

NTSB Identification: **DCA95MA001** .

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Scheduled 14 CFR operation of AMERICAN EAGLE AIRLINES  
Accident occurred Monday, October 31, 1994 in ROSELAWN, IN

Probable Cause Approval Date: 10/22/1996

Aircraft: ATR ATR-72-212, registration: N401AM

Injuries: 68 Fatal.

The airplane was in a holding pattern and was descending to a newly assigned altitude of 8,000 feet when it experienced an uncommanded roll excursion and crashed during a rapid descent. The loss of control was attributed to a sudden and unexpected aileron hinge moment reversal that occurred after a ridge of ice accreted beyond the deice boots. The manufacturer failed to disseminate adequate warnings and guidance to operators about the adverse characteristics of, and techniques to recover from, ice-induced aileron hinge moment reversal events; and failed to develop additional airplane modifications, which led directly to this accident. The DGAC failed to require the manufacturer to take additional corrective actions, such as performing additional icing tests, issuing more specific warnings regarding the aileron hinge moment reversal phenomenon, developing additional airplane modifications, and providing specific guidance on the recovery from a hinge moment reversal, which led directly to this accident. The ability of the FAA to monitor, on a real-time basis, the continued airworthiness of the ATR airplanes was hampered by the inadequately defined lines of communication, the inadequate means for the FAA to retrieve pertinent information, and the DGAC's failure to provide the FAA with critical airworthiness information., because of the DGAC's apparent belief that the information was not required to be provided under the terms of the Bilateral Airworthiness Agreement.

The National Transportation Safety Board determines the probable cause(s) of this accident as follows:

the loss of control, attributed to a sudden and unexpected aileron hinge moment reversal that occurred after a ridge of ice accreted beyond the deice boots while the airplane was in a holding pattern during which it intermittently encountered supercooled cloud and drizzle/rain drops, the size and water content of which exceeded those described in the icing certification envelope. The airplane was susceptible to this loss of control, and the crew was unable to recover. Contributing to the accident were: 1) the French Directorate General for Civil Aviation's (DGAC's) inadequate oversight of the ATR 42 and 72, and its failure to take the necessary corrective action to ensure continued airworthiness in icing conditions; and 2) the DGAC's failure to provide the FAA with timely airworthiness information developed from previous ATR incidents and accidents in icing conditions, 3) the Federal Aviation Administration's (FAA's) failure to ensure that aircraft icing certification requirements, operational requirements for flight into icing conditions, and FAA published aircraft icing information adequately accounted for the hazards that can result from flight in freezing rain, 4) the FAA's inadequate oversight of the ATR 42 and 72 to ensure continued airworthiness in icing conditions; and 5) ATR's inadequate response to the continued occurrence of ATR 42 icing/roll upsets which, in conjunction with information learned about aileron control difficulties during the certification and development of the ATR 42 and 72, should have prompted additional research, and the creation of updated airplane flight manuals,

flightcrew operating manuals and training programs related to operation of the ATR 42 and 72 in such icing conditions.