



**NATIONAL TRANSPORTATION SAFETY BOARD**

**Office of Aviation Safety**

**Western Pacific Region**

**January 16, 2018**

**AIRPLANE & ENGINE EXAMINATION**

**WPR18LA002**

**This document contains 4 embedded photos.**

**(10 Pages)**

**WPR18LA002**  
**Tonopah, Nevada**  
**October 2, 2017**  
**1230 PDT**  
**Cessna 172SP – N5311H**

**EXAMINATION PARTICIPANTS**

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**HISTORY OF FLIGHT**

On October 2, 2017, about 1230 Pacific daylight time, a Cessna 172 airplane, N5311H, was substantially damaged when it impacted a dry river bed near Tonopah, Nevada. The private pilot was not injured. The airplane was registered to and operated by L-Bird, LLC as a personal flight, conducted under the provision of *14 Code of Federal Regulations Part 91*. Visual meteorological conditions prevailed and a flight plan was not filed for the local flight, which had departed Winnemucca Municipal Airport (WMC), Winnemucca, Nevada and was destined for St. George, Utah.

According to the pilot, he refueled the accident airplane with about 52 gallons of 100 low lead aviation grade gasoline and then departed WMC with three other airplanes. The airplane was flown at an approximate altitude of 1,000 feet above ground level (agl) during cruise flight, which was uneventful until the airplane reached a large dry river bed in eastern Nevada. The

pilot recounted that the engine began to sputter. Almost instantaneously, the engine rpm decreased from 2,200 rpm to 1,500 rpm. At the time of the event, the pilot had selected BOTH fuel tanks on the fuel selector and both magnetos were engaged. The pilot then verified the throttle was in the FULL OPEN position and configured the airplane for a precautionary landing by fully extending the flaps. He then completed a 180 degree turn over the riverbed to approach his selected landing zone with a headwind. After the airplane touched down, the pilot applied back pressure to the yoke to keep the nose landing gear from touching down for as long as possible. Once the nose gear settled down, the airplane stopped abruptly, nosed over and came to rest inverted.

A postaccident examination of the airplane by Federal Aviation Administration inspectors revealed substantial damage to the rudder. The debris field was comprised of about 200 feet of main landing gear marks and a nose landing gear impact mark where the airplane came to rest.

During a subsequent interview with the pilot, he noted that he normally flies with the mixture set to lean-of-peak. On the day of the accident, he leaned the mixture out prior to departing from a high altitude airport and entered a climb. His altitude varied throughout the flight and eventually he entered a descent from 10,500 feet mean sea level (msl) to an altitude of about 8,000 ft msl. He encountered the loss of rpm moments after he leveled off at this altitude. The pilot enriched the mixture by turning the control one full rotation and never adjusted the mixture control to the FULL RICH setting.

#### PERSONNEL INFORMATION

The pilot, age 54, held a private pilot certificate with a rating for single-engine land. The pilot's most recent second class medical certificate was issued on August 15, 2016, which included the limitation, "must have available glasses for near vision." According to the pilot, his flight time included 145 hours of total flight time in all aircraft of which 9 hours had been accumulated in the accident airplane make and model.

#### AIRCRAFT INFORMATION

According to FAA records, the airplane was manufactured in 2002 and registered to L-Bird LLC on June 23, 2016. The airplane was powered by a Lycoming IO-360-L2A, air cooled, 180 horsepower engine. Maintenance records indicated that the airplane's most recent 100 hour inspection was completed on August 1, 2017 at a total time of 1,770.4 flight hours. The engine's most recent 100 hour inspection was completed at the same time. According to the airplane's tachometer, at the time of the accident, the engine had accrued 1,810 total time in service.

#### METEOROLOGICAL INFORMATION

The 1253 recorded weather observation at Yelland Field included wind 250° 5 knots, visibility 10 statute miles, few clouds 8,000 feet, temperature 08° C, dew point -11 C, and an altimeter setting of 29.91 inches of mercury.

#### WRECKAGE AND IMPACT INFORMATION

The airplane came to rest inverted in a dry river bed located about 13 nm southwest of Curren Ranch Airport (9U7), Curren, Nevada, publicly owned airport operated by the United States Bureau of Land Management (BLM) and 20nm south of Duckwater Airport (01U), Duckwater, Nevada, also publicly owned and operated by BLM. The dirt and turf airstrip was 5,100 ft long and 80 ft wide in a 03/21 runway configuration and the dirt airstrip at 01U was 2,700 ft long and 75 ft wide and also in a 03/21 runway configuration.

## ADDITIONAL INFORMATION

### Initial Observations

The airplane was recovered and stored by a recovery facility in Phoenix, Arizona. A postaccident examination of the airplane and engine was completed on January 9<sup>th</sup> by a representative of Textron Aviation under the supervision of the National Transportation Safety Board Investigator-in-Charge.

The airplane was photographed in its post-recovery condition with the wings and tail, which had been removed by the recovery team. Buckling was observed on the rudder skin and dents were found on the aft fuselage and wings. Once the airplane's external condition was documented, the engine cowling was removed.

The engine mounts were unremarkable and the engine case was intact. Loose sand and debris from the accident site were found on the battery case and engine case.

Continuity of the mixture and throttle controls were confirmed from the cockpit to their respective arms on the fuel control unit. The mixture control arm moved freely through its cockpit control lever from the lean position to full rich and the throttle moved freely through its control lever the idle position to full throttle. The air filter was removed from the air induction system and did not exhibit any contamination or debris.

Each of the engine's 4 Champion 38S fine wire top spark plugs were removed and were gray in appearance with some carbon deposits, consistent with normal wear when compared to the Champion Aerospace Aviation Service Manual. A thumb compression test revealed intake and exhaust pressure for each cylinder. Each ignition harness coil normal wear with the exception of the cylinder no. 1 ignition coil, which exhibited some contamination. However, each of the engine's 8 ignition harness coils displayed spark when the propeller was turned with the magneto switch on the BOTH setting.

### Fuel System

A trace amount of fuel that resembled 100 low lead aviation grade gasoline was drained through the fuel strainer. The fuel selector moved normally through its detents from the LEFT, RIGHT, and BOTH positions.

### Flight Control System

Flight control continuity was traced from the cockpit to the elevator, rudder, and ailerons. The wing flap actuator was not extended, consistent with a flap retracted position.

## Engine Test

The airplane tail was secured to a forklift and several gallons of 100 low lead aviation grade gasoline were plumbed into the aft port of the airplane's left tank at the wing root. Additionally, the original propeller displayed aft bending and was replaced with a test propeller.

The fuel pump was activated and positive fuel flow was verified. The following engine start procedure was used:

- Throttle: open ¼ inch
- Mixture: Full lean
- Aircraft Master: ON
- Ignition Switch: "START"
- Mixture: Full rich when engine starts

The engine momentarily ran rough at idle before power was increased to 1,800 rpm for a run-up engine test. At the engine run-up power setting, the right and left magnetos were individually tested and both showed a drop of about 100 rpm. The engine power was then reduced to idle performance, about 500 rpm, without any roughness before it was increased to full power. The engine held 2,300 rpm with the throttle in the FULL OPEN position and did not exhibit any roughness or hesitation. During the test, the fuel flow, amperage, oil temperature, oil pressure all displayed normal measurements.

## Post-Engine Run Examination

Most of the Champion 38S fine wire bottom spark plugs showed normal wear when compared to the Champion Aerospace Aviation Safety Manual. The bottom spark plug to cylinder no. 2 displayed evidence of lead bromide on the cone adjacent to the ground electrode and the bottom plug to cylinder no. 3 exhibited bridging between the cone and ground electrode. However, neither plug displayed any bridging or debris between the ground electrode and post.

The fuel injectors were not obstructed.

Rocker arm movement for each cylinder was smooth and unremarkable when the propeller was rotated.

The fuel strainer was disassembled and contained trace amounts of debris, but was not obstructed. The fuel lines from the right and left wing roots to the engine driven fuel pump were free of debris.

## Pilot's Operating Handbook (POH)

The emergency procedures section of the POH includes the following guidance in the event of an engine failure in flight:

- Airspeed: 68 kts
- Fuel shutoff valve: ON
- Fuel selector valve: BOTH
- Auxiliary fuel pump switch: ON
- Mixture: RICH
- Ignition switch: BOTH

The normal procedures section of the POH includes the following guidance for an inflight descent:

- Power – As desired
- Mixture – Adjust for smooth operation
- Altimeter – Set
- NAV/GPS switch – Set
- Fuel selector valve – BOTH
- Wing flaps – As desired

#### Fuel/Air Mixture Adjustments

A representative of the engine manufacturer reported that the engine may suffer leaning misfires if the fuel/air mixture is not enriched during a descent.



Photograph 1: Airplane Fuselage Prior to Examination



Photograph 2: Airplane Engine Prior to Examination



Photograph 3: Cylinder No. 2 Bottom Spark Plug



Photograph 4: Cylinder No. 3 Bottom Spark Plug