



SUBJECT: Ice/Rain Protection System – Stall Warning
Stall Warning System Characteristics in Icing Conditions

SAIB: CE-11-18
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This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin is written to inform pilots of normal, utility, acrobatic, and commuter category (part 23) airplanes certificated before 2000 of the potential hazards associated with stall warning characteristics in icing conditions.

At this time, this airworthiness concern is not considered an unsafe condition that would warrant an airworthiness directive (AD) action under Title 14 of the Code of Federal Regulations (14 CFR part 39).

Background

In order to identify precursors to accidents, the FAA studied icing related non-fatal incidents dating back 25 years. The FAA found evidence of stall events during flight in icing conditions on different airplane models in which either the pilot or passenger explicitly stated the stall warning system did not activate. In some of these events the pilots attributed “shudder” or buffet to either the engine or propeller icing but not an impending wing stall. These reported events occurred in the cruise phase of flight, in some cases with the autopilot engaged; during landing approach; and on landing.

Current icing regulations have only been applied to new part 23 airplane designs certificated since 2000. In these new designs, the stall warning system is designed and tested with critical ice accretions along the entire span of the wing. In many new designs this results in the stall warning speed biased higher in icing conditions. Prior to 2000, a clear and unambiguous buffet was accepted for stall warning in icing conditions, even if the airplane was equipped with a stall warning system and a heated stall warning sensor. Prior to 1973, there were no requirements to test part 23 airplanes in icing conditions. Part 23 airplanes were “approved” for flight in icing conditions if they were properly equipped. Many of these airplanes remain in the fleet today.

Recommendations

The airplane flight manual, pilot’s operating handbook, and placards should be consulted for limitations and procedures in icing conditions. We recommend that you ensure that the following procedures are followed if not specified for your airplane:

Buffet or shudder: Occurrences of buffet or shudder in icing conditions should be treated as an imminent wing stall. Recover by reducing angle of attack and slowly applying full power/torque.

Airspeed: Unless your airplane flight manual, pilot’s operating handbook, or any placard has specified an airspeed for flight in icing, increase airspeed by at least 25 percent above non-icing airspeed in every phase of flight. However, do not exceed any maximum airspeed limitations for your airplane.

Approach: In addition to increasing airspeed, cycle deicing boots prior to configuring for approach, configure early, and consider partial flaps.

Landing: Reduce power slowly in flare, airplane drag may be significant. Expect an increased landing distance and plan accordingly.

Autopilot: The autopilot may mask dangerous airspeed losses - monitor airspeed closely when the autopilot is engaged in icing conditions. When ice is accumulating on the airplane the autopilot should be disconnected at least once every five minutes to ensure normal airplane trim and handling qualities are maintained. Unless authorized in the airplane flight manual, the vertical modes of the autopilot that maintain a constant rate of climb, decent, or pitch should not be used. Pilots should be prepared for the possibility of unusual control forces and flight control displacements when disconnecting the autopilot, especially in severe icing conditions.

Severe Icing Conditions: If severe icing is encountered, disconnect the autopilot, and immediately request priority handling from air traffic control, or declare an emergency if required, to exit the severe icing conditions. If your airplane was not certificated to fly in freezing drizzle or freezing rain conditions, do not fly in these conditions. Do not rely on Automated Surface Observing System (ASOS) to report freezing drizzle. Know the severe icing cues for your airplane, such as ice behind the protected leading edge of the wing.

Airplanes Not Certificated for Flight in Icing: In-flight icing accidents and incidents involving these airplanes have outnumbered those on icing certificated airplanes in recent years. Pilots of these airplanes should be aware that these airplanes are not tested for “inadvertent” icing encounters. Do not believe the myth that “thicker” general aviation airplane airfoils are more tolerant of ice accretion. FAA research has dispelled that myth, as described in Advisory Circular 20-73A. The variability of icing conditions means that your next inadvertent encounter may not have the same outcome as your last one.

FAA Requests Information

Pilots of part 23 airplanes are encouraged to report environmental icing related incidents to the Aviation Safety Reporting System at <http://asrs.arc.nasa.gov/>. Include the airplane model and other details related to the above recommendations in this SAIB. Under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 et seq.), the Office of Management and Budget (OMB) has approved the information collection contained in this SAIB, and assigned OMB Control Number 2120-0731.

For Further Information Contact

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