

National Transportation Safety Board
Washington, DC 20594

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Brief of Accident

Adopted 11/15/1999

DCA94MA076 File No. 2066	09/08/1994	ALIQUIPPA, PA	Aircraft Reg No. N513AU	Time (Local): 19:03 EDT		
Make/Model:	Boeing / B-737-300			Fatal	Serious	Minor/None
Engine Make/Model:	Cfm / CFM65-3-B2/1		Crew	5	0	0
Aircraft Damage:	Destroyed		Pass	127	0	0
Number of Engines:	2					
Operating Certificate(s):	Flag Carrier/Domestic					
Name of Carrier:	USAIR					
Type of Flight Operation:	Scheduled; Domestic; Passenger Only					
Reg. Flight Conducted Under:	Part 121: Air Carrier					
Last Depart. Point:	CHICAGO, IL			Condition of Light:	Day	
Destination:	PITTSBURG, PA			Weather Info Src:	Witness	
Airport Proximity:	Off Airport/Airstrip			Basic Weather:	Visual Conditions	
				Lowest Ceiling:	0 Ft. AGL, Unknown	
				Visibility:	15.00 SM	
				Wind Dir/Speed:	Light and Variable	
				Temperature (°C):	23	
				Precip/Obscuration:		
Pilot-in-Command	Age: 45			Flight Time (Hours)		
Certificate(s)/Rating(s)				Total All Aircraft:	12000	
Airline Transport; Commercial; Flight Engineer; Multi-engine Land				Last 90 Days:	112	
				Total Make/Model:	12381	
Instrument Ratings				Total Instrument Time:	UnK/Nr	
Airplane						

The airplane crashed while maneuvering to land at Pittsburgh International Airport. The airplane entered an uncontrolled descent and impacted terrain about 6 miles east of the airport. The airplane struck the ground at an angle of descent of about 80 degrees, in a slight roll to the left, and the airspeed was about 260 knots at impact. The investigation revealed that during the accident sequence, the airplane rudder deflected rapidly to the left and reached its left aerodynamic blowdown limit shortly thereafter. Examination of the rudder system revealed that it is possible, in the main rudder power control unit (PCU) of the airplane (as a result of some combination of tight clearances within the servo valve, thermal effects, particulate matter in the hydraulic fluid, or other unknown factors), the servo valve secondary slide could jam to the servo valve housing at a position offset from its neutral position without leaving any obvious physical evidence and that, combined with rudder pedal input, could have caused the rudder to move opposite to the direction commanded by a rudder pedal input. This condition of the PCU was also consistent with analysis of the cockpit voice recorder, computer simulation, and human performance data, including operational factors

Brief of Accident (Continued)

DCA94MA076				
File No. 2066	09/08/1994	ALIQUIPPA, PA	Aircraft Reg No. N513AU	Time (Local): 19:03 EDT

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: APPROACH - VFR PATTERN - DOWNWIND

Findings

1. (C) FLIGHT CONTROL, RUDDER SURFACE - UNCOMMANDED
2. (C) FLIGHT CONTROL, RUDDER - JAMMED

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - UNCONTROLLED

Findings

3. AIRCRAFT CONTROL - NOT POSSIBLE

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings

4. TERRAIN CONDITION - GROUND

Findings Legend: (C) = Cause, (F) = Factor

The National Transportation Safety Board determines the probable cause(s) of this accident as follows.
A loss of control of the airplane resulting from the movement of the rudder surface to its blowdown limit. The rudder surface most likely deflected in a direction opposite to that commanded by the pilots as a result of a jam of the main rudder power control unit servo valve secondary slide to the servo valve housing offset from its neutral position and overtravel of the primary slide.