Aviation Investigation Final Report

Location:	Falcon, Colorado	**Accident Number:**	CEN18LA348
Date & Time:	August 23, 2018, 12:54 Local	**Registration:**	N2880W
Aircraft:	Piper PA32R	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot and the passenger planned to depart on a cross-country personal flight; the density altitude was about 9,500 ft mean sea level. During the pretakeoff engine run-up, the engine began running roughly. The pilot and a mechanic attempted to troubleshoot the engine issue by checking the dual magneto. According to the mechanic, the left magneto was inoperative and the P-leads were wired incorrectly; he then disconnected both magnetos' P-leads. The pilot's second and third engine run-ups appeared to produce full engine power when he adjusted the fuel mixture; however with an inoperative left magneto it is unlikely that full power was achieved. The pilot departed and was unable to maintain altitude and chose to land in a field adjacent to the airport; the airplane stalled just above the ground and then impacted the ground.

During a postaccident examination of the airplane, the left magneto was removed and tested; the left magneto did not produce a spark at any terminal, and the contact points did not open. In addition, the spark plugs connected to the left magneto did not exhibit signs of recent operation, which was consistent with an inoperative magneto. The disconnected P-leads would not have affected the right magneto's ability to energize half of the spark plugs. With an inoperative left magneto and a high density altitude, the available engine power would have been reduced, and the airplane's climb performance would have been degraded. The reduction in the available engine power, combined with the high-density altitude at the time of takeoff, resulted in the airplane's inability to maintain a positive rate of climb after lifting off.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's decision to depart with an inoperative left magneto, which resulted in degraded climb performance in high-density altitude conditions and a subsequent emergency landing.

Findings

Aircraft	(general) - Failure
Personnel issues	Decision making/judgment - Pilot
Environmental issues	High density altitude - Effect on operation
Environmental issues	High density altitude - Decision related to condition

Factual Information

History of Flight

Prior to flight	Electrical system malf/failure
Initial climb	Loss of engine power (total) (Defining event)
Emergency descent	Aerodynamic stall/spin
Emergency descent	Off-field or emergency landing

On August 23, 2018, at 1254 mountain daylight time, a Piper PA-32R-301 airplane, N2880W, experienced a partial loss of engine power after takeoff and conducted a forced landing to a field near Meadow Lake Airport (FLY), Falcon, Colorado. The private pilot and the passenger were not injured and the airplane sustained substantial damage. The airplane was registered to and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan had been filed. The airplane had just departed FLY and was en route to Estherville Municipal Airport (EST), Estherville, Iowa.

After the accident, the pilot stated that he had flown the airplane from EST to FLY earlier that day and planned to return to EST. During the preflight engine runup and magneto check, the engine was running rough so he taxied the airplane to a maintenance facility at FLY to troubleshoot the issue. The pilot stated that the mechanic checked the magnetos and disconnected a P-lead wire. The mechanic provided information about how the pilot should set the airplane's fuel mixture at a high elevation airport. The pilot completed another engine runup and set the fuel mixture according to the mechanic's instructions, then taxied to the runway for a "mock" takeoff roll to see if the engine was capable of producing takeoff power, which he reported was completed successfully. The pilot then taxied the airplane back to the mechanic and completed one final fuel mixture adjustment to reach full engine power at 2,700 rpm. The pilot then taxied back to the runway and began the takeoff roll; the airplane rotated for takeoff at 76 knots and 10° of flaps were extended. After climbing through 100 ft above ground level (agl), the engine experienced a loss of power and was unable to maintain altitude. The pilot stated that the stall warning horn was sounding so he lowered the nose to increase airspeed, then made a forced landing into a field straight ahead; the airplane stalled and then impacted the ground (figure 1).

Figure 1 – Airplane came to rest in an open field

The pilot later reported that one month before the accident, he experienced an issue with the magneto so he took the airplane to a maintenance facility where they reconnected a loose wire, then the engine operated normally.

The mechanic at FLY stated that the left side magneto was inoperative and that the P-leads were wired incorrectly. He disconnected both P-leads to the dual magneto and the pilot started the engine and appeared to achieve full power. He watched the pilot complete a mock takeoff attempt, during which the airplane climbed about 6 ft agl, and then landed. The mechanic instructed the pilot to extend the flaps to 10° and set the mixture to achieve 2,700 rpm for takeoff. The pilot taxied the airplane back to the south end of the runway and departed to the north. The mechanic noted that the airplane climbed to at least 50 ft agl and the pitch attitude was high. He found out later that the airplane had landed in a field. The left magneto was not repaired by the mechanic, nor did the pilot request it to be repaired.

Based on the temperature, dew point, barometric pressure, and field elevation, the density altitude was calculated above 9,400 ft mean sea level.

Federal Aviation Administration (FAA) inspectors completed a post-recovery examination of the airplane. The recovery crew reported to the FAA inspectors that they drained about 70 gallons of fuel from the airplane and it tested negative for water contamination. During the examination the FAA noted that the fuel system was free of contaminants. They found that both P-leads were disconnected from the dual magneto and were hanging loose in the engine compartment; the magneto was removed from its mount and tested for functionally. When the drive shaft was manually actuated, the right magneto produced a spark at each terminal, but the left magneto did not produce a spark at any terminal and the contact points did not open. The bottom spark plugs for cylinder Nos. 2 and 6 were oil soaked and the No. 6 cylinder contained oil. Also, a cold engine compression check revealed that the No. 2 cylinder was low, while the rest were within normal specification. No other anomalies were noted during the examination. FAA examination photos of the spark plugs revealed that some of the electrodes were degraded and did not exhibit signs of recent operation.

Pilot Information

Certificate:	Private	**Age:**	57,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	August 11, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 18, 2017
Flight Time:	820 hours (Total, all aircraft), 677 hours (Total, this make and model), 771.7 hours (Pilot In Command, all aircraft), 34.4 hours (Last 90 days, all aircraft), 20.1 hours (Last 30 days, all aircraft), 5.5 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:		**Age:**	Female
Airplane Rating(s):		**Seat Occupied:**	Rear
Other Aircraft Rating(s):		**Restraint Used:**	Lap only
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N2880W
Model/Series:	PA32R 301	**Aircraft Category:**	Airplane
Year of Manufacture:	1979	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32R-8013002
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	June 20, 2018 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	35 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4740.9 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-540-K1G5D
Registered Owner:		**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KFLY,6874 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	12:55 Local	**Direction from Accident Site:**	165°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots / 18 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	270°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.2 inches Hg	**Temperature/Dew Point:**	26°C / 0°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Falcon, CO (FLY)	**Type of Flight Plan Filed:**	None
Destination:	Estherville, IA (EST)	**Type of Clearance:**	None
Departure Time:	12:53 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	Meadow Lake FLY	**Runway Surface Type:**	Asphalt
Airport Elevation:	6873 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	33	**IFR Approach:**	None
Runway Length/Width:	6000 ft / 60 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	38.961666,-104.575279(est)

Administrative Information

Investigator In Charge (IIC):	Lindberg, Joshua
Additional Participating Persons:	Rich Bludnick; Federal Aviation Administration; Denver, CO
Original Publish Date:	September 27, 2019
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98144