



National Transportation Safety Board Aviation Accident Final Report

Location:	Elko, NV	Accident Number:	WPR15LA266
Date & Time:	09/23/2015, 1328 PDT	Registration:	N56897
Aircraft:	PIPER PA 28	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (partial)	Injuries:	1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The private pilot stated that, shortly after takeoff, the airplane would not maintain a positive rate of climb. The pilot reported that he had previously experienced this on hot days, so he continued to make small control corrections in anticipation of the airplane gaining altitude; however, once it reached about 200 ft above ground level, the airplane began to sink. The pilot then decided to retard the throttle and perform a forced landing into a field. The airplane landed hard, resulting in substantial damage.

The airplane was operating in a high density altitude environment and at the upper limit of its takeoff performance envelope at the time of the accident. Additionally, the pilot did not lean the engine's fuel mixture control before takeoff as recommended by the engine and airframe manufacturers' operating instructions; therefore, the engine was likely not producing full power, which resulted in the airplane's inability to climb. Further, the engine's spark plugs exhibited carbon fouling signatures consistent with an overly rich fuel-to-air mixture. Postaccident examination revealed no mechanical anomalies that would have precluded normal operation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's failure to sufficiently lean the engine's fuel-to-air mixture for the given density altitude, which resulted in reduced engine power output and the airplane's inability to climb.

Findings

Aircraft	Fuel control/carburetor - Incorrect use/operation (Cause)
Personnel issues	Incomplete action - Pilot (Cause)

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event) Off-field or emergency landing
Landing-flare/touchdown	Collision with terr/obj (non-CFIT)

On September 23, 2015, about 1328 Pacific daylight time, a Piper PA 28/140, N56897, collided with terrain shortly after takeoff from Elko Regional Airport, Elko, Nevada. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91. The private pilot sustained minor injuries, the passenger sustained serious injuries, and the airplane was substantially damaged. The cross-country flight departed Elko about 1326, with a planned destination of Nampa Municipal Airport, Nampa, Idaho. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot stated that he and the passenger had departed from their home field of Kidwell Airport, Cal-Nev-Ari, Nevada, about 0715 that morning. He intended to start the day early, due to the hot weather conditions en route. They stopped at Perkins Field Airport, Overton, Nevada, where they serviced the airplane to capacity with fuel, and then flew north towards Ely, Nevada. Having reached Ely and passed through Ruby Ridge Pass at an altitude of 8,800 ft mean sea level (msl), the engine began to run slightly "rough"; this had never happened before. The pilot adjusted the fuel mixture towards the lean position, the engine smoothed out, and an increase of 200 rpm was observed. He reported that he typically operated the engine at full rich fuel mixture during takeoff and cruise.

Having reached Elko, the pilot serviced the airplane with the addition of 15 gallons of fuel in the left tank, and 10 gallons in the right tank. He specifically did not want to fill the tanks to capacity as they were close to their destination, and he was concerned about performance degradation in the high temperature and elevations. The passenger was in the front right seat, and there were two bags in the back seats, both less than 10 pounds in weight.

He then started the engine about 1320, and the run-up was uneventful. The engine was operating normally and he began the takeoff roll on runway 12, as the other runway (6/24) was closed for construction. He had flown in and out of Elko before, and surmised that the length of runway 12 (3,012 ft), while adequate for takeoff, left him with minimal options should an emergency occur.

The airplane accelerated normally, and shortly after rotation, the controls began to feel "mushy"; He had experienced this before in hot weather conditions. He continued the initial climb, and gently applied control inputs, and anticipated that the airplane would regain a positive climb rate like it had in the past. However, the airplane would not climb more than 200 ft above ground level (agl). Having crossed the street at the end of the runway the airplane began to descend. As the descent continued he flew over warehouses, and he decided to retard the throttle and land straight ahead in a field. Just prior to impact he pulled the yoke aft to

reduce airspeed and resultant energy forces. The airplane landed hard in the field, shearing off both main landing gear, and crumpling the fuselage just aft of the cabin.

The pilot reported that at no time did the engine make any coughing or sputtering sounds, and that it kept operating normally throughout.

Witnesses who observed the airplane takeoff all recounted similar observations, as it appeared to be flying slowly after rotation, and did not gain significant altitude. One witness stated that the nose of the airplane was unusually high as it began to descend out of view behind buildings. None of the witnesses observed smoke or vapors emitting from the airplane during flight.

Pilot Information

Certificate:	Private	Age:	70, Male
Airplane Rating(s):	Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With Waivers/Limitations	Last FAA Medical Exam:	07/10/2015
Occupational Pilot:	No	Last Flight Review or Equivalent:	05/15/2015
Flight Time:	(Estimated) 250 hours (Total, all aircraft), 250 hours (Total, this make and model), 30 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	PIPER	Registration:	N56897
Model/Series:	PA 28 140	Aircraft Category:	Airplane
Year of Manufacture:	1973	Amateur Built:	No
Airworthiness Certificate:	Normal; Utility	Serial Number:	28-7425060
Landing Gear Type:	Tricycle	Seats:	4
Date/Type of Last Inspection:	10/10/2015, Annual	Certified Max Gross Wt.:	2150 lbs
Time Since Last Inspection:	5 Hours	Engines:	1 Reciprocating
Airframe Total Time:	2937.49 Hours as of last inspection	Engine Manufacturer:	LYCOMING
ELT:	C91A installed, not activated	Engine Model/Series:	O-320-E3D
Registered Owner:	On file	Rated Power:	140 hp
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KEKO, 5074 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	2056 UTC	Direction from Accident Site:	308°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	Light and Variable / 18 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	Variable	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.13 inches Hg	Temperature/Dew Point:	27° C / -6° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Elko, NV (EKO)	Type of Flight Plan Filed:	None
Destination:	NAMPA, ID (MAN)	Type of Clearance:	None
Departure Time:	1326 PDT	Type of Airspace:	Class E

At 1356, the automated surface weather facility at Elko Airport reported wind variable at 5 knots, gusting to 18 knots, 10 miles visibility, temperature at 27° C, dew point -6° C, and an altimeter setting at 30.13 inches of mercury.

Airport Information

Airport:	ELKO RGNL (EKO)	Runway Surface Type:	Asphalt
Airport Elevation:	5140 ft	Runway Surface Condition:	Dry
Runway Used:	12	IFR Approach:	None
Runway Length/Width:	3012 ft / 60 ft	VFR Approach/Landing:	Forced Landing

The airport was located at an elevation of 5,139.8 ft msl. The closed runway, 6/24, was 7,455 ft long.

Runway 12/30 had a limitation that takeoffs were only permitted on runway 12, and landings only on runway 30. The Federal Aviation Administration (FAA) Airport Facilities Directory reported that runway 30 sloped steeply upwards.

The density altitude at field elevation about the time of the accident was about 7,400 ft.

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	1 Serious	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Serious, 1 Minor	Latitude, Longitude:	40.822222, -115.777500 (est)

Tests And Research

The airplane was recovered, and examined by the NTSB Investigator-in-Charge, and representatives from the FAA and Piper Aircraft.

The examination revealed that the engine fuel mixture control was in the full-forward (full rich) position. The top spark plugs were removed and examined. All electrodes exhibited "normal", to "normal-worn" out wear signatures, indicative of normal service life when compared to the Champion Aviation AV-27 Check-a-Plug chart. Plugs 1, 3, and 4 exhibited dark grey discoloration and sooting, and plug 2 was coated in black soot consistent with "carbon fouled" when compared to the Champion chart.

No mechanical malfunctions or failures were observed during the examination. A full examination report is contained within the accident docket.

Airplane Performance

The airplane performance chart located in the Piper Pilot's Operating Manual, defined that at a gross weight of 1,950 pounds, with zero wind, flaps 0, on a paved level and dry runway, and a density altitude of 7,000 ft, the takeoff distance would be about 1,550 ft; with a distance to clear a 50 ft obstacle of about 3,300 ft. At the maximum gross weight of 2,150 pounds, the takeoff and clearance distances increased to 1,700 and 3,600 ft respectively. A notation on the chart stated, "EXTRAPOLATION OF CHART ABOVE 7,000 FT IS INVALID".

The "Operating Instructions/TAKEOFF" section of the operating manual was found in the airplane, and made the following recommendation,

"NOTE: Mixture full rich except a minimum amount of leaning is permitted for smooth engine operation when taking off at high elevation."

Lycoming Engines Service Instruction No. 1094D "Fuel Mixture Leaning Procedures", dated March 25, 1994, made the following recommendations,

"For 5,000 ft density altitude and above or high ambient temperatures, roughness or reduction of power may occur at full rich mixture. The mixture may be adjusted to obtain smooth engine operation. For fixed pitch propeller, lean to maximum RPM at full throttle prior to take-off where airports are 5,000 ft density altitude or higher. Limit operation at full throttle on the ground to a minimum."

Administrative Information

Investigator In Charge (IIC):	Elliott Simpson	Report Date:	05/23/2017
Additional Participating Persons:	Lee A Oscar; Federal Aviation Administration FSDO; Reno, NV Michael Shurtleff; Federal Aviation Administration FSDO; Reno, NV Charles Little; Piper Aircraft; Vero Beach, FL		
Publish Date:	05/23/2017		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=92037		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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](#).