

4. Safety Recommendations

As a result of this accident, the National Transportation Safety Board has recommended that the Federal Aviation Administration:

Issue immediately an emergency Airworthiness Directive to inspect all pylon attach points on all DC-10 aircraft by approved inspection methods. (Class I, Urgent Action) (A-79-41)

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)

Issue a Maintenance Alert Bulletin to U.S. certificated air carriers, and notify States that have regulatory responsibilities over foreign air carriers operating DC-10 aircraft, to require appropriate structural inspections of the engine pylons following engine failures involving significant imbalance conditions or severe side loads. (Class I, Urgent Action) (A-79-52)

Incorporate in type certification procedures consideration of:

- (a) Factors which affect maintainability, such as accessibility for inspection, positive or redundant retention of connecting hardware and the clearances of interconnecting parts in the design of critical structural elements; and
- (b) Possible failure combinations which can result from primary structural damage in areas through which essential systems are routed. (Class II--Priority Action) (A-79-98)

Insure that the design of transport category aircraft provides positive protection against asymmetry of lift devices during critical phases of flight; or, if certification is based upon

demonstrated controllability of the aircraft under condition of asymmetry, insure that asymmetric warning systems, stall warning systems, or other critical systems needed to provide the pilot with information essential to safe flight are completely redundant. (Class II--Priority Action) (A-79-99)

Initiate and continue strict and comprehensive surveillance efforts in the following areas:

- (a) Manufacturer's quality control programs to assure full compliance with approved manufacturing and process specifications; and
- (b) Manufacturer's service difficulty and service information collection and dissemination systems to assure that all reported service problems are properly analyzed and disseminated to users of the equipment, and that appropriate and timely corrective actions are effected. This program should include full review and specific FAA approval of service bulletins which may affect safety of flight. (Class II--Priority Action) (A-79-100)

Assure that the Maintenance Review Board fully considers the following elements when it approves an Airline/Manufacturer Maintenance Program:

- (a) Hazard analysis of maintenance procedures which involve removal, installation, or work in the vicinity of structurally significant ^{1/} components in order to identify and eliminate the risk of damage to those components;
- (b) Special inspections of structurally significant components following maintenance affecting these components; and
- (c) The appropriateness of permitting "On Condition" maintenance and, in particular, the validity of sampling inspection as it relates to the detection of damage which could result from undetected flaws or damage to structurally significant elements during manufacture or maintenance. (Class II--Priority Action) (A-79-101)

Require that air carrier maintenance facilities and other designated repair stations:

^{1/} Structurally significant items as defined in Appendix 1 of Advisory Circular 120-17A-"Maintenance Control By Reliability Methods."

- (a) Make a hazard analysis evaluation of proposed maintenance procedures which deviate from those in the manufacturer's manual and which involve removal, installation, or work on the majority of structurally significant components; and
- (b) Submit proposed procedures and analysis to the appropriate representative of the Administrator, FAA, for approval. (Class II--Priority Action) (A-79-102)

Revise 14 CFR 121.707 to more clearly define "major" and "minor" repair categories to insure that the reporting requirement will include any repair of damage to a component identified as "structurally significant." (Class II--Priority Action) (A-79-103)

Expand the scope of surveillance of air carrier maintenance by:

- (a) Revising 14 CFR 121 to require that operators investigate and report to a representative of the Administrator the circumstances of any incident wherein damage is inflicted upon a component identified as "structurally significant" regardless of the phase of flight, ground operation, or maintenance in which the incident occurred; and
- (b) Requiring that damage reports be evaluated by appropriate FAA personnel to determine whether the damage cause is indicative of an unsafe practice and assuring that proper actions are taken to disseminate relevant safety information to other operators and maintenance facilities. (Class II--Priority Action) (A-79-104)

Revise operational procedures and instrumentation to increase stall margin during secondary emergencies by:

- (a) Evaluating the takeoff-climb airspeed schedules prescribed for an engine failure to determine whether a continued climb at speeds attained in excess of V_{LO} , up to $V_{LO} + 10$ knots, is an acceptable means of increasing stall margin without significantly degrading obstacle clearance.
- (b) Amending applicable regulations and approved flight manuals to describe optimum takeoff-climb airspeed schedules; and
- (c) Evaluating and modifying as necessary the logic of flight director systems to insure that pitch commands in the takeoff and go-around modes correspond to optimum airspeed schedules as determined by (a) and (b) above. (Class II--Priority Action) (A-79-105)