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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2002-11345; Amdt. No. 25-~~111~~ 112]

JMN 7/31/03

RIN 2120-AH36

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

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This rule amends the airworthiness standards for transport category airplanes concerning material strength properties and material design values. It incorporates 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. Issuing this amendment eliminates regulatory differences between the airworthiness standards of the U.S. and the Joint Aviation Requirements of Europe, without affecting current industry design practices.

DATES: Effective ~~[insert date 30 days after date of publication in the Federal Register]~~ September 4, 2003

JMN 7/31/03

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SUPPLEMENTARY INFORMATION:

How Can I Obtain a Copy of this Final Rule?

You can get an electronic copy using the Internet by:

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

(2) Visiting the Office of Rulemaking's web page at http://www.faa.gov/avr/arm/nprm.cfm?nav=nprm; or

(3) Accessing the Government Printing Office's web page at http://www.acess.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 S.W., Washington, D.C. 20591, or by calling (202) 267-9680. Make sure to identify the amendment number or docket number of this rulemaking.

Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. Therefore, any small entity that has a question regarding this document may contact its local FAA official, or the person listed under FOR FURTHER INFORMATION CONTACT. You can find out

more about SBREFA on the Internet at http://www.faa.gov/avr/arm/sbrefa.htm, or by e-mailing us at 9-AWA-SBREFA@faa.gov.

Background

What Are the Relevant Airworthiness Standards in the United States?

In the United States, Title 14, Code of Federal Regulations (CFR) part 25 contains the airworthiness standards for type certification of transport category airplanes. 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, Joint Aviation Requirements (JAR)-25 contains the airworthiness standards for type certification of transport category airplanes. The Joint Aviation Authorities (JAA) of Europe developed these standards, based on part 25, 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 added costs to manufacturers and operators. These added costs, however, often 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 without a corresponding increase in the level of safety.

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 noticeable progress towards fulfilling the harmonization goal. The FAA identified the Aviation Rulemaking Advisory Committee (ARAC) as an ideal vehicle for helping to resolve 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 on 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 74 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 sets up 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 invites participation in working groups from interested members of the public who have knowledge or experience in the task areas. Working groups report directly to

the ARAC, and the ARAC must accept a working group proposal before presenting it 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.

This rulemaking has been identified as a "fast track" project. 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).

What is the Current Standard?

Section 25.613 of 14 CFR 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, including those where the applicant uses MIL-HDBK-5. This finding results in additional administrative time for both the manufacturer and the FAA. To reduce this administrative burden and to permit applicants to again use MIL-HDBK-5 data, the FAA issued Notice of Proposed Rulemaking No. 02-05 on January 29, 2002 (67 FR 4318).

What Changes to the Current Standard did the FAA Propose?

In Notice No. 02-05, we proposed to revise § 25.613 of part 25 to reinstate the pre-amendment 25-72 provision that permitted the Administrator to approve "other design values." We also proposed the following changes:

- Revise the heading of § 25.613 to read, "Material Strength Properties and Material Design Values." This change clarifies that the design values are material design values.
- Revise paragraph (b) 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.
- Revise paragraph (c) to 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. 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. 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.
- Remove paragraph (d) as fatigue is now adequately addressed in § 25.571.

- Revise the premium selection process of paragraph (e) to clarify that the design values are material design values.
- Add a new paragraph (f), which permits the use of other design values if approved by the Administrator.

Is Existing FAA Advisory Material Adequate?

Draft Advisory Circular (AC) 25.613-1, Material Strength Properties and Material Design Values, which describes acceptable methods of compliance with this rule, was published concurrently with Notice No. 02-05 for public comment. We plan to issue the final AC upon publication of the final rule in the Federal Register.

What Comments were Received in Response to the Proposal?

Only one commenter responded to the request for comments. The commenter thanked the FAA for the opportunity to comment.

What Analyses and Assessments Has the FAA Conducted?

Paperwork Reduction Act

There are no current or new requirements for information collection associated with this final 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 regulations.

Regulatory Evaluation Summary

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon 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. §§ 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 and, where appropriate, to be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Public Law 104-4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation).

In conducting these analyses, FAA has determined this rule: (1) has benefits that justify its costs, is not a "significant regulatory action" as defined in section 3(f) of Executive Order 12866, and is not "significant" as defined in DOT's Regulatory Policies and Procedures; (2) will not have a significant economic impact on a substantial number of small entities; (3) will reduce barriers to international trade; and (4) does not impose an unfunded mandate on State, local, or tribal governments, or on the private sector. These analyses, available in the docket, are summarized below.

Costs and Benefits

The FAA determines that there will be no additional costs associated with the rule and the current level of safety will be maintained or improved. As discussed in the previous section, in addition to harmonizing § 25.613 and JAA requirements, the amendments will 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 will not incur any additional costs. In fact, in certain cases, the manufacturer and the FAA will realize cost savings as a result of the revisions. 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. Second, a manufacturer could test each aircraft structural part (on a sampling basis) to verify strength characteristics. Third, a manufacturer could use another method for establishing material design values and then request FAA approval of an equivalent safety finding. The FAA estimates that the initial cost of the latter method, which is the least costly, is between $100,000 and $150,000.

There will be cost savings to the manufacturer and the FAA associated with the provision in the rule permitting the Administrator to approve other material design values (such as those listed in the draft AC). First, under certain conditions, manufacturers of transport category airplanes will 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, the manufacturer would avoid the initial or recurring cost of establishing material design values. Based on analysis of the available options described above, the FAA estimates that this cost saving (i.e., benefits) will be at least $100,000 per initial aircraft certification (the lower estimate of the least costly option).

Second, the (new) provision will eliminate the need for an equivalent safety finding in the third option. The manufacturer will realize minimal cost savings through a reduction in paperwork. For the FAA, the rule will eliminate approximately 30 hours of paperwork per aircraft certificate for an FAA aerospace engineer (GS-14, step 5) to conduct an equivalent safety finding. This converts to a cost savings of approximately $1,577 in administrative costs per certificate.

Given the findings of no incremental costs, benefits of at least $100,000 (i.e., cost-savings associated with rule-harmonization), and continuation of the necessary high level of safety, the FAA deems this final rule cost-beneficial.

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 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.

If, however, an agency determines that a 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.

As stated in the initial regulatory flexibility determination, the proposed rule affected only manufacturers of transport category airplanes. And, since all United States transport category airplane manufacturers exceed the Small Business Administration (SBA) small-entity standard of 1,500 employees for aircraft manufacturers, the FAA determined that the proposal "would not have a significant economic impact on a substantial number of small entities." There were no comments to the docket contesting this finding. Consequently, the FAA now certifies that the final rule "will not have a significant economic impact on a substantial number of small entities."

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 rule and has determined that it complies with the Act since it harmonizes U.S. standards with similar European standards. In addition, the rule will impose no incremental costs on either domestic or international manufacturers.

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 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 final rule and the principles and criteria of Executive Order 13132, Federalism. We determined that this action will 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, and therefore does not have federalism implications.

Regulations Affecting Intrastate 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 intrastate 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 final rule applies to the certification of future designs of transport category airplanes and their subsequent operation, it could affect intrastate aviation in Alaska. We received no comments on this final rule as it affects intrastate aviation in Alaska, and we will apply the rule to Alaska in the same way we will apply it nationally.

Plain English

Executive Order 12866 (58 FR 51735, October 4, 1993) requires each agency to write regulations that are simple and easy to understand. We invite your comments on how to make these regulations easier to understand, including answers to questions such as the following:

- Are the requirements in the regulations clearly stated?
- Do the regulations contain unnecessary technical language or jargon that interferes with their clarity?
- Would the regulations be easier to understand if they were divided into more (but shorter) sections?

- Is the description in the preamble helpful in understanding the regulations?

Please send your comments to the address specified in the ADDRESSES section.

Environmental Analysis

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

Energy Impact

The energy impact of the final rule has been assessed in accordance with the Energy, Policy, and Conservation Act (EPCA), Public Law 94-163, as amended (42 U.S.C. 6362), and FAA Order 1053.1. We have determined that the final rule is not a major regulatory action under the provisions of the EPCA.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends 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) introductory text, (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.

* * * * *

(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:

* * * * *

(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 July 25, 2003.

Certified to be a True Copy

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