



NTSB

SAFETY ALERT

National Transportation Safety Board

★ **Activate Leading-Edge Deice Boots As Soon as Airplane Enters Icing Conditions** ★

Thin amounts of ice, as little as 1/4 inch, can be deadly

The problem

- As little as 1/4 inch of leading-edge ice can increase the stall speed 25 to 40 knots. The danger is that some 1/4-inch accumulations have minimum impact and pilots become overconfident.
- Sudden departure from controlled flight is possible with only 1/4 inch of leading-edge ice accumulation at normal approach speeds.
- Pilots have been taught to wait for a prescribed accumulation of leading-edge ice before activating the deice boots because of the believed threat of ice bridging.
- In theory, ice bridging could occur if the expanding boot pushes the ice into a frozen shape around the expanded boot, thus rendering the boot ineffective at removing ice.
- The Safety Board has no known cases where ice bridging has caused an incident or accident, and has investigated numerous incidents and accidents involving a delayed activation of deice boots.
- Ice bridging is extremely rare, if it exists at all.
- Early activation of the deice boots limits the effects of leading-edge ice and improves the operating safety margin.
- Using the autopilot can hide changes in the handling qualities of the airplane that may be a precursor to premature stall or loss of control.
- Many airplanes still require pilots to visually identify ice on the wings and its thickness, which can be difficult to see from the cockpit.
- Many pneumatic deice boot systems only provide a means to manually cycle the system and have no provision for continuous operation.

What should pilots do when they encounter leading-edge ice?

- Leading-edge deice boots should be activated as soon as icing is encountered, unless the aircraft flight manual or the pilot's operating handbook pilots specifically directs not to activate them.
- If the aircraft flight manual or the pilot's operating handbook specifies to wait for an accumulation of ice before activating the deice boots, maintain extremely careful vigilance of airspeed and any unusual handling qualities.

- While icing conditions exist, continue to manually cycle the deice system unless the system has a provision for continuous operation.
- Turn off or limit the use of the autopilot in order to better “feel” changes in the handling qualities of the airplane.
- Be aware that some aircraft manufacturers maintain that waiting for the accumulation of ice is still the most effective means of shedding ice.

Need more information?

- Visit the NTSB website at <http://www.nts.gov> to access the following documents:
 - Accident brief addressing a non-fatal landing accident of a Cessna 500 on March 17, 2007, in Beverly, Massachusetts (NTSB Identification: [NYC07LA081](#)).
 - *Crash During Approach to Landing, Circuit City Stores, Inc., Cessna Citation 560, Pueblo, Colorado, February 16, 2005* ([NTSB/AAR-07/02](#)).
 - *In-flight Icing Encounter and Uncontrolled Collision with Terrain, Comair Flight 3272, Monroe, Michigan, January 9, 1997* ([NTSB/AAR-98/04](#)).
- FAA Advisory Circular 25.1419-1A, “Certification of Transport Category Airplanes for Flight in Icing Conditions.”
http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentnumber/25.1419-1a