Aviation Investigation Final Report

Location:	Allentown, Pennsylvania	**Accident Number:**	CEN22FA436
Date & Time:	September 28, 2022, 13:40 Local	**Registration:**	N7329F
Aircraft:	Piper PA-28-140	**Aircraft Damage:**	Destroyed
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 Fatal, 1 Serious
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor reported that the airplane was not performing as expected during the takeoff and initial climb. He took control of the airplane from his student and was able to clear trees off the departure end of the runway, but the airplane would not continue climbing and the engine was “noticeably weak.” He maneuvered the airplane, maintaining the best angle of climb airspeed (V_X), and was unable to find a suitable landing area. The airplane impacted trees and the ground and a postimpact fire ensued.

Postaccident examination of the airplane and its engine did not reveal any preimpact anomalies; however, the extensive fire damage precluded functional testing and examination of several airframe and engine components.

Recorded flight data indicated that the airplane was below the published V_x airspeed, but above stall speed. The airspeed derived from the data used surface winds reported at the departure airport and the actual winds encountered by the airplane could not be determined. This discrepancy could account for the difference in the derived speed and the speed the pilot reported. Operation of the airplane below V_X could have reduced the airplane’s climb rate but any deficit to climb performance could not be quantified.

The recorded temperature and dewpoint at the time of the accident was conducive to the development of serious icing at glide power and was between the range for icing at glide and cruise power and serious icing at cruise power.

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 for undetermined reasons.

Findings

Not determined	(general) - Unknown/Not determined
Environmental issues	Conducive to carburetor icing - Effect on equipment

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event)

On September 28, 2022, about 1340 eastern daylight time, a Piper PA28-140, N7329F, was destroyed when it was involved in an accident near Allentown, Pennsylvania. The student pilot was fatally injured, and the flight instructor was seriously injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

The flight instructor reported that the purpose of the instructional flight was to fly to a nearby tower-controlled airport. After a preflight inspection, and pre-takeoff engine run-up, the instructor asked the student to perform a soft-field takeoff.

The instructor stated that, during the takeoff, the airplane had not become airborne by the time he felt it should, and he prompted the student to increase the airplane's pitch attitude and it became airborne. The student then reduced pitch to remain in ground effect but settled briefly back onto the runway before re-establishing flight in ground effect. The instructor stated that the airplane seemed to take longer to accelerate to its best angle of climb speed (V_x), which he attributed to the student's initial slightly high pitch attitude. When the airplane reached V_X, the instructor assumed control of the airplane and maintained airspeed. He stated that the airplane was laboring in its climb, narrowly cleared the trees off the departure end of the runway, and was unable to climb thereafter. Although the engine was running, it was "noticeably weak." The instructor raised the flaps and continued to fly the airplane at V_x and was still not able to climb. He noted that the airplane was about 200 ft above the ground and approaching rising terrain. The instructor attempted to locate an area to land, but was unable to locate a suitable landing area, and the airplane descended into trees.

Recorded Automatic Dependent Surveillance-Broadcast (ADS-B) data showed that the airplane departed and continued for about 0.8 miles on runway heading, then made a slight left turn before the end of the data. The accident site was about 450 ft and 250° from the final recorded location. The reported wind at the departure airport was from 310° at 8 kts.

Examination of the data, taking into account the reported surface winds, showed that the airspeed during the final portion of the flight was below V_x but above the listed stall speed from the airplane owner's manual. The owner's manual listed a stall speed with 0° flap setting at maximum gross weight was 64 mph.

Figure 1. Overhead view of the accident flight path.

A witness to the accident, who was outside the residence where the accident occurred, reported that he did not hear the airplane until it impacted trees. The airplane then impacted the ground and a fire erupted. The witness was able to pull one of the occupants from the wreckage, but was unable to extricate the other occupant before fire engulfed the cabin section of the airplane.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	34,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	December 19, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 1, 2021
Flight Time:	1350 hours (Total, all aircraft), 700 hours (Total, this make and model), 1200 hours (Pilot In Command, all aircraft), 40 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	49,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3	**Last FAA Medical Exam:**	November 24, 2021
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	51 hours (Total, all aircraft), 51 hours (Total, this make and model), 12 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N7329F
Model/Series:	PA-28-140	**Aircraft Category:**	Airplane
Year of Manufacture:	1968	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	28-25237
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	July 1, 2022 Annual	**Certified Max Gross Wt.:**	2150 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	6031.1 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Installed	**Engine Model/Series:**	O-320-D3G
Registered Owner:	PROFLITE AERO LLC	**Rated Power:**	180 Horsepower
Operator:	PROFLITE AERO LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KXLL,385 ft msl	**Distance from Accident Site:**	6 Nautical Miles
Observation Time:	13:51 Local	**Direction from Accident Site:**	28°
Lowest Cloud Condition:	Unknown	**Visibility**	10 miles
Lowest Ceiling:	Broken / 4200 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	310°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.15 inches Hg	**Temperature/Dew Point:**	18°C / 10°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Allentown, PA	**Type of Flight Plan Filed:**	None
Destination:	Allentown, PA	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

The weather conditions at the departure airport included a temperature of 18°C, and dewpoint of 10°C. According to Federal Aviation Administration Special Airworthiness Information Bulletin CE-09-35, the temperature and dewpoint were in a range of susceptibility for serious icing at glide power and between the range for icing at glide and cruise power and serious icing at cruise power.

Airport Information

Airport:	ALLENTOWN QUEEN CITY MUNI XLL	**Runway Surface Type:**	Asphalt
Airport Elevation:	399 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	07/25	**IFR Approach:**	None
Runway Length/Width:	3950 ft / 75 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal, 1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal, 1 Serious	**Latitude, Longitude:**	40.558901,-75.510649

The inboard portion of the left wing remained lodged in a tree about 15 ft above ground level. The remainder of the wreckage was located at the base of the tree. Examination at the accident scene confirmed the presence of all airframe and engine components. The cabin section of the airplane was consumed by fire. The right wing was located adjacent to the fuselage remnants and the empennage remained attached to the aft fuselage. The tip of the left wing was on the opposite side of the tree on the driveway of the residence.

The engine, with the propeller still attached, was located at the front of the burned cabin section. Postaccident examination of the airplane and engine at the accident scene did not reveal any preimpact anomalies that would have prevented normal operation; however, fire damage prevented functional testing of several components.

Medical and Pathological Information

Toxicological testing of samples from the student revealed the presence of potentially impairing substances; however, according to the flight instructor's statement, the student had relinquished control of the airplane.

Administrative Information

Investigator In Charge (IIC):	Brannen, John
Additional Participating Persons:	Thomas Gilbert; FAA; Allentown, PA Ryan Enders; Lycoming; Williamsport, PA Damian Galbraith; Piper Aircraft; Vero Beach, FL
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Note:	
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