Aviation Investigation Final Report

Location:	Elkton, Kentucky	**Accident Number:**	ERA13LA269
Date & Time:	June 4, 2013, 17:00 Local	**Registration:**	N97592
Aircraft:	Stinson 108	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	2 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Following an uneventful full-stop landing, taxi back, and takeoff, the pilot continued around the airport traffic pattern and approached the runway for a second time, intending to perform a touch-and-go landing. The airplane subsequently touched down about one-third down the length of the runway. The pilot then increased engine power to full, and the airplane began to climb. As the airplane climbed, the pilot noted that the climb rate seemed to be slower than it was previously even though the engine appeared to be operating normally. The pilot continued the takeoff, but he then realized that the airplane would not be able to clear the trees, so he decided to land the airplane in a nearby field. During the landing, the airplane nosed over, resulting in substantial damage to the airframe. A postaccident examination of the engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

The atmospheric conditions at the time of the accident were conducive to serious carburetor icing at glide power settings. The pilot did not recall using carburetor heat during the approach to landing, and a postaccident examination of the airplane revealed that the carburetor heat control was in the "off" position. Therefore, it is likely that the airplane's carburetor accumulated ice during the approach to landing, which resulted in the observed partial loss of engine power during the subsequent climb. The application of carburetor heat during the approach could have prevented any initial accumulation of carburetor ice, and application subsequent to that point may have melted any previously accumulated ice and restored 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 during the approach to landing, which resulted in carburetor icing and a partial loss of engine power during a subsequent initial climb.

Findings

Environmental issues	Conducive to carburetor icing - Effect on equipment
Personnel issues	Use of equip/system - Pilot

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) (Defining event)
Emergency descent	Off-field or emergency landing
Landing-landing roll	Nose over/nose down

On June 4, 2013, about 1700 central daylight time, a Stinson 108, N97592, was substantially damaged during a forced landing shortly after takeoff from Standard Field (5KY4), Elkton, Kentucky. The commercial pilot and passenger incurred minor injuries. Visual meteorological conditions prevailed, and no flight plan was filed for the flight, which was destined for Russellville-Logan County Airport (4M7), Russellville, Kentucky. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

The pilot stated that the purpose of the flight was to practice takeoffs and landings on the turf runway at 5KY4. Following an uneventful departure from 4M7 and full-stop landing at 5KY4, he taxied back, took off from runway 31, and entered the airport traffic pattern. During the next landing, the airplane touched down about one-third down the runway. Intending to perform a touch-and-go landing, the pilot increased engine power to full and the airplane began to climb back into the air.

During the climb, the pilot reported that the engine sounded normal and smooth, but that the climb rate seemed to be slower than it was previously. With about one-third of the runway remaining, the pilot confirmed the throttle position and the flap setting, and upon reaching the end of the runway, the pilot realized that "something was wrong." The pilot thought that the airplane might be able to climb above a line of trees located about 1,500 feet beyond the departure end of the runway, and he attempted to increase the climb rate by increasing the pitch angle. At an altitude of about 60 to 80 feet, and upon realizing that the airplane would not be able to clear the trees, the pilot turned the airplane left toward a field, and decreased the pitch angle.

The airplane descended and the pilot attempted to land the airplane in the soft ground of a corn field, however during the landing roll, the airplane nosed over, resulting in substantial damage to the airframe. When speculating about the partial loss of power during the climb, the pilot stated that the engine sounded normal throughout the climb, and did not exhibit a loss of rpm. He also stated that during the approach to landing that immediately preceded the accident takeoff, he did not recall utilizing the carburetor heat, and that carburetor icing was one possible explanation for the loss of power.

The weather conditions reported at Outlaw Field (CKV), Clarksville, Tennessee, located about 16 nautical miles southwest of the accident site, at 1653, included calm winds, 10 statute miles visibility, clear skies below 12,000 feet, a temperature of 27 degrees C, a dew point of 13 degrees C, and an altimeter setting of 29.99 inches of mercury. According to a carburetor icing probability chart published by the Federal Aviation Administration (FAA), the temperature and dew point conditions were conducive to the formation of serious carburetor icing at glide engine power settings.

Standard Field was comprised of a single turf runway that was 2,930 feet long by 75 feet wide at an elevation of 665 feet.

The pilot held a commercial pilot certificate with ratings for airplane single and multi-engine land, and instrument airplane. His most recent FAA third-class medical certificate was issued in April 2011. The pilot reported 1,033 total hours of flight experience, 3 hours of which were in the accident airplane make and model.

An FAA inspector examined the wreckage following the accident. According to the inspector, the engine remained intact with no noted breaches of the engine case. Continuity of the valvetrain was confirmed through limited rotation of the propeller. Four of the spark plugs were examined, and each exhibited normal wear with some residual carbon buildup. The gascolator to carburetor fuel hose contained fuel that was absent of contamination, and the carburetor fuel screen was absent of debris. All of the carburetor controls remained attached and functional. The carburetor heat control was found in the "off" position and functioned normally when actuated. No evidence of any pre-impact mechanical malfunctions or failures of the engine was noted.

The inspector also examined the airframe and noted that the primary and secondary flight controls operated normally, and that both wing fuel tanks contained adequate fuel.

According to the manufacturer's published operating limitations, during landing, the carburetor heat control should be placed fully on if possible icing conditions exist. Given the weather conditions at the time of the accident, the published takeoff distance and climb to an altitude of 50 feet, assuming the airplane was loaded to maximum gross weight, with the wing flaps retracted, and utilizing a hard-surface runway, was about 1,800 feet.

According to the FAA Pilot's Handbook of Aeronautical Knowledge, carburetor ice occurs due to the effect of fuel vaporization and the decrease in air pressure in the carburetor's venturi, which can cause a sharp temperature decrease in the carburetor. If water vapor in the air condenses when the carburetor temperature is at or below freezing, ice may form on the internal surfaces of the carburetor, including the throttle valve. This then restricts the flow of the fuel/air mixture and reduces engine power. Generally, the first indication of carburetor icing in an airplane with a fixed-pitch propeller is a decrease in engine rpm, which may be followed by engine roughness. Under certain conditions, carburetor ice can build unnoticed until power is added.

The handbook further described that carburetor heat is an anti-icing system that preheats the air before it reaches the carburetor, and is intended to keep the fuel/air mixture above the freezing temperature to prevent the formation of carburetor ice. Carburetor heat can be used to melt ice that has already formed in the carburetor if the accumulation is not too great, but using carburetor heat as a preventative measure is the better option.

Pilot Information

Certificate:	Commercial	**Age:**	54,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	April 18, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	April 15, 2013
Flight Time:	1033 hours (Total, all aircraft), 3 hours (Total, this make and model), 1013 hours (Pilot In Command, all aircraft), 5 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Stinson	**Registration:**	N97592
Model/Series:	108	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	108-592
Landing Gear Type:	Tailwheel	**Seats:**	4
Date/Type of Last Inspection:	June 19, 2012 Annual	**Certified Max Gross Wt.:**	2150 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2723 Hrs at time of accident	**Engine Manufacturer:**	FRANKLIN
ELT:	Installed	**Engine Model/Series:**	6A4-150-B3
Registered Owner:	Club Voyager LLC	**Rated Power:**	150 Horsepower
Operator:	Club Voyager LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	CKV,550 ft msl	**Distance from Accident Site:**	16 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	240°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.98 inches Hg	**Temperature/Dew Point:**	27°C / 13°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Elkton, KY (5KY4)	**Type of Flight Plan Filed:**	None
Destination:	Russellville, KY (4M7)	**Type of Clearance:**	None
Departure Time:	17:00 Local	**Type of Airspace:**	

Airport Information

Airport:	Standard Field 5KY4	**Runway Surface Type:**	Grass/turf
Airport Elevation:	665 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	31	**IFR Approach:**	None
Runway Length/Width:	2930 ft / 75 ft	**VFR Approach/Landing:**	Touch and go;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Minor	**Latitude, Longitude:**	36.802776,-87.176391(est)

Administrative Information

Investigator In Charge (IIC):	Diaz, Dennis
Additional Participating Persons:	Porter Mayberry; FAA/FSDO; Louisville, KY
Original Publish Date:	December 11, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=87095