152629 FAA-2002-11345-2

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA- 2002-11345 **; Notice No.** 02-05 **]**

RIN 2120-AH36

Revised Requirement for Material Strength Properties and Design Values for Transport Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The Federal Aviation Administration proposes to revise the material strength properties and material design values requirement for transport category airplanes by incorporating changes developed in cooperation with the Joint Aviation Authorities of Europe and the U.S. and European aviation industry through the Aviation Rulemaking Advisory Committee (ARAC). This action is necessary because differences between the current U.S. and European requirements impose unnecessary costs on airplane manufacturers. These proposals are intended to achieve common requirements and language between the requirements of the U.S. regulations and the Joint Aviation Requirements (JAR) of Europe, while maintaining at least the level of safety provided by the current regulations and industry practice.

DATES: Send your comments on or before [insert date 60 days after date of publication in the Federal Register]

ADDRESSES:

Address your comments to the Docket Management System, U.S. Department of Transportation, Room Plaza 401, 400 Seventh Street SW., Washington, DC 20590-0001. You must identify the docket number, FAA-2002-11345 at the beginning of your comments, and you should submit two copies of your comments. If you wish to receive confirmation that the FAA has received your comments, please include a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. FAA-2002-XXXX." We will date-stamp the postcard and mail it back to you.

You also may submit comments electronically to the following Internet address: http://dms.dot.gov. You may review the public docket containing comments to these proposed regulations in person in the Dockets Office between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. The Dockets Office is on the plaza level of the NASSIF Building at the Department of Transportation at the above address. Also, you may review public dockets on the Internet at http://dms.dot.gov.

FOR FURTHER INFORMATION CONTACT: Rich Yarges, Airframe/Cabin Safety Branch, ANM-115, FAA Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue, SW., Renton, WA 98055-4056; telephone (425) 227-2143, facsimile (425) 227-1320, e-mail rich.yarges@faa.gov.

SUPPLEMENTARY INFORMATION:

How Do I Submit Comments to This NPRM?

Interested persons are invited to participate in the making of the proposed action by submitting such written data, views, or arguments as they may desire. Comments

relating to the environmental, energy, federalism, or economic impact that might result from adopting the proposals in this document also are invited. Substantive comments should be accompanied by cost estimates. Comments must identify the regulatory docket or notice number and be submitted in duplicate to the DOT Rules Docket address specified above.

All comments received, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking, will be filed in the docket. The docket is available for public inspection before and after the comment closing date.

We will consider all comments received on or before the closing date before taking action on this proposed rulemaking. Comments filed late will be considered as far as possible without incurring expense or delay. The proposals in this document may be changed in light of the comments received.

How Can I Obtain a Copy of This NPRM?

You can get an electronic copy using the Internet by taking the following steps:

(1) Go to the search function of the Department of Transportation's electronic Docket Management System (DMS) web page (http://dms.dot.gov/search).

(2) On the search page type in the last four digits of the Docket number shown at the beginning of this notice. Click on "search."

(3) On the next page, which contains the Docket summary information for the Docket you selected, click on the document number of the item you wish to view.

You can also get an electronic copy using the Internet through the Office of Rulemaking's web page at http://www.faa.gov/avr/armhome.htm or the Federal Register's web page at http://www.access.gpo.gov/su_docs/aces/aces140.html.

You can also get a copy by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue SW, Washington, DC 20591, or by calling (202) 267-9680. Make sure to identify the docket number, notice number, or amendment number of this rulemaking.

What Are the Relevant Airworthiness Standards in the United States?

In the United States, the airworthiness standards for type certification of transport category airplanes are contained in Title 14, Code of Federal Regulations (CFR) part 25. Manufacturers of transport category airplanes must show that each airplane they produce of a different type design complies with the appropriate part 25 standards. These standards apply to:

- airplanes manufactured within the U.S. for use by U.S.-registered operators, and
- airplanes manufactured in other countries and imported to the U.S. under a bilateral airworthiness agreement.

What Are the Relevant Airworthiness Standards in Europe?

In Europe, the airworthiness standards for type certification of transport category airplanes are contained in Joint Aviation Requirements (JAR)-25, which are based on part 25. These were developed by the Joint Aviation Authorities (JAA) of Europe to provide a common set of airworthiness standards within the European aviation community.

Twenty-three European countries accept airplanes type certificated to the JAR-25 standards, including airplanes manufactured in the U.S. that are type certificated to JAR-25 standards for export to Europe.

What is "Harmonization" and How Did it Start?

Although part 25 and JAR-25 are very similar, they are not identical in every respect. When airplanes are type certificated to both sets of standards, the differences between part 25 and JAR-25 can result in substantial additional costs to manufacturers and operators. These additional costs, however, frequently do not bring about an increase in safety. In many cases, part 25 and JAR-25 may contain different requirements to accomplish the same safety intent. Consequently, manufacturers are usually burdened with meeting the requirements of both sets of standards, although the level of safety is not increased correspondingly.

Recognizing that a common set of standards would not only benefit the aviation industry economically, but also maintain the necessary high level of safety, the FAA and the JAA began an effort in 1988 to "harmonize" their respective aviation standards. The goal of the harmonization effort is to ensure that:

- where possible, standards do not require domestic and foreign parties to manufacture or operate to different standards for each country involved; and
- the standards adopted are mutually acceptable to the FAA and the foreign aviation authorities.

The FAA and JAA have identified a number of significant regulatory differences (SRD) between the wording of part 25 and JAR-25. Both the FAA and the JAA consider "harmonization" of the two sets of standards a high priority.

What is ARAC and What Role Does it Play in Harmonization?

After initiating the first steps towards harmonization, the FAA and JAA soon realized that traditional methods of rulemaking and accommodating different administrative procedures was neither sufficient nor adequate to make appreciable progress towards fulfilling the goal of harmonization. The FAA then identified the Aviation Rulemaking Advisory Committee (ARAC) as an ideal vehicle for assisting in resolving harmonization issues, and, in 1992, the FAA tasked ARAC to undertake the entire harmonization effort.

The FAA had formally established ARAC in 1991 (56 FR 2190, January 22, 1991), to provide advice and recommendations concerning the full range of the FAA's safety-related rulemaking activity. The FAA sought this advice to develop better rules in less overall time and using fewer FAA resources than previously needed. The committee provides the FAA firsthand information and insight from interested parties regarding potential new rules or revisions of existing rules.

There are 64 member organizations on the committee, representing a wide range of interests within the aviation community. Meetings of the committee are open to the public, except as authorized by section 10(d) of the Federal Advisory Committee Act.

The ARAC establishes working groups to develop recommendations for resolving specific airworthiness issues. Tasks assigned to working groups are published in the

Federal Register. Although working group meetings are not generally open to the public, the FAA solicits participation in working groups from interested members of the public who possess knowledge or experience in the task areas. Working groups report directly to the ARAC, and the ARAC must accept a working group proposal before ARAC presents the proposal to the FAA as an advisory committee recommendation.

The activities of the ARAC will not, however, circumvent the public rulemaking procedures; nor is the FAA limited to the rule language "recommended" by ARAC. If the FAA accepts an ARAC recommendation, the agency proceeds with the normal public rulemaking procedures. Any ARAC participation in a rulemaking package is fully disclosed in the public docket.

What is the Status of the Harmonization Effort Today?

Despite the work that ARAC has undertaken to address harmonization, there remain a large number of regulatory differences between part 25 and JAR-25. The current harmonization process is extremely costly and time-consuming for industry, the FAA, and the JAA. Industry has expressed a strong desire to conclude the harmonization program as quickly as possible to alleviate the drain on their resources and to finally establish one acceptable set of standards.

Recently, representatives of the aviation industry [including Aerospace Industries Association of America, Inc. (AIA), General Aviation Manufacturers Association (GAMA), and European Association of Aerospace Industries (AECMA)] proposed an accelerated process to reach harmonization.

What is the "Fast Track Harmonization Program"?

In light of a general agreement among the affected industries and authorities to expedite the harmonization program, the FAA and JAA in March 1999 agreed upon a method to achieve these goals. This method, which the FAA has titled "The Fast Track Harmonization Program," is aimed at expediting the rulemaking process for harmonizing not only the 42 standards that are currently tasked to ARAC for harmonization, but approximately 80 additional standards for part 25 airplanes.

The FAA initiated the Fast Track program on November 26, 1999 (64 FR 66522). This program involves grouping all of the standards needing harmonization into three categories:

Category 1: Envelope – For these standards, parallel part 25 and JAR-25 standards would be compared, and harmonization would be reached by accepting the more stringent of the two standards. Thus, the more stringent requirement of one standard would be "enveloped" into the other standard. In some cases, it may be necessary to incorporate parts of both the part 25 and JAR standard to achieve the final, more stringent standard. (This may necessitate that each authority revises its current standard to incorporate more stringent provisions of the other.)

Category 2: Completed or near complete – For these standards, ARAC has reached, or has nearly reached, technical agreement or consensus on the new wording of the proposed harmonized standards.

Category 3: Harmonize – For these standards, ARAC is not near technical agreement on harmonization, and the parallel part 25 and JAR-25 standards cannot be

"enveloped" (as described under Category 1) for reasons of safety or unacceptability. A standard developed under Category 3 would be mutually acceptable to the FAA and JAA, with a consistent means of compliance.

Further details on the Fast Track Program can be found in the tasking statement (64 FR 66522, November 26, 1999) and the first NPRM published under this program, Fire Protection Requirements for Powerplant Installations on Transport Category Airplanes (65 FR 36978, June 12, 2000).

By notice in the Federal Register (60 FR 4222, January 20, 1995), the FAA tasked an ARAC working group of industry and government structural specialists from Europe, the United States, and Canada to review § 25.613 of part 25, along with corresponding paragraph 25.613 of the JAR, and supporting policy and guidance material, and to recommend to the FAA appropriate revisions for harmonization, including advisory material. The ARAC working group completed its work on that task and submitted its recommendation to the FAA. That effort was then absorbed under the Fast Track program when it was established in 1999. The regulatory changes proposed in this notice result from the recommendation of ARAC.

Discussion of the Proposal

Section 25.613 of part 25 prescribes requirements for material static strength properties and design values. Metallic material strength properties for aircraft manufactured in the U.S. have traditionally been based on those specified in Military Handbook (MIL-HDBK)-5. For metallic materials not listed in that handbook, the statistical procedures in the handbook were normally used to determine material strength

properties. Prior to Amendment 25-72 to part 25 (55 FR 29786, July 20, 1990), the "A" or "B" material strength properties listed in MIL-HDBK-5, or those listed in MIL-HDBK-17, and -23, or Army-Navy-Commerce (ANC)-18, were required to be used unless specific FAA approval was granted to use other properties. With Amendment 25-72, §§ 25.613 and 25.615 were combined into one requirement, § 25.613, and the references to MIL-HDBK-5, -17, -23, and ANC-18 were removed. As part of that amendment, the requirement to use "A" and "B" properties of the military handbook was replaced by a more general requirement specifying probabilities and confidence levels for material strength properties, with the test procedures and statistical methods unspecified. Those probability and confidence levels apply to metallic as well as non-metallic materials. In Europe, other standards have been used in showing compliance with JAR 25.613, such as the Euronorm, International Standard Organization, and Engineering Sciences Data Unit 00932 Metallic Data Handbook.

Because Amendment 25-72 removed the provision which permitted the Administrator to approve "other design values," such an approval requires an equivalent safety finding. This finding results in additional administrative time for both the manufacturer and the FAA. To reduce this administrative burden, the FAA proposes to revise the rule to reinstate the pre-amendment 25-72 provision. In addition, other changes of a clarifying nature are proposed.

Proposed Changes

This proposal would revise § 25.613 as follows:

- The heading of § 25.613 would be revised to read, "Material Strength Properties and Material Design Values." This change would clarify that the design values are material design values.
- Paragraph (a) would remain unchanged.
- Paragraph (b) would be revised to clarify that the design values are material design values. The "A" and "B" properties published in MIL-HDBK-5 and -17, or in equivalent handbooks, would be acceptable without further statistical analysis. The statistical methods specified in MIL-HDBK-5 and -17 would be acceptable for use in establishing material design values. Other statistical methods, amounts of data, and material property data might also be acceptable, including those specified in the European Standards previously noted.
- Paragraph (c) currently requires consideration of the effects of temperature on allowable stresses used for design where thermal effects are significant under normal operating conditions. The proposed revision would require consideration of environmental conditions in general, such as temperature and moisture, on material design values used in an essential component or structure, where those effects are significant in the airplane operating envelope. This change is made because environmental factors other than temperature may have a significant effect on allowable stresses, not only under normal operating conditions, but also at other conditions within the airplane operating envelope.

- Paragraph (d) would be removed by this proposal as fatigue is now adequately addressed in § 25.571.
- The premium selection process of paragraph (e) would be revised to clarify that the design values are material design values.
- A new paragraph (f) is proposed, which would permit the use of other design values if they are approved by the Administrator.

A draft Advisory Circular, AC 25.613-1X, Material Strength Properties and Material Design Values, which describes acceptable methods of compliance with this proposed rule, is being developed concurrently with this proposal. Public comments concerning the proposed AC are invited by separate notice published elsewhere in this issue of the Federal Register.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the FAA has determined that there are no requirements for information collection associated with this proposed rule.

International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has determined that there are no ICAO Standards and Recommended Practices that correspond to these proposed regulations.

Regulatory Evaluation Summary

Proposed changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs each Federal agency to propose or adopt a regulation only if the agency makes a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (19 U.S.C. section 2531-2533) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act requires agencies to consider international standards. Where appropriate, agencies are directed to use those international standards as the basis of U.S. standards. And fourth, the Unfunded Mandates Reform Act of 1995 requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules. This requirement applies only to rules that include a Federal mandate on State, local, or tribal governments or the private sector, likely to result in a total expenditure of $100 million or more in any one year (adjusted for inflation.)

In conducting these analyses, the FAA has determined this proposed rule: (1) has benefits which do justify its costs, is not a "significant regulatory action" as defined in the Executive Order, and is not "significant" as defined in DOT's Regulatory Policies and Procedures; (2) would not have a significant impact on a substantial number of small entities; (3) would not have an negative impact on international trade; and (4) would not impose an unfunded mandate on state, local, or tribal governments, or on the private sector. The FAA has placed these analyses in the docket and summarized them below.

The proposed rule would incorporate changes developed in cooperation with the Joint Aviation Authorities (JAA) of Europe and the U.S. and European aviation industry through the Aviation Rulemaking Advisory Committee (ARAC). If adopted, the proposed amendment would revise the requirements for material strength properties and material design values for transport category airplanes. Furthermore, the proposal would harmonize FAA requirements with those proposed by the JAA.

There would be no incremental costs as a result of the proposed rule. Rather, the proposed rule would result in cost savings to manufacturers and the FAA by reinstating a provision that permits the Administrator to approve other material design values published in accepted military and industry handbooks. A draft Advisory Circular (AC) accompanies this proposed rule and describes the acceptable methods of compliance. As a result, in certain material design values cases, the FAA estimates that the proposed rule would result in cost savings to manufacturers of transport category airplanes of at least $100,000 per initial aircraft certification. In addition, the FAA would realize an estimated administrative cost saving of approximately $1,460 per certification. Finally, by harmonizing JAA and FAA requirements, the proposed rule would create a single set of requirements accepted in both the United States and Europe. This action would foster international trade and make the aircraft certification process more efficient. Accordingly, the FAA has determined that the proposed rule would be cost-beneficial. The FAA solicits comments from affected entities with respect to this finding and determination and requests that all comments be accompanied by clear documentation.

Initial Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis as described in the Act.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the 1980 act provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

This proposed rule would affect manufacturers of transport category airplanes. However, all United States transport-aircraft category manufacturers exceed the Small Business Administration (SBA) small-entity standard of 1,500 employees for aircraft manufacturers. United States part 25 airplane manufacturers include: Boeing, Cessna

Aircraft, Gulfstream Aerospace, Learjet (owned by Bombardier), Lockheed Martin, McDonnell Douglas (a wholly-owned subsidiary of The Boeing Company), Raytheon Aircraft, and Sabreliner Corporation. Consequently, the Federal Aviation Administration certifies that the proposed rule would not have a significant economic impact on a substantial number of small entities. The FAA solicits comments from affected entities with respect to this finding and determination and requests that all comments be accompanied by clear documentation.

International Trade Impact Assessment

The Trade Agreement Act of 1979 prohibits Federal agencies from engaging in any standards or related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. In accordance with the above statute, the FAA has assessed the potential effect of this proposed rule and has determined that it complies with the Act because this rule would use European international standards as the basis for U.S. standards.

Unfunded Mandates Assessment

The Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March 22, 1995, is intended, among other things, to curb the practice of imposing unfunded Federal mandates on State, local, and tribal governments.

Title II of the Act requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may

result in a $100 million or more expenditure (adjusted annually for inflation) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action."

This proposed rule does not contain such a mandate. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

Executive Order 13132, Federalism

The FAA has analyzed this proposed rule and the principles and criteria of Executive Order 13132, Federalism. The FAA has determined that this action would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, the FAA has determined that this notice of proposed rulemaking would not have federalism implications.

Environmental Analysis

FAA Order 1050.1D defines FAA actions that may be categorically excluded from preparation of a National Environmental Policy Act (NEPA) environmental assessment or environmental impact statement. In accordance with FAA Order 1050.1D, appendix 4, paragraph 4(j), this proposed rulemaking action qualifies for a categorical exclusion.

Energy Impact

The energy impact of the proposed rule has been assessed in accordance with the Energy, Policy, and Conservation Act (EPCA), Public Law 94-163, as amended

(43 U.S.C. 6362), and FAA Order 1053.1. It has been determined that the proposed rule is not a major regulatory action under the provisions of the EPCA.

Regulations Affecting Interstate Aviation in Alaska

Section 1205 of the FAA Reauthorization Act of 1996 (110 Stat. 3213) requires the Administrator, when modifying regulations in title 14 of the CFR in a manner affecting interstate aviation in Alaska, to consider the extent to which Alaska is not served by transportation modes other than aviation, and to establish such regulatory distinctions as he or she considers appropriate. Because this proposed rule would apply to the certification of future designs of transport category airplanes and their subsequent operation, it could, if adopted, affect interstate aviation in Alaska. The FAA therefore specifically requests comments on whether there is justification for applying the proposed rule differently in interstate operations in Alaska.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend part 25 of Title 14, Code of Federal Regulations, as follows:

PART 25 - AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. The authority citation for part 25 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701-44702, and 44704.

2. Amend § 25.613 by revising the section heading and paragraphs (b), (c), and (e); by removing and reserving paragraph (d); and by adding a new paragraph (f) to read as follows:

§ 25.613 Material strength properties and material design values

(a) * * * * *

(b) Material design values must be chosen to minimize the probability of structural failures due to material variability. Except as provided in paragraphs (e) and (f) of this section, compliance must be shown by selecting material design values which assure material strength with the following probability:

(1) * * *

(2) * * *

(c) The effects of environmental conditions, such as temperature and moisture, on material design values used in an essential component or structure must be considered where these effects are significant within the airplane operating envelope.

(d) [Reserved]

(e) Greater material design values may be used if a " premium selection " of the material is made in which a specimen of each individual item is tested before use to determine that the actual strength properties of that particular item will equal or exceed those used in design.

(f) Other material design values may be used if approved by the Administrator.

Issued in Renton, Washington, on JAN 8 2002

Ali Bahrami
Acting Manager
Transport Airplane Directorate
Aircraft Certification Service

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Proposed Advisory Circular (AC) 25.613-1X, Material Strength Properties and Material Design Values

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed advisory circular.

SUMMARY: The Federal Aviation Administration invites public comment on a proposed new advisory circular. The advisory circular provides guidance related to a notice of proposed rulemaking published elsewhere in this issue of the Federal Register concerning material strength properties and material design values for transport category airplanes. This action provides interested persons an opportunity to comment on the proposed advisory circular concurrent with the proposed rulemaking.

DATES: Send your comments on or before [insert date 60 days after publication]

ADDRESSES: You should send your comments on the proposed AC to Rich Yarges, Federal Aviation Administration, Airframe/Cabin Safety Branch, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Ave SW., Renton, WA 98055-4056. You may also submit comments electronically to: rich.yarges@faa.gov.

FOR FURTHER INFORMATION CONTACT: Rich Yarges at the above address, telephone (425) 227-2143, or facsimile (425) 227-1320.

SUPPLEMENTARY INFORMATION:

How do I obtain a copy of the proposed advisory circular?

You may obtain an electronic copy of the advisory circular identified in this notice at the following Internet address: http://www.airweb.faa.gov/rgl. At the home page, click on "Draft Advisory Circulars." At the next page enter AC 25.613-1X in the "Search" box. Press "GO." If you do not have access to the Internet, you may request a copy by contacting Pat Siegrist, FAA Standardization Branch, ANM-113, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, WA 98055-4056; telephone (425) 227-2126.

How Do I Submit Comments on the Advisory Circular?

You are invited to comment on the proposed advisory material by submitting written comments, data, or views. You must identify the title of the AC and submit your comments in duplicate to the address specified above. We will consider all comments received on or before the closing date for comments before issuing the final advisory material.

Discussion

Elsewhere in this Federal Register, we invite public comment on a notice of proposed rulemaking (NPRM) concerning the material strength properties and material design values requirements for transport category airplanes. The proposed rule would reinstate a provision that permits the Administrator to approve other material design values published in accepted military and industry handbooks. Additionally, other changes of a clarifying nature are proposed. These proposed revisions are intended to achieve

common requirements and language between the requirements of the U.S. regulations and the Joint Aviation Requirements of Europe.

In addition to the amendments proposed in the NPRM, we announced the development of advisory material to supplement the proposal. The proposed advisory material describes acceptable methods of compliance with the proposed rule, and is intended to be reviewed along with the NPRM.

Issued in Renton, WA, on JAN 8 2002

Ali Bahrami
Acting Manager, Transport Airplane Directorate
Aircraft Certification Service

U.S. Department
of Transportation

**FEDERAL AVIATION
ADMINISTRATION**
Office of Aviation Policy and Plans
Washington, D.C. 20591

DRAFT REGULATORY EVALUATION, INITIAL REGULATORY FLEXIBILITY DETERMINATION, INTERNATIONAL TRADE IMPACT ASSESSMENT, AND UNFUNDED MANDATES ASSESSMENT

REVISED REQUIREMENT FOR MATERIAL STRENGTH PROPERTIES AND DESIGN VALUES FOR TRANSPORT AIRPLANES

PROPOSED RULE
(14 CFR PART 25)

**OFFICE OF AVIATION POLICY AND PLANS
OPERATIONS REGULATORY ANALYSIS BRANCH, APO-310**

Mohan Samtani
Marilyn DonCarlos
May 2001

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EXECUTIVE SUMMARY

This draft regulatory evaluation examines the impacts of the proposed rule to revise the requirements for material strength properties and material design values for transport category airplanes. The proposed rule would incorporate changes developed in cooperation with the Joint Aviation Authorities (JAA) of Europe and the U.S. and European aviation industry through the Aviation Rulemaking Advisory Committee (ARAC). The proposed amendments would harmonize FAA requirements with those proposed by the JAA.

There would be no incremental costs as a result of the proposed rule. Rather, the proposed rule would result in cost savings to manufacturers and the FAA by reinstating a provision that permits the Administrator to approve other material design values published in accepted military and industry handbooks. A draft Advisory Circular (AC) accompanies this proposed rule and describes the acceptable methods of compliance. As a result, in certain material design values cases, the FAA estimates that the proposed rule would result in cost savings to manufacturers of transport category airplanes of at least $100,000 per initial aircraft certification. In addition, the FAA would realize an estimated administrative cost saving of approximately $1,460 per certification. Finally, by harmonizing JAA and FAA requirements, the proposed rule would create a single set of requirements accepted in both the United States and Europe. This action would foster international trade and make the aircraft certification process more efficient. Accordingly, the FAA has determined that the proposed rule would be cost-beneficial.

Since the affected transport category airplane manufacturers are not considered small entities, the proposed rule would not impose a significant impact on a substantial number of small entities. The proposed amendments would harmonize with those proposed by the JAA and would not constitute a barrier to international trade. Furthermore, the proposed rule does not contain any Federal intergovernmental or private sector mandates; therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

I. INTRODUCTION

This draft regulatory evaluation examines the impacts of the proposed rule to revise the requirements for material strength properties and material design values for transport category airplanes. The proposed rule would incorporate changes developed in cooperation with the Joint Aviation Authorities of Europe and the U.S. and European aviation industry through the ARAC. The proposed amendment would harmonize FAA requirements with those proposed by the JAA.

II. BACKGROUND

The manufacturing, marketing, and certification of transport airplanes is increasingly an international endeavor. In order for U.S. manufacturers to export transport airplanes to other countries, the airplane must be designed to comply not only with the U.S. airworthiness requirements for transport airplanes (14 Code of Federal Regulations (CFR) part 25), but also with the transport airworthiness requirements of the countries to which the airplane is to be exported.

The European countries have developed a common airworthiness code for transport airplanes that is administered by the JAA of Europe. This code is the result of a European effort to harmonize the various airworthiness codes of the European countries and is called the Joint Aviation Requirements (JAR). It was developed in a format similar to 14 CFR part 25 (part 25) of the Federal Aviation Regulations (FAR). Although JAR-25 is very similar to part 25, there are differences in methodologies and criteria that often result in the need to address the same

design objective with more than one kind of analysis or test in order to satisfy both part 25 and JAR airworthiness codes.

Section 613 of part 25 (§ 25.613) prescribes requirements for material strength properties and design values. Prior to Amendment 25-72 (55 FR 29776, July 20, 1990), the rule required material strength properties found in certain military or industry handbooks[1] to be used unless specific FAA approval was granted to use other properties. Amendment 25-72 combined §§ 25.613 and 25.615 design properties into one requirement and removed the references to the handbooks. Instead, the requirement to use material strength properties of the handbooks was replaced by a more general requirement specifying probabilities and confidence levels for the properties, leaving test procedures and statistical methods unspecified.

In addition, Amendment 25-72 removed the provision that permitted the Administrator to approve "other design values." The applicant whose transport category airplane's material design values meet either the standards referenced in § 25.613 prior to Amendment 25-72 or comparable European standards[2], but has not shown that those values meet the probability and confidence level in current § 25.613(b), must now show an equivalent level of safety as part of

[1] The handbooks are: Military Handbook (MIL-HDBK)-5, "Metallic Materials and Elements for Flight Vehicle Structure;" MIL-HDBK-17, "Plastics for Flight Vehicles;" Army-Navy-Commerce (ANC)-18, "Design of Wood Aircraft Structures;" and MIL-HDBK-23, "Composite Construction for Flight Vehicles."

[2] European standards include those of Euronorm (EN), International Standards Organization (ISO), and Defence (DEF) Standard 00-932.

the FAA's certification of the airplane. This process has resulted in unnecessary costs to both the manufacturer and the FAA.

III. DISCUSSION OF THE PROPOSED RULE

The proposed rule was developed by the ARAC and presented to the FAA as a recommendation for rulemaking. If adopted, the proposal would harmonize material strength properties and material design values with those being proposed by the JAA.

The heading of § 25.613 would be revised to read "Material Strength Properties and Material Design Values." Section 25.613(a) would remain unchanged. Section 25.613(b) would be revised to clarify that the design values are material design values. Additionally, section 25.613(b) would reference proposed new § 25.613(f), described below.

The current rule at § 25.613(c) requires consideration of the effects of temperature on allowable stresses used for design. The proposed rule would require consideration of environmental conditions in general, including temperature and moisture, on material design values used in an essential component or structure, where those effects are significant within the airplane operating envelope. Moisture can affect material design values of composites. Although not required in the current rule, manufacturers already take into account the effect of moisture on design values. This proposed amendment would codify current industry practice.

Section 25.613(d) would be removed. It is addressed in § 25.571 Damage tolerance and fatigue evaluation of structure, and is not needed in this section.

Section 25. 613(e) would be revised to clarify that design values are material design values.

New section 25.613(f) would reinstate the provision that permits the Administrator to approve other design values. A draft Advisory Circular, AC 25.613-1, developed concurrently with the proposed rule, would describe acceptable methods of compliance, including those published in the handbooks referenced in the rule prior to Amendment 25-72 and other standards, such as those of American Society for Testing Materials (ASTM), the European Standards (EN), and International Standards Organization (ISO).

IV. COSTS AND BENEFITS

The FAA estimates that there would be no additional cost associated with this proposal. As discussed in the previous section, in addition to harmonizing § 25.613 and JAA requirements, the proposed rule would clarify the current rule, codify current practice, and reinstate the provision that permits the Administrator to approve other material design values. Consequently, manufacturers of transport category airplanes would not incur any additional cost. In fact, in certain cases, the manufacturer and the FAA would realize cost savings as a result of the

revisions to the requirements for material strength properties and material design values. These cost savings are examined in further detail in the following paragraphs.

Under the current rule, there are three potential options on which to base material strength properties and material design values. First, a manufacturer could conduct a material properties development program for each material, product form, and heat treatment. The FAA estimates that a program for a typical material (e.g., titanium, high-strength steels) would initially cost between $300,000 and $500,000. The total cost is a function of the number of materials, product forms, and heat treatments. Second, a manufacturer could test each aircraft structural part (on a sampling basis) to verify strength characteristics. Based on the cost of materials, testing, and analysis, the FAA estimates this recurring cost would be $6,000 to $60,000 for each aircraft structural part over an assumed 300-airplane production run. Again, the total cost is a function of the number of aircraft structural parts to be tested. Third, a manufacturer could use another method for establishing material design values and then request FAA approval of an equivalent safety finding[3]. The FAA estimates that the initial cost would be between $100,000 and $150,000.[4]

If the proposed rule were adopted, based on the provision permitting the Administrator to approve other material design values (such as those listed in the draft AC), there would be cost

[3] For further details, see part 21, section 21(b)(1).

[4] It is important to note that the first and third options incur an initial cost with minimal recurring costs (i.e., paperwork), whereas the second option incurs a noticeable recurring cost. In the long run, the second option would likely cost more than the third option.

savings to the manufacturer and the FAA. First, under certain conditions, manufacturers of transport category airplanes would no longer need to employ one of the options, described above. If the material design values can be found in the accepted military or industry handbooks[5], the manufacturer would avoid the initial or recurring cost of establishing material design values. Based on the estimates of the available options described above, the FAA estimates that this cost saving would be at least $100,000 per initial aircraft certification (the lower estimate of the least costly option).

Second, this provision would eliminate the need for an equivalent safety finding in the third option. The manufacturer would realize minimal cost saving through a reduction in some of their paperwork. For the FAA, the proposed rule would eliminate approximately 30 hours of paperwork per aircraft certificate for an FAA aerospace engineer (GS-14, step 5) to conduct an equivalent safety finding. As a result, the FAA would realize a cost saving of approximately $1,460 in administrative costs per certificate.[6]

[5] For example, the statistical methods specified in MIL-HDBK-5 and -17 would be acceptable for use in establishing material design values. Other statistical methods, amounts of data, and material property data may also be accepted by the FAA, including those specified in the European Standards (noted earlier).

[6] $36.80/hour (GS-14, step 5, excluding locality rates of pay) x 1.3245 (fringe benefits) x 30 hours = $1,462.25

The wage rate for a GS-14, step 5 can be found on the Office of Personnel Management (OPM) website.

The fringe benefits factor can be found in Table 4-5, page 4-22, Economic Analysis of Investment and Regulatory Decision--A Guide, FAA-APO-98-4, June 1998 (Analysis).

Finally, by harmonizing JAA and FAA standards, the proposed rule would create a single set of requirements accepted in both the United States and Europe. At present, airplane manufacturers must satisfy both the FAR and the European JAR certification standards to market transport category aircraft in both the United States and Europe. Harmonizing both sets of standards would foster international trade and make the aircraft certification process more efficient.

Based on the analysis presented above, the FAA has determined that the proposed rule would be cost-beneficial. The FAA solicits comments from affected entities with respect to this finding and determination and requests that all comments be accompanied by clear documentation.

V. INITIAL REGULATORY FLEXIBILITY DETERMINATION

The Regulatory Flexibility Act of 1980 (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis as described in the Act.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the 1980 act provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

This proposed rule would affect manufacturers of transport category airplanes. However, all United States transport-aircraft category manufacturers exceed the Small Business Administration (SBA) small-entity standard of 1,500 employees for aircraft manufacturers. United States part 25 airplane manufacturers include: Boeing, Cessna Aircraft, Gulfstream Aerospace, Learjet (owned by Bombardier), Lockheed Martin, McDonnell Douglas (a wholly-owned subsidiary of The Boeing Company), Raytheon Aircraft, and Sabreliner Corporation. Consequently, the Federal Aviation Administration certifies that the proposed rule would not have a significant economic impact on a substantial number of small entities. The FAA solicits comments from affected entities with respect to this finding and determination and requests that all comments be accompanied by clear documentation.

VI. INTERNATIONAL TRADE IMPACT ASSESSMENT

The Trade Agreement Act of 1979 prohibits Federal agencies from engaging in any standards or related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and where appropriate, that they be the basis for U.S. standards.

In accordance with the above statute, the FAA has assessed the potential effect of this proposed rule and has determined that it complies with the Act because this rule would use European international standards as the basis for U.S. standards.

VII. UNFUNDED MANDATES ASSESSMENT

The Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March 22, 1995, is intended, among other things, to curb the practice of imposing unfunded Federal mandates on State, local, and tribal governments.

Title II of the Act requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in a $100 million or more expenditure (adjusted annually for inflation) in any one year by State, local, and

tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action."

This proposed rule does not contain such a mandate. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.