Aviation Investigation Final Report

Location:	Columbia, Tennessee	**Accident Number:**	ERA24LA032
Date & Time:	November 11, 2023, 08:15 Local	**Registration:**	N29868
Aircraft:	Taylorcraft BC12-65	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was preparing for takeoff after the engine had been running for about 25 minutes. Before departing, he tested the carburetor heat and noted that it was functioning as expected. He applied power for takeoff and the engine accelerated “strongly and smoothly.” About 25-30 ft above the ground during the initial climb the engine suddenly lost about 1,000 rpm. The pilot elected to perform an off-field landing. He maneuvered to avoid a hedgerow and the airplane touched down in an in an area of high grass. During the landing sequence, the fuselage and right wing were substantially damaged.

A postaccident examination of the engine and fuel system did not reveal evidence of a preexisting anomaly or failure that would have precluded normal operation. The temperature/dew point at the time of the accident was in the range for serious carburetor icing at cruise power. While the pilot described checking the functionality of the carburetor heat before as part of his normal preflight checks, and leaving it on for “a little longer” than normal as a part of that process, given all available information, it is likely that the temperature of the carburetor dropped during the extended operation of the engine while on the ground, and that during takeoff, the carburetor accumulated ice to a point that resulted in the partial loss of engine 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 due to an accumulation of carburetor ice, resulting in an off-airport landing and substantial damage to the airplane.

Findings

Environmental issues	Conducive to carburetor icing - Effect on operation

Factual Information

History of Flight

Takeoff	Fuel related (Defining event)
Emergency descent	Off-field or emergency landing

On November 11, 2023, about 0815 eastern standard time, a Taylorcraft BC12-65 airplane, N29868, was substantially damaged when it was involved in an accident near Columbia, Tennessee. The private pilot incurred minor injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that he performed a preflight inspection of the airplane and confirmed there were about 12 gallons of fuel on board. Including engine start, taxi, and pretakeoff runup operations, the engine was running for about 25 minutes with no anomalies noted. Before takeoff he activated the carburetor head and noticed a “normal” engine rpm drop. He also stated that he left the carburetor heat applied, “for a little longer” and when he turned it off there was no engine rpm change. He applied power for takeoff and the engine accelerated “strongly and smoothly.” About 25-30 ft above the ground during the initial climb, the engine suddenly lost about 1,000 rpm. The pilot elected to perform an off-field landing. He maneuvered to avoid a hedgerow and the airplane touched down in an area of high grass. During the landing sequence the airplane was substantially damaged. The pilot was met by first responders.

The wreckage was examined after recovery to a storage facility. The wing and main fuel tanks contained fuel and were uncompromised. Fuel drained from the tanks was clean and free of water or other contaminants. The carburetor bowl contained a small amount of particulate matter. The carburetor inlet screen was clear.

The engine was turned through manually by rotating the propeller. Compression and suction were noted on all four cylinders and valve action was correct. The magnetos produced spark to all leads when operated manually. The spark plugs were normal in color and wear when compared to a Champion inspection chart. The carburetor was broken from the engine consistent with impact damage; however, the cockpit controls remained attached. The carburetor heat knob was found in the “off” position.

Examination of the fuel system and engine did not reveal evidence of a preexisting anomaly or failure that would have precluded normal operation.

The recorded temperature and dew point near the accident site was about 48 and 35 degrees, respectively. On a carburetor icing probability chart, those temperatures were in the “serious icing – cruise power” range.

FAA Special Airworthiness Information Bulletin (CE-09-35) – Carburetor Icing Prevention, stated that:

"…pilots should be aware that carburetor icing doesn't just occur in freezing conditions, it can occur at temperatures well above freezing temperatures when there is visible moisture or high humidity. Icing can occur in the carburetor at temperatures above freezing because vaporization of fuel, combined with the expansion of air as it flows through the carburetor, (Venturi Effect) causes sudden cooling, sometimes by a significant amount within a fraction of a second. Carburetor ice can be detected by a drop in rpm in fixed pitch propeller airplanes and a drop in manifold pressure in constant speed propeller airplanes. In both types, usually there will be a roughness in engine operation."

Pilot Information

Certificate:	Commercial; Private	**Age:**	74,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Sport pilot	**Last FAA Medical Exam:**	February 1, 2008
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 28, 2023
Flight Time:	1753 hours (Total, all aircraft), 275 hours (Total, this make and model), 1519 hours (Pilot In Command, all aircraft), 14 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Taylorcraft	**Registration:**	N29868
Model/Series:	BC12-65	**Aircraft Category:**	Airplane
Year of Manufacture:	1941	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	2719
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	January 18, 2023 Annual	**Certified Max Gross Wt.:**	1280 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2567.9 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	C85-12F
Registered Owner:	On file	**Rated Power:**	85 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:	KMRC,682 ft msl	**Distance from Accident Site:**	14 Nautical Miles
Observation Time:	08:10 Local	**Direction from Accident Site:**	232°
Lowest Cloud Condition:	Clear	**Visibility**	9 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	30°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.32 inches Hg	**Temperature/Dew Point:**	9°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Columbia, TN	**Type of Flight Plan Filed:**	None
Destination:	Clifton, TN (KM29)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	HUNTER 06TN	**Runway Surface Type:**	Grass/turf
Airport Elevation:	640 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	05/23	**IFR Approach:**	None
Runway Length/Width:	2000 ft / 50 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	35.698407,-86.956162(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Ralph
Additional Participating Persons:	David Stamps; FAA/FSDO; Nashville, TN
Original Publish Date:	July 24, 2024
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=193368