

Development of the Supplemental Structural Inspection Program

In order to evaluate the effect of increased fatigue cracking, with respect to maintaining fail-safe design and damage tolerance of the structure of McDonnell Douglas Model DC-9-81 (MD-81), DC-9-82 (MD-82), DC-9-83 (MD-83), DC-9-87 (MD-87) and MD-88 airplanes (commonly referred to as Model MD-80 and MD-88 airplanes), Boeing conducted a structural reassessment of those airplanes, using modern damage tolerance evaluation techniques. Boeing accomplished this reassessment using the criteria contained in AC No. 91-56, as well as 14 CFR 25.571; Amdt. 25-45. During the reassessment, members of the airline industry participated with Boeing in working group sessions and developed the SSIP for Model MD-80 and MD-88 airplanes. Engineers and maintenance specialists from the FAA also attended these sessions to observe these developments. Subsequently, based on the working group's recommendations, Boeing developed the Supplemental Inspection Document (SID) for Model MD-80 and MD-88 airplanes.

Aging Aircraft Safety Act (AASA)

In October 1991, Congress enacted Title IV of Public Law 102-143, the AASA of 1991, to address aging aircraft concerns. That Act instructed the FAA administrator to prescribe regulations that will ensure the continuing airworthiness of aging aircraft.

SSID Team

In April 2000 the Transport Airplane Directorate (TAD) chartered a SSID Team to develop recommendations to standardize the SID/SSID ADs regarding the treatment of repairs, alterations, and modifications (RAMs). The report can be accessed at <http://www.faa.gov/certification/aircraft/transport.htm>.

FAA Responses To AASA

In addition to the SSID Team activity, there are other on-going activities associated with FAA's Aging Aircraft Program. This includes, among other initiatives, our responses to the AASA.

On November 1, 2002, as one of the responses to the AASA, we issued the Aging Airplane Safety Interim Final Rule (AASIFR) (67 FR 72726, December 6, 2002). The applicability of that rule addresses airplanes that are operated under part 121 of the FAR (14 CFR part 121), all U.S. registered multi-engine airplanes operated under part 129 of the FAR (14 CFR part 129), and all multi-engine airplanes used in scheduled operations under part 135 of the Federal Aviation Regulations (14 CFR part 135).

The AASIFR requires the maintenance programs of those airplanes to include damage tolerance-based inspections and procedures that include all major structural RAMs. Currently, the ASSIFR requires that these procedures must be established and incorporated within four years after December 8, 2003, the effective date specified by the AASIFR.

Public Technical Meeting

The TAD also held a public meeting regarding standardization of the FAA approach to RAMs in SID/SSID ADs on February 27, 2003, in Seattle, Washington. We presented our views and heard comments from the public concerning issues regarding the standardization of the requirements of ADs for certain transport category airplanes that mandate SSIDs and that address the treatment of RAMs for those certain transport category airplanes. Our presentation included a plan for the standardization of SID/SSID ADs, the results of the SSID Team findings, and the TAD vision of how SID/SSID ADs may support compliance to the AASIFR. We also asked for input from operators on the issues addressing RAMs in SID/SSID ADs. One of the major comments presented at the public meeting was that operators do not have the capability to accomplish the damage tolerance assessments, and they will have to rely on the manufacturers to perform those assessments. Furthermore, the operators believe that the timeframes to accomplish the damage tolerance assessments will not permit manufacturers to support the operators. Another major comment presented was from the Airworthiness Assurance Working Group (AAWG) of the Aviation Rulemaking Advisory Committee (ARAC). The AAWG requested that we withdraw the damage tolerance requirements from the final rule and task AAWG to develop a new RAM damage tolerance based program with timelines to be developed by ARAC. The public meeting presentations can be accessed at <http://www.faa.gov/certification/aircraft/transport.htm>.

Explanation of Relevant Service Information

The FAA has reviewed and approved Boeing Report No. L26-022, "MD-80 Supplemental Inspection Document (SID)," Revision B, dated March 2003, which provides a description of Principal Structural Elements (PSEs) and Non Destructive Inspection (NDI) procedures and thresholds with repetitive inspection intervals for inspections of PSEs. For the purposes of this AD, a PSE is defined as an element that contributes significantly to the

carrying of flight, ground or pressurization loads, and the integrity of that element is essential in maintaining the overall structural integrity of the airplane.

The FAA also has reviewed and approved McDonnell Douglas Report No. MDC 91K0263, "DC-9/MD-80 Aging Aircraft Repair Assessment Program Document," dated July 1997, which provides procedures to determine the appropriate inspection or replacement program for certain repairs to the fuselage pressure boundary. These repairs and inspection/replacement programs are acceptable alternative methods of compliance for the repair and repair inspection programs specified in this proposed AD.

Explanation of Requirements of Proposed Rule

Since an unsafe condition has been identified that is likely to exist or develop on other products of this same type design, the proposed AD would require implementation of a structural inspection program of baseline structure to detect and correct fatigue cracking in order to ensure the continued airworthiness of airplanes as they approach the manufacturer's original fatigue design life goal.

Revision of the Maintenance Program

Paragraph (a) of the proposed AD would require a revision of the maintenance inspection program that provides for inspection(s) of the PSE per Boeing Report No. L26-022, "MD-80 SID," Revision B, dated March 2003. PSEs are also defined and specified in the SID. All references in this AD to the "SID" are to Revision B dated March 2003.

Supplemental Inspection Program (SIP)

Paragraph (b) of the proposed AD would specify that the supplemental inspection program be implemented on a PSE-by-PSE basis before structure exceeds its 75% fatigue life threshold ($\frac{3}{4}N_{th}$), and its full fatigue life threshold (N_{th}). The threshold value is defined as the life of the structure measured in total landings, when the probability of failure reaches one in a billion. The MD-80 SID program is not a sampling program. All airplanes would be inspected once prior to reaching both PSE thresholds (once by $\frac{3}{4}N_{th}$ and once by N_{th}). In order for the inspection to have value, no PSE would be inspected prior to half of the fatigue life threshold, $\frac{1}{2}N_{th}$. The additional $\frac{3}{4}N_{th}$ threshold aids in advancing the threshold for some PSEs as explained in Section 3 of Volume I, of the SID. Inspection of each PSE should be accomplished in