Aviation Investigation Final Report

Location:	San Jose, California	**Accident Number:**	WPR22LA271
Date & Time:	July 22, 2022, 19:11 Local	**Registration:**	N300BH
Aircraft:	Piper PA-32-301	**Aircraft Damage:**	Substantial
Defining Event:	Fuel starvation	**Injuries:**	1 Serious
Flight Conducted Under:	Part 91: General aviation - Business		

Analysis

The pilot had planned to fly the airplane on a short flight back to the owner's hangar following an annual inspection. According to the pilot, the engine lost all power during climbout from the departure airport. The airplane impacted the ground, struck a fence and came to rest upright.

Postaccident examination of the airplane revealed no preimpact mechanical anomalies of the airplane or engine that would have precluded normal operation. The airplane contained 15 gallons of fuel in each wing fuel tank before the annual inspection began. The maintenance facility ran the engine at maximum power with the fuel selector positioned on the left fuel tank for at least 45 minutes during the annual inspection. Fuel consumption calculations indicate this would have nearly depleted the left fuel tank of fuel. No additional fuel was added by the mechanics or the pilot before the accident flight nor was there any discussion between the pilot and mechanic regarding the amount of fuel remaining in the airplane.

It is likely that the pilot departed without a thorough preflight inspection or he would have observed the low fuel quantity and switched to the right fuel tank before departure. The pilot stated that he switched tanks once during the accident flight after the power loss. As the fuel selector was found in the right tank position at the accident site, it is likely that he departed on the left fuel tank. This evidence suggests that the pilot's improper fuel management resulted in fuel starvation and a total loss of engine power.

Further, the departure airport did not sell the type of fuel required to power the accident airplane. However, it is unlikely that this would have influenced the pilot's decision as he believed he had sufficient fuel to complete the flight.

Probable Cause and Findings

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

The pilot's inadequate preflight inspection and fuel management, which resulted in fuel starvation, a total loss of engine power, and an impact with terrain.

Findings

Aircraft	Fuel - Fluid management
Personnel issues	Preflight inspection - Pilot
Aircraft	Fuel - Inadequate inspection
Personnel issues	Fuel planning - Pilot
Personnel issues	Lack of communication - Maintenance personnel

Factual Information

History of Flight

Enroute-climb to cruise	Fuel starvation (Defining event)

On July 22, 2022, about 1911 Pacific daylight time, a Piper PA-32-301 airplane, N300BH, was substantially damaged when it was involved in an accident near San Jose, California. The pilot was seriously injured. The airplane was operated as a Title 14 *Code of Federal Regulations* (CFR) Part 91 business flight.

According to the pilot, the airplane had received an annual inspection after having been out of service for more than 2 months while it awaited a part. The pilot stated that he was notified by the maintenance facility about 1730 on the day of the accident that the airplane was ready. He noted that he had planned to fly the airplane in the airport traffic pattern at Reid-Hillview Airport of Santa Clara County (RHV), San Jose, California before flying the Norman Y Mineta San Jose International Airport (SJC), San Jose, California, located about 5 nm east of the departure airport. According to the pilot's recount, he spent about 25 minutes talking with the mechanic who showed him some of the work that was completed. The mechanic who spoke with the accident pilot stated that the pilot arrived in the late afternoon and talked with him for about 5 minutes; however, none of the conversation subject matter involved the airplane or the fuel level. The mechanic stated that he heard the airplane start about five minutes after they finished their conversation.

The pilot reported that after his conversation with the mechanic he performed a preflight inspection of the airplane. During this time, he noted that the fuel level was 15 gallons in each wing by observing the sight gauges and observed that the fuel had an odor and appearance consistent with 100 low lead aviation grade gasoline when he sumped the fuel system. He also reported that he confirmed that the fuel level from the sight gauges was consistent with fuel quantity indicators in the cockpit. The pilot did not attempt to refuel the airplane.

After his preflight inspection the pilot boarded the airplane and spent an additional 5 minutes in the cockpit reviewing his checklists before he taxied to the run-up area for runway 31R. After an uneventful engine run-up, he received clearance from the tower, and then taxied onto the active runway. The airplane departed normally and the pilot transitioned into a climb; as the airplane reached about 500 ft mean sea level it sustained a partial loss of power. The pilot looked for a possible landing site but was unsuccessful, as he was over a densely populated area. The pilot began a left turn to return to RHV, but during the turn the engine lost all power. According to the pilot, he verified the mixture was full rich, the fuel pump was on, and he switched the fuel tank selector to the opposite fuel tank. The pilot did not recall which tank he departed on. The propeller was windmilling during this time and the engine did not restart.

After a descent, the airplane impacted the ground and struck a fence before it came to rest about 0.3 nm northwest of the departure end of runway 31R. Photographs provided by law enforcement showed that the airplane came to rest upright. The left wing exhibited a steep upward bend about midspan and the right wing outboard leading edge was crushed. The forward fuselage was damaged and the engine was displaced from its normally mounted position.

According to a mechanic who worked on the airplane during its recent annual inspection, the airplane had 15 gallons of fuel in each wing before they started the inspection. During the inspection he verified the fuel quantity through both the cockpit fuel gauge and the fuel gauges at each wing. At the time they received the airplane the mechanic noted that the color of the fuel was blue, consistent with 100 low lead aviation grade gasoline. He did not remove or add any fuel. During the inspection, they replaced the wing sight gauges and noted 15 gallons in each wing, which was consistent with the cockpit fuel quantity indicators. After the inspection was completed, they performed a ground engine test run for 45-60 minutes at full throttle and full manifold pressure with the fuel selector on the left fuel tank. They momentarily selected the right fuel tank and then immediately switched back to the left fuel tank and noted that the fuel flow remained stable during the transitions.

According to another mechanic who arrived on scene about 20 minutes after the accident, the right wing contained approximately 15 gallons of fuel at the accident site and the left wing was breached and void of fuel. An on scene photograph captured by the Federal Aviation Administration showed the fuel selector in the right tank position.

Postaccident examination of the airplane and engine did not reveal any preimpact mechanical anomalies that would have precluded normal operation. Control continuity was traced from each flight control surface to the cockpit through separations made by recovery personnel. Examination of the fuel system also did not reveal any preimpact mechanical anomalies that would have affected fuel flow. A visual inspection of the left wing sight gauge did not reveal any preimpact anomalies and functional testing revealed that the unit defaulted to 0 gallons and movement of the fuel arm produced a movement of the needle.

Mechanical continuity was established throughout the engine when the propeller was rotated by hand. Thumb compression was achieved at all six cylinders and the valves displayed normal lift as the crankshaft was rotated. Examination of the cylinders' combustion chamber interior components using a lighted borescope revealed normal piston face and valve signatures, and no indications of foreign ingestion or detonation.

The three-bladed constant speed propeller remained attached at the crankshaft flange. All three blades remained attached to the hub. Two blades were bent aft about midspan and the third blade was bent aft near the blade tip.

Fuel testing revealed that the composition of the fuel was consistent with 100 low lead aviation grade gasoline. A water reaction analysis of water-soluble components that would allow free water to be incorporated with the fuel indicated 0 mL of volume change.

Fuel Consumption

According to the pilot's operating handbook (POH), the airplane had a total capacity of 107 gallons of fuel evenly split between two wing fuel tanks. The unusable fuel quantity was 5 gallons: 2.5 gallons per side.

The power setting table from the performance section of the POH showed that the fuel consumption would have ranged from 11.9 gph at 55% power, 13.8 gph at 65%, or 16.0 gph at 75% power depending on the selected power setting. The POH did not indicate how these fuel consumption values would change with altitude. The mechanic reported that they ran the airplane at full throttle and full manifold pressure for the entire engine test. Factoring a left tank usable fuel quantity of 13.5 gallons, fuel performance computations showed that the engine would have depleted the left tank of its fuel supply in approximately 50 minutes.

Fuel Availability

According to the airport manager, RHV ceased sales of 100 low lead aviation grade gasoline on January 1, 2022, which prompted numerous aircraft to outsource their fuel requirements to fuel depots at nearby airports, such as SJC.

Pilot in command and Preflight Action

According to 14 CFR §91.103 *Preflight Action*,

"Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include -

> *For a flight under IFR or a flight not in the vicinity of an airport, weather reports and forecasts, fuel requirements, alternatives available if the planned flight cannot be completed, and any known traffic delays of which the pilot in command has been advised by ATC"*

As described in 14 CFR §91.3 *Responsibility and authority of the pilot in command*,

"(a) The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft."

Pilot Information

Certificate:	Commercial	**Age:**	42,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	April 20, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 1039 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N300BH
Model/Series:	PA-32-301	**Aircraft Category:**	Airplane
Year of Manufacture:	1980	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32-8006011
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	July 19, 2022 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	1 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5430.93 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:		**Engine Model/Series:**	IO-540-K165
Registered Owner:	GREEN VALLEY CORPORATION I	**Rated Power:**	300 Horsepower
Operator:	GREEN VALLEY CORPORATION I	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	KRHV,133 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	18:47 Local	**Direction from Accident Site:**	86°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots / None	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	26°C / 10°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	San Jose, CA	**Type of Flight Plan Filed:**	
Destination:	San Jose, CA (SJC)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class D

Airport Information

Airport:	REID-HILLVIEW OF SANTA CLARA COUNTY RHV	**Runway Surface Type:**	
Airport Elevation:	135 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	37.332861,-121.8198(est)

Administrative Information

Investigator In Charge (IIC):	Stein, Stephen
Additional Participating Persons:	Jose Fierro; Federal Aviation Administration; San Jose, CA Mark Platt; Lycoming Engines; Williamsport, PA Kathryn Whitaker; Piper Aircraft Company; Vero Beach, FL
Original Publish Date:	December 14, 2023
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=105586