

NATIONAL TRANSPORTATION SAFETY BOARD WASHINGTON, D.C.

ISSUED: September 24, 1981

 Forwarded to:
 Mr. William S. Barney
 Federal Coordinator for Meteorological
 Services and Supporting Research (Acting)
 National Oceanic and
 Atmospheric Administration
 6011 Executive Boulevard
 Rockville, Maryland 20852

SAFETY RECOMMENDATION(S)
A-81-113 and -114

The National Transportation Safety Board has issued a safety report on the hazard 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 identified areas in which research and development efforts will be required to reduce the hazard of icing conditions to aircraft. From the meteorological standpoint, these areas encompass refined measurements of elements involved in ice formation and the use of such data for more precise forecasts of icing conditions.

Icing forecasts are based primarily on atmospheric soundings, surface synoptic observations, radar, and satellite information. There is no direct measure of the liquid water content of clouds and precipitation or drop size distribution, the two parameters that, along with temperature, are the primary criteria for the type and amount of ice accretion by aircraft. The forecasts, when issued, are in terms of "trace," "light," "moderate," and "severe." These intensity levels, although specifically defined as to the effect upon aircraft, do not apply equally to all aircraft. Moderate icing to a large commercial airliner might well be severe to a small general aviation aircraft.

The Safety Board believes that the technology needs to be developed to measure the icing parameters directly in the atmosphere on time and grid scales that will allow areas of icing to be described on a synoptic basis. Once this technology is developed, the data derived from it can be used to develop forecasting techniques to forecast icing conditions directly in the applicable parameters (liquid water content, drop size distribution, and temperature).

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

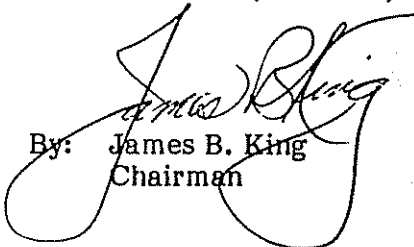
The National Transportation Safety Board therefore recommends that the Federal Coordinator for Meteorological Services and Supporting Research coordinate and direct efforts to:

Develop instruments to measure temperature, liquid water content, drop size distribution, and altitude in the atmosphere on a real-time basis that are sufficiently economical to use on a synoptic time and grid scale. (Class III, Longer-Term Action) (A-81-113)

Use the developed instrumentation to collect icing data on a real-time basis on a synoptic grid and, in turn, develop techniques to forecast icing conditions in terms of liquid water content, drop size distribution, and temperature. (Class III, Longer-Term Action) (A-81-114)

The Safety Board also 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 wide a range of these conditions as possible. These matters are being addressed to the Administrator of the Federal Aviation Administration. A copy of this letter is enclosed for your information and such coordination as you may deem necessary.

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