Aviation Investigation Final Report

Location:	Tyler, Minnesota	**Accident Number:**	CEN15LA382
Date & Time:	August 25, 2015, 08:47 Local	**Registration:**	N2805Z
Aircraft:	Piper PA 22-160	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The student pilot reported that the airplane was topped off with fuel before the flight and that he completed a functional check of the carburetor heat during his pretakeoff engine run-up. Shortly after liftoff, he observed a significant decrease in engine speed, and the airplane began to descend. He reduced the pitch to increase airspeed, but the airplane descended into a cornfield about 50 ft past the end of the runway.

Postaccident engine examination did not reveal any evidence of preimpact anomalies that would have precluded normal operation. Fuel samples from each wing tank, the fuel lines, the fuel strainer, and the carburetor bowl were consistent with 100 low-lead aviation fuel and did not contain any water or debris. The weather conditions were conducive to the formation of serious carburetor icing at all power settings. Additionally, the pilot reported that the grass runway was wet with dew, which likely increased the air humidity over the runway and the possibility of carburetor ice formation during taxi and takeoff. Although the pilot reported that he conducted a functional check of the carburetor heat before departure, it is likely he did not adequately ensure that the carburetor was clear of ice before beginning the takeoff. Based on the available information, the partial loss of engine power during takeoff was likely due to carburetor ice accumulation.

The pilot did not have a valid pilot certificate, and his most recent student certificate had been expired for 5.5 years. Additionally, federal regulations prohibit student pilots from acting as pilot-in-command of an aircraft carrying passengers.

Probable Cause and Findings

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

The student pilot's failure to adequately ensure the carburetor was clear of ice before takeoff, which resulted in a partial loss of engine power during takeoff due to carburetor icing.

Findings

Environmental issues	Conducive to carburetor icing - Effect on equipment
Personnel issues	Identification/recognition - Student/instructed pilot
Aircraft	Intake anti-ice, deice - Incorrect use/operation
Personnel issues	Qualification/certification - Pilot

Factual Information

History of Flight

Taxi-to runway	Other weather encounter
Takeoff	Loss of engine power (partial)
Takeoff	Attempted remediation/recovery
Landing	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

On August 25, 2015, about 0847 central daylight time, a Piper PA-22-160, N2805Z, collided with terrain during a forced landing shortly after takeoff from Tyler Municipal Airport (63Y), near Tyler, Minnesota. The student pilot sustained minor injuries and his two passengers sustained serious injuries. The airplane sustained substantial damage. The airplane was registered to the pilot and operated under the provisions of Title 14 *Code of Federal Regulations* Part 91 without a flight plan. Day meteorological conditions prevailed for the local flight that was originating at the time of the accident.

The pilot reported that the purpose of the flight was to take a couple family members on a pleasure flight. He stated that he completed a preflight inspection and topped-off the fuel tanks before the flight. He started the engine about 0837 and taxied to runway 32 (2,600 ft by 160 ft, grass). The pilot noted that the grass runway was wet with dew. The pilot reported that he completed a functional check of both magnetos and the carburetor heat during a pretakeoff engine runup. The pilot stated that he selected wing flaps to 20° (half-flaps) and that about 3/4 of the available runway length was used to achieve liftoff. The pilot reported that shortly after liftoff he observed the engine speed had decreased from takeoff power to 1,900 rpm and the airplane began to descend. He reduced airplane pitch to increase airspeed, but the airplane descended into a cornfield about 50 ft past the end of the runway.

The airplane and its engine were examined by a Federal Aviation Administration (FAA) airworthiness inspector and a representative from the engine manufacturer. Flight control cable continuity was established from the cockpit controls to each flight control surface. Fuel samples from each wing tank, fuel lines, fuel strainer, and the carburetor bowl were consistent with 100 low-lead aviation fuel and did not contain any water or debris. The carburetor air box was partially deformed by impact but otherwise appeared intact. The engine, a Lycoming O-320-B2A, serial number L-1872-39, remained attached to the airframe. The engine case remained intact with the accessory components still attached to their respective installation points. Internal engine and valve train continuity were confirmed as the engine crankshaft was rotated. Compression and suction were noted on all cylinders in conjunction with crankshaft rotation. Both magnetos remained attached to the engine case and provided spark on all posts while the crankshaft was rotated. The magneto timing was about 25° before top dead center. The spark plugs exhibited features consistent with normal engine operation. A borescope inspection of each cylinder did not reveal any anomalies with the cylinders, pistons, valves, or valve seats. The oil pickup screen was clear of debris. The disassembly of the carburetor revealed no water, corrosion, or debris in the bowl assembly. No anomalies were observed with the composite floats or the needle valve. A visual examination of the carburetor fuel inlet screen revealed no evidence of debris. The postaccident

examination did not reveal any anomalies that would have precluded normal engine operation during the flight.

A postaccident review of available meteorological data established that day visual meteorological conditions prevailed at the accident site. The nearest aviation weather reporting station was located at Southwest Minnesota Regional Airport (MML), Marshall, Minnesota, about 17 nautical miles northeast of the accident site. At 0855, about 8 minutes after the accident, the MML automated surface observing system reported: wind 320° at 8 knots, 10 miles surface visibility, clear sky, temperature 13°C, dew point 8°C, and an altimeter setting 30.21 inches of mercury.

According to a carburetor icing probability chart contained in FAA Special Airworthiness Information Bulletin CE-09-35, entitled "Carburetor Icing Prevention", the recorded temperature and dew point were in the range of susceptibility for the formation of serious carburetor icing at all engine power levels. Additionally, if ice forms in the carburetor of a fixed pitch propeller aircraft, the restriction to the induction airflow will reduce power and result in a drop of engine rpm.

According to FAA airman records, the pilot did not have a valid student certificate at the time of the accident. The pilot's most recent student certificate was issued on February 15, 2005, and subsequently expired on February 28, 2010. Additionally, according to Title 14 *CFR* Part 61.89(a), a student pilot is prohibited from acting as pilot-in-command of an aircraft carrying passengers.

Pilot Information

Certificate:	Student	**Age:**	39,Male
Airplane Rating(s):	None	**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:	Class 3 None	**Last FAA Medical Exam:**	February 15, 2005
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 81.6 hours (Total, all aircraft), 81.6 hours (Total, this make and model), 58.7 hours (Pilot In Command, all aircraft), 0 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N2805Z
Model/Series:	PA 22-160	**Aircraft Category:**	Airplane
Year of Manufacture:	1959	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	22-6798
Landing Gear Type:	Tailwheel	**Seats:**	4
Date/Type of Last Inspection:	April 21, 2015 Annual	**Certified Max Gross Wt.:**	2000 lbs
Time Since Last Inspection:	7 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2433.81 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-320-B2A
Registered Owner:	On file	**Rated Power:**	160 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:	MML,1183 ft msl	**Distance from Accident Site:**	17 Nautical Miles
Observation Time:	08:55 Local	**Direction from Accident Site:**	55°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.2 inches Hg	**Temperature/Dew Point:**	13°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Tyler, MN (63Y)	**Type of Flight Plan Filed:**	None
Destination:	Tyler, MN (63Y)	**Type of Clearance:**	None
Departure Time:	08:47 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Tyler Municipal Airport 63Y	**Runway Surface Type:**	Grass/turf
Airport Elevation:	1742 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	32	**IFR Approach:**	None
Runway Length/Width:	2600 ft / 160 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious, 1 Minor	**Latitude, Longitude:**	44.291667,-96.150276(est)

Administrative Information

Investigator In Charge (IIC):	Fox, Andrew
Additional Participating Persons:	Allan Thilmany; Federal Aviation Administration, Minneapolis FSDO; Minneapolis, MN David R Nelson; Federal Aviation Administration, Minneapolis FSDO; Minneapolis, MN Troy Helgeson; Lycoming Engines; Williamsport, PA
Original Publish Date:	March 18, 2019
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=91862