

Log 2445



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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Date: October 20, 1993

In reply refer to: A-93-133 through -135

Honorable David R. Hinson  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

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On March 24, 1993, a Boeing 737-300 operated by USAir was taxiing for takeoff when an off-duty captain on board as a passenger noticed that the wing spoiler panels were extended. A flight attendant immediately notified the flightcrew, who were not aware that the spoiler panels were extended. The airplane was taxied back to the gate for examination by maintenance personnel.

Examination revealed that the speed brake down control cable had failed at a point where it rides over a pulley in the right main landing gear well. This cable runs from the speed brake control lever in the cockpit to the spoiler ratio changer in the right main landing gear well. The spoiler panels can be extended by the speed brake control lever when the airplane is airborne or after landing to increase aerodynamic drag. If the speed brake down control cable fails, the spoiler panels are prevented from subsequently retracting when the speed brake control lever is moved back into the down position.

USAir determined that the speed brake down control cable failed because it had been misrouted. Instead of being routed on the pulley adjacent to the spoiler ratio changer, the cable was riding atop two spacers that attach cable guards to the pulley. Wear from riding on these spacers caused the cable to fail 14 inches from the spoiler ratio changer.

The Safety Board researched the service history of speed brake down control cable failures on Boeing 737 aircraft (all series of which use the same cable configuration) and determined that this was the third failure attributed to misrouting. No problems other than misrouting have been identified that can cause the cable to fail at this location.

The first failure occurred on a Boeing 737-200. Boeing reported in a 1986 In-Service Activities Report that a flightcrew was unable to retract the spoiler panels after

landing. An examination revealed that the speed brake down control cable had failed approximately 14 inches from the spoiler ratio changer. The cable had been misrouted atop the cable guard spacers during original manufacture. Also in its 1986 report, Boeing stated that eight operators had inspected 53 other airplanes that had production line positions close to that of the airplane with the failed cable. In all cases, the speed brake down control cable had been correctly routed on the pulley and beneath the cable guard spacers. Boeing reported that improved production inspection procedures had been implemented to ensure that the speed brake down control cable would be properly routed.

The second failure occurred on a Boeing 737-300. Boeing reported in a 1990 In-Service Activities Report that an operator discovered a speed brake down control cable misrouted atop the two cable guard spacers during routine maintenance. The cable had separated strands where it had been riding on the spacers but had not yet failed. The investigation determined that the cable had been misrouted during original manufacture. Again, Boeing stated that improved inspection procedures had been implemented to ensure that the speed brake down control cable would be properly routed during production.

In the March 24, 1993, incident, USAir believes the cable was misrouted during manufacture, while Boeing believes the cable was misrouted during subsequent maintenance performed by USAir. A review of the Boeing 737 Maintenance Manual revealed that there were instructions on how to rig and check tension on the cable, but there were no instructions or illustrations to inform maintenance personnel how to properly route this cable.

The Safety Board is concerned about the possibility of additional speed brake down control cable failures. Two failure scenarios are of particular concern. First, if the cable fails on the ground after an airplane lands, all ten spoiler panels will remain extended when the lever is placed in the down position. Since the takeoff configuration warning is based on control lever position and not actual spoiler position, the crew may be unaware that spoiler panels are extended when taking off (as would have been the case in the USAir incident had it not been for an observant off-duty captain). Secondly, if the cable fails in flight, the four flight spoiler panels will not retract when the lever is placed in the down position. The resultant higher-than-normal drag condition and changes in flight characteristics would have an adverse effect on the airplane's performance during continued flight.

Following the March 1993 incident, USAir issued a campaign directive that called for an inspection of speed brake down control cable routing on all 236 of its Boeing 737 aircraft. No further instances of cable misrouting were identified. The Safety Board supports the initiative taken by USAir in performing this inspection and believes that the FAA should require all Boeing 737 operators to take the same precaution.

In addition, the Safety Board believes that the FAA should review the production inspection procedures used by the Boeing Company on the B737 to inspect the speed brake down control cable. If necessary, the procedures should be modified to ensure that the cable is properly routed. Also, the Board believes that the FAA should require that specific instructions be included in the Boeing 737 Maintenance Manuals so that operators have the information and illustrations required for proper routing of the speed brake down control cable.

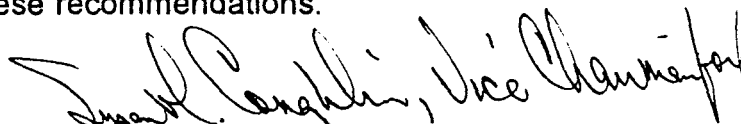
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Airworthiness Directive for a one-time inspection of all Boeing 737 series airplanes to determine if the speed brake down control cable is properly routed. Any cable found improperly routed should be removed and replaced before the airplane returns to service. (Class I, Urgent Action) (A-93-133)

Review the procedures used by the Boeing Company to inspect speed brake down control cable routing on newly manufactured airplanes. If necessary, modify the procedures to ensure that the cable is properly inspected. (Class II, Priority Action) (A-93-134)

Require the Boeing Company to modify its Model 737 Maintenance Manuals to include the information required for proper routing and inspection when performing maintenance on the speed brake down control cable. (Class II, Priority Action) (A-93-135)

Chairman VOGT, Vice Chairman COUGHLIN, Members LAUBER, HAMMERSCHMIDT, and HALL concurred in these recommendations.



By: Carl W. Vogt  
Chairman

AFFECTED PULLEY LOCATION  
(SEE NEXT PAGE)

