Aviation Investigation Final Report

Location:	West Jordan, Utah	**Accident Number:**	WPR14LA336
Date & Time:	August 10, 2014, 09:04 Local	**Registration:**	N4646F
Aircraft:	Piper PA 32R-300	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (partial)	**Injuries:**	3 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Witnesses located adjacent to the accident site reported that they observed the airplane depart, and that, as it was climbing, they heard the pilot state, "emergency," several times on the airport's common traffic advisory frequency; however, the pilot did not specify the nature of the emergency. The airplane subsequently struck a light post and then landed in an open soccer field south of the airport, and a postimpact fire ensued. Other witnesses located at the airport reported that the engine seemed to be backfiring throughout the entire takeoff and accident sequence. The pilot reported that he recalled the initial takeoff sequence and making the distress call; however, he did not recall the nature of the emergency or the accident sequence.

Postaccident examination of the airplane, flight control systems, engine, and propeller revealed no evidence of any preimpact mechanical malfunctions. Review of the airplane manufacturer's takeoff performance charts revealed that, at the time of the accident, the weather and environmental conditions were within the airplane's takeoff performance limitations. Given that the witnesses reported that the engine was backfiring and that the pilot declared an emergency, it is likely that the engine experienced a partial loss of power during initial climb. Due to the severity of the damage to the engine, the reason for the loss of power could not be determined.

Probable Cause and Findings

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

A partial loss of engine power during initial climb for reasons that could not be determined due to the severity of the damage to the engine.

Findings

Not determined	(general) - Unknown/Not determined
Environmental issues	Pole - Not specified

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event)
Initial climb	Collision with terr/obj (non-CFIT)

On August 10, 2014, about 0904 mountain daylight time, a Piper PA-32R-300, N4646F, was destroyed during a forced landing shortly after takeoff from the South Valley Regional Airport (U42), West Jordan, Utah. The airplane was registered to and operated by the pilot under the provisions of Title 14 Code of Federal Regulations Part 91. The private pilot and his two passengers sustained serious injuries. Visual meteorological conditions prevailed, and no flight plan was filed for the personal cross-country flight, which was originating at the time of the accident. The intended destination was Boise, Idaho.

Witnesses located adjacent to the accident site reported that the airplane departed from runway 16. As the airplane was ascending, a radio transmission from the pilot in the blind on the airports Common Traffic Advisory Frequency (CTAF) stated emergency several times, however, they did not specify what the emergency was. Witnesses reported that the airplane struck a light post and subsequently landed in an open soccer field south of the airport where a postimpact fire ensued. Additional witnesses located at the airport reported that the airplane lifted off the ground about 3,500 feet from the approach end of runway 16, and that the airplane never climbed above 100 to 150 feet above ground level. In addition, they reported that the engine seemed to be backfiring throughout the entire takeoff and accident sequence.

Examination of the accident site by a Federal Aviation Administration inspector revealed that the airplane came to rest upright about 0.5 miles south of the departure end of runway 16. All major structural components of the airplane were located within the wreckage debris path. The inboard areas of both wings and the center portion of the fuselage were mostly consumed by fire. The inspector reported that the left outboard wing fuel tank, which was breached, contained blue liquid consistent with 100 low lead fuel. The wreckage was recovered to a secure location for further examination.

In a written statement and telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the pilot reported that prior to the flight; he conducted a preflight check of the airplane, and noticed no abnormalities with the airplane. After the pilot and passengers boarded the airplane, he started the engine and taxied out to the departure end of the runway. During the pretakeoff engine checks, he noticed that one of the magnetos was fouled, and was able to correct it by leaning the mixture. The pilot stated that he obtained the weather via the airports automated weather observing system, and noted that the density altitude was over 7,000 feet. He added that immediately after lifting off of the runway, he made a distress call over the CTAF, however, did not recall anything about the nature of the emergency or the accident sequence.

Pilot Information

Certificate:	Private	**Age:**	56
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:**	No
Medical Certification:	Class 3 Unknown	**Last FAA Medical Exam:**	September 19, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	243 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N4646F
Model/Series:	PA 32R-300 300	**Aircraft Category:**	Airplane
Year of Manufacture:	1976	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32R-7680471
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:	July 27, 2013 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	1721 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:	On file	**Rated Power:**	
Operator:	On file	**Operating Certificate(s) Held:**	None

The six-seat, low-wing, retractable-gear airplane, serial number (S/N) 32R-7680471, was powered by a Lycoming IO-540-K1G5D engine, serial number L-15161-48A, rated at 300 horse power. It was equipped with a McCauley model B3D36C433-O/I-90VSA-1 three bladed adjustable pitch propeller.

Review of the airplane maintenance logbooks revealed that the most recent annual inspection was conducted on July 27, 2013, at an airframe total time of 1,721 hours.

Using the pilot and passenger's reported weights, full fuel, weights of recovered luggage, and an estimated weight of the airplane, it was determined that the airplane would have been under the published maximum gross weight of 3,600 pounds. The actual weight and balance calculations of the airplane were not located within the wreckage, and were most likely consumed by the postimpact fire.

Review of the manufacturer's supplied Flaps Up and 25-degree Flaps Takeoff Performance charts, located in the Pilot's Operating Handbook, revealed that the weather conditions present at the time of the accident were within the airplane's performance capability parameters. Using the manufacturer's supplied takeoff ground roll calculation charts for takeoffs with and without two notches of flaps, reported weather conditions, and maximum gross weight of the airplane, the Flaps Up takeoff ground roll was calculated to be about 4,250 feet, and flaps second notch takeoff ground roll to be about 3,000 feet. Using the manufacturer's supplied Gear Up performance calculation charts, reported weather conditions and maximum gross weight of the airplane, the climb performance with the gear in the "UP" position was calculated to be about 500 feet per minute.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KSLC,4227 ft msl	**Distance from Accident Site:**	11 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	6°
Lowest Cloud Condition:	Few / 14000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.2 inches Hg	**Temperature/Dew Point:**	23°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	West Jordan, UT (U42)	**Type of Flight Plan Filed:**	None
Destination:	Boise, ID	**Type of Clearance:**	None
Departure Time:	09:04 Local	**Type of Airspace:**	

A review of recorded data from the Salt Lake City International Airport automated weather observation station, located 11 miles north of the accident site, revealed at 0853, conditions were wind from 160 degrees at 4 knots, visibility 10 statute miles, few clouds at 14,000 feet, few clouds at 20,000 feet, temperature 23 degrees Celsius, dew point 9 degrees Celsius, and an altimeter setting of 30.20 inches of mercury. Using the reported weather conditions and airport elevation, the calculated density altitude was about 7,447 feet mean sea level (msl), with a pressure altitude of about 4,348 feet msl.

Airport Information

Airport:	SOUTH VALLEY RGNL U42	**Runway Surface Type:**	Asphalt
Airport Elevation:	4606 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	16	**IFR Approach:**	None
Runway Length/Width:	5862 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

The South Valley Regional Airport (U42) is a non-towered airport with a reported field elevation of 4,606 feet msl. The airport is equipped with one asphalt runway, runway 16 and 34, which is 5,862 feet long and 100 feet wide.

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	3 Serious	**Latitude, Longitude:**	40.60361,-111.991386

Tests and Research

Examination of the recovered wreckage was performed on October 15, 2014, at the facilities of Air Transport, Phoenix, Arizona, by representatives of Piper Aircraft and Lycoming Engines under the supervision of the NTSB IIC. The examination revealed that the engine and right wing were separated to facilitate wreckage recovery and transport. The forward portion of the fuselage from the baggage compartment to the firewall was mostly consumed by fire. Two forward seats (pilot/copilot) and the left and right rear row seats were found installed. Remains of two shoulder restraints were located within the main wreckage. The cockpit controls, including the throttle, propeller, and mixture levers, instruments, and avionics were damaged and mostly consumed by fire.

The empennage, including the vertical stabilizer, rudder, and horizontal stabilator remained intact with the exception of each outboard section of the horizontal stabilator, which were cut to facilitate wreckage transport. The trim tab remained attached to its respective mount.

The fuel selector valve was found positioned to the right fuel tank. The airframe fuel strainer bowl was removed and found to be full of liquid, which was consistent with 100 low-lead aviation fuel. No debris was noted. Additionally, the fuel screen was free of debris.

Flight control continuity was established from the cockpit controls aft to the rudder and horizontal stabilator, and wing roots. The right wing was cut by recovery personnel and the left wing was thermally damaged. Both aileron bell cranks had control cables attached. The stabilator trim drum was found in a position consistent with slight nose up, or takeoff position.

The recovered engine, a Lycoming IO-540-K1G5D, serial number L-15161-48A, remained intact and exhibited thermal damage throughout. The propeller governor, propeller, magneto, fuel pump, starter, alternator, and oil filter remained attached to the engine. The rocker box covers and all engine accessories were removed. All intake and exhaust rocker arms were intact. The engine crankshaft was rotated by hand using a hand tool attached to the propeller governor mounting pad. Rotational continuity was established throughout the engine and valve train. Thumb compression and suction was obtained on all six cylinders.

The single drive dual magneto exhibited thermal damage, exposing the internal components. All of the internal components were in place, however, were fire damaged. The magneto drive shaft would not rotate by hand. Due to the fire and thermal damage sustained to the magneto assembly and engine, engine-to-magneto timing could not be determined.

The top and bottom spark plugs were removed and examined. The electrodes were undamaged and exhibited normal coloration with the exception with the number 1, 2, and 3 bottom plugs, which were covered in oil. The propeller governor remained attached to the engine. The propeller governor linkage remained attached; however, the control arm appeared to be bent forward. No impact damage was noted surrounding the area of the control arm. The propeller governor screen was free of debris.

For further information regarding the airframe and engine examination, see the NTSB Airframe and Engine Examination Summary Report within the public docket for this accident.

Examination of the propeller was conducted at the facilities of McCauley Propeller Systems, Wichita, Kansas, by representatives of McCauley Propeller Systems and the NTSB IIC on November 20, 2014. The examination of the McCauley B3D36C433-O/I-90VSA-1 three-bladed propeller revealed that the propeller had damage consistent with impact and mid-level rotational energy absorption. The propeller blades had leading edge impact damage, leading edge polishing, and chordwise gouges and paint scratches.

The propeller exhibited no impact signature markings or component positions that would have indicated an angle disagreement between blades at impact. All three propeller blades exhibited indications of functioning in the normal operating range at impact. The exact blade angles at the time of impact were not determined. There was no evidence of any type of propeller failure or malfunction prior to the accident sequence.

The Hartzell propeller governor, part number F-4-11B, was retained and subsequently functionally tested using a test bench. During the bench test, no anomalies were noted that would have precluded normal operation.

Administrative Information

Investigator In Charge (IIC):	Cawthra, Joshua
Additional Participating Persons:	Darren Vaughn; Federal Aviation Administration; Salt Lake City, UT Charles Little; Piper Aircraft; Vero Beach, FL Mark Platt; Lycoming Engines; Williamsport, PA
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Note:	
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