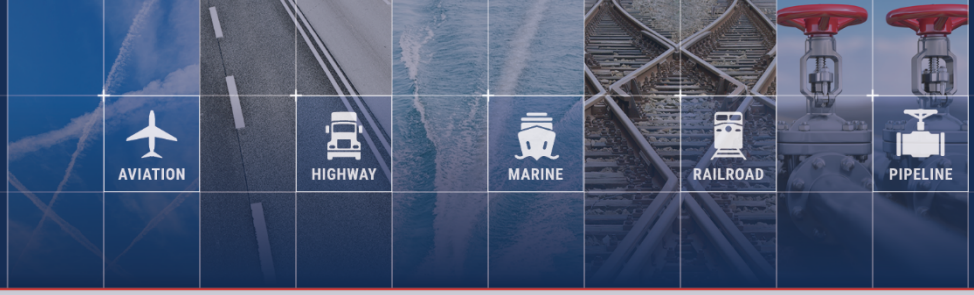

Aviation Investigation Final Report

Location:	Howell, Michigan	**Accident Number:**	CEN23LA266
Date & Time:	June 24, 2023, 10:30 Local	**Registration:**	N4008Q
Aircraft:	Piper PA-28-181	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot reported that during a local flight, while in the traffic pattern, the airplane's engine power decreased to 900 rpm. He attempted to restore engine power but was unsuccessful and attempted to make a forced landing to the runway. He landed on the grass about 1,000 ft short of the runway surface, bounced, and impacted the localizer antenna. The airplane sustained substantial damage to the fuselage and both wings.

Postaccident examination of the engine and fuel systems revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. The weather conditions at the time of the accident were conducive to a serious accumulation of carburetor ice at glide power. The pilot reported that he used carburetor heat while attempting to restore engine power, but not before he made his descent in the traffic pattern and the loss of engine power.

Based on the available information, the loss of engine power was likely due to carburetor ice accumulation. Additionally, the low altitude at which the loss of engine power occurred significantly reduced the amount of time available to the pilot to troubleshoot and restore engine power before the forced landing.

Probable Cause and Findings

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

A loss of engine power due to the formation of carburetor ice that resulted from the pilot's delayed use of carburetor heat during the landing approach.

Findings

Environmental issues	Conducive to carburetor icing - Effect on equipment
Environmental issues	Airport structure - Contributed to outcome
Personnel issues	Delayed action - Pilot

Factual Information

History of Flight

Approach-VFR pattern downwind	Fuel related (Defining event)
Emergency descent	Landing area undershoot
Emergency descent	Collision with terr/obj (non-CFIT)

On June 24, 2023, about 1030 eastern daylight time, a Piper PA-28-181, N4008Q, was substantially damaged when it was involved in an accident near Livingston County Spencer J Hardy Airport (OZW), Howell, Michigan. The pilot and passenger were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, a 100-hour inspection had just been completed. The pilot reported that the engine run-up was completed with no anomalies noted. After liftoff, the pilot remained in the traffic pattern for runway 31 at OZW. The first traffic pattern and touch-and-go landing was uneventful. On the second traffic pattern, the pilot extended his downwind leg by five seconds for spacing from another airplane in the traffic pattern. When the pilot reduced power and added 10° of flaps for the descent, he noticed that engine rpms had decreased to 900.The pilot attempted to restore engine power by turning on carburetor heat and verifying the electric fuel pump was on. The pilot was unable to restore engine power and transitioned to attempt a forced landing to runway 31. During the forced landing attempt, the pilot glided underneath powerlines and over the airport perimeter fence. The airplane touched down in the grass short of runway 31. The airplane bounced on an embankment, impacted the localizer antenna, and came to rest upright.

The airplane came to rest 1,000 ft before the arrival end of runway 31. The right wing separated at the wing root. The left wing was damaged and leaked fuel.A postaccident examination did not reveal any preimpact mechanical malfunctions or failures that would have precluded normal operation.

The carburetor linkage was connected and moved freely. The carburetor heat valve moved freely from open to closed. The electric fuel pump was tested and fuel flow was noted from the output line. Fuel was present throughout the fuel system, carburetor, and fuel filters, and no water or debris was detected in the fuel. The engine-driven fuel pump was observed to pump fuel during engine rotation. The carburetor accelerator pump had positive pressure during manual actuation.

The fuel selector moved freely to all positions. The oil filter was new and appeared to be installed properly. An oil sample was obtained and no contaminants or metal were noted. The

engine’s crankshaft was rotated by hand and internal and valvetrain continuity was established. The top spark plugs were removed from the cylinders and remained attached to the magneto leads. The spark plugs produced spark when the engine was rotated.

At 1035, the weather reported at OZW included a temperature of 22°C and a dew point of 20°C. The calculated relative humidity at that temperature and dewpoint was 88%. Review of the icing probability chart contained in Federal Aviation Administration (FAA) Special Airworthiness Information Bulletin CE-09-35 revealed that the weather conditions at the time of the accident were "conducive to serious icing at glide [idle] power."

According to FAA Advisory Circular 20-113, "To prevent accidents due to induction system icing, the pilot should regularly use [carburetor] heat under conditions known to be conducive to atmospheric icing and be alert at all times for indications of icing in the fuel system." The circular recommended that when operating in conditions where the relative humidity is greater than 50%, "…apply carburetor heat briefly immediately before takeoff, particularly with float type carburetors, to remove any ice which may have been accumulated during taxi and runup." It also stated, "Remain alert for indications of induction system icing during takeoff and climb-out, especially when the relative humidity is above 50 percent, or when visible moisture is present in the atmosphere."

Pilot Information

Certificate:	Private	**Age:**	39,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	January 8, 2023
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 1, 2021
Flight Time:	328 hours (Total, all aircraft), 109 hours (Total, this make and model), 241 hours (Pilot In Command, all aircraft), 10.2 hours (Last 90 days, all aircraft), 1.7 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:	**Age:**	Female
Airplane Rating(s):	**Seat Occupied:**	Right
Other Aircraft Rating(s):	**Restraint Used:**	Lap only
Instrument Rating(s):	**Second Pilot Present:**	
Instructor Rating(s):	**Toxicology Performed:**	
Medical Certification:	**Last FAA Medical Exam:**	
Occupational Pilot:	**Last Flight Review or Equivalent:**	
Flight Time:		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N4008Q
Model/Series:	PA-28-181	**Aircraft Category:**	Airplane
Year of Manufacture:	1977	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	28-7790468
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 24, 2023 100 hour	**Certified Max Gross Wt.:**	2550 lbs
Time Since Last Inspection:	0.2 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5335.68 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	C91 installed, not activated	**Engine Model/Series:**	O-360A4M
Registered Owner:	DIPPOLD LOIS MARIE	**Rated Power:**	180
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:	KOZW,944 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	10:35 Local	**Direction from Accident Site:**	301°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 1300 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.96 inches Hg	**Temperature/Dew Point:**	22°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Howell, MI	**Type of Flight Plan Filed:**	VFR
Destination:	Howell, MI	**Type of Clearance:**	VFR
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	LIVINGSTON COUNTY SPENCER J HARDY OZW	**Runway Surface Type:**	Concrete
Airport Elevation:	962 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	31	**IFR Approach:**	None
Runway Length/Width:	5000 ft / 100 ft	**VFR Approach/Landing:**	Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	42.623547,-83.971755

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):	Rutt, Brian
Additional Participating Persons:	Steve Janos; FAA East Michigan FSDO
Original Publish Date:	May 14, 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=192460