

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 4, 1979

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-79-45 and -46

This correspondence is to confirm and amplify the data given during a telephone recommendation on June 2 when our Director, Bureau of Technology contacted your Associate Administrator for Aviation Standards. We recommended urgent actions regarding further inspection of DC-10 aircraft as a result of the most recent findings of our investigation of the accident involving N110AA on May 25, 1979.

While complying with the FAA's initial Airworthiness Directive requiring inspection of the engine pylon mounting structure of DC-10 aircraft, American Airlines found two aircraft in their fleet, N106AA and N119AA, with damage to the pylon aft bulkhead. The aft bulkhead is the structural element which contains the spherical bearing which carries the aft attachment of the pylon to a mating clevis on the wing structure. This fitting provides the major reaction to vertical and side loads imposed on the pylon. The aft bulkhead fitting has a continuous flange on the forward side to which the main pylon structure is attached. The damage observed on both N106AA and N119AA was a crack in the center of the horizontal upper flange directly beneath the attachment bearing. The crack on N106AA was reportedly 2 inches long and the crack on N119AA was reportedly 5 inches long. When examined visually it was apparent that the crack in N106AA was caused by physical impact. Further investigation disclosed that this impact likely occurred when the pylon was installed during previous maintenance. American Airlines had begun a program last fall to comply with Douglas Aircraft Co. Service Bulletins 54-48 and 54-59 when the aircraft were undergoing periodic checks at their maintenance facility in Tulsa, Oklahoma. This maintenance was performed on N106AA on December 7, 1978, and on N119AA on March 19, 1979.

Compliance with these Service Bulletins requires that the pylon be lowered from the wing structure for the installation of new bearings in the forward and aft bulkhead fittings. American Airlines' procedures for removing and reinstalling the pylon consisted of lowering and raising the pylon with the engine still attached,

by supporting the entire assembly by a forklift placed under the engine. Board personnel who observed this procedure noted that the forklift operator had limited control in the precise placement of the aft bulkhead fitting into the wing-mounted clevis during reinstallation of the pylon. Vertical misalignment of a fraction of an inch can result in the pylon aft bulkhead upper horizontal flange assembly striking the forward ear of the wing-mounted clevis, causing the flange to crack. The Board believes that this occurred on both N106AA and N119AA. The installation geometry of the pylon aft bulkhead and the lower wing structure is such that an inspector cannot observe the cracked area easily. Thus, any damage which has occurred as a result of the installation procedure is likely to be undetected.

While the investigation of the accident involving N110AA is continuing, preliminary evidence indicates that the forward flange on the No. 1 pylon aft bulkhead fitting had failed completely. Metallurgical examination disclosed that there was a preexisting crack about 10 inches long in the same area where cracks were evident on the other two aircraft. N110AA had been subjected to the engine removal and reinstallation procedure on March 30, 1979. The aircraft had accrued 430 flight hours since that time.

Although the Douglas Service Bulletin specifies removal of the engine before removal and reinstallation of the pylon to wing attachment fittings, the Safety Board is aware that several operators are using the same procedure as American Airlines. The Safety Board is particularly concerned that other aircraft in the DC-10 fleet may have been damaged and that additional aircraft will be damaged as a result of actions which are presently being undertaken to correct deficiencies uncovered during the latest required inspections. The Safety Board, therefore, believes that urgent actions are required to prevent such damage from resulting in an accident.

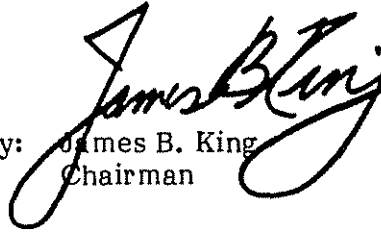
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue a telegraphic Airworthiness Directive to require an immediate inspection of all DC-10 aircraft in which an engine pylon assembly has been removed and reinstalled for damage to the wing-mounted pylon aft bulkhead, including its forward flange and the attaching spar web and fasteners. Require removal of any sealant which may hide a crack in the flange area and employ eddy-current or other approved techniques to ensure detection of such damage. (Class I, Urgent Action) (A-79-45)

Issue a Maintenance Alert Bulletin directing FAA Maintenance Inspectors to contact their assigned carriers and advise them to immediately discontinue the practice of lowering and raising the pylon with the engine still attached. Carriers should adhere to the procedure recommended by the Douglas Aircraft Company Service Bulletin which include removing the engine from the pylon before removing the pylon from the wing. (Class I, Urgent Action) (A-79-46)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and HOGUE, Members concurred in the above recommendations.

By: James B. King
Chairman

A handwritten signature in black ink, appearing to read "James B. King". The signature is written in a cursive style with a large, sweeping initial "J".