



# National Transportation Safety Board

Washington, D.C. 20594  
Safety Recommendation

109# 1933

**Date:** December 8, 1987

**In reply refer to:** A-87-121

Honorable T. Allan McArtor  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

On November 5, 1986, a Northwest Orient Airlines Boeing 757 airplane, N516US, while being operated under 14 CFR Part 121 rules, experienced a restricted aileron control problem while en route to Minneapolis, Minnesota. The flight departed Washington, D.C., with 181 passengers and 7 crewmembers aboard. The airplane had been exposed to moderate rain showers for 2 hours and 50 minutes while parked on the ramp and had departed through moderate rain showers. Degradation of aileron control authority was initially noticed during the en route climb to a cruising altitude of flight level (FL) 390. Upon reaching FL 390, the autopilot was engaged. Five minutes later, the autopilot caution light illuminated and an electronic instrument caution and advisory system message was displayed indicating that the aileron servo position and the aileron surface position disagreed by more than 3°. At that point, the same indications were received from two of the airplane's three autopilots.

While diagnosing the autopilot problem, the flightcrew discovered that the ailerons were jammed and could not be moved using normal manual roll forces on the control wheel. En route troubleshooting with the operator's ground maintenance control for the following few minutes at cruise altitude showed that the airplane was "completely unresponsive in roll, with pitch and yaw control normal." With 15° of control wheel deflection and about 40 pounds of force applied to the control wheel, the captain was able to free the controls in the left direction only. This slight control freedom obtained in the left direction was rough and there was still no control authority to the right.

During a requested descent, control authority to the right was regained as the airplane passed through about FL 250. Descent was continued to 12,000 feet at a true outside air temperature of plus 7° centigrade. The flightcrew stated that the aileron control felt normal after about 10 minutes. The airplane remained at 12,000 feet for the remainder of the flight to Minneapolis, where it landed without further incident. The airplane was inspected and no deficiencies were noted.

Further investigation revealed that the most plausible explanation for the restriction and binding of the aileron control system was that moisture had accumulated and frozen between the aileron cables and the cable guides. The day after the incident, November 6, 1986, the Boeing Company issued Service Bulletin (SB) B-757-27-0079, which recommended that several cable guides be removed and that sealant be applied to eight structural ribs in the wing to act as dams and direct water away from the cables. (Two incidents similar to the one under investigation were referenced in the bulletin.) The Boeing Company had previously incorporated in new production airplanes, including N516US, the application of sealant dams, but the sealant apparently did not prevent water accumulation on the aileron cables.

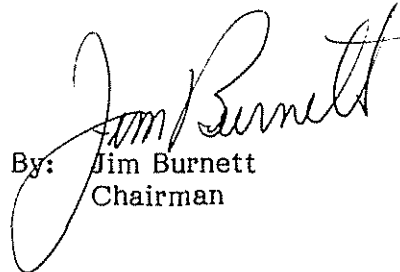
On January 22, 1987, Boeing issued Operations Bulletin 757-87-1, which recommended that flights descend below the freezing level if aileron binding occurs, and that they attempt to land at an airport where the temperature is above freezing or return to the departure airport. The bulletin also advised that those recommended procedures would remain in effect until "binding due to ice is prevented from recurring by increasing the clearance between the aileron cable and the cable guides throughout the wing." On June 25, 1987, Boeing issued Revision 1 to SB B-757-27-0079 to expand the scope of the original Service Bulletin and to replace all aileron control cable guides with new guides having an increased internal diameter.

The Safety Board has evaluated Revision 1 to SB B-757-27-0079 and believes that the Federal Aviation Administration should require installation of the improved aileron control cable guides provided for in the Service Bulletin to preclude a loss of aileron control in Boeing 757 airplanes that could lead to serious accident.

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

Issue an Airworthiness Directive to make mandatory the installation of improved aileron control cable guides on Boeing 757 airplanes as provided in Service Bulletin B-757-27-0079, Rev. 1 of June 25, 1987. (Class II, Priority Action) (A-87-121)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, NALL, and KOLSTAD, Members, concurred in this recommendation.

  
By: Jim Burnett  
Chairman