

Log # 2529C



**National Transportation Safety Board**  
Washington D.C. 20594  
**Safety Recommendation**

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**Date:** August 15, 1996

**In reply refer to: A-96-71 through  
-73**

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On October 31, 1994, at 1559 Central Standard Time, an Avions de Transport Regional, model 72-212 (ATR 72), registration number N401AM, ~~leased to and operated by Simmons Airlines, Incorporated, and doing business as (d.b.a.) American Eagle flight 4184,~~ crashed during a rapid descent after an uncommanded roll excursion. The airplane was in a holding pattern and was descending to a newly assigned altitude of 8,000 feet when the initial roll excursion occurred. The airplane was destroyed by impact forces; and the captain, first officer, 2 flight attendants and 64 passengers received fatal injuries. Flight 4184 was a regularly scheduled passenger flight being conducted under 14 Code of Federal Regulations (CFR) Part 121; and an instrument flight rules flight plan had been filed.<sup>1</sup>

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<sup>1</sup>For more detailed information, read Aircraft Accident Report--"In-flight Icing Encounter and Loss of Control, Simmons Airlines, d.b.a. American Eagle Flight 4184, Avions de Transport Regional (ATR), Model 72-212, N401AM, Roselawn, Indiana, October 31, 1994" (NTSB/AAR-96/01)

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The National Transportation Safety Board has determined that the probable causes of this accident were 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 because: 1) ATR failed to completely disclose to operators, and incorporate in the ATR 72 airplane flight manual, flightcrew operating manual and flightcrew training programs, adequate information concerning previously known effects of freezing precipitation on the stability and control characteristics, autopilot and related operational procedures when the ATR 72 was operated in such conditions; 2) 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 3) the DGAC's failure to provide the FAA with timely airworthiness information developed from previous ATR incidents and accidents in icing conditions, as specified under the Bilateral Airworthiness Agreement and Annex 8 of the International Civil Aviation Organization.

Contributing to the accident were: 1) 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 and other icing conditions not specified in 14 Code of Federal Regulations (CFR) Part 25, Appendix C; and 2) the FAA's inadequate oversight of the ATR 42 and 72 to ensure continued airworthiness in icing conditions.

As a result of the investigation of this accident, the Safety Board has concluded that the weather forecasts produced by the National Weather Service (NWS) were correct based on the available information, and that the actions of the forecasters at the National Aviation Weather Advisory Unit, Kansas City, and the Center Weather Service Unit meteorologists at the Chicago air route traffic control center were in accordance with NWS guidelines and procedures.

Nonetheless, the Safety Board has some concerns about the lack of weather information disseminated to the crew of flight 4184. Specifically, the information contained in AIRMETs [airman's meteorological information] "Zulu," "Sierra" and "Tango," and Update 2, was available well in advance of

flight 4184's departure, and was pertinent to the airplane's route of flight. This information was not, and typically would not be, included in the weather portion of the flight release provided by Simmons Airlines/AMR Eagle. Further, it could not be determined if the flightcrew had obtained the updated weather information via the hazardous in-flight weather advisory service (HIWAS) while en route or prior to the recorded conversations on the cockpit voice recorder (CVR).

14 CFR Part 121.601 (b) and (c) state, in part, respectively, "before beginning a flight the aircraft dispatcher shall provide the pilot in command with all available weather reports and forecasts of weather phenomena that may affect the safety of flight" and that during a flight the dispatcher shall provide "any additional available information of meteorological conditions including adverse weather phenomena." FAA Order 8400.10, paragraph 1423, (Operational Requirements - Flightcrews) requires that AIRMET information be considered in the preflight planning process; however, Center Weather Advisories (CWAs) are not required to be included or considered. Simmons Airlines dispatchers review the AIRMETs, but they do not typically include them in the flight release package. CWAs are not included in the release packages because they are not required. The Safety Board is concerned that because Simmons Airlines dispatchers do not include AIRMETs (which include information regarding moderate icing) and CWA information, flightcrews may not be provided "all available weather reports and forecasts of weather phenomena" necessary to make informed decisions.

Although the Safety Board concludes that the actions of the flightcrew would not have been significantly different if they had received the AIRMETs, the Safety Board believes that Simmons Airlines/AMR Eagle should require its dispatchers to include in the flight release AIRMETs and CWAs that are pertinent to the route of flight so that this information can be available for preflight and in-flight decisionmaking.

In this accident, the flightcrew did not indicate that it was concerned about holding in icing conditions, but the Safety Board notes that there were some potentially distracting events during the hold. The CVR recorded about 15 minutes of personal conversation between a flight attendant and the captain from 1528:00 to 1542:38. The CVR also recorded music playing for

about 18 minutes, as well as the sounds of the captain's departure from the cockpit for about 5 minutes to use the rest room.

According to 14 CFR Part 121.542 (the "sterile cockpit" rule) and FAA staff testimony at the Safety Board's public hearing on this accident, holding at 10,000 feet or above is not considered to be a "critical" phase of flight. Thus, the presence of the flight attendant in the cockpit and the ensuing conversation were not in violation of AMR Eagle policy or Federal regulations.

Although the presence of the flight attendant and the music could have been a distraction to the flightcrew, both pilots appeared attentive to flight-related duties immediately before, as well as during the roll upset. Thus, the Safety Board concludes that neither the flight attendant's presence in the cockpit nor the flightcrew's conversations with her contributed to the accident. The Safety Board noted, however, that the AMR Eagle ATR 72 flight manual gives the captain the authority to declare "any other phase of a particular flight" a critical phase depending on the circumstances and thus to invoke the sterile cockpit rule. Therefore, the Safety Board concludes that a sterile cockpit environment would have reduced flightcrew distractions and could have heightened the flightcrew's awareness to the potentially hazardous environmental conditions in which the airplane was being operated. However, the sterile cockpit environment would not have increased the flightcrew's understanding of the events that eventually transpired. Nonetheless, the Safety Board believes that Simmons Airlines/AMR Eagle should encourage its captains to observe a sterile cockpit environment when an airplane is holding, regardless of altitude, in meteorological conditions, such as convective areas or icing conditions, that have the potential to demand significant attention of a flightcrew.

The investigation of this accident revealed conflicts in guidance and procedures between aircraft flight manuals (AFMs), flight operations manuals (FOMs), and other published material. For example, a review of the Normal Procedures/Flight Conditions section of the ATR 72 AFM, and the ATR Flightcrew Operating Manuals for both the ATR 42 and ATR 72 aircraft revealed that neither publication contained the statement, "Operation in freezing rain must be avoided." Additionally, these manuals did not contain any information prohibiting flight in freezing rain, or any limitation when

operating in such conditions. At the Safety Board's public hearing, the ATR Vice President, Flight Operations for North America, testified that the omission of this information from the manuals was "not intentional."

In 1992, ATR published a brochure entitled, All Weather Operations, which contained information regarding the operation of the ATR airplanes in various weather conditions that included icing. In this brochure, ATR stated "...flight in freezing rain should be avoided where practical." The brochure also provided information to pilots on how to recognize freezing drizzle and freezing rain conditions and stated, "...as soon as possible, leave freezing rain conditions. This can usually be accomplished by climbing to a higher altitude into the positive temperature region or by altering course." The brochure was provided by ATR as general information and was not a required addition, substitution, or revision to any of the FAA-approved ATR flight or operating manuals. ATR distributed the All Weather Operations brochure to all ATR operators, including Simmons Airlines, and also attempted to send a copy to all ATR pilots directly. Simmons Airlines/AMR Eagle did not distribute the brochure to its pilots because some of the information was contrary to Federal Aviation Regulations and some of the operational information was more permissive than the approved aircraft operating manual. Also, Simmons Airlines/AMR Eagle indicated that while it did use some of the information from the brochure to enhance the operations manual, the ATR All Weather Operations brochure consolidated information that already existed in the various ATR and Simmons Airlines/AMR Eagle flight manuals, specifically in the "Conditional" section of the Aircraft Operating Manual (AOM).

The Safety Board remains concerned about such conflicts and believes that an audit should be undertaken to eliminate the existing conflicts in guidance and procedures.

Therefore, as a result of its investigation of this accident, the National Transportation Safety Board recommends that AMR Eagle:

Require dispatchers to include in the flight release airman's meteorological information (AIRMETs) and center weather advisories (CWAs) that are pertinent to the route of flight so that flightcrews can consider this information in their preflight and in-flight decisions. (Class II, Priority Action) (A-96-71)


Encourage captains to observe a "sterile cockpit" environment when an airplane is holding, regardless of altitude, in meteorological conditions such as convective areas or icing conditions, that have the potential to demand significant attention of a flightcrew. (Class II, Priority Action) (A-96-72)

Conduct a procedural audit to eliminate existing conflicts in guidance and procedures between the Aircraft Flight Manuals, Flight Operations Manuals, and other published material. (Class II, Priority Action) (A-96-73)

Also, the Safety Board issued Safety Recommendations A-96-48 through -69 to the Federal Aviation Administration, and A-96-70 to the National Oceanic and Atmospheric Administration.

The National Transportation Safety Board is an independent federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations A-96-71 through -73 in your reply.

Chairman HALL, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations. Vice Chairman FRANCIS did not participate.

By:   
Jim Hall  
Chairman