



# National Transportation Safety Board

Washington, D.C. 20594  
Safety Recommendation

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**Date:** February 9, 1998  
**In reply refer to:** A-98-7

Honorable Jane F. Garvey  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

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On September 8, 1996, a United Airlines Boeing 737-322, N332UA, experienced what the flightcrew described as severe airframe vibration accompanied by feedback through the rudder pedals after departure from Newark International Airport, Newark, New Jersey. The pilots indicated to the air traffic controller that they would return to the airport and then landed without incident.

While investigating this occurrence, the National Transportation Safety Board was informed of a previous event that had occurred on August 6, 1993. In this event, a United Airlines Boeing 737-300, N340UA, which had departed from LaGuardia Airport, Flushing, New York, encountered intermittent high amplitude vibration in the rudder pedals. The flight diverted to Newark, New Jersey, where it landed without incident.

According to United Airlines, after the first event, N340UA was placed on jacks to simulate the flight mode. It was noted that application of the main wheel brakes caused a kickback or vibration in the rudder pedals. This vibration subsided when either the antiskid system or the "B" system hydraulics were turned off. Also, United Airlines issued an operational alert bulletin to its flightcrews that described the event. United Airlines has attributed the rudder pedal vibrations on both the August 6, 1993, and September 8, 1996, incidents to inadvertent activation by the pilot of the main wheel brakes while in flight.

According to the Boeing Commercial Airplane Group, the antiskid system prevents skidded or blown tires on landing should the pilot inadvertently apply the brakes before touchdown. In the air mode, instability in the brake pedals can occur when the pedals are rapidly depressed, and results in an oscillation of the brake pedals and the rudder.

This condition affects the B-737-300, 737-400, and 737-500 series airplanes. Discussions with Boeing revealed that although the Boeing 737 operations manual states, "...Do not apply brakes after becoming airborne. Braking is automatically applied when the Landing Gear Lever is placed in the UP position..." there is no warning or mention of the possibility of rudder and

rudder pedal vibration in the FAA-approved airplane flight manual.<sup>1</sup> In addition, the operations manual does not mention the consequences of applying the brakes in flight or any corrective action necessary to stop rudder pedal vibration that could result from that action. The Safety Board is concerned that as long as this condition exists, it should be appropriately annotated in the FAA-approved airplane flight manual, along with the appropriate corrective actions defined. Therefore, the Safety Board believes that the FAA should require Boeing to make an addition to the FAA-approved airplane flight manual and abnormal procedures to state that severe vibration of the rudder and rudder pedals may be experienced if the main wheel brakes are applied while airborne and to describe corrective action necessary to terminate the vibration, for Boeing 737 airplanes that are subject to braking system vibrations from airborne brake application.

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

Require the Boeing Commercial Airplane Group to make an addition to the FAA-approved airplane flight manual and abnormal procedures to state that severe vibration of the rudder and rudder pedals may be experienced if the main wheel brakes are applied while airborne and to describe corrective action necessary to terminate the vibration, for Boeing 737 airplanes that are subject to braking system vibrations from airborne brake application. (A-98-7)

Chairman HALL and Members HAMMERSCHMIDT and BLACK concurred in this recommendation. Vice Chairman FRANCIS and Member GOGLIA did not concur.

By:

  
Jim Hall  
Chairman

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<sup>1</sup> On some other airplanes it is common practice to apply the brakes shortly after takeoff to stop the main landing gear wheels from spinning in the wheel wells after gear retraction. This action prevents wheel vibration as the wheels spin down to a stop.