

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: September 24, 1981

Forwarded to:

Honorable J. Lynn Helms
 Administrator
 Federal Aviation Administration
 800 Independence Avenue, S.W.
 Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-81-115 through -118

The National Transportation Safety Board has issued a safety report on the hazards of aircraft structural icing, including the physical aspects of the problem as it relates to aircraft, methods of avoidance and/or prevention, the adequacy of icing forecasts, and the certification of aircraft for flight into known icing conditions. ^{1/}

The Safety Board has recommended that the Acting Federal Coordinator for Meteorological Services and Supporting Research take appropriate action to refine the measurement and forecasting of meteorological elements involved in aircraft icing. A copy of the correspondence is enclosed for your information and such coordination as you may deem necessary.

Once this technology has been developed, forecasts should describe icing conditions directly in the applicable parameters (liquid water content, drop size distribution, and temperature). To make these forecasts useable, aircraft maintenance will have to evaluate their aircraft under varying conditions of the meteorological parameters and establish their effect upon specific aircraft.

The criteria for certificating aircraft for flight into known icing conditions contained in 14 CFR 25 are based almost entirely upon icing studies conducted by the National Aeronautics and Space Administration in the late 1950's using current transport aircraft and considering cloud droplets as a moisture source. Ice crystal/droplet mixtures and freezing rain were not considered. The Safety Board believes the icing criteria in 14 CFR 25 should be reviewed in light of the latest knowledge of cloud physics and the characteristics of modern aircraft. In addition, the procedures used by aircraft manufacturers to certificate aircraft under 14 CFR 25 should be reviewed to determine that they are representative of conditions found in nature and cover as much as possible.

^{1/} For more detailed information read "Safety Report--Aircraft Icing Avoidance and Protection" (NTSB-SR-81-1).

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Evaluate individual aircraft performance in icing conditions in terms of liquid water content, drop size distribution, and temperature, and establish operational limits and publish this information for pilot use. (Class III, Longer-Term Action) (A-81-115)

Review the icing criteria published in 14 CFR 25 in light of both recent research into aircraft ice accretion under varying conditions of liquid water content, drop size distribution, and temperature, and recent developments in both the design and use of aircraft; and expand the certification envelope to include freezing rain and mixed water droplet/ice crystal conditions, as necessary. (Class III, Longer-Term Action) (A-81-116)

Establish standardized procedures for the certification of aircraft which will approximate as closely as possible the magnitudes of liquid water content, drop size distribution, and temperature found in actual conditions, and be feasible for manufacturers to conduct within a reasonable length of time and at a reasonable cost. (Class III, Longer-Term Action) (A-81-117)

Furthermore, during the background investigation for this report, an examination of 14 CFR 91.209(c) and 135.227(c) revealed that the content of the regulations is not consistent with the definition of severe icing contained in the Airman's Information Manual (AIM) and used by the National Weather Service. The AIM definition indicates "that the rate of accumulation (of ice) is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary."

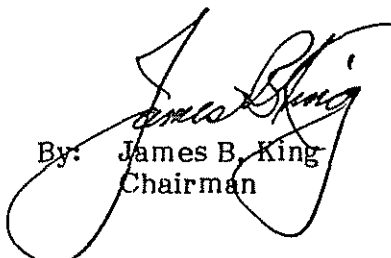
Title 14 CFR 91.209(c) states that "except for an airplane that has ice protection provisions that meet the requirements in Section 34 of Special Federal Aviation Regulation No. 23 or those for transport category airplane-type certification, no pilot may fly an airplane into known or forecast severe icing conditions." Similarly, 14 CFR 135.227(c) states that "except for an airplane that has ice protection provisions that meet Section 34 of Appendix A, or those for transport category airplane-type certification, no pilot may fly an aircraft into known or forecast severe icing conditions."

Even though 14 CFR 91.209(c) and 135.227(c) indicate that aircraft with certain anti-icing/deicing equipment are permitted to fly into known or forecast severe icing conditions, the AIM definition of severe icing states that such equipment will not reduce or control the severe icing hazard. The Safety Board believes that clarification of the regulations is necessary.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration, as an interim priority measure:

Reevaluate and clarify 14 CFR 91.209(c) and 135.227(c) to insure that the regulations are compatible with the definition of severe icing established by the Federal Coordinator for Meteorological Services and Supporting Research as published in the Airman's Information Manual. (Class II, Priority Action) (A-81-118)

KING, Chairman, DRIVER, Vice Chairman, and GOLDMAN and BURSLEY, Members, concurred in these recommendations. McADAMS, Member, did not participate.


By: James B. King
Chairman

Enclosure