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**Department of
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**14 CFR Parts 27 and 29
Harmonization of Miscellaneous
Rotorcraft Regulations; Final Rule**

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****14 CFR Parts 27 and 29**

[Docket No. 28929; Amendment Nos. 27-35 & 29-42]

RIN 2120-AG23

Harmonization of Miscellaneous Rotorcraft Regulations

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: The FAA is amending the airworthiness standards for normal and transport category rotorcraft. The changes amend the airworthiness standards to require a cockpit indication of autopilot operating mode to the pilots for certain autopilot configurations, to clarify the burn test requirements for electrical wiring for transport category rotorcraft, and to provide a new requirement for an electrical wire burn test for normal category rotorcraft. The rule also adds a 1.33 fitting factor structural strength requirement to the attachment of litters and berths.

EFFECTIVE DATE: September 11, 1998.

FOR FURTHER INFORMATION CONTACT: Carroll Wright, Regulations Group, Rotorcraft Directorate, Aircraft Certification Service, FAA, Worth, Texas 76193-0111, telephone number (817) 222-5120, fax (817) 222-5961.

SUPPLEMENTARY INFORMATION:**Availability of Final Rules**

Using a modern and suitable communications software, an electronic copy of this document may be downloaded from the FAA regulations section of the Fedworld electronic bulletin board service (telephone: 703-321-3339), the **Federal Register's** electronic bulletin board service (telephone: 202-512-1661), or the FAA's Aviation Rulemaking Advisory Committee (ARAC) Bulletin Board service (telephone: 800-322-2722 or 202-267-5948).

Internet users may reach the FAA's web page at <http://www.faa.gov/avr/arm/nprm/nprm/htm> or the **Federal Register** webpage at http://www.access.gpo.gov/su_docs/aces/aces140.html for access to recently published rulemaking documents.

Any person may obtain a copy of this final rule 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. Communications must

identify the amendment number of docket number of this final rule.

Persons interested in being placed on the mailing list for future Notices of Proposed Rulemaking (NPRMs) and Final Rules should request from the above office a copy of Advisory Circular No. 11-2A, NPRM Distribution System, that describes the application procedure.

Small Entity Inquiries

The Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) requires the FAA to report inquiries from small entities concerning information on, and advice about, compliance with statutes and regulations within the FAA's jurisdiction, including interpretation and application of the law to specific sets of facts supplied by a small entity.

If you are a small entity and have a question, contact your local FAA official. If you do not know how to contact your local FAA official, you may contact Charlene Brown, Program Analyst Staff, Office of Rulemaking, ARM-27, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591, 1-888-551-1594. Internet users can find additional information on SBREFA in the "Quick Jump" section of the FAA's web page at <http://www.faa.gov> and may send electronic inquiries to the following internet address: 9-AWA-SBREFA@faa.dot.gov.

Background

These amendments are based on NPRM No. 97-8 published in the **Federal Register** on June 9, 1997 (62 FR 31475). That notice proposed to amend the airworthiness standards for both normal and transport category rotorcraft based on recommendations from the ARAC. By announcement in the **Federal Register** (60 FR 4221, January 20, 1995), the "Harmonization of Miscellaneous Rotorcraft Regulations Working Group" was chartered by the ARAC. The working group included representatives from the major rotorcraft manufacturers (normal and transport) and representatives from Aerospace Industries Association of America, Inc. (AIA), Association Europeenne des Constructeurs de Material AeroSpatial (AECMA), Helicopter Association International (HAI), Joint Aviation Authorities (JAA), and the Federal Aviation Administration (FAA) Rotorcraft Directorate. This broad participation is consistent with FAA policy to have all known interested parties involved as early as practicable in the rulemaking process.

On January 9, 1996, the Miscellaneous Harmonization Working Group submitted recommendations to the ARAC concerning the need (1) to provide a cockpit indication of autopilot operating mode to the pilots for certain autopilot configurations, (2) to clarify the burn test requirements for electrical wiring for transport category rotorcraft, (3) to provide a new requirement for an electrical wire burn test for normal category rotorcraft, and (4) to add a 1.33 fitting factor structural strength requirement to the attachment of litters and berths. The working group also submitted recommendations to ARAC concerning the disharmonizations introduced by the new Rotorcraft 30 Second/2 Minute One-Engine Inoperative Power Ratings (OEI) (59 FR 47764; September 16, 1994) and the Crash Resistant Fuel Systems (CRFS) in Normal and Transport Category Rotorcraft (59 FR 50380; October 3, 1994) final rules.

The ARAC reviewed the working group recommendations and subsequently recommended that the FAA revise the airworthiness standards for normal and transport category rotorcraft to incorporate the miscellaneous changes. The changes to 14 CFR parts 27 and 29 (parts 27 and 29) are harmonized with the European Joint Aviation Requirements (JAR) 27 and 29. The FAA evaluated the ARAC recommendations and made its proposals in NPRM 97-8. The FAA received two comments to the proposed miscellaneous changes.

Discussion of Comments

Interested persons have been afforded an opportunity to participate in the making of these amendments. Due consideration was given to the comments received from the two commenters. One commenter representing HAI was fully supportive of the proposed changes.

Another commenter recommended changes to the proposed part 27 electrical wire burn test requirements. This commenter does not believe self-extinguishing wire is required for low amperage installation and requested the following wording be added to § 27.1365: " * * * To require self-extinguishing installation of electrical wire and cable larger than 18 gauge and carrying current draws of over 5 amps per wire. Multi-strand cable with over 4 strands in a closed cable sheave are exempt from this requirement * * * " The FAA does not agree to exempt multi-strand wires or 18 gauge wires or smaller. Any wire, regardless of size or number of strands, may constitute a fire hazard. Small gauge wires may be

routed in wire bundles with larger gauge wires. Any fire in the wire bundle would be fueled by nonself-extinguishing wire and thereby defeat the purpose of the rule.

After considering all of the comments, the FAA has determined that air safety and the public interest require adoption of the amendments are proposed.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. § 3507(d)), there are no requirements for information collection associated with this final use.

International Compatibility

The FAA has determined that a review of the Convention on International Civil Aviation Standards and Recommended Practices is not warranted because there is not a comparable rule under International Civil Aviation Organization (ICAO) standards.

Regulatory Evaluation Summary

Proposed 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 (RFA) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. And fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 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, the FAA has determined that this rule: (1) will generate benefits that justify its costs and is not a "significant regulatory action" as defined in the Executive Order; (2) is not "significant" as defined as DOT's Regulatory Policies and Procedures; (3) will not have a significant impact on a substantial number of small entities; (4) will lessen restraints on international trade; and (5) does not contain a significant intergovernmental or private sector mandate. These analyses, available in the docket, are summarized below.

Economic Evaluation

The revisions will impose no incremental costs on the larger manufacturers that produce both part 27 and 29 rotorcraft. For smaller manufacturers producing only part 27 rotorcraft, there will be incremental costs totalling approximately \$60,000 (nondiscounted 1997 dollars) per type certification. For some manufacturers of specialized equipment in part 27 rotorcraft, incremental cost could equal an additional \$500 per rotorcraft. Overall, the changes will increase safety and promote harmonization between FAA and JAA regulations. Harmonization will eliminate unnecessary duplication of certification requirements (e.g., testing/design), thus reducing manufacturers' costs.

The costs and benefits of the changes regarding the fitting factor for berths and litters, removal of the phrase "unless a rollover is shown to be extremely remote" (in §§ 27.975(b) and 29.975(a)(7)), autopilot operating mode, and burn test for electrical wire in normal category rotorcraft are summarized below. All other revisions involve minor clarifications or administrative changes.

The fitting factor requirement will not impose incremental costs on most rotorcraft manufacturers. One small manufacturer of part 27 rotorcraft indicated additional nonrecurring testing and analysis costs of \$2,100 to substantiate the 1.33 factor in an initial new type certification; most likely, this additional cost will not be incurred in subsequent type certification. Although there have been no identifiable accidents involving litters attributable to insufficient attachment strength, even one minor injury will far exceed the relatively low costs. Codification of the 1.33 fitting factor, which is inherent in most current designs, will ensure that all future designs include this standard, increasing the minimum level of safety.

There will be no incremental costs or benefits associated with removal of the phrase "unless a rollover is shown to be extremely remote" in §§ 27.975(b) and 29.975(a)(7) since rotorcraft currently meet the minimum fuel spillage requirements of these sections.

The autopilot display requirement will not impose any incremental costs on rotorcraft manufacturers since new autopilot systems employed in rotorcraft are identical to those in airplanes and the mode indicator is now integral to such system. Codification of this requirement will ensure that all future rotorcraft designs comply with this standard.

Most U.S. and European manufacturers currently use electrical wire that meets the burn test requirements for transport category rotorcraft since they produce both parts 27 and 29 rotorcraft. However, the few manufacturers that produce normal category rotorcraft only will likely experience additional costs. One manufacturer estimates additional nonrecurring testing/design costs at \$5,300 per type certification and additional wiring costs of \$530 per rotorcraft. At an estimated production of seven rotorcraft per year, the incremental recurring costs will total \$3,710 per year for ten years, or \$37,100 total (nondiscounted 1997 dollars), under one type certification. Another manufacturer estimates additional wiring costs of \$370 per rotorcraft and no additional nonrecurring costs. At an estimated production of 20 rotorcraft per year, the incremental recurring costs will total \$7,400 per year ten years, or \$74,000 total (nondiscounted 1997 dollars), under one type certification. Averaging the incremental costs for these two manufacturers results in an estimate of approximately \$58,200 per type certification (135 units produced at approximately \$430 per unit).

Part 27 rotorcraft which will be used in specialized operations may require somewhat more expensive wiring to meet the new burn test requirements. The second commenter to the notice alluded to earlier (a manufacturer of fire-fighting systems) indicates that meeting the new standards will result in a 5 percent increase in the selling price of its system, or \$900 per unit. A manufacturer of agricultural spraying systems, however, indicates increased per system costs of only a fraction of one percent, equating to \$100 per unit. Since both of these systems represent the type of add-on electrical system potentially affected by the wiring provision, using the average of the two estimates, or \$500, is appropriate. Assuming 20 of the new production rotorcraft (about 15%) will be equipped with the add-on systems, the additional incremental costs total \$10,000.

Examination of National Transportation Safety Board accident data for the period 1983 through 1995 indicates several rotorcraft accidents and incidents in which the electrical system was cited as a cause or contribute factor. One accident (in June 1994) was primarily caused by an electrical short in the wiring which burned a hole in the main fuel line, causing a post-impact fire that destroyed the part 27 helicopter. The FAA believes that the revised burn test requirements could have prevented this accident. If

the rule prevents one such accident during the operating lives (25-years) of rotorcraft produced under one part 27 type certification; the rule will be cost-beneficial: Replacement costs of a substantially-damaged rotorcraft equals \$125,000 (this benefit alone will exceed the total costs of approximately \$70,000); adding cumulative damage from two or three minor incidents (say \$20,000 to \$30,000) and potential harmonization cost savings (\$50,000, based on estimates from previous harmonized rotorcraft rules) increases the benefits to approximately \$200,000, which is almost three times the costs. If one serious injury (valued at over \$500,000) is prevented, the benefits of the rule would be several times the estimated costs.

In addition, codification of those requirements complied with indirectly (i.e., as a result of complying with other provisions) or "voluntarily" (by virtue of competitive pressures) will ensure continuation of enhanced safety levels in future rotorcraft designs.

Based on the findings of no significant incremental costs coupled with the benefits of harmonization savings and higher levels of safety, the FAA has determined that the rule will be 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 proposed or final rule will 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.

For manufacturers, a small entity is one with 1,500 or fewer employees. Only five rotorcraft have 1,500 or fewer employees and therefore qualify as small entities. However, three of these are not currently producing new type-certificated rotorcraft, and another does not compete with the larger manufacturers. Consequently, only one producer could potentially be impacted by this rule. However the annualized increased certification costs for a rotorcraft manufacturer (based on the average incremental costs of the wiring requirements as reported by the two manufacturers, added to the costs to comply with the fitting factor requirements) equals approximately \$4,400 per type certification, which is not considered significant within the meaning of the RFA. Consequently, the FAA certifies that the rule will not have a significant economic impact on a substantial number of small rotorcraft manufacturers.

The two manufacturers of specialized component systems described earlier are also small entities; notwithstanding, the average \$500 incremental cost can easily be passed on to purchasers given the inelastic demand for such specialized rotorcraft systems. There is not a substantial number of other rotorcraft systems. There is not a substantial number of other rotorcraft parts manufacturers that will be impacted by this rule. Consequently, the FAA certifies that the rule will not have a significant economic impact on a substantial number of small rotorcraft parts manufacturers.

International Trade Impact Assessment

Consistent with the Administration's belief in the general superiority, desirability, and efficacy of free trade, it is the policy of the Administrator to remove or diminish, to the extent feasible, barriers to international trade, including both barriers affecting the export of American goods and services to foreign countries and those affecting the import of foreign goods and services into the United States.

In accordance with that policy, the FAA is committed to develop as much as possible its aviation standards and practices in harmony with its trading partners. Significant cost savings can result from this, both to American companies doing business in foreign markets, and foreign companies doing business in the United States.

This rule is a direct action to respond to this policy by increasing the harmonization of the U.S. Federal

Aviation Regulations with the European Joint Aviation Requirements. The result will be a positive step toward removing impediments to international trade.

Federalism Implications

The regulations herein will not have substantial direct effects 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, in accordance with Executive Order 12612, it is determined that this rule will not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March 22, 1995, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal government, in the aggregate, or by the private sector, of \$100 million or more (adjusted annually for inflation) in any one year. Section 204(a) of the Act, 2 U.S.C. 1534(a), requires the Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, local, and tribal governments on a proposed "significant intergovernmental mandate." A "significant intergovernmental mandate" under the Act is any provision in a Federal agency regulation that will impose an enforceable duty upon State, local, and tribal governments, in the aggregate, of \$100 million (adjusted annually for inflation) in any one year. Section 203 of the Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

The FAA determined that this rule does not contain a significant intergovernmental or private sector mandate as defined by the Act.

List of Subjects in 14 CFR Parts 27 and 29

Air transportation, Aircraft, Aviation safety, Rotorcraft; Safety.

The Amendments

Accordingly, the FAA amends 14 CFR parts 27 and 29 as follows:

PART 27—AIRWORTHINESS STANDARDS: NORMAL CATEGORY ROTORCRAFT

1. The authority citation for part 27 continues to read as follows:

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

2. In § 27.625, a new paragraph (d) is added to read as follows:

§ 27.625 Fitting factors.

* * * * *

(d) Each seat, berth, litter, safety belt, and harness attachment to the structure must be shown by analysis, tests, or both, to be able to withstand the inertia forces prescribed in § 27.561(b)(3) multiplied by a fitting factor of 1.33.

3. Section 27.785 is amended by revising the heading and by adding a new sentence to the end of paragraph (k)(2) to read as follows:

§ 27.785 Seats, berths, litters, safety belts, and harnesses.

* * * * *

(k) * * *

(2) * * * The fitting factor required by § 27.625(d) shall be applied.

§ 27.975 [Amended]

4. In § 27.975, paragraph (b) is amended by removing the words “, unless a rollover is shown to be extremely remote”.

5. In § 27.1329, a new paragraph (f) is added to read as follows:

§ 27.1329 Automatic pilot system.

* * * * *

(f) If the automatic pilot system can be coupled to airborne navigation

equipment, means must be provided to indicate to the pilots the current mode of operation. Selector switch position is not acceptable as a means of indication.

6. In § 27.1365, a new paragraph (c) is added to read as follows:

§ 27.1365 Electric cables.

* * * * *

(c) Insulation on electrical wire and cable installed in the rotorcraft must be self-extinguishing when tested in accordance with Appendix F, Part I(a)(3), of part 25 of this chapter.

PART 29—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT

7. The authority citation for part 29 continues to read as follows:

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

8. In § 29.625, a new paragraph (d) is added to read as follows:

§ 29.625 Fitting factors.

* * * * *

(d) Each seat, berth, litter, safety belt, and harness attachment to the structure must be shown by analysis, tests, or both, to be able to withstand the inertia forces prescribed in § 29.561(b)(3) multiplied by a fitting factor of 1.33.

9. Section 29.785 is amended by revising the heading and by adding a new sentence to the end of paragraph (k)(2) to read as follows:

§ 29.785 Seats, berths, litters, safety belts, and harnesses

* * * * *

(k) * * *

(2) * * * The fitting factor required by § 29.625(d) shall be applied.

§ 29.923 [Amended]

10. In § 29.923(a), the first sentence of the introductory text is amended adding the phrase “and (p)” immediately following the reference to paragraph “(n)”.

§ 29.975 [Amended]

11. In § 29.975, paragraph (a)(7) is amended by removing the words “, unless a rollover is shown to be extremely remote”.

12. In § 29.1329, a new paragraph (f) is added to read as follows:

§ 29.1329 Automatic pilot system.

* * * * *

(f) If the automatic pilot system can be coupled to airborne navigation equipment, means must be provided to indicate to the pilots the current mode of operation. Selector switch position is not acceptable as a means of indication.

13. In § 29.1351, paragraph (d)(1)(iii) is removed.

§ 29.1351 General.

14. In § 29.1359, a new paragraph (c) is added to read as follows:

§ 29.1359 Electrical system fire and smoke protection.

* * * * *

(c) Insulation on electrical wire and cable installed in the rotorcraft must be self-extinguishing when tested in accordance with Appendix F, Part I(a)(3), of part 25 of this chapter.

Issued in Washington, DC, on August 7, 1998.

Jane F. Garvey,
Administrator.

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