

Log 1576

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: March 4, 1983

Forwarded to:

Honorable J. Lynn Helms  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-83-2

On February 15, 1983, the captain of an Eastern Airlines Boeing 727-225, N8831E, made an intentional gear-up landing at Miami International Airport following a malfunction in the left main landing gear actuating system subsequent to takeoff from the West Palm Beach Airport. The flightcrew reported that the left main landing gear door light did not extinguish at the completion of the post-takeoff gear retraction cycle. Subsequent efforts to remedy the malfunction, including recycling the landing gear and manual extension attempts, failed to obtain safe extension or retraction indications for the left main gear. Consequently, the right main and nose landing gear were retracted and a gear-up landing was made. The gear-up landing resulted in substantial damage to the lower fuselage keel beam, the inboard trailing edge flaps, and the landing gear doors. There were 67 passengers and a crew of 4 aboard. Seven passengers sustained minor injuries during evacuation of the airplane.

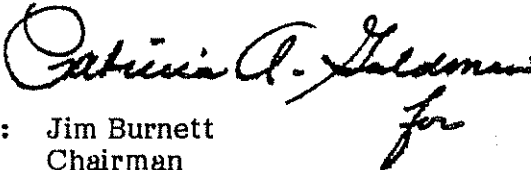
The National Transportation Safety Board's investigation centered on the hydraulic/mechanical operation of the landing gear system. Normal retraction and extension of the main landing gear occurs as follows: Selection of the cockpit gear handle to the up position initially directs hydraulic pressure to the door actuators to open the doors. The doors open downward and inboard. When the doors reach the full open position, the linkage mechanically sequences pressure to the retraction side of the main landing gear actuators. The landing gears then retract into the wheel wells and latch into mechanical up locks, and the gear position mechanically sequences pressure to the door actuators to close the doors. The doors are then driven upward and outboard to fit flush with the fuselage body contour. The landing gear door actuator piston rod includes an internal locking mechanism which locks the doors in place. Proper extension of the actuator also results in contact with a microswitch which extinguishes the door lights in the cockpit once the retraction cycle is completed. The gear extension cycle is essentially the reverse of the retraction cycle except hydraulic pressure is sequenced to the extension side of the main landing gear actuators.

During the investigation, it was found that with the accident airplane on jacks and the gear door removed, the left main landing gear operated normally both hydraulically and manually. Detailed examination of the left main gear door revealed that the inboard actuator arm to which the door actuator piston rod attaches was loose on its mount. The serrated arm is adjustable to allow for proper rigging of the doors and is fastened to its serrated mount by two attachment bolts. The bolt heads could be turned by hand, and there was evidence of fretting in the serrations on the arm and its mount. The Boeing 727 Maintenance Manual specifies that the attachment bolts be torqued to 25 to 42 foot-pounds after door rigging is completed.

Unwanted relative movement between the door actuator arm and its mount apparently resulted in a misrigged door which disrupted the mechanical sequencing of the hydraulic system so that hydraulic pressure was not supplied to the main gear actuator during attempts to extend the gear. Further, the mechanical interference between the gear and the door mechanism apparently prevented manual extension of the gear. Although the investigation is continuing, we believe that the above condition might exist on other Boeing 727 airplanes and could result in landing gear malfunctions. Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive to require an immediate inspection of the inboard attachment fittings for the actuator arms of the main landing gear doors on Boeing 727 airplanes for proper torque and security of the two attachment bolts; and if any evidence of looseness or relative motion in the fitting is found to require that the gear doors be rerigged. The Airworthiness Directive should further require that the fittings be checked daily during maintenance preflight inspections. (Class I, Urgent Action) (A-83-2)

BURNETT, Chairman, GOLDMAN, Vice Chairman, and McADAMS and BURSLEY, Members, concurred in this recommendation. ENGEN, Member, did not participate.

  
By: Jim Burnett  
Chairman