



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Carrington, North Dakota	Accident Number:	CEN23LA233
Date & Time:	June 3, 2023, 09:00 Local	Registration:	N8843L
Aircraft:	Piper PA-25-235	Aircraft Damage:	Substantial
Defining Event:	Fuel related	Injuries:	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The pilot reported that after engine start, taxi, and run-up, he remained on the ground about 10 minutes at idle power waiting for a rise in oil temperature and reduction in oil pressure since it was the first flight of the day, and the engine was cold. Shortly after departure while turning onto the crosswind leg of the traffic pattern, the engine lost power and the pilot executed a forced landing to a gravel road. During landing, the airplane impacted a drainage ditch, which resulted in substantial damage to both wings.

A review of meteorological information revealed that the airplane was operating in an environment conducive to serious carburetor icing at a glide power setting.

During a postaccident examination, no preimpact mechanical malfunctions or failures were discovered that would have precluded normal operation.

With no anomalies noted from the postaccident examination and the weather conditions present at the time of the accident, it is likely that carburetor ice formed during the extended ground run at idle power while the pilot waited for the oil temperature to rise.

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 as a result of carburetor ice that formed while the engine was operating at a low power setting for an extended period of time before departure.

Findings

Aircraft	Intake anti-ice, deice - Capability exceeded
Environmental issues	Conducive to carburetor icing - Effect on equipment

Factual Information

History of Flight

Maneuvering-low-alt flying	Fuel related (Defining event)
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On June 3, 2023, about 0900 central daylight time, a Piper PA-25-235 airplane, N8843L, was substantially damaged when it was involved in an accident near Carrington, North Dakota. The pilot was uninjured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 137 aerial application flight.

According to the pilot, after engine start, he taxied to the end of the runway to perform an engine run-up and allow the oil temperature to rise. During the run-up, the pilot checked the magnetos and turned on the carburetor heat. During the carburetor heat check, he noted an expected drop in rpm and then turned off the carburetor heat. He stated that he remained on the ground about 10 minutes at idle power waiting for a rise in oil temperature and reduction in oil pressure since it was the first flight of the day and the engine was cold.

The pilot stated that shortly after departure while turning onto the crosswind leg of the traffic pattern, the engine lost power, and he executed a forced landing to a gravel road. During landing, the airplane impacted a drainage ditch, which resulted in substantial damage to both wings.

During a postaccident examination, no preimpact mechanical malfunctions or failures were discovered that would have precluded normal operation.

The temperature (75°F) and dewpoint (62°F) about the time of the accident were plotted on a carburetor icing probability chart, which showed that the airplane was operating in an environment conducive for serious carburetor icing at a glide power setting. (See figure.)

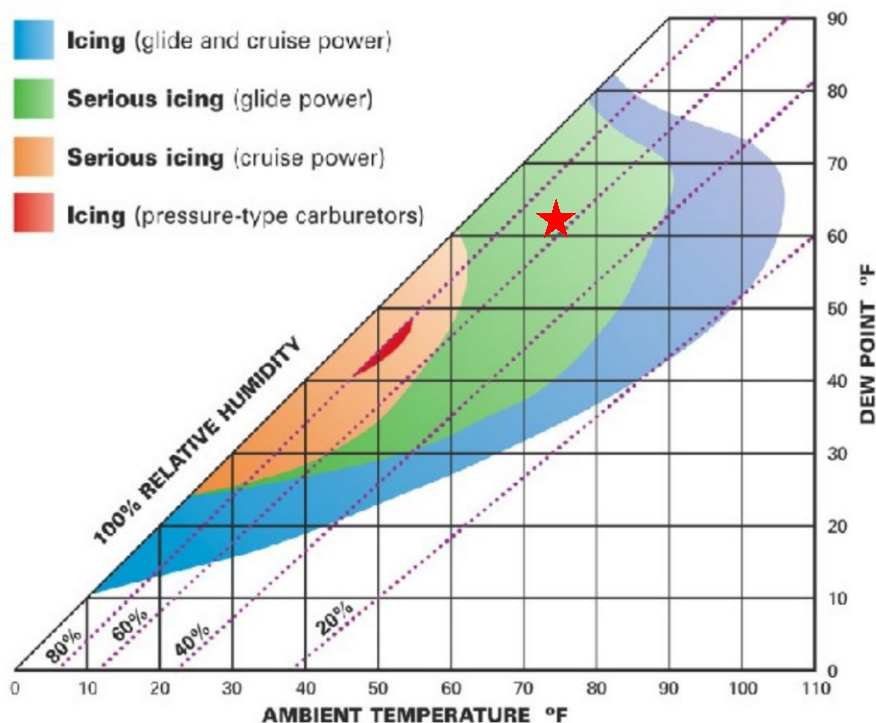


Figure. Carburetor Icing Probability Chart. Reference: FAA Special Airworthiness Information Bulletin CE-09-35

Pilot Information

Certificate:	Commercial	Age:	23
Airplane Rating(s):	Single-engine land; Single-engine sea	Seat Occupied:	Single
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane single-engine; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	May 12, 2023
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	April 19, 2023
Flight Time:	448 hours (Total, all aircraft), 76 hours (Total, this make and model), 240 hours (Pilot In Command, all aircraft), 4 hours (Last 90 days, all aircraft), 3 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N8843L
Model/Series:	PA-25-235	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Restricted (Special)	Serial Number:	25-5354
Landing Gear Type:	Tailwheel	Seats:	1
Date/Type of Last Inspection:	Unknown	Certified Max Gross Wt.:	
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:		Engine Manufacturer:	Lycoming
ELT:		Engine Model/Series:	O-540-B2C5
Registered Owner:	POLRIES LARRY J	Rated Power:	235 Horsepower
Operator:	POLRIES LARRY J	Operating Certificate(s) Held:	Agricultural aircraft (137)
Operator Does Business As:	Larry's Aerial	Operator Designator Code:	L2YG

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KJMS,1494 ft msl	Distance from Accident Site:	37 Nautical Miles
Observation Time:	08:56 Local	Direction from Accident Site:	148°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	140°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.06 inches Hg	Temperature/Dew Point:	24°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Carrington, ND (46D)	Type of Flight Plan Filed:	None
Destination:	Carrington, ND (46D)	Type of Clearance:	None
Departure Time:	08:59 Local	Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	47.442983,-99.142824(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.nts.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):	Williams, David
Additional Participating Persons:	Gary Kwasniewski; FAA; Fargo, ND
Original Publish Date:	November 15, 2023
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=192334

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).