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**Federal Aviation
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InFO

Information for Operators

InFO 09007
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http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info

An InFO contains valuable information for operators that should help them meet certain administrative, regulatory, or operational requirements with relatively low urgency or impact on safety.

Subject: Pilot Training and Checking Under Title 14 of the Code of Federal Regulations (14 CFR) Parts 61, 91, 91 Subpart K (91K), 121, 135, 141, and/or 142.

Purpose: To ensure that all pilots of pneumatic deicing boot-equipped airplanes understand and receive training on proper operation of those systems and on maintaining an appropriate airspeed in icing conditions. This InFO cancels InFO 09005.

Background: On February 16, 2005, there was a fatal accident of a Cessna Citation 560 (CE-560) during an approach in icing conditions. The National Transportation Safety Board (NTSB) determined that the probable cause of this accident was the flightcrew's failure to effectively monitor and maintain airspeed and comply with the procedures for activating the deicing boots on approach. This led to an aerodynamic stall from which they did not recover. This accident reinforces the need for flightcrews to be trained to properly follow all icing-related operating limitations and operating procedures specified in the Aircraft Flight Manual (AFM) or FAA approved operator's manual. As a result, the NTSB issued Safety Recommendations A-07-12 and A-07-13.

Discussion:

A. Boot Operation. Historically, pilots have been taught to wait until a recommended thickness of ice builds up, typically ¼" – ½", before activating the deicing boots because early activation of the boots was thought to result in ice bridging. Ice bridging is when the ice deforms to the shape of the expanded deicing boot without being shed, then remains in this deformed shape and hardens, rendering the boot ineffective. Also, certain manufacturers have held that waiting for a certain accretion thickness leads to more effective shedding of ice. More recent tests have shown that modern deicing boot designs are not susceptible to ice bridging (see the current edition of Advisory Circular (AC) 20-73, Aircraft Ice Protection). These tests have also shown that activating the boots early and often will not degrade ice shedding from the boots, and in some conditions will improve ice shedding over the length of the icing encounter. Ice that remains on the boots after a boot cycle is residual ice that will be shed with further boot cycles, and will not result in ice bridging. Residual ice occurs more often as both airspeed and outside air temperature decrease.

Pilots should follow the boot activation and operating procedures specified in the AFM or FAA approved operator's manual for the airplane they are flying and should be aware of the following additional information:

- If icing has been encountered during the flight, boots should be cycled prior to approach and landing.
- If the AFM does not have specific boot operation procedures or if ice thickness is difficult to judge, pilots should not be reluctant to cycle modern boots at the first sign of ice accretion and then as needed. Boots with less than 1.75 inch diameter tubes, operating pressures of 15 psig or greater, and fast inflation/deflation times are considered modern. If the airplane was certificated after 1960, it likely has modern boots.
- Residual ice accretion on boots can be minimized with the proper application of an ice adhesion inhibitor recommended by the boot or airplane manufacturer (e.g., ICEX II for Goodrich Corporation deicing boots). Any other product, such as wax, can damage the boots and may cause more ice accretion.
- Many airplanes certificated for operation in icing conditions before 2001 (both part 23 and 25 certificated airplanes) do not have a mode that will automatically continue to cycle the deicing boots once the system has been energized. In this case, continual monitoring and operation of the deicing boots increases the pilots' workload. Pilots should be alert to the need to recycle the boots as necessary during flight in icing conditions.
- Inter-cycle and residual ice is inherent in pneumatic boot operation, and can lead to a significant increase in stall speeds.

B. Severe Icing. For many airplanes with pneumatic deicing boots, operating limitations require the flightcrew to exit severe icing conditions. These limitations provide the flightcrew with cues to recognize severe icing and procedures for exiting the severe icing conditions.

C. Airspeed. The NTSB recommends that flight training in the CE-560 airplane emphasize the AFM requirements that pilots increase airspeed and operate the deice boots during approaches when ice is present on the wings.

1). For other aircraft whose AFM or operator's procedures do not contain minimum icing airspeeds, use the non-ice stall speed multiplied by 1.5 as a minimum airspeed while operating in icing conditions.

2). Pilots should not accept an airspeed assigned by air traffic control (ATC) that is lower than that required by their manuals, the airplane manufacturer's recommended airspeed, or the 50% margin recommended above, as applicable. Training should also emphasize that this increased airspeed, if maintained to the runway threshold in a stabilized approach configuration, may also require increased landing distance. Airspeed losses in icing, particularly of turbopropeller powered airplanes, can be hazardous, and pilots of turbopropeller-powered airplanes should follow the guidance in Safety Alert for Operators (SAFO) 06016, In-Flight Icing, Turbo Propeller Powered Airplanes.

Recommended Action: To ensure safe operations in icing conditions, the following actions should be taken. Parts 61, 91, 91K, 121, 135, 141, and/or 142 personnel who have responsibility over training and checking (e.g., Director of Operations, Chief Flight Instructor) should:

- Modify training and checking programs as necessary to reflect the airplane's operating limitations and operator's procedures for flight in icing conditions, as well as information provided in this InFO. If icing Airworthiness Directive (AD) procedures are applicable, modify training to reflect them.
- Modify training and checking programs to ensure that they include training on ice accumulation, shedding, and ice-bridge formation per the current edition of AC 91-74, Pilot Guide: Flight Icing Conditions.
- Modify training and checking programs to ensure that they include emphasis on maintaining and monitoring the appropriate airspeed in icing conditions.
- Modify training and checking programs to ensure that there is special emphasis training on operation of the pneumatic deicing boots in accordance with the AFM or FAA approved operator's manual.
- Modify training and checking programs to teach and emphasize monitoring skills and workload management (CRM/SRM skills) during operations in icing conditions.

Checking of personnel conducting operations under parts 61, 91, 91K, 121, 135, 141, and 142 (e.g., Training Center Evaluator, Check Airman) should include the following:

- During any flight check or practical test (e.g., Section 135.297 proficiency check, instrument rating practical test, type rating practical test), the pilot must demonstrate knowledge and use of pneumatic deicing boots, including ice accumulation, shedding, and ice bridge formation per AC 91-74.
- During any operational approval flight-check, the pilot must demonstrate the appropriate use of the deicing boot system and flight management including appropriate monitoring, speed requirements and workload management in icing conditions.

Contact: Questions regarding this InFO that pertain to pilot training and checking under parts 61, 91, 91K or 141 should be directed to Tom Glista, Certification and General Aviation Operations Branch, AFS-810 through your appropriate Region at (202) 267-7922.

Questions regarding this InFO that pertain to pilot training and checking under parts 121, 135 or 142 should be directed to Eric Friedman, Air Carrier Training and 142 Training Center Branch, AFS-210, through your appropriate Region at (202) 493-5259.