



# Aviation Investigation Final Report

<b>Location:</b>	Shreveport, Louisiana	<b>Accident Number:</b>	CEN23LA087
<b>Date &amp; Time:</b>	January 20, 2023, 16:34 Local	<b>Registration:</b>	N71SN
<b>Aircraft:</b>	WORLD AIRCRAFT CO WA-3	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Fuel related	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

When the experimental airplane was on the downwind leg of the traffic pattern, abeam the numbers, the engine started to run rough and vibrate. The pilot added power and the engine smoothed out. The pilot ensured the backup electric fuel pump was in the “on” position and turned the airplane to land on the runway. While on short final, the pilot reduced power and received a low rpm warning from his avionics. When he increased the throttle, the engine stopped producing power. A high sink rate developed, and the airplane landed hard on the runway, which resulted in substantial damage to the empennage.

Postaccident examination of the airplane and engine did not reveal any anomalies that would have precluded normal operation.

The airplane was operating in an area conducive to the formation of serious carburetor icing at glide power settings. The airplane was fueled with 93-octane automotive fuel which could make carburetor icing more likely. The airplane was not equipped with a carburetor temperature gauge or a carburetor heat control, nor were they required.

## Probable Cause and Findings

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

The loss of engine power due to carburetor icing.

## Findings

<b>Aircraft</b>	Descent/approach/glide path - Not attained/maintained
<b>Environmental issues</b>	Conducive to carburetor icing - Effect on equipment

# Factual Information

## History of Flight

Approach-VFR pattern downwind	Fuel related (Defining event)
Landing-flare/touchdown	Hard landing

On January 20, 2023, about 1634 central standard time, an experimental World Aircraft Company WA-3 light sport airplane, N71SN, was substantially damaged when it was involved in an accident near Shreveport, Louisiana. The pilot was not injured. The flight operated under the provisions of the Title 14 *Code of Federal Regulations* Part 91 as a personal flight.

The pilot reported that he departed for takeoff on runway 14 following a normal engine runup. He remained in the traffic pattern and when the airplane was on the downwind leg of the traffic pattern, abeam the numbers, the engine started to run rough and vibrate. The pilot added power and the engine smoothed out. The pilot ensured the backup electric fuel pump was in the on position and he turned the airplane to land on runway 14. While on short final, the pilot reduced power and received a low rpm warning from his avionics. When he increased the throttle, the engine stopped producing power. A high sink rate developed, and the airplane landed hard on the runway, which resulted in substantial damage to the empennage.

Postaccident examination of the airplane revealed no anomalies with the airframe or engine that would have precluded normal operation.

A review of the Carburetor Icing Probability Chart located in the FAA’s Special Airworthiness Information Bulletin CE-09-35, *Carburetor Icing Prevention*, dated June 30, 2009, found that the airplane was operating in an area conducive to the formation of serious icing at glide power settings and close to the area of serious icing at cruise power. The airplane was fueled with 93-octane automotive fuel which, as noted below, could make carburetor icing more likely. Additionally, the airplane was not equipped with a carburetor temperature gauge or a carburetor heat control, nor was it required to be by the FAA.

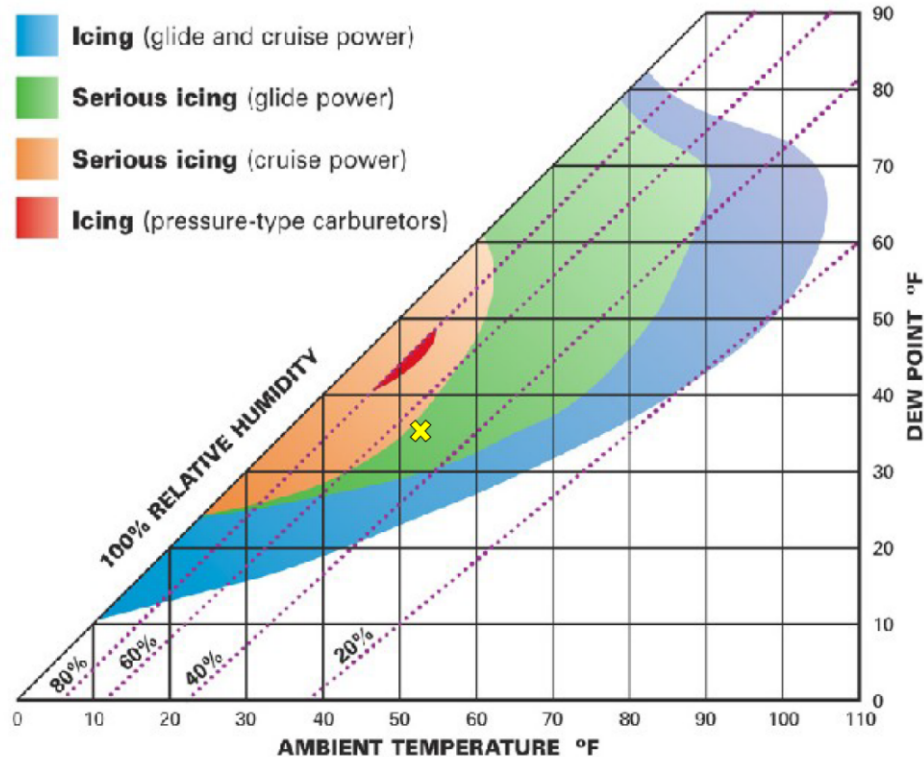


Figure 1. Carburetor Icing Probability Chart

According to Transport Canada TP 10737 (Use of Automotive Gasoline [Mogas] in Aviation), Mogas is generally higher in volatility than Avgas and will thus absorb more heat from the mixing air when vaporizing, resulting in ice accumulation at higher ambient temperatures. It goes on to say that “the likelihood of carb icing while flying on Mogas is higher,” and advises that, “[a]lthough the severity of the carb icing and the methods to deal with it are similar for both Avgas and Mogas, its ONSET is likely to occur at HIGHER AMBIENT TEMPERATURES and at LOWER HUMIDITY with Mogas. In other words, conditions under which a pilot may feel there is only a slight risk for carb icing on Avgas may in fact be ideal for the formation of ice while using more volatile Mogas. This will result in the need to select ‘carb heat on’ in less severe icing conditions and for a longer duration while using Mogas.”

## Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	60, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Center
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 3 With waivers/limitations	<b>Last FAA Medical Exam:</b>	May 20, 2022
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	(Estimated) 365 hours (Total, all aircraft), 0 hours (Total, this make and model), 1 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	WORLD AIRCRAFT CO	<b>Registration:</b>	N71SN
<b>Model/Series:</b>	WA-3	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	2014	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Experimental light sport (Special)	<b>Serial Number:</b>	3061421101
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	June 22, 2022 Condition	<b>Certified Max Gross Wt.:</b>	1320 lbs
<b>Time Since Last Inspection:</b>	1 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	4 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Rotax
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	912ULS
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	100 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Dusk
<b>Observation Facility, Elevation:</b>	KDTN, 172 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	16:36 Local	<b>Direction from Accident Site:</b>	148°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Overcast / 9000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	4 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	130°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.23 inches Hg	<b>Temperature/Dew Point:</b>	12°C / 2°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Shreveport, LA	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Shreveport, LA	<b>Type of Clearance:</b>	VFR
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Class D

## Airport Information

<b>Airport:</b>	SHREVEPORT DOWNTOWN DTN	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	179 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	14	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	5016 ft / 150 ft	<b>VFR Approach/Landing:</b>	Touch and go

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 None	<b>Latitude, Longitude:</b>	32.545827, -93.75031 (est)

## Preventing Similar Accidents

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### 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

<b>Investigator In Charge (IIC):</b>	Aguilera, Jason
<b>Additional Participating Persons:</b>	William Hardy; FAA FSDO; Baton Rouge, LA
<b>Original Publish Date:</b>	March 28, 2024
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=106619">https://data.ntsb.gov/Docket?ProjectID=106619</a>

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](#).