach points. The fuel tank was ruptured, and the wing was partially consumed by fire. The left main landing gear was separated from the wing structure. The flap was found in the retracted position, and continuity was established to the flap and aileron control surfaces. The outboard 4 feet of the right wing and aileron were separated and came to rest in the energy path. The remaining right wing section came to rest inverted adjacent to the fuselage, and was separated at the attach points. The fuel tank was ruptured, and the wing was consumed by fire. The lower section of the main landing gear was separated. The right aileron

control cables were attached to the bell crank and continuity was established.

The horizontal and vertical stabilizers remained attached to their respective attach points and were partially consumed by fire. The rudder and horizontal stabilizer control surfaces remained attached to their respective attach points, the control cables were found secure, and control continuity was established. The stabilator trim drum inner shaft had a measured shaft extension of 1 inch (nine threads exposed). The measurement was consistent with a stabilator trim setting of approximately 4 degrees nose up.

The entire cockpit and cabin area was destroyed by a post-impact fire. The flap handle was found in the retracted position. All four seat frame attach points were found secure. All four seatbelt buckles were located, and one remained in the buckled position. All cockpit instruments and controls were destroyed by the fire.

The engine was partially separated from the firewall, and the engine mounts were fractured. The number 3 cylinder rocker cover was damaged in the area consistent with the intake valve. The spark plugs were removed and according to the Champion Spark Check-A-Plug chart AV-27, the spark plug electrodes were worn beyond service limits. The engine cylinders were boroscoped, the number 3 intake valve was observed not to close onto the seat, and no anomalies were noted with the other cylinders. The engine was rotated by hand, and continuity was established throughout the engine and accessories. The engine and its components were retained and shipped to the manufacturer for further examination.

The two-bladed fixed pitch propeller remained intact. Both blades were bent aft and twisted toward the direction of rotation. The leading edges of both blades displayed gouging and chord wise surface scraping and scratches.

The airplane was equipped with an Emergency Locator Transmitter (ELT). The ELT was destroyed by the post crash fire.

PATHOLOGICAL INFORMATION

A toxicological test was not performed on the pilot.

FIRE

A post-impact fire consumed the right wing, a portion of the left wing, a portion of the empennage, the cockpit and cabin. No evidence of pre-impact fire was noted.

SURVIVAL ASPECTS

One fatal passenger, a 23-month old male infant, was seated in the left rear and strapped in a conventional car seat. The car seat was restrained in the airplane seat via the airplane's seat belt. According to the surviving female passenger, the infant survived the initial impact; however, was fatally injured as a result of the post-impact fire.

The other fatal passenger, a 42-year old adult male, was seated in the right rear seat. According to the female passenger, after the impact and the ensuing fire, the adult male passenger exited the airplane. In an attempt to rescue the infant, the male passenger sustained extensive thermal injuries, and succumbed to his injuries on August 20, 2002.

TEST AND RESEARCH

On October 10, 2002, the engine was examined and test run at the facilities of Lycoming, located in Williamsport, Pennsylvania, under the supervision of the NTSB IIC. Prior to the engine test run, the engine was visually examined and the following actions were completed: removed and slaved the #3 rocker box cover, removed and slaved the left and right magneto harnesses, and removed and slaved a broken carburetor fuel inlet fitting.

Following the visual examination, the engine was mounted to an engine test cell. The engine was test run at various power settings for approximately 31 minutes according to the engine manufacturer specifications. No discrepancies or anomalies were noted during the engine test run.

ADDITIONAL INFORMATION

A review of the Piper (Cherokee) PA-28-180 owner's manual, Section IV Performance Charts, the Takeoff Distance vs. Density Altitude chart revealed that with 25 degrees flaps, [maximum] effort, paved, level, dry runway, the airplane at full gross weight and a DA of 7,000 feet, the airplane required a 1,400-foot takeoff distance. No performance data was available in the manual for takeoffs above 7,000 feet density altitude. According to the witness, the airplane's takeoff roll was approximately 5,000 feet.

A review of the owner's manual performance chart, Rate of Climb vs. Density Altitude, revealed that the airplane at full gross weight and a DA of 8,000, 9,000, 12,000, and 13,000 feet with 0 degrees of flaps, the maximum rate of climb was calculated to be approximately 410, 370, 250, and 210 feet per minute, respectively.

The airplane wreckage was release to the owner's representative.

Pilot Information

Certificate:	Private	Age:	42, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	06/12/2002
Occupational Pilot:		Last Flight Review or Equivalent:	12/01/2002
Flight Time:	260 hours (Total, all aircraft), 50 hours (Total, this make and model), 185 hours (Pilot In Command, all aircraft), 20 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N6444J
Model/Series:	PA-28-180	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	28-4862
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	11/09/2001, Annual	Certified Max Gross Wt.:	2400 lbs
Time Since Last Inspection:	250 Hours	Engines:	1 Reciprocating
Airframe Total Time:	2755 Hours at time of accident	Engine Manufacturer:	Lycoming
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	O-360-A4A
Registered Owner:	Glenwood Flyers L.L.C.	Rated Power:	180 hp
Operator:	Glenwood Flyers L.L.C.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:		Distance from Accident Site:	
Observation Time:		Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	
Precipitation and Obscuration:			
Departure Point:	Eagle, CO (EGE)	Type of Flight Plan Filed:	VFR
Destination:	Idaho Falls, ID (IDA)	Type of Clearance:	VFR
Departure Time:	0839 MDT	Type of Airspace:	Class E

Wreckage and Impact Information

Crew Injuries:	1 Serious	Aircraft Damage:	Destroyed
Passenger Injuries:	2 Fatal, 1 Serious	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal, 2 Serious	Latitude, Longitude:	39.808611, -107.276389

Administrative Information

Investigator In Charge (IIC): Aaron M Sauer **Report Date:** 09/30/2003

Additional Participating Persons: William T Gierhart; Federal Aviation Administration; Salt Lake City, UT
Michael C McClure; The New Piper Aircraft, Inc.; Prosper, TX
John B Butler; Lycoming; Arlington, TX

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 pubinquiry@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](#).