



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

March 26, 2019

Specialist's Report

METEOROLOGY

ERA19LA097

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A. ACCIDENT

Location: Vero Beach, Florida
Date: February 8, 2019
Time: 1706 eastern standard time
2206 Universal Coordinated Time (UTC)
Airplane: Piper PA-28; Registration: N9219J

B. METEOROLOGIST

Don Eick
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C. SUMMARY

On February 8, 2019, at 1706 eastern standard time, a Piper PA-28-161, N9219J, was substantially damaged when it impacted a utility pole and trees during a forced landing near Vero Beach, Florida. The private pilot was uninjured. The airplane was registered to FlightSafety International and operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan was filed for local flight that originated from the Vero Beach Regional Airport (VRB), Vero Beach, Florida.

D. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's Senior Meteorologist was not on scene for this investigation and conducted the meteorology phase of the investigation from the Washington D.C. office, collecting data from official National Weather Service (NWS) sources including the Weather Prediction Center (WPC) and the National Center for Environmental Information (NCEI). All times are eastern standard time (EST) based upon the 24-hour clock, local time is -5 hours from UTC, and UTC=Z. NWS airport and station identifiers use the standard International Civil Aviation Organization 4-letter station identifiers versus the International Air Transport Association 3-letter identifiers, which deletes the initial country code designator "K" for U.S. airports. Directions are referenced to true north and distances in nautical miles. Heights are in feet (ft) above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles.

The accident site was estimated at latitude 27.664167° N and longitude 80.424722° W.

E. WEATHER INFORMATION

1.0 Synoptic Conditions

The NWS southeast Surface Analysis Chart for 1600 EST on February 8, 2019 is included as figure 1 with the approximate accident site noted by a red star. The chart depicted a low-pressure center of 1017-hectopascals (hPa)¹ over North Carolina (just off the chart) with an associated cold front extending southwestward through South Carolina, into southeastern Georgia, and into northern Florida. Ahead of the cold front was a trough of low-pressure that extended from near Jacksonville southwestward to the Tampa area. A ridge of high pressure extended over central and southern Florida, with a weak pressure gradient over the region. The accident site was located ahead of the cold front and the trough on the warm air side of the front and in a region of a weak pressure gradient.

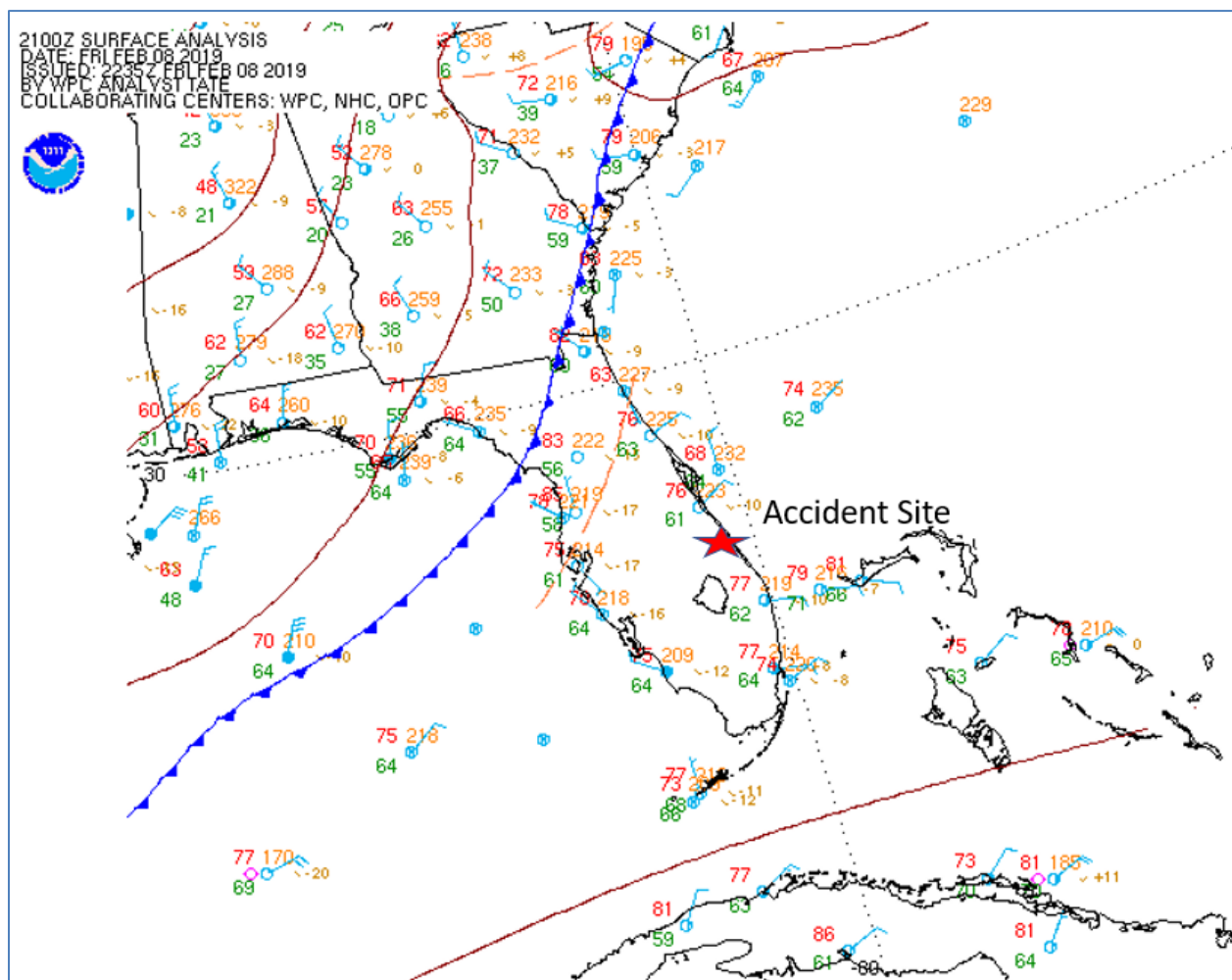


Figure 1 - NWS southeast Surface Analysis Chart for 1600 EST

¹ Hectopascals (hPa) is the NWS new standard unit for reporting sea-level pressure and is interchangeable with the term millibar (mb) with the same units. Standard sea-level pressure is 1013.25-hPa.

The station models in the vicinity of the accident site indicated light easterly winds at approximately 10 knots, with scattered to broken cloud cover, and temperatures in the upper 70's degrees Fahrenheit (°F), with dew point in the low 60's °F. No significant weather was reported phenomena were reported in the vicinity of the accident site.

2.0 Weather Observations

The accident occurred in the traffic patter for Vero Beach Regional Airport (KVRB), Vero Beach, Florida. The airport had an Automated Surface Observation System (ASOS) and was augmented by air traffic control personnel through a limited aviation weather reporting system (LAWRS) program. The airport lists an elevation of 24 ft and had a magnetic variation of 7° West. The following conditions were reported at the approximate time of the accident:

KVRB weather observation at 1653 EST, wind from 050° at 9 knots, visibility 10 statute miles or more, ceiling overcast clouds at 5,500 ft agl, temperature of 23° Celsius (C), dew point temperature of 17° C, and an altimeter setting of 30.20 inches of mercury (Hg). Remarks: automated observation system with a precipitation discriminator, sea-level pressure 1022.5-hPa, temperature 22.8° C, dew point 17.2° C.

The calculated relative humidity at this temperature and dewpoint was 71%, and the density altitude was 877 ft. The raw observations in standard METAR format issued from approximately 1500 through 1900 EST surrounding the period were as follows, the time of the accident is included in bold italic print for reference:

METAR KVRB 081953Z 03009KT 10SM OVC060 24/17 A3020 RMK AO2 SLP225 T02390167

METAR KVRB 082053Z 05009KT 10SM OVC055 23/17 A3020 RMK AO2 SLP225 T02280167 55010

METAR KVRB 082053Z COR 05009KT 10SM BKN055 23/17 A3020 RMK AO2 SLP225 T02280167

METAR KVRB 082153Z 05009KT 10SM OVC055 23/17 A3020 RMK AO2 SLP225 T02280172

Accident 2206Z

METAR KVRB 082253Z 05010KT 10SM OVC047 21/18 A3021 RMK AO2 SLP229 T02110178

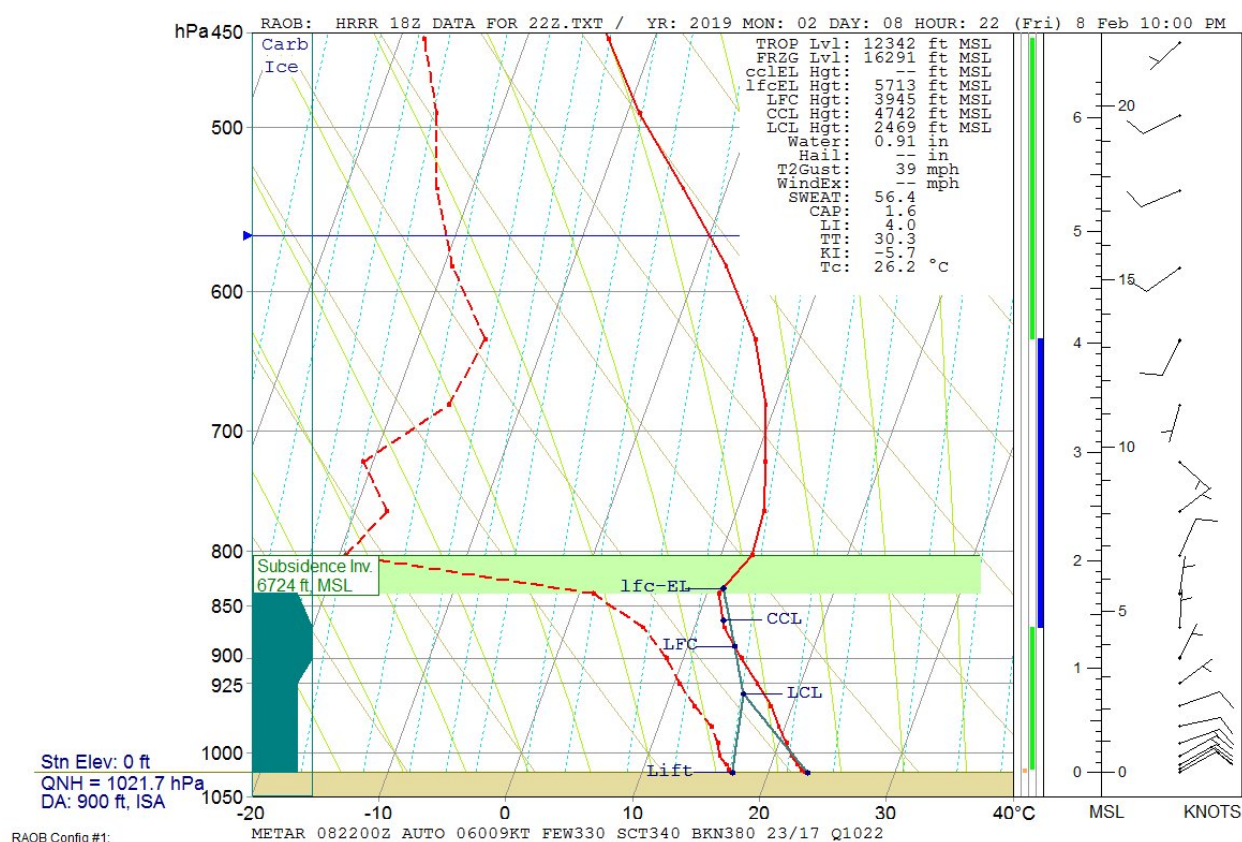
*METAR KVRB 082353Z 04006KT 10SM FEW045 BKN055 21/17 A3022 RMK AO2 SLP232 T02110172 10261
20211 53006*

3.0 Sounding

A High Resolution Rapid Refresh (HRRR)² numerical model for 1700 EST was obtained from archive data at the NOAA Air Resource Laboratory and was plotted on a standard Skew T log

² The HRRR is a National Oceanic and Atmospheric Administration (NOAA) real-time three-kilometer resolution, hourly-updated, cloud-resolving, convection-allowing atmospheric model, initialized by three-kilometer grids with three-kilometer radar assimilation. Radar data is assimilated in the HRRR every 15 minutes over a one-hour period.

diagram³ using the complete Rawinsonde Observation RAOB program software⁴. Figure 2 is the HRRR sounding plot from the surface through 450-hPa or approximately 21,000 ft over the accident site coordinates.



The initial model run for the HRRR was based on 1500 EST data and run for 1700 EST. The model sounding expected a surface temperature of 23° C (73° F), a dew point temperature of 17° C (63° F), with a relative humidity of approximately 70%, and a density altitude of approximately 900 ft, which was consistent with the METAR observation. The HRRR sounding depicted a temperature inversion due to subsidence was noted at 6,724 ft with drying conditions immediately above the inversion. The RAOB algorithm indicated a high probability of carburetor icing from the surface to the inversion or through 5,000 ft and is indicated by the dark green bar on the left side of the diagram.

³ Skew T log P diagram – is a standard meteorological plot or thermodynamic diagram using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

⁴ RAOB software – The complete RAwinsonde OBservation program is an interactive sounding analysis program developed by Environmental Research Services, Matamoras, Pennsylvania, for plotting and analyzing upper air data.

4.0 Carburetor Icing Probability Chart

FAA Advisory Circular 20-113 explains, "To prevent accidents due to induction system icing, the pilot should regularly use of 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 advisory circular warns pilots that carburetor ice is most likely to occur when temperatures are below 70° F (or 21° C) and the relative humidity is above 80%.

The FAA Special Airworthiness Information Bulletin (SAIB) CE-09-35 issued in June 2009 warns pilots of the potential hazards associated with carburetor icing. The following graph depicts the probability of carburetor icing for various temperatures and relative humidity conditions from that bulletin:

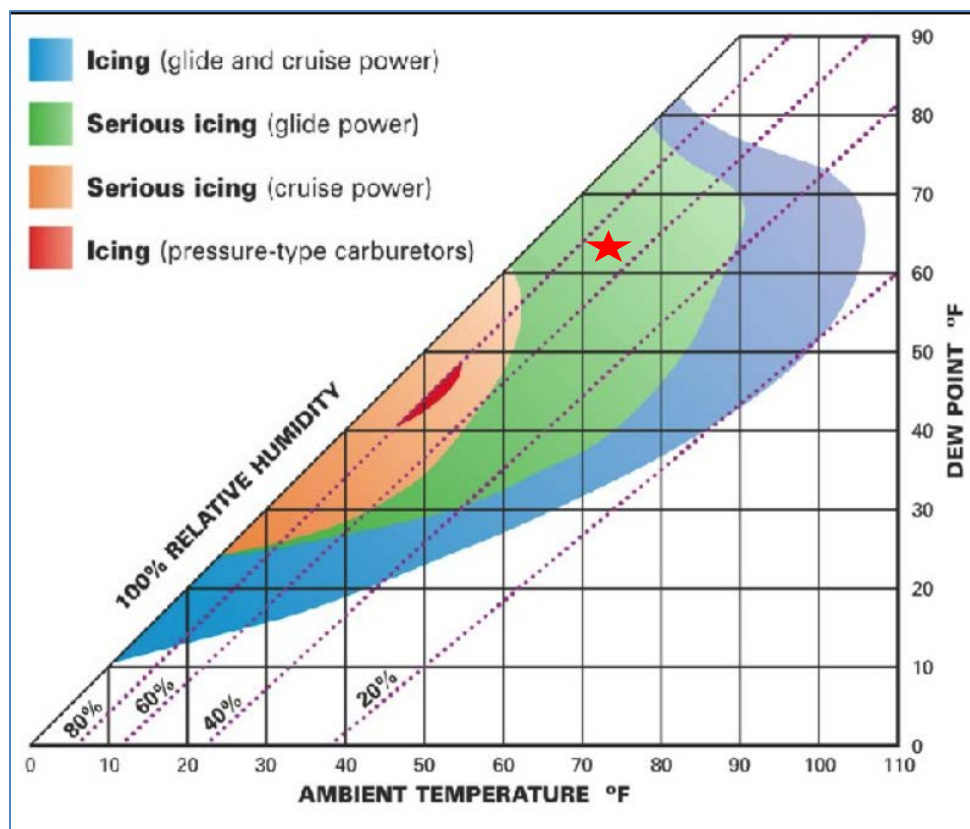


Figure 2 – Probability of Carburetor Icing

A red star has been added to the chart to depict the conditions at KVRB at the time of the accident, which was in the "Serious Icing" category at glide power.

The FAA recommends that there are some steps a pilot can take to prevent, recognize, and respond to carburetor icing.

To prevent carburetor icing, the pilot should:

- Assure the proper functionality of the carburetor heat during the ground (Before Takeoff) check.

- Use carburetor heat on approach and descent when operating at low power settings, or in conditions where carburetor icing is probable.

To recognize carburetor icing, the warning signs are:

- A drop in rpm in fixed pitch propeller airplanes.
- A drop in manifold pressure in constant speed propeller airplanes.
- In both types, usually there will be a roughness in engine operation.

The pilot should respond to carburetor icing by applying full carburetor heat immediately. The engine may run rough initially for short time while ice melts.

The above recommendations are general suggestions. The pilot should consult the AFM or the pilot's operating handbook for the proper use of carburetor heat.

Submitted by:

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