

Purpose

April 13, 2001

This summary is intended as an update to the results of ATSRAC Tasks 1-5. In addition, this file provides information concerning the addition of four new tasks.

Background

Previous correspondence provided the partial results of the first two tasks assigned to the Aging Transport Rulemaking Advisory Committee (ATSRAC). These tasks entailed a non-intrusive inspection of wiring installed on eighty-one airplanes, an intrusive inspection of wiring removed from six airplanes, a review of the electrical service history of eight airplane models, and a review of airworthiness directives (AD) requiring repetitive inspections. This message provides the results of the intrusive wiring inspections and the repetitive-action AD review.

On January 17/18 2001 the results of the three remaining tasks assigned to ATSRAC were presented by the working groups. The results of these tasks, which involved a review of the wiring standard practices documentation, review of electrical systems maintenance practices, and a review of available electrical systems training, are provided below.

As the two-year charter of ATSRAC expired on 20 January 2001, the FAA rechartered ATSRAC for an additional two years and assigned four new tasks. These tasks include a review and consolidation of existing FAR Part 25 regulations regarding electrical systems, development of a specification for format and content of the standard wiring practices documents, definition of an enhanced training program for electrical systems, and development of enhanced maintenance practices for airplane systems. Each task is discussed in more detail below.

Finally, the FAA has outlined their expectations for implementation of the recommendations made by ATSRAC to date. This program, identified as the Enhanced Airworthiness Program for Airplane Systems (EAPAS), is discussed in more detail below.

Task 1. Aircraft Condition Survey

As indicated previously, a total 182 of 3215 items noted during the non-intrusive survey were deemed significant enough to warrant additional evaluation. None of the 3215 items reviewed by the eight working groups were found to be obvious and immediate fleetwide safety of flight concerns. Five of the 182 total significant items are expected to result in airplane or procedural changes.

The intrusive wiring inspection conducted to determine the adequacy of visual inspection found that visual inspection could probably not be relied upon to detect degraded repair, cracking, arcing, or delamination. Where these conditions may occur, and

where the consequence of wire failure is unacceptable, other means for prevention and mitigation must be used. Though some specific degenerative conditions cannot be directly observed, correlation of other findings with the existence of these conditions is, in some cases, possible.

The intrusive report contains twenty-eight specific conclusions regarding the risk associated with uncorrected degenerative conditions, and recommends options for prevention or mitigation of failure. The working group recommended that these conclusions and recommendations be considered when revising best practice documentation and advisory material. However, the conclusions are not sufficiently specific to serve as mandatory design or maintenance requirements.

Task 2 Service History Review

Previous correspondence also provided the process used and the results from the service history review. The review of hundreds of documents applicable to electrical systems on the eight airplane models has resulted in the identification of twenty-eight service bulletins for additional emphasis. The FAA is presently developing notices of proposed rulemaking on those service bulletins.

In addition to the service history review the eight individual airplane model working groups were tasked with identifying existing ADs that include continued repetitive actions, and recommend which of those ADs should have a mandated terminating action. Of the seventy-nine ADs identified, eight were recommended by the working groups as necessitating termination action. By airplane model, these eight are:

DC-8

88-11-03 Inspect feeder cables for arcing
92-27-06 Inspect rudder pedal adjuster hub

DC-9

89-06-03 Inspect fuel supply hose for mfr date (DC-9 and DC-10)
92-02-04 Inspect rudder actuator for internal leakage
98-11-10 inspect speedbrake latching lever pin

DC-10

79-15-14 Inspect slat system drive and cable assemblies
92-16-03 Inspect lateral control mixer bracket
95-11-02 Inspect NLG lock links

In addition, because of the similarity to AD 92-27-06 on the DC-8, Boeing believes that AD 96-02-05 should be considered by the FAA for terminating action.

The FAA has begun developing worksheets for evaluation of regulatory action to mandate termination of the aforementioned ADs.

Task 3 Maintenance Enhancement

Originally when defined in January 1999 this task had five main components; review and revise MSG-3 processes, define improved electrical system inspection criteria, define practices to eliminate wire bundle contamination, establish a process to link line maintenance and shop maintenance actions, and define acceptable criteria for corrosion of components. The last two items were later removed from the task.

The recommendations posted by the Working Group and accepted by ATSRAC are expected to lead to an improvement in the method for developing scheduled maintenance programs and an enhancement of the current practices used during on-airplane maintenance.

The four main enhancements in maintenance criteria are:

- Development of an enhanced zonal analysis logic that complements the existing MSG-3 zonal analysis procedures
- Clarification of the definition of a general visual inspection and guidance on what is expected from performance of a zonal inspection
- Identification of protection and cautions to be added to maintenance instructions which will lead to minimization of contamination and accidental damage during maintenance
- Recognition of the need to revisit maintenance programs to ensure that appropriate instructions for continued airworthiness exist for single element, dual loadpath designs in flight controls systems

Task 4 Update Standard Practices for Wiring

Task 4 entailed a review and update of standard practices for wiring to both define standards for simplified standard practices and define a process of training development.

Recommendations emanating from this review resulted in the following recommendations:

- Aircraft and component manufacturers should provide standard practices for care and maintenance of wiring systems
- Add requirements in ATA 100/i2200 for standard practices for wiring systems which should include a structure of major sections for standard practices dealing with wire, cable and other components of the aircraft's electrical system
- Establish the requirement for recurrent qualification training of maintenance technicians to include WDM Chapter 20 content, supporting documentation including ATA Spec 117, and applicable FAA advisory circulars
- Encourage all applicable training programs to highlight prevention as priority number one and "clean-as-you-go"
- Highlight the human factors element during training for all disciplines to assure that standard practices are followed.

Task 5 Electrical Systems Training Programs

The last task assigned to ATSRAC required review of air carrier and repair station inspection and repair training programs in order to recommend actions to address aging systems, define desired attributes of future training programs, and define model inspection and repair training programs.

Based on training gaps identified during accomplishment of the the aging systems program the training working group, with the input of regulatory bodies and industry, has built a definitive course of instruction. This course outline includes the following modules:

Introduction - safety, tools, troubleshooting.

Chapter 20 - overall structure.

Inspection - general and detailed, damage.

Housekeeping - contamination & cleaning.

Wire - identification, inspection & repair

Connectors - inspection and repair.

Connector Repair - specific repair procedures.

Line Replaceable Units - connector repair

These individual modules are split into sections and subsections, and are objective driven with measurable skills. Subsections are used to author teaching notes by the instructor for specific airplanes and students. The entire program is intended to be tailored to a particular operator's needs, or may be taken in its entirety.

ATSRAC - New Tasks Assigned

As indicated above, the FAA rechartered ATSRAC for additional two years and assigned four additional tasks. These proposed tasks, have not yet been entered into the Federal Register and are not finalized, but are partly the result of the recommendations from the previous five tasks, and are partly the result of issues identified outside of the initial tasking. A brief description of each major task, and the individual subtasks are provided below:

Task 6 - Wire System Certification

Review of the electrical system certification regulations revealed that improvement could be made by consolidating and clarifying the requirements. As such the FAA has asked ATSRAC to review and consolidate existing FAR Part 25 regulations regarding electrical systems, review existing advisory material, and submit recommendations for necessary changes to the certification requirements. Specific aspects of the task include the adequacy of FAR 25-1309 coverage, wire separation requirements and definition of system criticality.

Task 7 - Standardize Standard Wiring Practices Documentation

Using the recommendations emanating from Task 4, the FAA has asked that ATSRAC develop a specification for format and content of the standard wiring practices documents. Although a format was not provided, the Task 4 working group recommended the inclusion of:

- Cleaning requirements and methods
- Wire and cable identification
- Wire and cable damage limits
- Installation clamping and routing requirements
- Repair and replacement procedures
- Inspection methods

Task 8 Enhanced Training Program for Wire Systems

The FAA has tasked ATSRAC to provide a recommended wire system training program that could be incorporated into an FAA advisory circular and JAA advisory material. The wire system training program is expected to apply to air carrier operations, repair station programs, and other operators of transport aircraft.

Minimum content of an enhanced wire systems training program is expected to include:

- Safe installation, maintenance and operation
- Modes of degradation of wire installations
- Lightning/HIRF protection
- Corrosion of components
- Contamination
- Accumulation of dust, lint, and debris
- Damage prevention and cleaning

This task includes not only the content of a training program, but will also define the recurring frequency at which training will be required.

Task 9 Enhanced Maintenance Programs for Systems

The FAA has identified a need to define general criteria for maintenance and inspection activities which maintenance programs should exhibit to address aging systems issues. Enhancements are needed to the maintenance planning procedures, maintenance procedures, inspection procedures, inspection criteria, procedures for protection of systems during maintenance, and maintenance training programs to ensure that aging systems issues are adequately addressed. These enhancements, when applied to a specific airplane type should lead to development of an airplane model-specific maintenance program which adequately addresses aging systems issues.

To assist the FAA in formulating appropriate guidance for defining an acceptable maintenance program for systems, ATSRAC is tasked to provide a recommendation for enhancing maintenance

programs for systems. The outcome of the recommendations will be included in an FAA AC and JAA ACJ which will provide a basis for establishing an enhanced maintenance program that addresses aging systems issues. This AC shall be directed toward those CFR 14 Part 25 Transport Category aircraft currently being used in part(s) 91, 121, 125, and 129 operations.

FAA Enhanced Airworthiness Program for Airplane Systems (EAPAS)

In addition to the nine tasks mentioned above, the FAA is presently developing programs aimed at improved information sharing, enhanced reporting and analysis of wire problems, and aging systems research and development. Present research and development programs concern arc fault detection, circuit breaker inspection and maintenance, and automated wire inspection techniques; while anticipated R&D projects include wire separation and wire performance requirements.

The FAA has indicated that implementation of the results from the nine tasks, plus the results of the EAPAS programs noted above will include PART 25 rule changes, new operations rules to part(s) 91, 121, 125, and 129 operations, the release of at least two advisory circulars to provide guidance along these lines, a special federal aviation regulation (SFAR), and a change to Appendix H of the Instructions for Continued Airworthiness (FAR 25-1529).

Although the schedule for release of these changes has not yet been established, Boeing expects that release will begin to occur as early as January 2002.

Summary

The original membership of ATSRAC continue to be actively involved in the four additional tasks as a component of EAPAS. However, ATSRAC, the JAA and the FAA are actively soliciting increased operator participation. Given the extensive changes to airline operations and maintenance, coupled with the expected implementation within eight months, operator participation is crucial to ensuring that the forthcoming enhancements are practical and beneficial.

Operators interested in participating in this program may contact either of the following individuals for additional information:

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