Aviation Investigation Final Report

Location:	Manhattan, Montana	**Accident Number:**	WPR24LA271
Date & Time:	August 11, 2024, 10:34 Local	**Registration:**	N8576Y
Aircraft:	Piper PA-18-150	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The instructor pilot was giving dual instruction to a pilot-rated student. He reported that soon after departure, the airplane engine RPM reduced to idle. The pilot verified the throttle was at full power, adequate fuel was in both tanks and subsequently applied carburetor heat, which restored the engine to full power. After 10 seconds the RPM began surging and the pilot then turned the carburetor heat off. He turned the carburetor heat on again and pumped the throttle repeatedly while the power continued to surge until the engine quit and he lost all power. They were unable to restart the engine and landed the airplane in a nearby agricultural field. The airplane came to rest inverted, which resulted in substantial damage to the vertical stabilizer.

The engine ran normally on the ground after the airplane was returned to its upright position following the accident. When the temperature and the dewpoint near the time of the accident were plotted on a carburetor icing probability graph, it was revealed that the airplane was likely operating in meteorological conditions conducive to the formation of carburetor icing (for glide power settings). The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

Probable Cause and Findings

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

A total loss of engine power due to carburetor icing.

Findings

Environmental issues	Conducive to carburetor icing - Effect on operation

Factual Information

History of Flight

Enroute	Loss of engine power (total) (Defining event)
Enroute	Attempted remediation/recovery
Landing	Off-field or emergency landing
Landing	Nose over/nose down
Post-impact	Evacuation

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	29,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	June 19, 2023
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	July 1, 2024
Flight Time:	544 hours (Total, all aircraft), 293 hours (Total, this make and model), 443 hours (Pilot In Command, all aircraft), 80 hours (Last 90 days, all aircraft), 36 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Private	**Age:**	21,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	March 5, 2021
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	May 3, 2024
Flight Time:	220 hours (Total, all aircraft), 5 hours (Total, this make and model), 154 hours (Pilot In Command, all aircraft), 7 hours (Last 90 days, all aircraft), 4 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N8576Y
Model/Series:	PA-18-150	**Aircraft Category:**	Airplane
Year of Manufacture:	1976	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18-8889
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	April 5, 2024 Annual	**Certified Max Gross Wt.:**	2000 lbs
Time Since Last Inspection:	28.8 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4477.7 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, activated, aided in locating accident	**Engine Model/Series:**	O-320 SERIES
Registered Owner:	RIDGELINE AVIATION INC	**Rated Power:**	180 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:	KBZN,4431 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	10:56 Local	**Direction from Accident Site:**	105°
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:	30.17 inches Hg	**Temperature/Dew Point:**	18°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Manhattan, MT	**Type of Flight Plan Filed:**	None
Destination:	Manhattan, MT	**Type of Clearance:**	VFR
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	BOZEMAN YELLOWSTONE INTL BZN	**Runway Surface Type:**	
Airport Elevation:	4473 ft msl	**Runway Surface Condition:**	Vegetation
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	45.823782,-111.34711(est)

Preventing Similar Accidents

Preventing Carburetor Icing (SA-029)

The Problem

According to NTSB aircraft accident data, from 2000 to 2011, carburetor icing was a cause or factor in about 250 accidents. On average, carburetor icing causes or contributes to two fatal accidents per year. Accident evidence shows that some pilots do not recognize weather conditions favorable to carburetor icing and inaccurately believe that carburetor icing is only a cold- or wet-weather problem. Pilots may also have not used the carburetor heat according to the aircraft's approved procedures to prevent carburetor ice formation. In addition, some pilots may not recognize and promptly act upon the signs of carburetor icing.

What can you do?

- Check the temperature and dew point for your flight to determine whether the conditions are favorable for carburetor icing. Remember, serious carburetor icing can occur in ambient temperatures as high as 90° F or in relative humidity conditions as low as 35 percent at glide power.
- Refer to your approved aircraft flight manual or operating handbook to ensure that you are using carburetor heat according to the approved procedures and properly perform the following actions:
    - Check the functionality of the carburetor heat before your flight.
    - Use carburetor heat to prevent the formation of carburetor ice when operating in conditions and at power settings in which carburetor icing is probable. Remember, ground idling or taxiing time can allow carburetor ice to accumulate before takeoff.
    - Immediately apply carburetor heat at the first sign of carburetor icing, which typically includes a drop in rpm or manifold pressure (depending upon how your airplane is equipped). Engine roughness may follow.
- Consider installing a carburetor temperature gauge, if available.
- Remember that aircraft engines that run on automotive gas may be more susceptible to carburetor icing than engines that run on Avgas.

See https://www.ntsb.gov/Advocacy/safety-alerts/Documents/SA-029.pdf for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Johnson, Scott
Additional Participating Persons:	Steve Mahoney ; Federal Aviation Adminstration; Helena, MT
Original Publish Date:	February 27, 2025
Last Revision Date:	
Investigation Class:	Class 4
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=194908