Aviation Investigation Final Report

Location:	Shreveport, Louisiana	**Accident Number:**	CEN23LA087
Date & Time:	January 20, 2023, 16:34 Local	**Registration:**	N71SN
Aircraft:	WORLD AIRCRAFT CO WA-3	**Aircraft Damage:**	Substantial
Defining Event:	Fuel related	**Injuries:**	1 None
Flight Conducted Under:	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

Aircraft	Descent/approach/glide path - Not attained/maintained
Environmental issues	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.

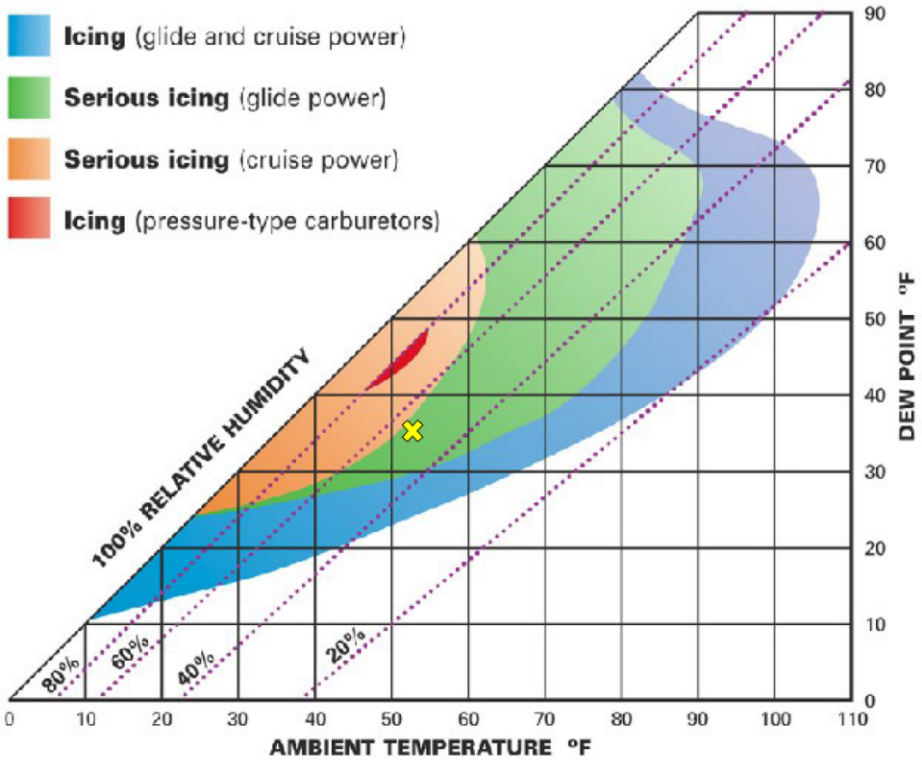

Figure 1. Carburetor Icing Probability Chart

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

Certificate:	Private	**Age:**	60,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Center
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 20, 2022
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(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

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

Meteorological Information and Flight Plan

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

Airport Information

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

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	32.545827,-93.75031(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):	Aguilera, Jason
Additional Participating Persons:	William Hardy; FAA FSDO; Baton Rouge, LA
Original Publish Date:	March 28, 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=106619