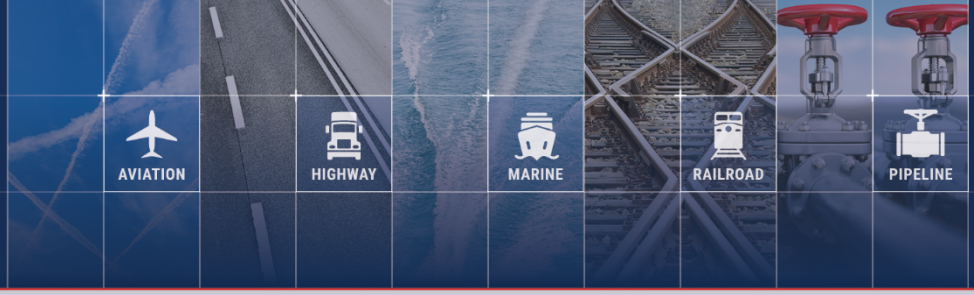

Aviation Investigation Final Report

Location:	Sevierville, Tennessee	**Accident Number:**	ERA19LA139
Date & Time:	March 27, 2019, 16:30 Local	**Registration:**	N22GM
Aircraft:	MARLOW Bearhawk	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that the experimental, amateur-built airplane experienced a total loss of engine power while maneuvering at an altitude of 2,500 ft mean sea level. He activated the electronic fuel injection/ignition system emergency power switch and attempted to restart the engine, but was unsuccessful. He performed a forced landing to a field, during which the airplane sustained substantial damage to the left wing and fuselage. A review of engine and flight data recorded by the electronic flight information system revealed a sudden increase (about 240°F over 1 second) in exhaust gas temperature (EGT) in the No. 1 cylinder, consistent with abnormal combustion immediately preceded the loss of engine power. Shortly thereafter, the engine rpm began to decrease, and the electrical system load increased by about 8 amps, then decreased by about 17 amps. The engine rpm continued to decrease for the next 2.5 minutes, consistent with a windmilling propeller, before it reached 900 rpm and then decreased to 0 rpm just prior to the landing. The electronic ignition circuit breaker was found activated. The reason for the abnormal combustion and the activation of the electronic ignition circuit breaker which resulted in a total loss of engine power could not be determined based on the available information.

Probable Cause and Findings

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

Abnormal combustion in the No. 1 cylinder for reasons that could not be determined based on the available evidence, followed by the activation of the ignition system circuit breaker, which resulted in a total loss of engine power.

Findings

Aircraft	(general) - Unknown/Not determined

Factual Information

History of Flight

Maneuvering	Loss of engine power (total) (Defining event)
Maneuvering	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

On March 27, 2019, about 1630 eastern daylight time, an experimental, amateur-built Bearhawk airplane, N22GM, was substantially damaged when it was involved in an accident in Sevierville, Tennessee. The airline transport pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, about 45 minutes after takeoff, while in a left turn at an altitude of about 2,000 ft mean sea level (msl), the engine lost all power. He attempted to restart the engine but was unsuccessful. During the attempt, he noticed that the fuel pressure was about 25 to 30 psi, which was 5-10 psi lower than normal. He activated the electronically-controlled fuel injection/ignition system "emergency power" switch (which provides a predetermined amount of fuel to the engine to allow it to "limp home"), but power was not restored. The propeller continued to windmill as the pilot prepared the airplane for a forced landing. The pilot landed in a nearby field, but was unable to stop the airplane before a steep downslope, and the airplane came to rest upright in a creek at the edge of the field.

The pilot reported that he departed with about 40 gallons of fuel. He estimated at the time the engine lost power, the airplane had about 20 gallons in the left tank and 10 gallons in the right tank. He said that both of the wing fuel shutoff valves (one for each wing tank) were in the "open" position when the engine lost power. The pilot further reported that the wing fuel tanks fed a header tank in the fuselage, which fed fuel to the engine.

The engine was a Superior/Barrows model IO-360-B1XC2 equipped with computer-controlled electronic fuel injection and electronic ignition systems.

Examination of the wreckage by a Federal Aviation Administration inspector revealed that the left wing was crushed aft outboard of the wing strut, and fuselage frame tubes were damaged in several locations. First responders observed fuel leaking from the left wing upon their arrival.

The airplane was equipped with two Dynon model SV-HDX800 electronic flight instrument displays, which recorded engine and flight data parameters. A review of the recorded data revealed that, as the airplane was at a pressure altitude of 2,885 ft (about 2,500 ft msl) and an airspeed of 92 knots, a sudden rise in exhaust gas temperature in the No. 1 cylinder occurred. The rise was from 760° to 892°C (1,400° to 1,638°F, respectively) within about 1 second. About 3 seconds later, the fuel flow, fuel pressure, and manifold pressure all began to rise, the engine speed decreased from 2,054 to 1,525 rpm, and the electrical system amperage rose from 23 to 31 amps. Shortly thereafter, the engine power briefly

increased to 1,821 rpm, and then began to decrease. At that time, the electrical system amperage decreased to about 14 amps, about 9 amps below what it was prior to the "spike" upward to 31 amps. The engine rpm continued to decrease for the next 2.5 minutes, before it reached 900 rpm, then decreased to 0 rpm just prior to the landing.

A photograph of the instrument panel taken by the salvager showed a circuit breaker labeled "IGN" (10 amps) was in the "out" or activated position.

Pilot Information

Certificate:	Airline transport; Flight instructor	**Age:**	52,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	BasicMed Without waivers/limitations	**Last FAA Medical Exam:**	August 23, 2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	June 11, 2018
Flight Time:	15000 hours (Total, all aircraft), 43 hours (Total, this make and model), 1500 hours (Pilot In Command, all aircraft), 28 hours (Last 90 days, all aircraft), 2 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	MARLOW	**Registration:**	N22GM
Model/Series:	Bearhawk	**Aircraft Category:**	Airplane
Year of Manufacture:	2018	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	59-187/188-829
Landing Gear Type:	Tailwheel	**Seats:**	4
Date/Type of Last Inspection:	January 23, 2019 Condition	**Certified Max Gross Wt.:**	2500 lbs
Time Since Last Inspection:	4 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	44 Hrs at time of accident	**Engine Manufacturer:**	Superior/Barrows
ELT:	C126 installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-360-B1XC2
Registered Owner:	On file	**Rated Power:**	200 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:	DKX,833 ft msl	**Distance from Accident Site:**	20 Nautical Miles
Observation Time:	16:35 Local	**Direction from Accident Site:**	293°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	18°C / 2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Jonesborough, TN (97TN)	**Type of Flight Plan Filed:**	None
Destination:	Jonesborough, TN (97TN)	**Type of Clearance:**	None
Departure Time:	15:45 Local	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	35.83361,-83.494445(est)

Administrative Information

Investigator In Charge (IIC):	Brazy, Douglass
Additional Participating Persons:	Paul Jones; FAA/FSDO ; Nashville , TN
Original Publish Date:	April 6, 2022
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=99188