Aviation Investigation Final Report

Location:	South Boston, Virginia	**Accident Number:**	ERA20LA195
Date & Time:	May 26, 2020, 14:30 Local	**Registration:**	N5948P
Aircraft:	Piper PA24	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

During a personal flight the private pilot proceeded to the destination airport and entered the airport traffic pattern for a planned full-stop landing. While on a close-in downwind leg of the airport traffic pattern the engine experienced a sudden and total loss of engine power. The pilot turned toward the approach end of the runway and attempted to restore engine power but was unsuccessful. The airplane impacted an obstruction light and touched down in tall grass on airport property before coming to rest upright.

Postaccident examination of the engine revealed the crankshaft gear attachment bolt was loose, the lockplate was fractured, and the alignment dowel was sheared. The intact portion of the fractured lockplate was similar to an un-bent exemplar lockplate; therefore, it is likely the mechanic who overhauled the engine about 253 hours and 8 years earlier did not bend the lockplate against the flat of the crankshaft gear attachment bolt head. The crankshaft gear drives two idler gears in the accessory gearbox, which drive the camshaft, engine driven fuel pump, vacuum pump and the magneto drive couplings. The failure of the crankshaft gear to rotate would result in a loss of engine power.

Probable Cause and Findings

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

The powerplant mechanic's failure to properly affix the engine crankshaft gear lockplate during overhaul, resulting in a total loss of engine power.

Findings

Aircraft	Recip eng rear section - Incorrect service/maintenance
Personnel issues	(general) - Maintenance personnel

Factual Information

History of Flight

Approach-VFR pattern downwind	Loss of engine power (total) (Defining event)
Maneuvering	Off-field or emergency landing
Landing-flare/touchdown	Collision with terr/obj (non-CFIT)

On May 26, 2020, about 1430 eastern daylight time, a Piper PA-24-250, N5948P, was substantially damaged when it was involved in an accident near South Boston, Virginia. The private pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot stated that he performed a preflight inspection of the airplane before the intended 20 to 25 minutes flight, which included a check of each wing fuel tank sump drain and also the gascolator with no contaminants found. He also checked the flexible hoses in the engine compartment for condition and security, looked for fuel stains, and checked the P-Leads for condition and security. Prior to departure he performed an engine run-up noting that the magneto decreases were about 25 rpm or less from each magneto.

After takeoff he proceeded towards the William M Tuck Airport (W78), South Boston, Virginia, where while on a close-in downwind leg of the airport traffic for runway 19 flying at 1,200 ft mean sea level, the engine experienced a sudden total loss of power. He turned on the auxiliary fuel pump, moved the fuel selector from the left tank where it had been since takeoff to the right tank, and moved the mixture control to full rich, but engine power was not restored. He turned towards the approach end of the runway with the airplane configured with the flaps and landing gear retracted and maintained 80 miles-per-hour (mph). The airplane subsequently impacted an obstruction light, touched down in tall/thick grass on airport property and slid an unknown distance before coming to rest upright. The airplane was recovered to W78 for examination of the engine.

Examination of the engine following recovery by a Federal Aviation Administration (FAA) inspector revealed hand rotation of the crankshaft did not result in rotation of the magnetos, or valve train action at the No. 1 cylinder. The accessory case was removed and during rotation of the crankshaft, the crankshaft gear did not rotate. The crankshaft gear attachment bolt which was marked on the head with “2247”, was “found unsecured and loose.” The bolt, fractured remnants of the lockplate, and crankshaft gear were removed. It was noted that the alignment dowel pin was sheared. The profile of the intact portion of the accident lockplate was similar to an un-bent exemplar lockplate. The left and right magneto driven gears, crankshaft gear, and crankshaft gear attachment bolt were undamaged. It was not determined if there was Loctite anti-seize compound on the lower portion of the crankshaft gear attachment bolt threads. The

crankshaft gear drives two idler gears in the accessory gearbox, which drive the camshaft, engine driven fuel pump, vacuum pump and the magneto drive couplings.

A review of the engine maintenance records revealed the engine was overhauled by an airframe and powerplant (A&P) mechanic in 2011 and had accrued about 253 hours since overhaul at the time of the accident. The maintenance record entry for the engine overhaul did not specify installation of a new crankshaft gear attachment bolt or lockplate, or the final torque value of the crankshaft gear attaching bolt, as specified by Lycoming Service Bulletin 475C, dated January 30, 2003.

According to the FAA inspector, the A&P mechanic was deceased; therefore, it could not be determined what procedures were used to install the crankshaft gear or whether a new crankshaft gear attachment bolt or lockplate was installed at the time of engine overhaul.

Pilot Information

Certificate:	Private	**Age:**	62,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	BasicMed None	**Last FAA Medical Exam:**	May 22, 2019
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 29, 2019
Flight Time:	1903 hours (Total, all aircraft), 1620 hours (Total, this make and model), 1903 hours (Pilot In Command, all aircraft), 5 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N5948P
Model/Series:	PA24 250	**Aircraft Category:**	Airplane
Year of Manufacture:	1959	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	24-1039
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	August 5, 2019 Annual	**Certified Max Gross Wt.:**	2800 lbs
Time Since Last Inspection:	10 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4628 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	C91 installed, not activated	**Engine Model/Series:**	O-540-A1A
Registered Owner:	On file	**Rated Power:**	250 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:	W78,420 ft msl	**Distance from Accident Site:**	
Observation Time:	14:35 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 3800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.15 inches Hg	**Temperature/Dew Point:**	26°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Clarksville, VA (W63)	**Type of Flight Plan Filed:**	None
Destination:	South Boston, VA	**Type of Clearance:**	None
Departure Time:	14:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	William M Tuck Airport W78	**Runway Surface Type:**	Asphalt
Airport Elevation:	420 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	19	**IFR Approach:**	None
Runway Length/Width:	4003 ft / 75 ft	**VFR Approach/Landing:**	Forced landing;Full stop;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	36.699184,-78.899894(est)

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	Mark Jennings; FAA/FSDO; Richmond, VA
Original Publish Date:	June 14, 2022
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=101328