Aviation Investigation Final Report

Location:	Hilltop Lakes, Texas	**Accident Number:**	CEN20LA402
Date & Time:	September 20, 2020, 10:50 Local	**Registration:**	N236KM
Aircraft:	Piper PA46	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	4 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

While in cruise flight at 19,000 ft mean sea level (msl), the pilot declared an emergency to air traffic control and stated that the airplane had lost engine power and that he needed to divert. The pilot elected to divert to an airport that was about 5 miles south of his position. Archived automatic dependent surveillance-broadcast data and commercially available flight track data showed that a descent was initiated from 19,000 ft and the airplane proceeded directly to, and circled around, the airport one time while descending. The last data point showed the airplane at 1,250 ft msl (about 750 ft above ground level) and about 1 mile north of the approach end of the runway. From the cruise altitude of 19,000ft until the last data point, about 12 minutes and 45 seconds had elapsed, which equated to an average descent rate of about 1,392ft per minute.

Witnesses located about 1/4 mile south of the end of the runway on a miniature golf course noticed the propeller on the airplane was not turning. They stated that they saw the airplane in a “really hard” left bank; the nose of the airplane dropped, and it impacted the ground in a near vertical attitude. The airplane came to rest along a road about 200 ft south of the airport property. The airplane impacted the terrain in a nose low, near vertical attitude and sustained substantial damage to fuselage and both wings. It is likely that, based on the location of the runway, relative to the miniature golf course, the pilot initiated the left bank to avoid bystanders on the ground and inadvertently exceeded the wing’s critical angle of attack, which resulted in an aerodynamic stall.

The airplane was equipped with an engine trend monitor (ETM), which captured various events concerning the accident flight, including engine start, operating limit exceedances, and power checks. The ETM captured a power check while the airplane was at 19,100 ft. About 3 minutes 32 seconds later, an engine off event was recorded. The ETM further captured a logon message, which was consistent with the power being cycled, at an altitude of 3,542 ft, 9 minutes, 52 seconds later. The ETM did not record any start attempts between the logged engine off event and when power was lost to the unit. A postaccident examination of the

airframe, engine, and accessories did not reveal any mechanical malfunctions or anomalies that would have precluded normal operation. Although it cannot be determined whether a restart attempt would have been successful, the data were consistent with a restart not being attempted.

Both the engine failure and power off landing checklists contained instructions for the pilot to establish the airspeed at 90 knots; however, when the winds aloft were applied to the reported groundspeeds, it was evident this did not occur. Furthermore, the power off landing checklist instructed the pilot to be about 1,500 ft above the airport on the downwind leg; however, data indicate that the airplane was about 5,000 ft above the airport on the downwind leg. The rapid descent from 5,000 ft on the downwind leg to about 750 ft above ground level on the final leg resulted in an unstabilized approach.

Probable Cause and Findings

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

The loss of engine power for reasons that could not be determined and the pilot's failure to maintain control of the airplane which resulted in an aerodynamic stall and spin. Contributing to the accident was the pilot's failure to establish and maintain a proper glidepath.

Findings

Personnel issues	Use of checklist - Pilot
Aircraft	(general) - Unknown/Not determined
Aircraft	Descent/approach/glide path - Not attained/maintained
Aircraft	Airspeed - Not attained/maintained

Factual Information

History of Flight

Enroute	Loss of engine power (total) (Defining event)
Landing	Loss of control in flight

On September 20, 2020, about 1050 central daylight time (CDT), a Piper PA-46-310, N236KM, was substantially damaged when it was involved in an accident near Hilltop Lakes, Texas. The commercial pilot and three passengers sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 personal flight.

While in cruise flight at 19,000 ft mean sea level (msl), the pilot declared an emergency to air traffic control (ATC) and stated that the airplane had lost engine power and that he needed to divert. The pilot elected to divert to Hilltop Lakes Airport (0TE4), which was about 5 miles south of his position. Archived Federal Aviation Administration (FAA) automatic dependent surveillance-broadcast (ADS-B) data revealed that when the airplane was about 5 miles west of 0TE4, a descent was initiated from 19,000 ft, and the airplane proceeded directly to and circled the airport one time while descending. ADS-B data was lost about 3 miles northeast of the airport, as the airplane descended below the floor of the ADS-B reception capability.

Commercially available flight track data, which aggregates and geo-references FAA data sources, continued to receive aircraft data as the airplane turned to a final approach segment. The last data point showed the airplane about 1 mile north of the approach end of runway 15 at 0TE4 at an altitude of 1,250 ft, 169 knots groundspeed and on a ground track of 145°. From the cruise altitude of 19,000 ft until the last data point, about 12 minutes and 45 seconds had elapsed, which equated to an average descent rate of about 1,392 ft per minute.

Witnesses located about 1/4 mile south of the end of runway 15 reported seeing what they described as the airplane taking off, before noticing the propeller was not turning. They stated they saw the airplane in a left bank just prior to the nose dropping and the airplane impacting the ground in a near vertical attitude.

Pilot Information

Certificate:	Commercial	**Age:**	59,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	July 1, 2019
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 1107 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N236KM
Model/Series:	PA46 310P	**Aircraft Category:**	Airplane
Year of Manufacture:	1984	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	46-8508014
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Turbo prop
Airframe Total Time:		**Engine Manufacturer:**	PWC
ELT:		**Engine Model/Series:**	PT-6A-34
Registered Owner:		**Rated Power:**	
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KCLL,320 ft msl	**Distance from Accident Site:**	22 Nautical Miles
Observation Time:	10:53 Local	**Direction from Accident Site:**	198°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	20°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.08 inches Hg	**Temperature/Dew Point:**	24°C / 16°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Horseshoe Bay, TX (KDZB)	**Type of Flight Plan Filed:**	IFR
Destination:	Natchitoches, LA (KIER)	**Type of Clearance:**	IFR
Departure Time:	10:00 Local	**Type of Airspace:**	Class A

The following is a sampling of the winds aloft reported near 0TE4 about 9 minutes after the accident.

Height (ft-MSL)	DD/FF (deg/kts)
1,306	037/15
2,458	051/19
4,861	062/20
7,046	059/21

Airport Information

Airport:	Hilltop Lakes 0TE4	**Runway Surface Type:**	Asphalt
Airport Elevation:	502 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	15	**IFR Approach:**	None
Runway Length/Width:	3018 ft / 40 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	4 Fatal	**Latitude, Longitude:**	31.073888,-96.213333(est)

The airplane came to rest along a road about 200 ft south of the airport property. The airplane impacted the terrain in a nose low, near vertical attitude and sustained substantial damage to fuselage and both wings. A strong odor, consistent with jet fuel, was noted on scene and the left-wing fuel tank was breached.

The cockpit area exhibited extensive aft crushing and tearing around the circumference which resulted in the fuselage being separated. Flight control cable continuity was confirmed from the cockpit controls to the respective control surfaces, with the exception of separations consistent with wreckage recovery cuts and separations consistent with impact forces. The flap actuator rod was found extended about 6”, which is consistent with the flaps being fully extended at the time of the accident.

When moving the right wing during a post-recovery examination, liquid consistent with Jet-A fuel was observed pouring from the vapor return line at the wing root and from the leading edge near the inboard end of the fuel tank.

The engine exhibited severe impact damage and deformation. The center firewall was deformed around the engine and multiple airframe components including: the starter, alternator, air conditioning compressor, wiring, and parts of the mount structure remained attached to the engine. There was no evidence of uncontained engine failure or undercowl fire. The fuel control unit (FCU) and turboprop governor lines were intact. The Py line fittings at the turboprop governor, were secure on both sides of the center firewall but could be backed off without a wrench. The P3 line to FCU fitting was also finger tight. There was no debris accumulation on the engine magnetic chip detector plug or in the fuel or oil filters. There was residual fuel remaining in the fuel filter bowl and a small amount of shiny particulate was visible in the fuel when viewed under light

The accident airplane was equipped with a Shadin Avionics engine trend monitor (ETM), P/N 943200-11, S/N 0200. The ETM was recovered from the wreckage and shipped to the National Transportation Safety Board (NTSB) Recorders Laboratory in Washington, DC for evaluation and download. Recovered data captured the accident flight. Additionally, the unit was programmed to record select engine events including start, engine operating limit exceedances, and power checks. The following were the logged events from the accident flight:

TIME (CDT)	EVENT DESCRIPTION	COMMENTS
09:36:44	LOGON	Logon message is consistent with power being cycled on. Pressure Altitude at airport: 970 ft.
09:52:51	LOGON	
09:54:21	UNSUCCESSFUL ENGINE START ATTEMPT #1	Start Max ITT: 732°C, Ng light-off speed: 20.3%, Start Time- 13 seconds. Start cycle was logged butthere was no run time before engine off was recorded.
09:57:02	UNSUCCESSFUL ENGINE START ATTEMPT #2	ETM recorded Low Bus Voltage: 327.68V. According to Shadin, 327.68V is recorded when the expected sequence of engine parameters is not met.
10:01:03	UNSUCCESSFUL ENGINE START ATTEMPT #3	Low Bus Voltage: 327.68V
10:02:20	ENGINE START ATTEMPT #4	Low Bus Voltage: 327.68V. There was no associated “engine off log” timestamp after start attempt #4 consistent with a successful engine start where the expected sequence of engine parameters was not met. The ETM did not record engine start parameters.
10:03:11	ENGINE TORQUE EXCEEDANCE	Level 1 Torque Exceedance- 1,460 ft-lb for a duration of 1 second.
10:03:20	TAKEOFF	
10:05:36	ENGINE TORQUE EXCEEDANCE	Level 1 Torque Exceedance- 1424 ft-lb for a duration of 4 seconds.
10:24:11	ENGINE POWER CHECK	Pressure Altitude: 19,090 ft, Indicated Airspeed- 171 kts., Np- 2,141RPM, Torque- 880 ft-lb., Fuel Flow-36.1 GPH, ITT- 704°C, Ng- 94.2%
10:38:16	ENGINE POWER CHECK	Pressure Altitude: 19,100 ft, Indicated Airspeed- 171 kts., Np- 2,155 RPM, Torque- 866 ft-lb., Fuel Flow-35.5 GPH, ITT- 701°C, Ng- 94.2%
10:41:48	ENGINE OFF LOG	Engine off is logged when Ng drops below 48%.
10:51:40	LOGON	Logon message is consistent with power being cycled on. There was not a subsequent engine start attempt. Pressure Altitude- 3,540 ft.

Additional Information

Checklist Usage

The JetProp LLC AFM supplement for emergency procedures related to engine power loss in flight superseded the original procedures since there was a change in engine type. The first item on the *Engine Failure (Mechanical Failure)* checklist said to trim for 90 knots indicated airspeed (KIAS). The groundspeed of the airplane, as reported by track data, showed the ground speed varied between 122 knots (KTS) and 172 kts.

The first item on the *Power Off Landing* checklist said to establish best gliding angle and 90KIAS. Two notes were included in this procedure with the first instructing the pilot to "establish spiral pattern to arrive at 1,500 ft above field at downwind position for normal approach." The second stated "when assured of reaching the field, use flaps as necessary and slow to 77 KIAS with flaps fully extended for shortest landing. When the airplane was on a downwind leg, the reported altitude was about 5,000 ft above ground level.

Administrative Information

Investigator In Charge (IIC):	Williams, David		
Additional Participating Persons:	Rick Bolton; FAA; Houston, TX Jonathon Hirsch; Piper Aircraft, Inc.; Vero Beach, FL		
Original Publish Date:	August 19, 2022	**Investigation Class:**	3
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=101995		