Aviation Investigation Final Report

Location:	Longview, Texas	**Accident Number:**	CEN18LA209
Date & Time:	June 1, 2018, 07:34 Local	**Registration:**	N72066
Aircraft:	Luscombe 8A	**Aircraft Damage:**	Substantial
Defining Event:	Fuel starvation	**Injuries:**	1 Serious, 1 None
Flight Conducted Under:	Part 91: General aviation - Flight test		

Analysis

The commercial pilot departed on the personal flight with about half fuel. During the departure climb, the airplane experienced a loss of engine power. The pilot subsequently performed a forced landing to a field, and, during touchdown, the airplane nosed over and impacted the ground. Postaccident examination of the airplane revealed no evidence of mechanical malfunctions or failures that would have precluded normal engine operation. The pilot reported that he did not use carburetor heat during the takeoff. The use of full carburetor heat during takeoff and landing was stipulated by the airplane's type certificate data sheet, which indicated that a placard is required stating, "Full carburetor air heat required for takeoff and landing." However, the accident airplane did not have that placard installed.

Further, a special airworthiness information bulletin (SAIB) applicable to this airplane configuration noted the need for procedures to prevent the possible loss of power on takeoff and climb and stated that flight testing revealed that fuel flow could be interrupted from the fuselage-mounted tank as a result of acceleration and higher pitch attitudes commonly encountered in takeoff and climb. The SAIB stated that the use of full carburetor heat on takeoff is unconventional yet necessary to ensure continuous fuel flow to the engine. Thus, the pilot's failure to use carburetor heat resulted in the loss of engine power.

Probable Cause and Findings

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

The pilot's failure to use carburetor heat for takeoff, which resulted in an interruption of continuous fuel flow to the engine and a loss of engine power during climb. Also causal was the lack of required placarding warning of the need to use full carburetor heat on takeoff and landing.

Findings

Personnel issues	Lack of action - Pilot
Aircraft	(general) - Not installed/available
Aircraft	Intake anti-ice, deice - Not used/operated

Factual Information

History of Flight

Enroute-climb to cruise	Fuel starvation (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)
Landing	Nose over/nose down

On June 1, 2018, at 0734 central daylight time, a Luscombe 8A airplane, N72066, experienced a loss of engine power during a departure climb from runway 13 at East Side Airport (3TS0), near Longview, Texas. The pilot/mechanic performed a forced landing to a field near Longview, Texas. The airplane sustained substantial damage. The commercial pilot received serious injuries and a passenger was uninjured. The airplane was registered to an individual and operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight that was not operating on a flight plan. Day visual meteorological conditions prevailed at the time of the accident. The local flight was originating at the time of the accident.

The airplane had not flown for approximately 10 years and underwent a complete restoration and an engine overhaul. Prior to the accident flight, the airplane had flown for the about two hours since the restoration. The airplane design did not have a cockpit mixture control and the airplane was not equipped with a mixture control. The airplane was equipped with one fuel tank, did not have a fuel quantity gauges, nor did it have an electrical system. The airplane was equipped with an originally equipped vented fuel cap, a fuselage mounted main fuel tank, and a Continental A-65-1 engine (the serial number was not provided and is unknown).

The accident flight was intended to be a personal flight flown by the pilot/mechanic, who restored the airplane along with the passenger, who had painted the wings of the airplane.

The pilot stated that prior to the accident flight, the airplane fuel quantity was checked using a dipstick, and the quantity was half full, about 7-8 gallons, and the total fuel capacity was 15 gallons. The pilot stated that he did not use carburetor heat for the takeoff. During the departure climb, the engine lost partial power while climbing through about 200 ft above ground level (AGL), regained power for about 10 seconds, and then lost all power while climbing through about 400 ft AGL. The pilot subsequently performed a forced landing to a field while avoiding powerlines and houses. During touchdown, the airplane nosed over and impacted the ground.

The pilot's recommendation of how the accident could have been avoided was that takeoffs should not be performed with less than full fuel because the fuel tank is located behind the pilot seat and was shoulder high, and the carburetor is located about below the engine and at a height equal to that of the rudder pedals. In a climb attitude, the carburetor and fuel tank are the same height and the gravity fed fuel will stop flowing. He stated the he had previously flown the airplane for a total flight time of 7 hours and had no issues during the takeoff phase of those flights with full fuel.

Several hours passed before the airplane was recovered and a post-accident examination of the airplane was performed. The examination revealed the presence of fuel staining on the ground where the airplane had been overturned. Fuel had drained from the airplane fuel tank due to the nosed-over attitude of the airplane. There was no debris in the fuel tank when visually inspected through the fuel cap filler. The gascolator was broken off from impact, and there was no fuel in the lines leading to the carburetor. The carburetor screen did not contain debris. The carburetor jet was unobstructed and had a normal spray pattern when tested using water. Engine control continuity from the cockpit throttle control to the carburetor was confirmed. The cockpit primer control was extended about 3/8 inch. One propeller blade was relatively straight, and the second propeller blade was bent backwards, consistent with a lack of torsional rotation. The engine exhibited compression, valve train continuity, and drive train continuity. Electrical continuity of the ignition system was confirmed. The spark plugs exhibited normal coloration except for one of the spark plugs that was wetted with engine oil consistent with the cylinder rings in the respective cylinder having not been seated during engine break-in.

Special Airworthiness Information Bulletin (SAIB) CE-14-09, dated February 13, 2014, was issued for all Luscombe Model 8A airplanes equipped with a fuselage mounted main fuel tank and Continental A-65-1 engines (the original production configuration), specifically the need for procedures to prevent the possible loss of power on takeoff and climb. Flight testing revealed that fuel flow could be interrupted from the fuselage mounted tank as a result of acceleration and higher pitch attitudes commonly encountered in takeoff and climb.

The SAIB stated that use full carburetor heat on takeoff is unconventional yet necessary to assure continuous fuel flow to the engine. Also, the vented fuel cap must be installed with the vent opening facing forward into the prevailing air stream. It is physically possible to install the fuel cap backwards; this condition will decrease fuel flow from the tank. The cap should have lettering indicating the forward direction. If the "forward" lettering is missing or obscured it should be renewed. During pre-flight inspection, while the cap is removed, it is advisable to check the vent function by blowing into the vent tube.

The airplane type certificate data sheet, A-694, revision 25, dated February 12, 2014, Section II Model 8A approved March 27, 1939, stated that a placard was required stating, in part: 'Full carburetor air heat required for takeoff and landing'…

The airplane was certified under CAR 3; and due to the certification basis, it was not required have an approved flight manual.

The placard, part number 18856, was part of the airplane type certificate and was a required installation. The placard stated:

"FULL CARBURETOR AIR

HEAT REQUIRED FOR TAKE-OFF

AND LANDING"

The accident airplane did not have the placard installed.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	74,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 1, 2016
Flight Time:	5000 hours (Total, all aircraft), 8 hours (Total, this make and model), 20 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Luscombe	**Registration:**	N72066
Model/Series:	8A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3493
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	April 15, 2018 Annual	**Certified Max Gross Wt.:**	1260 lbs
Time Since Last Inspection:	7 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1450 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Not installed	**Engine Model/Series:**	C65
Registered Owner:		**Rated Power:**	65 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	GGG,366 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	07:53 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Clear	**Visibility**	6 miles
Lowest Ceiling:	Broken / 900 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.92 inches Hg	**Temperature/Dew Point:**	26°C / 24°C
Precipitation and Obscuration:	Moderate - None - Mist		
Departure Point:	Longview, TX (3TS0)	**Type of Flight Plan Filed:**	None
Destination:	Longview, TX (3TS0)	**Type of Clearance:**	None
Departure Time:	07:34 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	East Side Airport 3TS0	**Runway Surface Type:**	Grass/turf
Airport Elevation:	373 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:	13	**IFR Approach:**	None
Runway Length/Width:	2400 ft / 75 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious, 1 None	**Latitude, Longitude:**	32.518054,-94.68972(est)

Administrative Information

Investigator In Charge (IIC):	Gallo, Mitchell
Additional Participating Persons:	Gary Watson; Federal Aviation Administration; North Texas FSDO; Irving, TX
Original Publish Date:	November 19, 2019
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97400