

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

[Docket No. 29277; Notice No.98-6]

RIN 2120-AG59

Rotorcraft Load Combination Safety Requirements

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This document proposes the amendment of the airworthiness standards for rotorcraft load combination (RLC) certification. This proposal would revise the safety requirements for RLC's to address advances in technology and to provide an increased level of safety in the carriage of humans. These proposed amendments would provide an improvement in the safety standards for RLC certification and lead to a harmonized international standard.

DATES: Comments must be submitted on or before October 13, 1998.

ADDRESSES: Comments on this proposed rule may be delivered or mailed in triplicate to: Federal Aviation Administration (FAA), Office of the Chief Counsel, Attn: Rules Docket (AGC-200), Docket No. 29277, Room 915G, 800 Independence Avenue, SW., Washington, DC 20591. Comments delivered must be marked Docket No. 29277. Comments may also be sent electronically to the following internet address: 9-nprm-cmts@faa.dot.gov. Comments may be examined in Room 915G on weekdays between 8:30 a.m. and 5:00 p.m., except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Mr. Mike Mathias, Rotorcraft Directorate, Aircraft Certification Service, Regulations Group, FAA, Fort Worth, Texas 76193-0111, telephone (817) 222-5123.

SUPPLEMENTARY INFORMATION:**Comments Invited**

Interested persons are invited to submit written data, views, or arguments on this proposed rule. Comments relating to the environmental, energy, federalism, or economic impact that might result from adopting the proposals in this notice are also invited. Substantive comments should be accompanied by cost estimates. Comments should identify the regulatory docket number and should be submitted in triplicate to the Rules Docket address specified above.

All comments received on or before the closing date for comments specified will be considered by the Administrator before taking action on this proposed rulemaking. Late-filed comments will be considered to the extent practicable. The proposals contained in this notice may be changed in light of the comments received.

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

Commenters wishing the FAA to acknowledge receipt of their comments submitted in response to this notice must include a preaddressed, stamped postcard on which the following statement is made: "Comments to Docket No. 29277." The postcard will be date stamped and returned to the commenter.

Availability of NPRM's

An electronic copy of this document may be downloaded using a modem and suitable communications software 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 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's web page 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 NPRM by submitting a request to the FAA, Office of Rulemaking, ARM-1, 800 Independence Avenue, SW., Washington DC 20591, or by calling (202) 267-9680. Communications must identify the notice number of this NPRM.

Persons interested in being placed on a mailing list for future NPRM's should request a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedures.

History

For many years the design standards for external load attaching means for normal and transport category rotorcraft were contained in Subpart D, Airworthiness Requirements of 14 CFR part 133 (part 133), Rotorcraft External Load Operations. However, these design

standards more appropriately belonged under parts 27 and 29. Amendments 27-11 (41 FR 55469, December 20, 1976) and 29-12 (41 FR 55454, December 20, 1976) added new §§ 27.865 and 29.865 and moved some of these design standards from the operational rules of part 133 to the certification rules of parts 27 and 29.

Rotorcraft-load combination classes (RLC) are defined in 14 CFR 1.1. Part 133 prohibits the carrying of humans, except for crewmembers, external to the aircraft under all existing RLC's (A, B, or C). However, on April 5, 1978, Exemption No. 2534 was granted to permit carrying harbor pilots external to the rotorcraft using a hoist and sling.

Because of the proven public utility of the operations conducted with Exemption No. 2534, in January 1987, after notice and a public meeting, Amendment 133-9 (51 FR 40707, November 7, 1986) was adopted. Amendment 133-9 established provisions for a new Class D RLC for transporting external loads other than Classes A, B, or C. Class D may apply to either human or nonhuman external cargo operations; however, under Amendment 133-9, § 133.45(e) specifies that only certain Transport Category A rotorcraft can be used for RLC Class D external load operations. Also, Amendment 133-9 added § 133.35 to establish specific limitations and the necessary safety requirements for routine external load transportation under Class D.

Aviation Rulemaking Advisory Committee (ARAC) Involvement

In 1991 the FAA requested that ARAC study the need to revise the regulations on RLC in light of advancements in technology and operational procedures and to develop regulatory recommendations. The ARAC was established on February 5, 1991 (56 FR 2190, January 22, 1991), to assist the FAA in the rulemaking process by providing advice from the private sector on major regulatory issues affecting aviation safety. The ARAC includes representatives of manufacturers, air carriers, general aviation, industry associations, labor groups, universities, and the general public. The ARAC's formation has given the FAA additional opportunities to solicit information directly from significantly affected parties who meet and exchange ideas about proposed and existing rules that should be either created, revised, or eliminated.

On November 27, 1992, following an announcement in the **Federal Register** (56 FR 63546, December 4, 1991), the ARAC charged The External Load

Working Group with making a recommendation to the ARAC concerning whether new or revised airworthiness standards are appropriate for Class D rotorcraft external loads, as follows: "Should parts 27 or 29 be amended to incorporate Class D external load attaching means, to complement Amendment 133-9, which authorizes the transport of passengers external to the rotorcraft, with certain conditions and limitations?"

The working group, chaired by a representative from McDonnell Douglas Helicopter Systems, included technical specialists knowledgeable in both military and civil external load operations, in external load and emergency rescue equipment design and manufacturing, and in both FAA and industry external load design and operational requirements. This broad participation is consistent with FAA policy to have all known interested parties involved as early as practicable in the rulemaking process.

The working group reviewed unpublished data regarding external loads safety issues developed by the FAA as the starting point for their discussions. After reviewing the unpublished data, the working group determined that it was necessary to do further research and to include consideration of more diverse design configurations and operating procedures.

The working group reviewed current methods that the military and other nations' airworthiness authorities use to certificate aircraft conducting external load operations. The group also evaluated current operational practices with aircraft certificated in all categories and public aircraft operations involving human and nonhuman external loads. The working group researched available military and domestic safety standards and guidance, the accident and incident history of external load operations conducted under current certification standards, and the specific safety requirements necessary for human and nonhuman external load operations in each RLC class.

Technical Research

The following material was researched by the ARAC working group and contributed significantly to formulating these proposals. Copies may be found in Rules Docket No. 29277.

1. United States Army Material Command (USA, AMC) Pamphlet No. 706-203, "Engineering Design Handbook Helicopter Engineering, Part Three, Qualification Assurance," Headquarters United States Army

Material Command, Washington, D.C. 20315.

2. USAAVSCOM TR 89-D-22A, "Aircraft Crash Survival Design Guide; Volume IV—Aircraft Seats, Restraints, Litters, and Cockpit/Cabin Delethalization."

3. MIL-STD-882B, "Military Standard-System Safety Program Requirements," March 30, 1984.

4. MIL-STD-1472D, "Military Standard-Human Engineering Design Criteria for Military Systems, Equipment, and Facilities," March 14, 1989.

5. British Civil Airworthiness Requirements 29, Issue 1, December 17, 1986.

6. Advisory Circular 133-1A, "Rotorcraft External-Load Operations in Accordance with part 133," October 16, 1979.

7. "Rotorcraft Use in Disaster Relief and Mass Casualty Incidents-Case Studies," DOT/FAA/RD-90/10, June 1990.

8. "Guidelines for Integrating Helicopter Assets into Emergency Planning," DOT/FAA/RD-90/11, July 1991.

9. FAA Order 8700.1, "General Aviation Operations Inspector's Handbook" Chapter 96, Change 8, March 1, 1992.

The research centered on the following:

- (1) Current methods used by the military to qualify external loads;
- (2) Current methods used by the world's airworthiness authorities for certification of external loads;
- (3) Current practice in restricted category and public use operations regarding human and nonhuman external load operations;
- (4) Load retention and release devices that exist and are certifiable;
- (5) Current military and domestic safety standards and guidance;
- (6) Accident and incident history of external load operations that relate to the current certification standards; and
- (7) Specific certification safety requirements that are necessary for human versus nonhuman external load operations.

Statement of the Issues

Although rotorcraft external load operations are routinely conducted in a safe manner under the existing safety standards, several preventable accidents and incidents have occurred during the preceding decade. For example, several preventable inadvertent releases of humans being carried external to the rotorcraft have occurred due to the lack of specific safety standards for quick-release systems (QRS). Additionally, the

equipment employed in external load operations has changed significantly since the existing safety standards were promulgated. Examples of these equipment changes are more diverse, maneuverable, and powerful rotorcraft designs, new QRS designs, new personnel carrying device systems (PCDS) designs, and new methods of rigging external loads to the rotorcraft.

Because of the need for both modernization and a higher level of safety, this proposal would address safety requirements for human external cargo (HEC) and nonhuman external cargo (NHEC); update load-to-vertical-angle certification requirements; add reliability and durability requirements for external load retention and release systems and devices; and add electromagnetic interference and lightning protection requirements because these items are not specifically addressed in the existing regulations.

In addition, this proposal would amend part 29 by adding new certification requirements that are compatible with the operating requirements of current part 133 for RLC Class D external loads. This proposal would provide a clearly specified certification safety standard for RLC Class D external loads in part 29. The change to part 29 would respond to increasing public demand for specific RLC Class D provisions that meet operational needs through standardized certification criteria.

Studies and analyses of service difficulty reports and the introduction of modern external load equipment and operational practices have shown a need for updating the regulations to (1) significantly decrease the potential for future accidents and incidents; (2) ensure that external cargo load carrying devices, their release mechanisms, their load carrying systems, and their flight performance, reflect modern operational needs; and (3) provide updated standards that can be harmonized with the Joint Airworthiness Regulations (JAR).

Current Requirements

Currently, §§ 27.865 and 29.865 contain identical provisions and apply only to RLC Class A, B, and C loads at the gross weights and associated load factors common for relatively heavy NHEC loads. Primary and secondary quick-release devices are required; however, specific safety features and test and reliability requirements for the entire QRS are not specified. In-flight handling qualities and release (i.e., jettisonability) characteristics of NHEC and HEC are not currently addressed.

Part 29 Transport Category A rotorcraft are eligible under part 133 for Class D RLC operations. However, part 29 design standards do not exist for certification of Class D RLC's.

FAA Evaluation of ARAC Recommendation

After reviewing the External Load Working Group's work product and the ARAC recommendations, the FAA has determined that parts 27 and 29 should be revised to establish an increased margin of safety in rotorcraft external load operations. These revisions are necessary to implement modern safety standards that accommodate current and anticipated operational RLC applications and procedures and provide separate levels of safety for NHEC and HEC RLC's. These new safety standards are more fully described in the General Discussion of Proposals section. These changes to parts 27 and 29 include the addition of: (1) increased load factors for HEC; (2) increased QRS safety standards for both NHEC and HEC; (3) new PCDS standards for HEC; (4) new flight-handling characteristic standards for both NHEC and HEC; (5) increased fatigue substantiation standards for both NHEC and HEC; and (6) to part 29 only, the RLC Class D standard. These improvements to the safety standards should prevent many accidents and incidents. The proposal would provide identical, improved external load standards for rotorcraft certificated under parts 27 and 29 and would provide RLC Class D certification standards under part 29.

General Discussion of Proposals

These proposals would provide essentially identical external load standards in parts 27 and 29. In addition, both the part 27 and 29 proposals would provide certification standards for all RLC's that are compatible with the operational requirements in part 133.

Proposed Amendments to §§ 27.25(c) and 29.25(c)

The proposed amendments to §§ 27.25 and 29.25 would limit the availability of increased gross weights to those RLC's that involve the carriage of nonhuman loads. For applications for certification with human loads, the applicant would be limited by subparagraph (c)(1) to the maximum weight established in § 27.25(a). The changes would be a new limitation to reflect the distinction being made between those operations involving the carrying of humans externally for which a higher level of safety is needed.

Proposed Amendments to §§ 27.865 and 29.865

Because the proposed amendments would address more than just the attachment means for external loads, the undesignated center headings and the section titles of proposed §§ 27.865 and 29.865 would be changed from "External Load Attaching Means" to "External Loads."

Proposed Amendments to §§ 27.865(a) and 29.865(a)

The addition of new human external cargo certification requirements (HEC) and additional requirements for nonhuman external cargo (NHEC) certification results in modification of §§ 27.865(a) and 29.865(a). The most significant modification is a change in the current load factor specification to distinguish between and provide the required additional level of safety for HEC.

Current §§ 27.865(a) and 29.865(a) require the use of a 2.5g vertical limit load factor or a lesser value (derived from current §§ 27.337 through 27.341 or 29.337 through 29.341) at the maximum external load value for which certification is requested. This 2.5g limit load factor would be retained for NHEC applications in the proposals.

However, for HEC applications that are typically lower gross weight configurations, proposed §§ 27.865(a) and 29.865(a) contain a higher vertical limit load factor to be applied to the external load attachment and the entire attached PCDS. The higher vertical limit load factor is specified by these proposals as either the analytically derived maximum vertical limit load factor for the proposed operating envelope or a vertical limit load factor of 3.5 (derived from §§ 27.337 and 29.337). However, in no case would these proposals allow the maximum vertical limit load factor for HEC to be less than 2.5. Linear interpolation between minimum and maximum vertical design load factors and standard operating gross weight is one simple, acceptable means to determine design limit load factors.

Proposed §§ 27.865(a) and 29.865(a) would also require the limit static load for any RLC, either HEC or NHEC, to be determined and applied in both the vertical direction, and for jettisonable external loads in any direction, making the maximum angle that can be achieved in service (but not less than 30°) with the vertical axis of the rotorcraft. The term "maximum angle that can be achieved in service" means the largest angle expected to occur during normal operation. This term is

added to the vertical angle requirement to ensure that sidepull (or other) configurations used for jettisonable RLC applications, such as wire stringing, that typically involve angles greater than the current 30°, would be addressed at the time of certification. The current 30° angle requirement was established based on the rule-of-thumb design limit for winch or hoist applications typical when the rule was promulgated and applications using larger angles were unforeseen. The proposed rule would not change the 30° angle limitation for winch or hoist applications. The existing rule does not specifically address RLC applications such as sidepull configurations. These proposed section changes would more closely match the needed safety standards to the type of RLC operations in the industry.

Proposed Amendments to §§ 27.865(b) and 29.865(b)

The terms "quick-release system," "primary quick release subsystem," and "backup quick release subsystem" are substituted throughout proposed §§ 27.865(b) and 29.865(b) for the current terminology of quick-release device, primary quick-release device, and mechanical backup quick-release device to require certification of the entire QRS, not just the quick-release devices. The proposals would also require that the primary and backup QRS be isolated from one another to ensure fail safety.

Also to facilitate harmonization with the Joint Aviation Authorities (JAA), the FAA proposes to delete the current references to RLC Classes B and C from §§ 27.865(b) and 29.865(b). These references are not necessary to the proposed new §§ 27.865(b) and 29.865(b) because the design distinctions necessary to provide the required level of safety would be made during certification without a need to refer to the operations based RLC classes. These distinctions are made by specifying whether or not an external load is jettisonable or non-jettisonable and whether or not an external load is human or non-human.

Proposed Amendments to §§ 27.865(b)(1) and 29.865(b)(1)

Proposed §§ 27.865(b)(1) and 29.865(b)(1) would allow the primary quick release control to be mounted either on a primary control or in any equivalently accessible location. This proposed change is intended to liberalize design options and allow a more realistic workload distribution among larger dedicated crews while maintaining the same level-of-safety.

The proposals would allow the control to be operated by a crewmember without necessarily being reachable by the pilot. The rotorcraft's approved operating procedures must address the responsibilities and procedures for the control of the QRS.

Proposed Amendments to §§ 27.865(b)(2) and 29.865(b)(2)

Proposed §§ 27.865(b)(2) and 29.865(b)(2) would change the current requirement that the backup control for the quick-release device be only a manual mechanical control. These proposals would require that a backup quick release subsystem of an approved design be readily available to the pilot or other crewmember.

Proposed Amendments to §§ 27.865(b)(3)(i) and 29.865(b)(3)(i)

Because of adverse service history and the need to specifically distinguish the levels of safety for HEC and NHEC, proposed §§ 27.865(b)(3)(i) and 29.865(b)(3)(i) would require that both the primary and backup quick release subsystems be reliable, durable, and functional. Reliability would be demonstrated by use of design features and by use of failure modes and effects analysis. Both reliability and durability would be demonstrated by use of repetitive functional tests. These proposed reliability and durability criteria would apply only to newly modified or type certificated helicopters equipped with external load attachment provisions or devices or both.

Proposed Amendments to §§ 27.865(b)(3)(ii) and 29.865(b)(3)(ii)

Proposed §§ 27.865(b)(3)(ii) and 29.865(b)(3)(ii) would require protection of the quick-release subsystems against potential internal and external sources of electromagnetic interference (EMI) and lightning. The new requirements are necessary to prevent inadvertent jettison of NHEC and HEC from sources such as stray electromagnetic signals, static electricity, and lightning strikes. Proposed field intensity levels are 200 volts per meter for applicable portions of QRS used for HEC and 20 volts per meter for applicable portions of QRS used for NHEC. The purpose of the requirements is for those applicable portions of the QRS to withstand these field intensity levels without inadvertent load release.

Proposed Amendments to §§ 27.865(b)(3)(iii) and 29.865(b)(3)(iii)

Proposed §§ 27.865(b)(3)(iii) and 29.865(b)(3)(iii) would require that the quick-release subsystems be protected against failures that could occur as a

result of an electrical or mechanical malfunction of other rotorcraft components.

Proposed Amendments to §§ 27.865(c) and 29.865(c)

This proposal would redesignate existing §§ 27.865(c) and 29.865(c) as §§ 27.865(e) and 29.865(e), respectively. New §§ 27.865(c) and 29.865(c) are proposed to separately address the safety requirements for HEC carriage. The new requirements would ensure that the HEC certification requirements are clearly and properly identified.

Proposed Amendments §§ 27.865(c)(1) and 29.865(c)(1)

Proposed §§ 27.865(c)(1) and 29.865(c)(1) would require that the HEC load release primary and backup controls meet the requirements of §§ 27.865(b) and 29.865(b), respectively, and that both controls be designed to require dual actuation (i.e., require two distinct actions) for load release. This is necessary to mitigate inadvertent HEC release.

Proposed Amendments to §§ 27.865(c)(2) and 29.865(c)(2)

Proposed §§ 27.865(c)(2) and 29.865(c)(2) would require that the applicant demonstrate that the PCDS is reliable in accordance with the HEC provisions of §§ 27.865(b)(3)(i) and 29.865(b)(3)(i), respectively; has the structural capability required under §§ 27.865(a) and 29.865(a), respectively; and has the essential personnel safety provisions (based on the design configuration of the PCDS) to minimize hazards to occupants carried external to the rotorcraft.

Proposed Amendments to §§ 27.865(c)(3) and 29.865(c)(3)

Proposed §§ 27.865(c)(3) and 29.865(c)(3) would require that all necessary placards and markings be provided and be properly located to facilitate their proper use and, for the PCDS, to clearly specify the ingress and egress instructions.

Proposed Amendments to §§ 27.865(c)(4) and 29.865(c)(4)

Proposed §§ 27.865(c)(4) and 29.865(c)(4) would require that an intercom system or other approved equipment be installed to ensure proper communication among crewmembers and occupants during an emergency. For simple rescue systems that do not have intercom systems mandated by operating regulations, voice signals or hand signals to PCDS occupants may be acceptable. In more complex systems, it is intended that more sophisticated

communication systems, such as intercoms, be provided.

Proposed Amendments to §§ 27.865(c)(5) and 29.865(c)(5)

Proposed §§ 27.865(c)(5) and 29.865(c)(5) would require that all flight limitations and procedures for HEC operations be identified and incorporated in the flight manual.

Proposed Amendment to § 29.865(c)(6)

To be compatible with part 133.45(e), proposed § 29.865(c)(6) would require, for HEC operations that require the use of Category A rotorcraft only (Class D RLC), that one-engine-inoperative hover performance capability information based on a dynamic engine failure (simulated engine failure in an actual test rotorcraft) be provided in the flight manual for the operating weights, altitudes, and temperatures for which external load approval is requested.

Proposed Amendments §§ 27.865(d) and 29.865(d)

Proposed new §§ 27.865(d) and 29.865(d) would require that critically configured jettisonable external loads (class and type) must be shown to be both transportable and releasable without hazard to the rotorcraft during normal flight conditions. In addition, these external loads must be shown to be releasable without hazard to the rotorcraft during emergency flight conditions. Compliance with the proposed requirements can be accomplished by using a combination of analysis, ground tests, and flight tests. This is necessary to ensure that the extremities of the operating range are thoroughly explored without unnecessary risk and cost. The new provisions would mitigate HEC transport problems such as entanglements with the rotorcraft in flight and will provide a mandatory flight test validation of the QRS. Current §§ 27.865(d) and 29.865(d) would be revised and redesignated as §§ 27.865(f) and 29.865(f), respectively.

Proposed Amendments to §§ 27.865(e) and 29.865(e)

Current §§ 27.865(c) and 29.865(c) would be revised and redesignated as §§ 27.865(e) and 29.865(e), respectively. The proposals would amend these sections by adding a requirement to install a placard next to the external load attaching means that specifies any operational limitations in addition to the maximum authorized external load weight that can be attached.

Proposed Amendments to §§ 27.865(f) and 29.865(f)

Sections 27.865(d) and 29.865(d) would be revised and redesignated as §§ 27.865(f) and 29.865(f), respectively. These paragraphs would require that for NHEC, all critical structural elements such as those in the external load attachment and carrying system whose failure would result in a hazard to the rotorcraft (not just the cargo hook) have a fatigue analysis in accordance with §§ 27.571 and 29.571, as applicable. The proposals would also require that for HEC, the entire QRS and PCDS and their attachments to the rotorcraft have a fatigue analysis in accordance with §§ 27.571 or 29.571, as applicable.

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 rule.

International Compatibility

The FAA has reviewed corresponding International Civil Aviation Organization international standards and recommended practices and Joint Aviation Authorities regulations, where they exist, and has identified no differences in these proposed amendments and the foreign 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 Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. 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, which are summarized as follows (and available in the docket), the FAA has determined that this NPRM is not a "significant regulatory action" under section 3(f) of Executive Order 12866 and therefore was not reviewed by the

Office of Management and Budget. This NPRM is not considered significant under Department of Transportation's Policies and Procedures (44 FR 11034, February 26, 1979). In addition, for the reasons stated under the "Trade Impact Statement" and the "Regulatory Flexibility Determination," the FAA certifies that this NPRM will not have a significant economic impact on a substantial number of small entities and would not result in the expenditure by State, local or tribal governments, in the aggregate, or by the private sector, of \$100 million or more annually.

The FAA invites the public to provide comments (and related data) on the assumptions made in this evaluation. All comments received will be considered in the final regulatory evaluation.

Costs and Benefits

Costs

The costs of the proposed rule, which would be borne by manufacturers and operators, are evaluated for the time period extending from its implementation date through the operating lives of 75 rotorcraft assumed to be produced under four new type certificates (involving 15-year production runs of 5 rotorcraft per year total under all four new type certificates) and placed into part 133 service. Over the course of this evaluation period, incremental costs would total approximately \$388,500 (1996 dollars), or \$203,000 discounted to present value (using an interest rate of seven percent and letting "present" be the date of initial type certification application). Of the \$388,500 total cost, \$156,000 is attributable to incremental design, analysis, test, and other certification costs, \$30,000 to incremental production costs (75 rotorcraft at \$400 each), and \$202,500 to incremental weight penalty fuel costs (\$180 per year per rotorcraft over 15-year operating lives of 75 rotorcraft). On a per-rotorcraft basis, costs would average approximately \$5,200, or \$2,700 discounted. These incremental costs would be offset to some extent by potential cost savings associated with the harmonization of these proposals with the JAA and eventual creation of identical JAA airworthiness standards, streamlining of certification approvals for part 133 operators, and some relaxed requirements for parts 27 and 29 manufacturers (see Benefits section, below).

Benefits

To estimate the safety benefits of the proposed rule, the FAA reviewed

records of accidents involving part 133 operators that occurred between mid-1983 and mid-1994 that could have been prevented or the losses reduced if the proposed changes were in effect. During the 11-year period, there were 17 such accidents involving fatal and/or non-fatal injuries, or damage to equipment, or both. Eight of the accidents resulted in harm to persons (either inside or outside of the rotorcraft), totaling eight fatalities and two serious injuries. Fifteen of the 17 accidents involved either substantial damage (seven) or destruction of the rotorcraft (eight).

To provide a basis for comparing the safety benefits and costs of rulemaking actions, the FAA currently uses a minimum statistical value of \$2.7 million for a fatality avoided and \$518,000 for a serious injury avoided. Applying these standards to the casualty losses summarized above and making allowances for the costs of rotorcraft damage, the total cost of the 17 accidents was approximately \$27.2 million.

The FAA estimates that the proposed rule could prevent at least 50 percent of the type of accidents summarized above. Applying it retrospectively would yield dollar benefits of approximately \$13.6 million (one-half of \$27.2 million). Over the 11-year accident evaluation period, the part 133 fleet averaged approximately 300 active rotorcraft. Therefore, the benefits would average approximately \$4,100 per year per rotorcraft (\$13.6 million/11 years/300 operating part 133 rotorcraft per year). Applying this per-rotorcraft safety benefit to the cumulative number of complying rotorcraft results in total safety benefits of \$4.6 million (or \$1.3 million discounted to present value). On a per-rotorcraft basis, these benefits would average approximately \$61,500, or \$17,300 discounted.

In addition to improving safety, the proposed rule would provide some cost-relief in certain respects. New production rotorcraft would be delivered with standardized procedures for external load operations, and could result in a small savings to part 133 operators. Further, changes to current regulations that relate to the primary and backup quick-release devices would reduce production costs for parts 27 and 29 rotorcraft manufacturers. The changes would also increase harmonization and commonality between U.S. and European airworthiness standards. Harmonization would eliminate unnecessary differences in airworthiness requirements, thus reducing manufacturers' certification costs.

Comparison of Costs and Benefits

The proposed rule would generate benefits in the form of increased safety and cost relief (see preceding paragraph—the potential cost relief has not been included in the cost/benefit calculation). On a per-rotorcraft basis, the life-cycle safety benefits would average approximately \$17,300 (discounted) and the costs would average approximately \$2,700 (discounted), yielding a benefit-to-cost ratio of 6.4 to 1. On this basis alone, the proposed rule is cost-beneficial; additional quantified efficiency and harmonization benefits would increase this ratio.

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 an RFA is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

The entities that would be affected by the proposed rule consist of rotorcraft manufacturers (included in Standard Industrial Classification (SIC 3721, Aircraft and Aircraft Parts Manufacturers) and external load operators (SIC 4512, 4513, 4522). Manufacturers would incur additional development, certification, and production costs. In addition to indirectly incurring all or part of these costs in the form of higher rotorcraft acquisition costs, operators would incur

increased fuel costs resulting from weight penalties. Although the certification costs (non-recurring) would be either fully absorbed by the manufacturer(s), passed on in-total to operator(s) (purchasers), or more likely, absorbed in some proportion by both, the FAA in this analysis adopts a conservative approach and allocates total certification costs to each category in assessing significant economic impact. Incremental per-unit production costs, however, are assumed to be fully passed on to purchasers (operators).

For manufacturers, a small entity is one with 1,500 or fewer employees. Only five rotorcraft manufacturers 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 a fourth does not produce rotorcraft used for external loads. The fifth small manufacturer produces specialized smaller rotorcraft, a minority of which are configured for external load operations; this producer does not compete with the larger manufacturers. Annualized certification costs imposed by the proposed rule are estimated to be \$3,800 per manufacturer for each certification and is not considered significant within the meaning of the RFA.

There are numerous external load operators. The FAA has not determined how many of these are small operators and if a substantial number would potentially be impacted by the proposal. However, most external load operations involve specialized activities such as logging, offshore oil drilling, or emergency rescue operations, the demand for which is highly price-inelastic; the operators can readily pass on the incremental costs to their customers. Notwithstanding, the maximum annualized cost per rotorcraft would most likely not be greater than \$314 (includes manufacturers' certification and production costs passed on to the purchaser and increased fuel costs, but excludes potential offsetting cost-savings). This amount probably equates to less than the cost of two hours' operating time (representing a de minimus portion of annual revenues) and is not considered significant within the meaning of the RFA. In addition, no small manufacturer or small operator would bear a disproportionate cost burden nor have a greater likelihood of failing in business compared to larger entities.

Based on the findings delineated above and consistent with the objectives and requirements of the RFA as amended, the FAA certifies that this proposed rule would not have a

significant economic impact on a substantial number of small entities. The FAA invites comments on this finding (and the underlying assumptions) during the public comment period following publication of the subject NPRM.

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 United States' companies doing business in foreign markets, and foreign companies doing business in the United States.

This proposed 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 would be a positive step toward removing impediments to international trade.

Federalism Implications

The regulations proposed 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 proposal would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Unfunded Mandates Reform Act

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 governments, 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 determines that this proposed rule does not contain a significant intergovernmental or private sector mandate as defined by the Act.

List of Subjects

14 CFR Part 27

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

14 CFR Part 29

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

The Proposed Amendments

In consideration of the foregoing, the Federal Aviation Administration proposes to amend parts 27 and 29 of Title 14, Code of Federal Regulations (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. Section 27.25 is amended by revising paragraph (c) to read as follows:

§ 27.25 Weight limits

* * * * *

(c) *Total weight with jettisonable external load.* A total weight for the rotorcraft with a jettisonable external load attached that is greater than the maximum weight established under paragraph (a) of this section may be established for any rotorcraft-load combination if—

- (1) The rotorcraft-load combination does not include human external cargo,
- (2) Structural component approval for external load operations under either

§ 27.865, or under equivalent operational standards is obtained,

(3) The portion of the total weight that is greater than the maximum weight established under paragraph (a) of this section is made up only of the weight of all or part of the jettisonable external load,

(4) Structural components of the rotorcraft are shown to comply with the applicable structural requirements of this part under the increased loads and stresses caused by the weight increase over that established under paragraph (a) of this section, and

(5) Operation of the rotorcraft at a total weight greater than the maximum certificated weight established under paragraph (a) of this section is limited by appropriate operating limitations under § 27.865 (a) and (d) of this part.

3. The undesignated center heading preceding § 27.865 is revised as set forth below, and in § 27.865 the section heading, paragraph (a) introductory text and paragraph (b) are revised; paragraphs (c) and (d) are redesignated as paragraphs (e) and (f) and revised; and new paragraphs (c) and (d) are added to read as follows:

External Loads

§ 27.865 External loads.

(a) It must be shown by analysis, test, or both, that the rotorcraft external load attaching means for rotorcraft-load combinations to be used for nonhuman external cargo applications can withstand a limit static load equal to 2.5, or some lower load factor approved under §§ 27.337 through 27.341, multiplied by the maximum external load for which authorization is requested. It must be shown by analysis, test, or both that the rotorcraft external load attaching means and corresponding personnel carrying device system for rotorcraft-load combinations to be used for human external cargo applications can withstand a limit static load equal to 3.5 or some lower load factor, not less than 2.5, approved under §§ 27.337 through 27.341, multiplied by the maximum external load for which authorization is requested. The load for any rotorcraft-load combination class, for any external cargo type, must be applied in the vertical direction. For jettisonable external loads of any applicable external cargo type, the load must also be applied in any direction making the maximum angle with the vertical that can be achieved in service but not less than 30°. However, the 30° angle may be reduced to a lesser angle if—

* * * * *

(b) The external load attaching means, for jettisonable rotorcraft-load combinations, must include a quick-release system to enable the pilot to release the external load quickly during flight. The quick-release system must consist of a primary quick release subsystem and a backup quick release subsystem that are isolated from one another. The quick-release system, and the means by which it is controlled, must comply with the following:

(1) A control for the primary quick release subsystem must be installed either on one of the pilot's primary controls or in an equivalently accessible location and must be designed and located so that it may be operated by either the pilot or a crewmember without hazardously limiting the ability to control the rotorcraft during an emergency situation.

(2) A control for the backup quick release subsystem, readily accessible to either the pilot or another crewmember, must be provided.

(3) Both the primary and backup quick release subsystems must—

(i) Be reliable, durable, and function properly with all external loads up to and including the maximum external load for which authorization is requested.

(ii) Be protected against electromagnetic interference (EMI) from external and internal sources and against lightning to prevent inadvertent load release.

(A) The minimum level of protection required for jettisonable rotorcraft-load combinations used for nonhuman external cargo is a radio frequency field strength of 20 volts per meter.

(B) The minimum level of protection required for jettisonable rotorcraft-load combinations used for human external cargo is a radio frequency field strength of 200 volts per meter.

(iii) Be protected against any failure that could be induced by a failure mode of any other electrical or mechanical rotorcraft system.

(c) For rotorcraft-load combinations to be used for human external cargo applications, the rotorcraft must—

(1) For jettisonable external loads, have a quick-release system that meets the requirements of paragraph (b) of this section and that—

(i) Provides a dual actuation device for the primary quick release subsystem, and

(ii) Provides a separate dual actuation device for the backup quick release subsystem.

(2) Have a reliable, approved personnel carrying device system that has the structural capability and

personnel safety features essential for external occupant safety,

(3) Have placards and markings at all appropriate locations that clearly state the essential system operating instructions and, for the personnel carrying device system, the ingress and egress instructions.

(4) Have equipment to allow direct intercommunication among required crewmembers and external occupants, and

(5) Have the appropriate limitations and procedures incorporated in the flight manual for conducting human external cargo operations.

(d) The critically configured jettisonable external loads must be shown by a combination of analysis, ground tests, and flight tests to be both transportable and releasable throughout the approved operational envelope without hazard to the rotorcraft during normal flight conditions. In addition, these external loads must be shown to be releasable without hazard to the rotorcraft during emergency flight conditions.

(e) A placard or marking must be installed next to the external-load attaching means clearly stating any operational limitations and the maximum authorized external load as demonstrated under § 27.25 and this section.

(f) The fatigue evaluation of § 27.571 of this part does not apply to rotorcraft-load combinations to be used for nonhuman external cargo except for the failure of critical structural elements that would result in a hazard to the rotorcraft. For rotorcraft-load combinations to be used for human external cargo, the fatigue evaluation of § 27.571 of this part applies to the entire quick release and personnel carrying device structural systems and their attachments.

PART 29—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT

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

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

§ 29.25 [Amended]

5. Section 29.25 is amended by revising paragraph (c) to read as follows:

* * * * *

(c) *Total weight with jettisonable external load.* A total weight for the rotorcraft with a jettisonable external load attached that is greater than the maximum weight established under paragraph (a) of this section may be

established for any rotorcraft-load combination if—

(1) The rotorcraft-load combination does not include human external cargo,

(2) Structural component approval for external load operations under either § 29.865 or under equivalent operational standards is obtained,

(3) The portion of the total weight that is greater than the maximum weight established under paragraph (a) of this section is made up only of the weight of all or part of the jettisonable external load,

(4) Structural components of the rotorcraft are shown to comply with the applicable structural requirements of this part under the increased loads and stresses caused by the weight increase over that established under paragraph (a) of this section, and

(5) Operation of the rotorcraft at a total weight greater than the maximum certificated weight established under paragraph (a) of this section is limited by appropriate operating limitations under § 29.865 (a) and (d) of this part.

6. The undesignated center heading preceding § 29.865 is revised as set forth below, and in § 29.865 the section heading, paragraph (a) introductory text and paragraph (b) are revised; paragraphs (c) and (d) are redesignated as paragraphs (e) and (f) and revised; and new paragraphs (c) and (d) are added to read as follows:

External Loads

§ 29.865 External loads.

(a) It must be shown by analysis, test, or both, that the rotorcraft external load attaching means for rotorcraft-load combinations to be used for nonhuman external cargo applications can withstand a limit static load equal to 2.5, or some lower load factor approved under §§ 29.337 through 29.341, multiplied by the maximum external load for which authorization is requested. It must be shown by analysis, test, or both that the rotorcraft external load attaching means and corresponding personnel carrying device system for rotorcraft-load combinations to be used for human external cargo applications can withstand a limit static load equal to 3.5 or some lower load factor, not less than 2.5, approved under §§ 29.337 through 29.341, multiplied by the maximum external load for which authorization is requested. The load for any rotorcraft-load combination class, for any external cargo type, must be applied in the vertical direction. For jettisonable external loads of any applicable external cargo type, the load must also be applied in any direction making the maximum angle with the

vertical that can be achieved in service but not less than 30°. However, the 30° angle may be reduced to a lesser angle if—

* * * * *

(b) The external load attaching means, for jettisonable rotorcraft-load combinations, must include a quick-release system to enable the pilot to release the external load quickly during flight. The quick-release system must consist of a primary quick release subsystem and a backup quick release subsystem that are isolated from one another. The quick release system, and the means by which it is controlled, must comply with the following:

(1) A control for the primary quick release subsystem must be installed either on one of the pilot's primary controls or in an equivalently accessible location and must be designed and located so that it may be operated by either the pilot or a crewmember without hazardously limiting the ability to control the rotorcraft during an emergency situation.

(2) A control for the backup quick release subsystem, readily accessible to either the pilot or another crewmember, must be provided.

(3) Both the primary and backup quick release subsystems must—

(i) Be reliable, durable, and function properly with all external loads up to and including the maximum external load for which authorization is requested.

(ii) Be protected against electromagnetic interference (EMI) from external and internal sources and against lightning to prevent inadvertent load release.

(A) The minimum level of protection required for jettisonable rotorcraft-load combinations used for nonhuman external cargo is a radio frequency field strength of 20 volts per meter.

(B) The minimum level of protection required for jettisonable rotorcraft-load combinations used for human external cargo is a radio frequency field strength of 200 volts per meter.

(iii) Be protected against any failure that could be induced by a failure mode of any other electrical or mechanical rotorcraft system.

(c) For rotorcraft-load combinations to be used for human external cargo applications, the rotorcraft must—

(1) For jettisonable external loads, have a quick-release system that meets the requirements of paragraph (b) of this section and that—

(i) Provides a dual actuation device for the primary quick release subsystem, and

(ii) Provides a separate dual actuation device for the backup quick release subsystem.

(2) Have a reliable, approved personnel carrying device system that has the structural capability and personnel safety features essential for external occupant safety.

(3) Have placards and markings at all appropriate locations that clearly state the essential system operating instructions and, for the personnel carrying device system, ingress and egress instructions,

(4) Have equipment to allow direct intercommunication among required crewmembers and external occupants,

(5) Have the appropriate limitations and procedures incorporated in the flight manual for conducting human external cargo operations, and

(6) For human external cargo applications requiring use of Category A

rotorcraft, have one-engine-inoperative hover performance data and procedures in the flight manual for the weights, altitudes, and temperatures for which external load approval is requested.

(d) The critically configured jettisonable external loads must be shown by a combination of analysis, ground tests, and flight tests to be both transportable and releasable throughout the approved operational envelope without hazard to the rotorcraft during normal flight conditions. In addition, these external loads must be shown to be releasable without hazard to the rotorcraft during emergency flight conditions.

(e) A placard or marking must be installed next to the external-load attaching means clearly stating any operational limitations and the maximum authorized external load as

demonstrated under § 29.25 and this section.

(f) The fatigue evaluation of § 29.571 of this part does not apply to rotorcraft-load combinations to be used for nonhuman external cargo except for the failure of critical structural elements that would result in a hazard to the rotorcraft. For rotorcraft-load combinations to be used for human external cargo, the fatigue evaluation of § 29.571 of this part applies to the entire quick release and personnel carrying device structural systems and their attachments.

Issued in Washington, DC, on July 6, 1998.

Thomas E. McSweeney,

Director, Aircraft Certification Service.

[FR Doc. 98-18552 Filed 7-10-98; 8:45 am]

BILLING CODE 4910-13-P