SP-20

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National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: August 31, 1989
In reply refer to: A-89-98

Honorable James B. Busey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On May 2, 1989, a McDonnell Douglas MD-82 operated by American Airlines enroute from Seattle, Washington, to Chicago, Illinois, was landed at the Minneapolis/St. Paul Airport after the flightcrew discovered a problem with the hydraulic systems. There were no injuries and the airplane sustained only minor damage to the landing gear doors.

The National Transportation Safety Board determined that the power transfer unit shutoff valve (PTU S/O), a component of the hydraulic system, had failed. Inspection of the valve, P/N 240695, disclosed that the mounting plate attachment screws failed, allowing the right-half valve body to separate from the plate. This condition caused the airplane's left hydraulic system to be disabled because of a loss of hydraulic fluid. Disassembly of the valve at the manufacturer's facility, Whittaker Controls Inc., Burbank, California, indicated that the valve geartrain was bound up and immobilized when the valve body separated; this condition prevented the valve from operating and thereby disabled the airplane's right hydraulic system. The failure of both of the airplane's hydraulic systems disabled all of the hydraulically powered systems except the thrust reversers and main landing gear brakes, which remained operational for a limited time only because of reserve power from accumulators.

Discussions with American Airlines, McDonnell Douglas, and Whittaker Controls during the Safety Board investigation revealed that American Airlines has had five failures of the Whittaker Controls P/N 240695 PTU S/O valve. Whittaker Controls has redesigned the PTU S/O valve to prevent the type of failure that occurred in this incident and has published Service Bulletin 240695-29-1, which provides a modified valve actuation arrangement. The modification includes improved strength valve body attachment screws, welded valve bodies, steel gears, and a shear pin in the motor-to-valve geartrain. The modified valve has been reidentified as P/N 240695-1. The improvements in the design of the 240695-1 PTU S/O valve have been engineered to ensure the safe operation of the MD-80 series airplane's hydraulic systems.

McDonnell Douglas has released All Operators Letters (AOL) 9-1668B and AOL 9-1951 to inform operators of the modifications available. The AOLs also recommend operator implementation and note that McDonnell Douglas MD-80 series production will incorporate the improved valve on fuselage number 1456 and subsequent airplanes.

The Safety Board believes that the potential loss of hydraulic power in the MD-80 series airplanes poses a significant safety problem. Although the airplane has been demonstrated and certified to be capable of flying safely without hydraulic power, the Safety Board believes that every effort must be made to ensure that both hydraulic systems will function as designed. Of particular concern to the Safety Board is the effect that hydraulic system failure would have on landing performance, as a result of the loss of the use of flaps and normal wheel brakes. Diversion of the airplane to an airport with a longer runway may not be possible under some circumstances.

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

> Issue an Airworthiness Directive to require the replacement of the Whittaker Controls P/N 240695 power transfer unit shutoff valve with the Whittaker Controls P/N 240695-1 power transfer unit shutoff valve on all airplanes equipped with P/N 240695. (Class II, Priority Action)(A-89-98)

KOLSTAD, Acting Chairman, BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in this recommendation.

By: James L. Kolstad
Acting Chairman