

Widespread Fatigue Damage (WFD) Notice of Proposed Rulemaking (NPRM)

November 29, 2006



Federal Aviation
Administration



Purpose and Ground Rules

Purpose of Presentation:

To provide an overview of and rationale for the differences between the ARAC WFD recommendation and the WFD NPRM.

Ground Rules for Discussion:

Due to ex parte communication concerns, we will only discuss the differences and rationale.

We will not cover if or how the final rule will be modified to address the comments received to the NPRM.

We can address questions requesting clarification of the points being made, but cannot address comments on the NPRM or rationale, or requests for the FAA to revise the rule.

FAA Tasking and ARAC Recommendations

- **The FAA issued two tasks in 1999.**
 - First task requested that ARAC propose new operating rules (14 CFR parts 91, 121, 125, 129, and 135) to address WFD.
 - Second task requested that ARAC review part 25 (section 25.571 and Appendix H) and recommend changes to provide compatibility with the operational rules addressing WFD.
- **In 2001 and 2003, ARAC made two rulemaking recommendations relative to widespread fatigue damage.**



2001 ARAC Recommendation

- **FAA should issue an operational rule that requires operators incorporate:**
 - A “structural maintenance program” into its maintenance program and a “limit of validity” (LOV) of the maintenance program.
 - A revised structural maintenance program with a revised LOV into its maintenance program in order to continue operation.
 - A program to address existing and new repairs and alterations.



2003 ARAC Recommendation

- **FAA should issue a revision to section 25.571 that requires applicants:**
 - Show the airplane free from WFD up to the “limit of validity” (LOV) of the maintenance program.
 - Incorporate the LOV into the Airworthiness Limitation section of the Instructions for Continued Airworthiness.



Differences between recommendation and NPRM

Areas of differences:

- Applicability of Rule
- Limit of Validity (LOV) vs. Initial Operation Limit (IOL)
- Baseline Program for Existing Airplanes
- Compliance Dates for Baseline Program
- Airplane Configuration
- Repairs and Alterations
- Methodology for Addressing Repairs and Alterations (Guidelines)
- Extended LOV vs Extended Operational Limit (EOL)
- New Certification Programs



Applicability of Rule

ARAC Recommendation

The rule should apply to:

- Airplanes operated under part 91, 121, 125, 129, or 135 with a maximum takeoff gross weight (MTGW) of greater than 75,000 lbs.
- All future part 25 airplanes (new certification).

FAA NPRM

The proposal applies to:

- Airplanes operated under part 121 or 129 with:
 - MTGW of greater than 75,000 lbs.
 - MTGW of less than 75,000lbs and later increased to greater than 75,000 lbs.
- All future part 25 airplanes (new certification).



Applicability of Rule

Rationale for FAA NPRM approach:

- To ensure a cost-beneficial regulatory evaluation, the FAA reduced the scope of the proposed operational rule.
- The FAA found it necessary to address those airplanes originally certificated to a MTGW of 75,000 lbs or less that had been later modified to a MTGW greater than 75,000 lbs.



LOV vs. IOL

ARAC Recommendation

- Require an limit of validity (LOV) of the maintenance program to be established.
- LOV of the maintenance program is the point in time in flight cycles or hours, where additional inspections and/or modification/replacement actions must be incorporated into the operator's maintenance program in order to continue operation.

FAA NPRM

- Require an initial operational limit (IOL) to be established.
- IOL is the period of time, stated as a number of total accumulated flight cycles or flight hours, beyond which an airplane may not be operated.
- Operation beyond an operational limit would require incorporation of an extended operational limit and necessary inspections, modifications or replacements.

LOV vs. IOL

Rationale for FAA NPRM approach:

- The FAA anticipated that the term “limit of validity” (LOV) of the maintenance program could be misinterpreted: it could imply that an entire maintenance program would be invalid at some point.
- Since the AAWG’s clarification of the LOV definition stated it represented an “operational limit,” the FAA decided to use that term instead of LOV.
 - Both the LOV and IOL have the effect of limiting the operation of the airplane, unless further work is done

Baseline Program for Existing Airplanes

ARAC Recommendation

- DAH: No requirement.
- Operator: Incorporate a structural maintenance program into its maintenance program and “limit the validity” (LOV) of the maintenance program.
 - Structural maintenance program includes SSIP, CPCP, RAP, and mandatory modification program (Aging Aircraft Program).

FAA NPRM

- DAH: Perform an evaluation to determine when WFD is likely to occur and to establish an IOL.
 - Maintenance actions developed per FAA-approved schedule (i.e., binding schedule).
 - IOL incorporated into Airworthiness Limitations section (ALS).
- Operator: Incorporate ALS that includes the IOL into its maintenance program.



Baseline Program for Existing Airplanes

Rationale for FAA NPRM approach:

- The Design Approval Holder (DAH) requirements support operator compliance with the operational rule:
 - FAA Aging Airplane Program Update (published 7/30/04)
 - FAA's policy on Design Approval Holder Rules (published 7/12/05)
- The NPRM did not include SSIP, CPCP, RAP or the mandatory modification programs because they have been mandated by airworthiness directives (AD) or operational rules, or voluntarily incorporated through MSG-3.



Baseline Program for Existing Airplanes

Rationale for FAA NPRM approach continued:

- During discussions with AAWG, it was thought that type certificate (TC) holders would:
 - Set an initial LOV at approximately DSG (all airplanes)
 - Provide a program for operators to accomplish after they have passed the initial LOV (DSG)
 - Set new LOV at 125-150% of the DSG
- TC holders later presented a different approach to operators and the FAA.
 - No initial LOV at DSG
 - Baseline program is accomplished by Service Bulletins and ADs
 - Set LOV at 125-150% of the DSG
- The NPRM uses the approach described in the second bullet.



Compliance Dates for Baseline Program

ARAC Recommendation

- DAH: No requirement.
- Operator: Incorporate LOV within 12 months after rule effective date

FAA NPRM

- DAH: Establish IOL by 12/18/07
 - 12-month compliance time after rule effective date
- Operator: Incorporate the IOL by 6/18/08
 - 18-month compliance time after rule effective date



Compliance Dates for Baseline Program

Rationale for FAA NPRM approach:

- The Design Approval Holder (DAH) requirements support operator compliance with the operational rule:
 - FAA Aging Airplane Program Update (published 7/30/04)
 - FAA's policy on Design Approval Holder Rules (published 7/12/05)
- In order to achieve FAA objectives to complete implementation of rule by 2010, hard compliance dates were proposed.



Airplane Configuration

ARAC Recommendation

Configuration is defined as “baseline” structure.

FAA NPRM

Configuration is defined as “baseline” structure **plus ADs mandating modifications or replacements.**



Airplane Configuration

Rationale for FAA NPRM approach:

- The DAH should evaluate their airplane configuration as it exists today, which includes configuration changes mandated by AD.



Repairs and Alterations

ARAC Recommendation

LOV

- DAH: No requirement.

FAA NPRM

Initial operational limit

- DAH: Address certain existing repairs and alterations up to the initial operational limit.
 - TC holder to evaluate their repairs and alterations (e.g., service bulletins and structural repair manuals) by 12/18/09.
 - STC holder to evaluate their alterations by 12/18/10.
- Applicant: Address new alterations by 12/18/10 or the date the certificate is issued, whichever occurs later.



Repairs and Alterations (continued)

ARAC Recommendation

LOV

- Operator: Address all repairs and alterations susceptible to WFD.
 - Within 48 months after airplane reaches its initial LOV (DSG), address existing repairs and alterations for WFD.
 - Within 18 months after installation, evaluate new repairs and alterations and establish inspection and/or modification threshold.

FAA NPRM

Initial operational limit

- Operator: Address repairs and alterations susceptible to WFD for which airworthiness directives have been issued.

Extended operational limit (EOL)

- Person seeking approval of EOL: Evaluate existing repairs and alterations for each affected airplane.
- Operator: Address new repairs and alterations within 90 days after installation.



Repairs and Alterations

Rationale for FAA NPRM approach:

- The main concern for WFD is the baseline airplane structure.
- Existing non-TC holder repairs are not evaluated unless an EOL is established. Approach provided by ARAC delays evaluation to 48 months after reaching LOV, such that the evaluation of existing repairs may not happen.
- New repairs should be less of a concern than existing repairs.
- If LOVs were established much higher than DSG, existing repairs and alterations would not be evaluated (under approach recommended by ARAC).
- FAA approach ensures most repairs and alterations would be evaluated.

Guidelines

ARAC Recommendation

No recommendations for developing specific guidelines.

- AAWG provided general criteria.

FAA NPRM

Proposed that TC holders develop guidelines for evaluating repairs and alterations.

- The FAA tasked ARAC to develop guidance material relative to assessing repairs and alterations (May 2004).



Guidelines

Rationale for FAA NPRM approach:

- Since the proposed AC from ARAC did not provide a means of compliance for repairs and alterations, the FAA needed to address this in our proposal.



Extended LOV vs. EOL

ARAC Recommendation

The operators' maintenance program must be revised to include a new structural maintenance program (inspections and modification/replacement actions to the **baseline structure**) and a new/extended LOV in order to continue operation.

FAA NPRM

To establish an EOL, the airplane **configuration must include “baseline” structure and ADs plus repairs and alterations.**



Extended LOV vs. EOL

Rationale for FAA NPRM approach:

- Configuration included repairs and alterations to ensure repairs and alterations not evaluated under IOL were addressed under the EOL.
- ARAC delays evaluation of existing repairs and alterations to 48 months after reaching LOV.
- If LOVs are established much higher than DSG, existing repairs and alterations would not be evaluated (under approach recommended by ARAC).
- The main concern for WFD is the baseline airplane structure.



New Certification Programs

ARAC Recommendation

- TC Applicant:
 - Establish an **LOV** and demonstrate with full-scale fatigue test evidence that WFD will not occur up to the **LOV**.
 - Incorporate the **LOV** into the ALS.
- Compliance by the completion of the certification test or FAA-approved schedule.

FAA NPRM

- TC Applicant:
 - Establish an **IOL** and demonstrate with full-scale fatigue test evidence that WFD will not occur up to the **IOL**.
 - Incorporate the **IOL** into the ALS.
- Compliance by the completion of the certification test or FAA-approved schedule.



Summary

- We identified nine areas of differences between the ARAC WFD recommendation and the WFD NPRM.
- We explained our rationale for those differences.
 - Possible misinterpretation of the term “LOV”
 - Incorporation of design approval holder requirements
 - Change in approach in setting LOV by TC holders
 - Means of compliance for repairs and alterations not provided by ARAC

