Supporting Statement
Widespread Fatigue Damage

1. Explain the circumstances that make the collection of information necessary. Identify any legal or administrative requirements that necessitate the collection.

This final rule requires actions to preclude WFD in transport category airplanes. It applies to both existing transport category airplanes that have a maximum takeoff gross weight greater than 75,000 pounds and to all transport category airplanes to be certified in the future, irrespective of the maximum takeoff weight.

(1) Section 26.21 [§ 26.21(b)] requires design approval holders to establish a limit of validity (LOV) of the engineering data that supports the maintenance program for affected airplane models. This section requires design approval holders to evaluate the airplane structural configuration of each model for which they hold a type certificate to determine its susceptibility to WFD and, if susceptible, that it would not occur before the LOV. The evaluation would be based on test data, analyses and, if available, service history, and teardown inspections of high-time airplanes. Using the results of the evaluation, the design approval holder must then establish an LOV. Section 26.21 also requires, unless previously accomplished, design approval holders establish an Airworthiness Limitations section (ALS) for each airplane structural configuration evaluated, incorporate the applicable LOV and submit it to the FAA Oversight Office for approval.

Section 26.21 [§ 26.21(d)] requires that design approval holders develop and submit a compliance plan to the FAA for approval. The purpose of the compliance plan is to ensure that affected persons and the FAA have a common understanding and agreement of what is necessary to achieve compliance with these sections. The plan will also ensure that the affected persons produce the ALS and service information in a timely manner that is acceptable in content and format. Integral to the compliance plan will be the inclusion of procedures to allow the FAA to monitor progress toward compliance. These aspects of the plan will help ensure that the expected outcomes will be acceptable and on time for incorporation by the affected operators into their maintenance programs in accordance with the operational rules contained in this proposal.

(2) Section 121.1115 and 129.115 require operators of an affected airplane to incorporate into their maintenance programs the Airworthiness Limitations section of the Instructions for Continued Airworthiness that includes an LOV for the airplane. The amendments to parts 121 and 129 have the effect of prohibiting operation of an airplane beyond its LOV.[1]

(3) Section 25.571 and Appendix H require applicants of future transport airplane designs to include the LOV in the airplane's Airworthiness Limitations section of the Instructions for Continued Airworthiness. The LOV will apply regardless of how or by whom the airplane is operated.

[1] Under 14 CFR 91.403(c), no person may operate an airplane contrary to its applicable airworthiness limitations. By requiring operators to incorporate the LOV airworthiness limitations developed by the design approval holders under this rule, this final rule makes those LOVs applicable to the affected airplanes, and § 91.403(c) requires operators to comply with them.

(4) Section 26.23 allows any person to extend the LOV for an airplane, if the person can demonstrate that it will be free of WFD up to the extended LOV, and to develop a maintenance program that supports the extended limit. The extended LOV is optional. To operate beyond the initial LOV or any subsequent LOV, the operator must incorporate the extended LOV and the associated maintenance actions into its maintenance program and may not operate the airplane beyond that limit.

This collection of information supports the DOT strategic goal of safety.

2. Indicate how, by whom, and for what purpose the information is to be used.

TC and STC holders would use the documentation to demonstrate to their FAA Oversight Office that they are compliant with the rule by establishing limits of validity (LOVs) of the engineering data that supports the maintenance program. Operators would submit the LOV to their Principal Maintenance Inspectors to demonstrate that they are compliant with the rule. When the airplane is sold or transferred, the new owner would comply with the ALS requirements. An operator may not operate an airplane beyond its LOV, unless the operator has incorporated an extended LOV and associated maintenance actions.

The compliance plan required by § 26.21(d) will be used by the FAA to assist the design approval holder in complying with its requirements. This requirement is modeled substantially on "The FAA and Industry Guide to Product Certification," which is currently used for developing project-specific certification plans for type certification programs to ensure that the project proceeds in a timely manner and reaches its original goal. It is necessary in this instance because the rule also contains requirements for operators to incorporate the LOV into their maintenance programs. The rule specifies a date by which the design approval holder must make the LOV available to operators. The operators' compliance date, 12 months after the design approval holders' compliance date, is also specified in the rule. If the design approval holder has not produced the LOV by the specified compliance date, operators will not have the information they need. If the design approval holder produces the LOV 6 months late, then the operators will have only 6 months, instead of 12 months, until their specified compliance date. So the compliance plan is necessary to ensure that the design approval holder is progressing towards successful completion of the LOV and that there will be no unexpected delays to prevent their timely completion.

3. Describe any consideration of information technology used to reduce burden as well as any technical or legal obstacles to reducing burden.

FAA Order 8000.79 dated March 22, 2002, provides procedures for the use of electronic technology when requested by any person required to comply with any of the regulations listed in paragraph 5 of the order. The procedures would also apply to the WFD rule. Based on Order 8000.79, the FAA will actively work with industry on the technical and legal aspects of accepting electronic documents from design approval holders and operators.

Historically, the FAA has required persons to send paper documents to the FAA for review and approval. These documents include formal signatures. The FAA may accept draft documents electronically for review. However, the acceptance of electronic signatures is an obstacle to accepting electronic documents for FAA approval. Because of this, the approval process under the WFD rule would require affected persons to send paper documents to the FAA for final

review and approval. This would remain the practice until a written procedure is agreed upon with any person who chooses to use electronic technology to comply with the WFD rule.

We estimate that approximately 10% of the design approval holders and operators will submit the information electronically.

For recordkeeping, we do not require that operators keep their records in any special format.

4. Describe efforts to identify duplication. Show specifically why any similar information already available cannot be used or modified for use for the purpose(s) described in 2 above.

These documents will be developed by TC and STC holders for operators to comply with this rule. There is no evidence of duplication as this information is not currently available elsewhere.

5. If the collection of information has a significant impact on a substantial number of small businesses or other small entities (item 14 of the Paperwork Reduction Act submission form), describe the methods used to minimize burden.

This rule will not have a significant economic impact on a substantial number of small entities for the following reasons.

1. Entities potentially affected by this rule include part 25 manufacturers; applicants for future type certificates; applicants for certain future supplemental type certificates (STCs) and amended type certificates; and part 121 and 129 operators of transport category airplanes.

2. The FAA uses the size standards from the Small Business Administration for Air Transportation and Aircraft Manufacturing, which specifies companies having less than 1,500 employees as small entities.

3. The current United States part 25 airplane manufacturers that are affected include: Boeing, Lockheed Martin, and McDonnell Douglas (a wholly-owned subsidiary of The Boeing Company). These manufacturers will incur type certificate (TC) and amended TC costs. Because all U.S. transport-aircraft category manufacturers have more than 1,500 employees, none are considered small entities.

4. Future type certificate applicants will incur additional compliance costs. These applicants will incur the cost only if the applicant believes the expected revenue from additional sales will exceed the expected cost. While future STC and amended TC costs will be passed on to airplane operators, it is not possible to determine which operator will buy and install such STCs. Because expected revenue will be greater than the expected cost, the FAA believes there will not be a significant impact on a substantial number of STC applicants.

5. The FAA has determined that: No part 25 manufacturers are small entities, there will not be a significant impact on a substantial number of amended TC or STC applicants, and the estimated operator compliance cost will not be significant.

The FAA will provide guidance material to aid those impacted by the WFD rule.

6. Describe the consequence to Federal program or policy activities if the collection is not conducted or is conducted less frequently.

If the collection was not conducted or was conducted less frequently, then it would be impossible for operators to comply with the rule.

7. Explain any special circumstances that require the collection to be conducted in a manner inconsistent with the general information collection guidelines in 5 CFR 1320.5(d)(2)(i)-(viii).

There is only one circumstance that requires the collection to be inconsistent with the guidelines in 5 CFR 1320.5(d)(2) and that is the requirement that the airplane records be maintained for the life of the airplane.

8. Describe efforts to consult persons outside the agency to obtain their views on the availability of data, frequency of collection, the clarity of instructions and recordkeeping, disclosure, or reporting format (if any), on the data elements to be recorded, disclosed, or reported.

The FAA based this rule on a recommendation from the Aviation Rulemaking Advisory Committee (ARAC), which comprises, in part, representatives from various type certificate holders and operators.

This rule was published as an NPRM on April 18, 2006. Information describing the collection requirements proposed therein was included in the NPRM and comments were requested at that time. We received 61 comment submissions about the proposed rules from 40 commenters. We did receive comments on the development of LOV by design approval holders, the compliance plan, training programs, and the maintenance program changes. These comments, and our responses, are discussed in the final rule.

9. Explain any decision to provide any payment or gift to respondents, other than remuneration of contractors or grantees.

Not applicable.

10. Describe any assurance of confidentiality provided to respondents and the basis for the assurance in statute, regulation, or agency policy.

Respondents are not given assurance of confidentiality. Certain records would be available through the Freedom of Information Act.

11. Provide additional justification for any questions of a sensitive nature, such as sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private.

There are no questions of a sensitive nature.

12. Provide estimates of the hourly burden of the collection of information.

This final rule would result in an annual record keeping and reporting burden as follows:

Documents Required to Show Compliance with the Rule	Average Annual Hours	Present Value Discounted ($2007) Cost
FAA-approved revised or new ALS	132	$10,551
FAA-approved WFD compliance plan	436	$20,547
FAA-approved maintenance program revision for operators	29	$5,321
Total	597	$36,419

The FAA computed the annual recordkeeping (total hours) burden by analyzing the necessary paperwork requirements needed to satisfy each process of the rule. The average cost per hour varies due to the number of affected airplanes in each group, the amount of engineering time required to develop programs, and the amount of time required for each inspection.

13. Provide an estimate of the total annual cost burden to respondents or record keepers resulting from the collection of information.

There are no costs the FAA has not already included in Question 12.

14. Provide estimates of annualized cost to the Federal Government.

Conservatively assuming that half of the time will be spent by the operator filing the maintenance plans and half of the time will be spent by the FAA reviewing the maintenance plan, the average annualized cost to the Federal Government will be $18,210.

15. Explain the reasons for any program changes or adjustments reported in Items 13 or 14 of the OMB Form 83-1.

This is a new collection.

16. For collections of information whose results will be published, outline plans for tabulation, and publication.

The FAA will publish a notice in the Federal Register informing the public that the LOVs are available on an FAA website when this information is received from the design approval holders.

17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons that display would be inappropriate.

Approval to not display the expiration date is not requested.

18. Explain each exception to the certification statement identified in Item 19, "Certification for Paperwork Reduction Act submissions," of OMB Form 83-1.

There are no exceptions.

Appendix A – § 25.571 and Appendix H

§ 25.571 Damage-tolerance and fatigue evaluation of structure.

(a) * * *

(3) Based on the evaluations required by this section, inspections or other procedures must be established, as necessary, to prevent catastrophic failure, and must be included in the Airworthiness Limitations section (ALS) of the Instructions for Continued Airworthiness required by § 25.1529. The limit of validity of the engineering data that supports the maintenance program (hereafter referred to as limit of validity), stated as a number of total accumulated flight cycles or flight hours or both, established by this section must also be included in the ALS of the Instructions for Continued Airworthiness required by § 25.1529. Inspection thresholds for the following types of structure must be established based on crack growth analyses and/or tests, assuming the structure contains an initial flaw of the maximum probable size that could exist as a result of manufacturing or service-induced damage:

* * * * *

(b) *Damage-tolerance evaluation.* The evaluation must include a determination of the probable locations and modes of damage due to fatigue, corrosion, or accidental damage. Repeated load and static analyses supported by test evidence and (if available) service experience must also be incorporated in the evaluation. Special consideration for widespread fatigue damage must be included where the design is such that this type of damage could occur. A limit of validity must be established that corresponds to the period of time, stated as a number of total accumulated flight cycles or flight hours or both, during which it is demonstrated that widespread fatigue damage will not occur in the airplane structure. This demonstration must be by full-scale fatigue test evidence. The type certificate may be issued prior to completion of full-scale fatigue testing, provided the Administrator has approved a plan for completing the required tests, and the Airworthiness Limitations section of the Instructions for Continued Airworthiness required by § 25.1529 of this part specifies that no airplane may be operated beyond a number of cycles equal to ½ the number of cycles accumulated on the fatigue test article, until such testing

is completed. The extent of damage for residual strength evaluation at any time within the operational life of the airplane must be consistent with the initial detectability and subsequent growth under repeated loads. The residual strength evaluation must show that the remaining structure is able to withstand loads (considered as static ultimate loads) corresponding to the following conditions:

* * * * *

APPENDIX H TO PART 25—INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

3. Amend H25.4 by revising paragraph (a)(1), reserving paragraph (a)(3), and adding paragraph (a)(4) to read as follows.

H25.4 Airworthiness Limitations section.

* * * * *

(a) * * *

(1) Each mandatory modification time, replacement time, structural inspection interval, and related structural inspection procedure approved under § 25.571;

(2) * * *

(3) [Reserved]

(4) A limit of validity (LOV) of the engineering data that supports the maintenance program, stated as a total number of accumulated flight cycles or flight hours or both, approved under § 25.571 of this part. Until the full-scale fatigue testing is completed and the FAA has approved the LOV, this section must set forth a number of cycles not greater than ½ the number of cycles accumulated on the fatigue test article.

* * * * *

Appendix B – § 26.21

§ 26.21 Limit of validity (LOV).

(a) *Applicability*. Except as provided in paragraph (g), this section applies to transport category, turbine powered airplanes with a type certificate issued after January 1, 1958, and —

(i) maximum takeoff gross weights greater than 75,000 pounds as approved during the original type certification of the airplane; or

(ii) maximum takeoff gross weights of 75,000 pounds or less, and later increased to greater than 75,000 pounds by an amended type certificate or supplemental type certificate.

(b) *Limit of validity.* Each person identified in paragraph (c) of this section must comply with the following requirements:

(1) Establish an LOV of the engineering data that supports the maintenance program (hereafter referred to as LOV) that corresponds to the period of time, stated as a number of total accumulated flight cycles or flight hours or both, during which it is demonstrated that widespread fatigue damage will not occur in the airplane. This demonstration must include an evaluation of airplane structural configurations and be supported by test evidence, analysis and, if available, service experience and teardown inspection results of high time airplanes of similar structural design, accounting for differences in operating conditions and procedures. The airplane structural configurations to be evaluated include—

(i) all model variations and derivatives approved under the type certificate; and

(ii) all structural modifications and replacements, to the airplane structural configurations specified in paragraph (b)(1)(i), mandated by airworthiness directives as of [insert effective date of the final rule].

(2) If the LOV depends on performance of maintenance actions for which service information has not been mandated by airworthiness directive as of [insert effective date of the final rule], submit the following to the FAA Oversight Office:

(i) For those maintenance actions for which service information has been issued as of the applicable compliance date specified in paragraph (c) of this section, a list identifying each of those actions.

(ii) For those maintenance actions for which service information has not been issued as of the applicable compliance date specified in paragraph (c) of this section, a list identifying each of those actions and a binding schedule for providing in a timely manner the necessary service information for those actions. Once the FAA Oversight Office approves this schedule, you must comply with that schedule.

(3) Unless previously accomplished, establish an Airworthiness Limitations section (ALS) for each airplane structural configuration evaluated under paragraph (b)(1) and submit it to the FAA Oversight Office for approval. The ALS must include the applicable LOV established under paragraph (b)(1) of this section.

(c) *Persons who must comply and compliance dates.* The following persons must comply with the requirements of paragraph (b) of this section by the specified date.

(1) Holders of type certificates (TC) of airplane models identified in Table 1 of this section: no later than the date identified in Table 1 of this section.

(2) Applicants for TCs, if the date of application was before [insert effective date of the final rule]: no later than [insert date 60 months after effective date], or the later of the following:

(i) the date the certificate is issued; or

(ii) the date the applicant demonstrates by full-scale fatigue test evidence under § 25.571(b) of this chapter that widespread fatigue damage will not occur in the airplane structure.

(3) Holders of either supplemental type certificates (STCs) or amendments to TCs that increase maximum takeoff gross weights from 75,000 pounds or less, to greater than 75,000 pounds: no later than [insert date 18 months after effective date].

(4) Applicants for either STCs or amendments to TCs that increase maximum takeoff gross weights from 75,000 pounds or less, to greater than 75,000 pounds: no later than [insert date 18 months after effective date], or the date the certificate is issued, whichever occurs later.

(d) *Compliance plan*. Each person identified in paragraph (e) of this section must submit a compliance plan consisting of the following:

(1) A proposed project schedule, identifying all major milestones, for meeting the compliance dates specified in paragraphs (c) and (h) of this section.

(2) A proposed means of compliance with paragraphs (b)(1) through (b)(3) of this section.

(3) A proposal for submitting a draft of all compliance items required by paragraphs (b) and (g) of this section for review by the FAA Oversight Office not less than 60 days before the compliance date specified in paragraph (c) or (h) of this section, as applicable.

(4) A proposal for how the LOV will be distributed.

(e) *Compliance dates for compliance plans*. The following persons must submit the compliance plan described in paragraph (d) of this section to the FAA Oversight Office by the specified date.

(1) Holders of type certificates (TC): no later than [insert date 90 days after effective date].

(2) Applicants for TCs, if the date of application was before [insert effective date of the final rule]: no later than [insert date 90 days after effective date].

(3) Holders of either supplemental type certificates (STC) or amendments to TCs that increase maximum takeoff gross weights from 75,000 pounds or less, to greater than 75,000 pounds: no later than [insert date 90 days after effective date].

(4) Applicants for either STCs or amendments to TCs that increase maximum takeoff gross weights from 75,000 pounds or less, to greater than 75,000 pounds, if the date of application was before [insert effective date of the final rule]: no later than [insert date 90 days after effective date].

(5) Applicants for either STCs or amendments to TCs that increase maximum takeoff gross weights from 75,000 pounds or less, to greater than 75,000 pounds, if the date of application was after [insert effective date of the final rule]: within 90 days after the date of application.

(f) *Compliance plan implementation*. Each affected person must implement the compliance plan as approved in compliance with paragraph (d) of this section.

(g) This section does not apply to the following airplane models:

(1) Bombardier BD-700

(2) Bombardier CL-44

(3) Gulfstream G-V

(4) Gulfstream G-VSP

(5) British Aerospace, Aircraft Group and Societe Nationale Industrielle Aerospatiale Concorde Type 1

(6) British Aerospace (Commercial Aircraft) Ltd., Armstrong Whitworth Argosy A.W. 650 Series 101

(7) British Aerospace Airbus, Ltd., BAC 1-11

(8) BAE Systems (Operations) Ltd., BAe 146

(9) BAE Systems (Operations) Ltd., Avro 146

(10) Lockheed 300-50A01 (USAF C141A)

(11) Boeing 707

(12) Boeing 720

(13) deHavilland D.H. 106 Comet 4C

(14) Illyushin Aviation IL 96T

(15) Bristol Aircraft Britannia 305

(16) Avions Marcel Dassault - Breguet Aviation Mercure 100C

(17) Airbus Caravelle

Appendix B – § 26.23

§ 26.23 Extended limit of validity (LOV).

(a) *Applicability.* Any person may apply to extend an LOV of the engineering data that supports the maintenance program (hereafter referred to as LOV) approved under § 25.571 of this subchapter, § 26.21 of this subpart, or this section. Extending an LOV is a major design change. The applicant must comply with the relevant provisions of subparts D or E of part 21 of this subchapter and paragraph (b) of this section:

(b) *Extended limit of validity.* Each person applying for an extended LOV must comply with the following requirements:

(1) Establish an extended LOV that corresponds to the period of time, stated as a number of total accumulated flight cycles or flight hours or both, during which it is demonstrated that widespread fatigue damage will not occur in the airplane. This demonstration must include an evaluation of airplane structural configurations and be supported by test evidence, analysis and, if available, service experience and teardown inspection results of high time airplanes of similar structural design, accounting for differences in operating conditions and procedures. The airplane structural configurations to be evaluated include—

(i) all model variations and derivatives approved under the type certificate for which approval for an extension is sought; and

(ii) all structural modifications and replacements to the airplane structural configurations specified in paragraph (b)(1)(i), mandated by airworthiness directive, up to the date of approval of the extended LOV.

(2) Establish a revision or supplement, as applicable, to the Airworthiness Limitations section (ALS) of the Instructions for Continued Airworthiness required by § 25.1529 of this subchapter, and submit it to the FAA Oversight Office for approval. The revised ALS or supplement to the ALS must include the applicable extended LOV established under paragraph (b)(1) of this section.

(3) Develop the maintenance actions determined by the WFD evaluation performed in paragraph (b)(1) of this section to be necessary to preclude WFD from occurring before the airplane reaches the proposed extended LOV. These maintenance actions must be documented as airworthiness limitation items in the ALS and submitted to the FAA Oversight Office for approval.

Appendix C – §§ 121.1115 and 129.115

§ 121.1115 Limit of validity (LOV).

(a) *Applicability*. This section applies to certificate holders operating any transport category, turbine powered airplane with a type certificate issued after January 1, 1958, and, as approved during the original type certification of the airplane, with a maximum takeoff gross weight—

(i) greater than 75,000 pounds; or

(ii) less than or equal to 75,000 pounds, and later increased to greater than 75,000 pounds by an amended type certificate or supplemental type certificate.

(b) *Limit of validity*. No certificate holder may operate an airplane identified in paragraph (a) of this section after the applicable date identified in Table 1 of this section, unless an Airworthiness Limitations section approved under appendix H to part 25 or § 26.21 of this chapter is incorporated into its maintenance program. The ALS must—

(1) include a LOV approved under § 25.571 or § 26.21 of this chapter, as applicable, except as provided in paragraph (f) of this section; and

(2) be clearly distinguishable within its maintenance program.

(c) *Operation of excluded airplanes*. No certificate holder may operate an airplane identified in § 26.21(g) of this chapter after [insert date 30 months after effective date], unless an Airworthiness Limitations section approved under appendix H to part 25 or § 26.21 of this chapter is incorporated into its maintenance program. The ALS must—

(1) include an LOV approved under § 25.571 or § 26.21 of this chapter, as applicable, except as provided in paragraph (f) of this section; and

(2) be clearly distinguishable within its maintenance program.

(d) *Extended limit of validity*. No certificate holder may operate an airplane beyond the LOV specified in paragraph (b)(1), (c), or (f)of this section, as applicable, unless the following conditions are met:

(1) An ALS must be incorporated into its maintenance program that—

(i) includes an extended LOV and any widespread fatigue damage (WFD) airworthiness limitation items (ALIs) approved under § 26.23 of this chapter; and

(ii) is approved under § 26.23 of this chapter;

(2) The extended LOV and the airworthiness limitation items pertaining to widespread fatigue damage must be clearly distinguishable within its maintenance program.

(e) *Principal Inspector approval.* Certificate holders must submit the maintenance program revisions required by paragraphs (b), (c), and (d) of this section to the Principal Maintenance Inspector for review and approval.

(f) *Exception*. For any airplane for which an LOV has not been approved as of the applicable compliance date specified in paragraph (c) or Table 1 of this section, instead of including an approved LOV in the ALS, an operator must include the applicable default LOV specified in Table 1 or Table 2 of this section, as applicable, in the ALS.