DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 29

[Docket No. 24802; Amendment No. 29–40]

RIN 2120–AB36

Airworthiness Standards; Transport Category Rotorcraft Performance

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This rule adopts new and revised airworthiness standards for the performance of transport category rotorcraft. The changes define more clearly the factors for determining takeoff, climb, and landing performance requirements. These changes provide an improved level of safety associated with recent technological advances in the design of turboshaft engines and rotorcraft.

EFFECTIVE DATE: June 10, 1996.

FOR FURTHER INFORMATION CONTACT: T.E. Archer, Policy and Procedures Group (ASW–110), Rotorcraft Standards Staff, Aircraft Certification Service, Federal Aviation Administration, Fort Worth, Texas 76193–0110, telephone (817) 222–5126.

SUPPLEMENTARY INFORMATION:

Background

This final rule is based on a Notice of Proposed Rulemaking (NPRM) (Notice 90–1), issued January 2, 1990 (55 FR 698, January 8, 1990). The NPRM was preceded by an Advance Notice of Proposed Rulemaking (ANPRM) (Notice 85–19) issued October 9, 1985 (50 FR 42126, October 17, 1985), and by a public meeting on April 30, 1986 (51 FR 4504, February 5, 1986), in Fort Worth, Texas. A transcript of that meeting is contained in the docket for this rulemaking. Supplemental Notice of Proposed Rulemaking (SNPRM) (Notice 90–1A), issued June 15, 1994 (59 FR 33598, June 29, 1994), modified Notice 90–1 by including a minimum descent height of 15 feet.

Amendment 29–21 (48 FR 4373, January 26, 1983) revised the transport category rotorcraft airworthiness requirements to provide for an increased level of safety in several areas, including performance. Subsequently, a Federal Aviation Administration (FAA) program to develop guidance material (Advisory Circulars 27–1 and 29–2A) for certification of rotorcraft in accordance with the requirements of Title 14 of the Code of Federal Regulations (Title 14) part 29 (part 29) revealed a need for some additions to and clarification of the provisions of Amendment 29–21. Those additions and clarification are included in this amendment.

Amendment 29–21 modified the applicability limits of Categories A and B of Transport Category Rotorcraft. Category A rotorcraft must meet a higher level of safety, including the requirement to have multiple engines, and be able to continue safe flight after an engine failure. Category B rotorcraft may be either single or multiengine, but the changes adopted in Amendment 29–21 limited this category further to a maximum capacity of nine passengers and 20,000 pounds gross weight. No changes are made to those limits in this amendment.

A significant element of Notice 90–1 was a proposed minimum climb gradient for the Category A takeoff path. This standard was proposed to standardize the climb gradient for helicopters regardless of their airspeeds and to facilitate heliport planning. The present standard requires a minimum rate of climb for the takeoff path; however, recently certificated rotorcraft, as well as most rotorcraft currently under development, produce maximum rates of climb at higher airspeeds than the previous generation of rotorcraft. For a specific rate of climb, the climb gradient decreases as climb airspeed increases. This results in a shallower climb gradient for modern, high-speed rotorcraft than for older, slow-speed rotorcraft. Notice 90–1 proposed a minimum climb gradient based on the present rate-of-climb requirement and the lower airspeed of older rotorcraft. At the time Notice 90–1 was issued, FAA analysis suggested that this change would have involved an acceptably small weight (payload) penalty. However, more precise data supplied by the commenters in response to the notice indicate there would be a payload penalty of 450 pounds or greater for a current 10,000-pound class helicopter. This could represent as much as 20 to 25 percent of the passenger payload, which one commenter characterized as totally unacceptable. Upon reconsideration, the FAA agrees that the proposal would have a significantly more burdensome effect and would not be cost beneficial, and as noted in the following discussion, the proposal for requiring minimum climb gradient is not adopted in this rule.

All interested persons have been given an opportunity to participate in the making of these amendments, and due consideration has been given to all comments received. Except for the change described above and for the nonsubstantive, editorial, and clarifying changes as discussed herein, the proposals have been adopted as proposed.

Discussion of Comments

Five commenters each responded to Notices 85–19 and 90–1. These commenters represent worldwide manufacturers, operators, and airworthiness authorities. The commenters' recommendations and the suggested changes are summarized in the following discussions. Four commenters responded to Notice 90–1A and all agreed with that proposal.

14 CFR 29.1 Applicability

Notice 90–1 proposed to change the reference in paragraph (e) from §§ 29.79 to 29.87, which is redesignation of the section number for the height-velocity envelope. There were no comments; therefore, the proposal is adopted.

New 14 CFR 29.49 Performance at Minimum Operating Speed (Old § 29.73)

Notice 90–1 proposed to redesignate § 29.73 as § 29.49 to relocate the requirements for helicopter hover performance. For transport category helicopters, hover performance is analogous to the stall speed for transport category airplanes and provides the basis for all other performance requirements. Therefore, by placing the requirements for hovering performance first, the other requirements more logically follow.

One commenter proposes a requirement for one-engine-inoperative (OEI) hover performance both in and out-of-ground effect (OGE). This comment, also made in response to the ANPRM, is beyond the scope of this rule as proposed in the notice.

This commenter also recommends that OGE controllability (in 17-knot winds from any direction) should also be required. The FAA disagrees. Past FAA policy has permitted OGE performance to be presented in zero wind if a minimum of yaw control remains (i.e., must be able to generate a positive yaw rate) or to be demonstrated with some wind condition if the demonstrated conditions are clearly identified in the Rotorcraft Flight Manual (RFM). The validity of this policy has been borne out by good service experience; therefore, the 17-knot criteria are not considered necessary in determining OGE controllability. Therefore, the FAA considers the calm-wind OGE hover performance data with no related controllability limit are the minimum data that should be provided, and the amendment is adopted as proposed. The

requirement to provide performance information about OGE hover and the maximum safe wind for the data presented is clarified in the new § 29.1587(a)(6) and revised § 29.1587(b)(8).

14 CFR 29.51 Takeoff Data: General

Notice 90–1 proposed to change the sections referenced in the introductory text of paragraph (a) to correspond to the applicable sections numbered in accordance with these new amendments. No comments were received; therefore, the proposal is adopted as proposed.

14 CFR 29.53 Takeoff: Category A

This proposal would separate, in the text, the Category A takeoff requirement from the definition of a decision point. No comments were received; therefore, the proposal is adopted as proposed.

New 14 CFR 29.55 Takeoff Decision Point: Category A

Notice 90–1 proposed to add this new section to redefine the takeoff critical decision point (CDP) previously contained in § 29.53; it further proposed to remove the requirement to identify the CDP by height and airspeed, since height alone or other factors may be more appropriate. A commenter suggests that the section title and other references to ''critical decision point'' be changed to ''takeoff decision point (TDP).'' The commenter notes that TDP is compatible with the term ''landing decision point (LDP)'' already in other regulatory parts. The FAA agrees; accordingly, ''critical decision point'' is changed to ''takeoff decision point.''

Additionally, a commenter to § 29.59 states that engine failure and the TDP do not occur at the same time because of necessary pilot-recognition time. The FAA agrees that a time interval for pilot recognition of the engine failure must be included when establishing the TDP. Calculating a pilot-recognition time interval when determining the TDP is a natural part of the TDP-determining process. Current industry practice already adequately considers this pilot-recognition time interval in determining the TDP. Therefore, to explicitly state this requirement in the regulations imposes no additional economic burden on manufacturers. Also, to harmonize Title 14 and the Joint Aviation Requirements (JAR's), the certification requirements for the Joint Aviation Authorities (JAA) of Europe, an explicit adoption of the pilot-recognition time interval is necessary. Therefore, since a pilot-recognition time interval is currently being used by manufacturers, and the FAA and the manufacturers are interested in harmonizing Title 14 and the JAR's, a new paragraph (c) has been added to § 29.55 to require that a pilot-recognition time interval be included in the TDP determination.

This section is adopted with changes as discussed.

14 CFR 29.59 Takeoff Path: Category A

Notice 90–1 proposed to move the rejected takeoff requirements to a new § 29.62 and more clearly define the takeoff path from the start of the takeoff to completion at 1,000 feet above the takeoff surface. It also proposed the new phrase ''critical decision point,'' now changed to ''takeoff decision point'' as explained in new § 29.55. The most significant proposed change was to establish minimum climb gradients along the takeoff path. Present requirements specify only a rate of climb. The use of gradients would have assisted heliport designers and provided additional safe ground clearance. The FAA estimated that inclusion of these gradients would introduce only a slight performance penalty. However, as discussed earlier, more precise data submitted by commenters indicate that adopting these gradients would result in an unanticipated decrease in the payload of a 10,000-pound class rotorcraft. Therefore, present rate-of-climb requirements are retained; the proposed minimum climb gradient is not adopted; and the remaining paragraphs of § 29.59 are renumbered accordingly.

One commenter proposes that a new section be introduced to require information on the takeoff path acceleration segment distance when accelerating from V_{TOSS} to V_y and that § 29.1587 also be amended to require these data. The commenter's proposal is beyond the scope of Notice 90–1; therefore, the proposal is not included in the amendment as adopted but may be appropriate for future rulemaking.

Another commenter disagrees that engine failure and CDP (now TDP) occur at the same time. The FAA agrees as discussed previously under § 29.55. Accordingly, the proposed § 29.59(a)(2) has been reworded by changing critical decision point to engine failure point; and by adding the phrase, ''. . . continue to the TDP, and then . . .'' to paragraph (a)(3). These additions clarify that consideration of the time interval between engine failure and the pilot's recognition of the failure is necessary in establishing TDP.

Notice 90–1, with respect to loss of altitude after engine failure, proposed no minimum height during descent to attain V_{TOSS} except that touchdown should not occur. Also, Notice 90–1 proposed that a minimum ground clearance be determined during certification and the data included in the RFM. Several commenters objected to the proposal and stated that a minimum ground clearance value should be specified in the rule. Wide support was expressed by European authorities, manufacturers, and operators to limit the descent to not less than 15 feet above the takeoff surface. Also, this minimum height was reflected in the European JAA, Notice of Proposed Amendment (NPA) 29–2, Preliminary Issue 1. However, since Notice 90–1 proposed to eliminate the existing 35-foot minimum height of part 29, requiring a new minimum height of a specified value in excess of that proposed was more stringent than that proposed in Notice 90–1. Therefore, the FAA issued Notice 90–1A to include a minimum descent height of 15 feet and all commenters agreed. Hence, the minimum descent height of 15 fee is adopted as proposed by Notice 90–1A. However, the paragraph is shown as (e) rather than (g) as proposed by Notice 90–1A due to renumbering as discussed previously.

New 14 CFR 29.60 Elevated Heliport Takeoff Path: Category A

Notice 90–1 proposed to add this section to introduce the requirements for pinnacle takeoff path, Category A. However, two commenters suggest using the term ''elevated'' rather than ''pinnacle'' since ''elevated'' is a more common term. The FAA agrees, and the word ''pinnacle'' has been replaced with ''elevated heliport'' wherever used. Several commenters also recommend that the requirement for takeoff climb gradients be deleted from this section. Therefore, as in the ground-level takeoff path, the climb gradients proposed for this section have also been removed because data submitted by commenters indicate that adopting these gradients would result in an unanticipated decrease in payload.

However, the FAA notes that the proposal for this section was not clear in Notice 90–1. The section, as proposed, would require a continuous maneuver from the start of the takeoff unit reaching 1,000 feet above the takeoff surface with two specific rate-of-climb requirements at 200 and 1,000 feet above the takeoff surface. A continuous climb was never intended by the FAA. For example, if the descent below the takeoff surface is 200 feet, using a continuous climb standard would require a total initial climb of 400 feet to regain a point 200 feet above the takeoff surface. Therefore, climbing at a rate of 100 feet per minute would take

4 minutes to regain a point 200 feet above the takeoff surface while the current One Engine Inoperative (OEI) standards only require that 2½ minutes of emergency power be available. Hence, the time for this descent-climb would not be compatible with the time-limited OEI power level that is permitted. Therefore, this paragraph has been clarified to indicate that the distances to be measured will be the vertical magnitude of any descent below the takeoff surface and the horizontal distance from the start of the takeoff to the point where a positive rate of climb is established at an airspeed of at least V_{TOSS}. This will be considered to be the end of the takeoff distance. (See § 29.61.) From the end of the takeoff distance, climb data will be used for the remainder of takeoff path planning. The rate-of-climb requirements at 200 and 1,000 feet above the takeoff surface will remain the same but will be clearly identified as separate requirements and not a part of a continued takeoff maneuver. Climb gradients were also included in the proposal but, as previously discussed, are not adopted. This section is adopted with changes as discussed.

New 14 CFR 29.61 Takeoff Distance: Category A

Notice 90–1 proposed to add a new section to define more clearly the parameters to be used in determining takeoff distance. No comments were received on this proposal. However, in view of the previous discussion of elevated heliports and the changes to § 29.60, a second paragraph is added to more clearly define takeoff distances. Also, as discussed for the new § 29.59, a requirement for considering the pilot recognition interval following engine failure is recognized in the new § 29.61. The addition of § 29.61(b) states explicitly that the takeoff distance for elevated heliports is defined the same as that for nonelevated heliports except that there is no requirement that the rotorcraft remain at least 35 feet above the takeoff surface. This provision harmonizes Title 14 and the JAR. Section 29.61(b) relieves applicants from the requirement to attain and maintain at least 35 fee of altitude when determining the takeoff distance from an elevated heliport. Thus, the takeoff distance will be shorter for rotorcraft that take off from an elevated heliport. Thus, the takeoff distance will be shorter for rotorcraft that take off from an elevated heliport that the distance needed to reach 35 feet above the takeoff surface as required by § 29.61(a) for rotorcraft that take off from a nonelevated heliport. This reduction in takeoff distance will result from an exchange of the inherent altitude of the elevated heliport for airspeed and subsequently rate of climb. The FAA has determined that this relieving provision will neither increase the economic burden on any applicant nor increase the scope of this rule. Therefore, the proposal is adopted with the noted changes.

New 14 CFR 29.62 Rejected Takeoff: Category A

Notice 90–1 proposed to separate the text of the rejected takeoff criteria from the takeoff path section and impose the restriction for the use of only primary controls while airborne. No comments were received; therefore, the proposal is adopted with the change of CDP to TDP, the change of ''takeoff decision'' to ''engine failure,'' and the addition of ''the rotorcraft continuing to takeoff decision point,'' as explained in the discussion of new § 29.55.

New 14 CFR 29.64 Climb: General

This new section relocates and clarifies the general climb requirements. No comments were received; therefore, the proposal is adopted without change.

14 CFR 29.65 Climb: All Engines Operating

Notice 90–1 proposed to add a general requirement to determine Category a rotorcraft climb performance. Currently Category A rotorcraft climb performance is required only when V_{NE} (never-exceed speed) is less than best climb speed (V_Y) at sea level. No comments were received; therefore, the proposal is adopted without change.

14 CFR 29.67 Climb: One-engine-Inoperative

Notice 90–1 proposed to include the takeoff climb gradients as a part of the general climb requirement, as well as the OEI climb requirements to be met at 200 and 1,000 feet above the takeoff surface.

Commenters recommend that the climb gradient requirements be removed. The FAA agrees because data submitted by commenters indicate that adopting these gradients would result in an unanticipated decrease in payload. Therefore, the proposed climb gradient requirements are not adopted. However, the rate of climb requirements are adopted as proposed. Also, various clarifying word changes have been made including adding the words ''climb following'' before ''takeoff'' in paragraph (a)(2)(ii) to clarify that the unfavorable center of gravity applies to the climb following takeoff. The proposal is adopted with the noted changes.

14 CFR 29.75 Landing: General

Notice 90–1 proposed to revise the general landing requirements to separate specific requirements and to provide references to those specific landing requirement sections. No comments were received; therefore, the proposal is adopted without change.

14 CFR 29.77 Landing Decision Point

Notice 90–1 proposed to add the new requirement for designation of a landing decision point (LDP), which has been an industry practice although not required in all recent Category A certifications. No comments were received; therefore, the proposal is adopted without change except for clarifying that, in accordance with the discussion for § 29.55, pilot recognition time must be considered.

14 CFR 29.79 Landing: Category A

Notice 90–1 proposed to establish the Category A landing requirements as a separate section with only minor revision from the present requirements. One commenter discusses studies and computer predictions for approaches and landings at elevated heliports but does not propose any changes. Since no changes were recommended, and the FAA does not see a need for any changes based on the commenters' discussion, the proposal is adopted without change.

New 14 CFR 29.81 Landing Distance: Category A

Notice 90–1 proposed a new section to require landing distances to be determined from specific heights. One commenter suggests that the proposed flight profile between LDP and touchdown using an elevated heliport is unduly restrictive. This comment was based on the commenter's concern that the proposal would require consideration of a 25-foot high screen at the approach edge of the elevated heliport. The FAA notes that this is not the intent of this section. The proposed horizontal landing distance determined from a point 25 feet higher than the elevated heliport need not be contained within the heliport landing surface. ''Pinnacle'' has been changed to ''elevated heliport'' in accordance with previous discussions. Therefore, the proposal is adopted with the change as noted.

New 14 CFR 29.83 Landing: Category B

Notice 90–1 proposed a new § 29.83 that included moving the Category B landing requirement presently in § 29.75(c) into this new section and required landing distances to be determined power-on rather than power-off. One commenter suggests

deleting the requirement to avoid the unsafe area of the height-velocity (HV) envelope since Category B rotorcraft with nine or fewer passengers and less than 20,000 pounds do not have the HV envelope as a limitation and may transit the unsafe area of the HV envelope during landing. The FAA disagrees. While the commenter is correct about the HV envelope not being a limitation for Category B rotorcraft with nine or fewer passengers, the FAA cannot agree with presenting data that include normal operations within the unsafe area of the HV envelope. Certain operations (e.g., external loads and hoist work) are not necessarily limited by the type certification HV envelope; however, the operator still should be aware that the operations do not involve normal procedures, and the operator should evaluate the risk in accordance with the applicable regulations (e.g., part 133). Therefore, the proposal is adopted without change.

New 14 CFR 29.85 Balked Landing: Category A (Old § 29.77)

Notice 90–1 proposed to redesignate present § 29.77 as a new § 29.85, to clarify the relationship between the landing decision point and balked landing, and to remove the prohibition against descending below 35 feet above the landing surface. The proposal only specified that the rotorcraft ''not touch down'' during descent. One commenter proposes that some minimum height be required. As previously discussed under § 29.59, the FAA agrees; however, Notice 90–1 proposed to allow the rotorcraft to descend below the current 35-foot height as long as it does not touch down. Therefore, the FAA issued Notice 90–1A to include the 15-foot minimum descent height. Three commenters to Notice 90–1A fully agreed with the proposed changes. One commenter agreed provided the working for § 29.85(c) read identically to the wording of Notice 90–1. However, it was necessary to amend the wording in proposed paragraph (c) to add the minimum descent height restriction requirements. Otherwise, the wording is identical. Also, as previously discussed the term ''elevated'' will be used rather than ''pinnacle.'' Therefore, the proposal is adopted by adding the 15-foot minimum descent height and the amended wording to paragraph (c) and by adding the phrase ''failed and failure recognized'' to paragraph (b) to specify that the time interval for pilot recognition of engine failure must be considered as discussed in § 29.55.

New 14 CFR 29.87 Height-velocity Envelope (Old § 29.79)

Notice 90–1 proposed to redesignate § 29.79 as a new § 29.87 and to revise the engine power conditions to be used. No comments were received; therefore, the proposal is adopted with only editorial changes.

14 CFR 29.1323 Airspeed Indicating System

Notice 90–1 proposed to change the term ''height-speed'' to ''height-velocity'' to agree with other changes in the proposal. No comments were received; therefore, the proposal is adopted without change.

14 CFR 29.1587 Performance Information

Notice 90–1 proposed to change this section to conform to other changes in the proposal. One commenter suggests requiring, as performance information, the steady gradient of climb for each weight, altitude, and temperature for which takeoff data are scheduled for the two conditions between the end of the takeoff and at 1,000 feet above the takeoff surface. The FAA does not agree. This would require a significant increase in the number of flight tests for compilation of data and for FAA verification of this data, with resulting significant adverse economic impact and no perceived safety benefits. As discussed with respect to the new § 29.49, the requirement to provide OGE performance data, including the maximum safe wind for the data presented, is added to the Category A requirements in § 29.1587(a)(6). Also, § 29.1587(b)(8) is revised to reflect that OGE performance data, including maximum safe wind for the data presented, is no longer optional. Even though the new paragraph (a)(6) and the revised paragraph (b)(8) were not proposed, they only require the presentation in the Rotorcraft Flight Manual of the new OGE performance data, including the maximum wind for the data presented. The collection of the data is now required by the new § 29.49. New paragraph (a)(6) and revised paragraph (b)(8) state explicitly what would otherwise be required during the certification process to demonstrate compliance with the new required § 29.49. In addition to clarifying § 29.49(c), the new paragraph (a)(6) for Category A rotorcraft and the revised paragraph (b)(8) for Category B rotorcraft have identical provisions and additionally harmonize the FAR and the JAR. Based on these factors, the minimal burden placed on manufacturers of presenting the data that they are required to develop, and the remote likelihood of an adverse comment, it is unnecessary to solicit prior public comment on these nonsubstantive changes. Therefore, the proposal is adopted with the noted changes.

Regulatory Evaluation Summary

Changes to federal regulations must undergo several economic analyses. First, Executive Order 12866 directs Federal agencies to promulgate new regulations or modify existing regulations only if the potential benefits to society outweigh the potential costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Finally, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. In conducting these assessments, the FAA has determined that this rule: (1) Will generate benefits exceeding its costs and is not ''significant'' as defined in Executive Order 12866; (2) is not ''significant'' as defined in DOT's Policies and Procedures; (3) will not have a significant impact on a substantial number of small entities; and (4) will not impact international trade. These analyses, available in the docket, are summarized below.

Cost/Benefit Analysis

The rule includes 31 changes to 21 sections of part 29. Twenty eight of the changes are either editorial in nature or update the regulations to correspond with current technology. Three changes, as discussed below, were singled out for study because they are more substantive in terms of cost and/or benefit impact. The FAA has determined that these requirements will have no or negligible economic impacts on manufacturers and operators.

Section 29.49(b)—Performance at Minimum Operating Speed (Category B Hover Performance). This rule renumbers § 29.73 to 29.49, deletes paragraph (b)(2), and removes the minimum hover performance requirement for Category B helicopters (but still requires that hover performance data be developed and provided by the manufacturer). There will be no cost impact resulting from this change, since test requirements are unchanged and design changes are not required. Although the same amount of hover performance data will still be required from manufacturers, operators will benefit by being able to capitalize on a small increase in gross weight and payload.

Section 29.49(c)—Performance at Minimum Operating Speed (Out-of-

Ground Effect Hover Performance). The rule will require that manufacturers provide out-of-ground effect (OGE) hover ceiling data to operators. Manufacturers have historically provided this information on a voluntary basis. Industry sources estimate that requiring OGE hover data will add, at most, an additional 3 to 5 flight test hours. At a cost of $24,800 per flight test hour, this represents an additional cost to manufacturers of $74,400 to $124,000 (in 1994 dollars) per certification.

OGE hover performance data is needed by operators that conduct external lift operations. If an operator were to conduct external lift operations without OGE hover data, the operator might pick up excessively heavy loads. While a single excessive load would not necessarily lead to an accident, it could create excessive stress on the dynamic components of the helicopter that could eventually lead to fatigue failure of a critical component and, subsequently, an accident. The expected benefit of averting a single accident entailing just one serious injury and/or moderate damage to the helicopter would easily exceed the upper-bound certification cost of $124,000.

Other advantages of requiring that manufacturers provide OGE hover data are that: (1) Operators will no longer be concerned that manufacturers might arbitrarily stop providing the data, (2) operators may feel more confident about the data because the FAA would be approving it, and (3) the FAA can assure uniformity in the presentation of data between manufacturers.

Section 29.83—Landing: Category B. The rule will require that approach and landing tests for Category B rotorcraft be made with power on rather than with engine power off. This is a more normal flight profile. This change will benefit pilots by providing more useful data in the flight manual for flight planning purposes since pilots normally plan for power-on landings. This will be particularly useful if a rotorcraft is operating at or near maximum gross weight in or around unimproved landing areas where landing distances are more critical. This will also increase the safety of test pilots since they will be required to perform fewer power-off tests. There are no or negligible additional costs associated with this change.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by government regulations. The RFA requires a Regulatory Flexibility Analysis if a proposed or final rule would have a significant economic impact, either detrimental or beneficial, on a substantial number of small entities. FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, prescribes standards for complying with RFA review requirements in FAA rulemaking actions. The Order defines ''small entities'' in terms of size thresholds, ''significant economic impact'' in terms of annualized cost threshold, and ''substantial number'' as a number which is not less than eleven and which is more than one-third of the small entities subject to the proposed or final rule.

The rule will affect manufacturers and operators of future type-certificated transport category rotorcraft. For manufacturers, Order 2100.14A specifies a size threshold for classification as a small entity as 75 or fewer employees. Since no part 29 rotorcraft manufacturer has 75 or fewer employees, the rule will not have significant economic impact on a substantial number of small manufacturers. For operators, the benefits of increased payloads would probably not exceed the annualized thresholds specified in the Order; consequently, the rule will not have a significant economic impact on a substantial number of small operators.

International Trade Impact

The rule will have little or no impact on trade for either U.S. firms doing business in foreign markets or foreign firms doing business in the United States.

Federalism Implications

The regulations adopted 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 these amendments do not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

For the reasons discussed in the preamble, and based on the findings in the Regulatory Flexibility Determination and the International Trade Impact Analysis, the FAA has determined that this regulation is not a significant regulatory action under Executive Order 12866. In addition, the FAA certifies that these changes will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. All changes are found to have negligible or no cost impacts. Small entities are not affected because transport rotorcraft are manufactured by large entities, and trade is not affected since foreign manufacturers also must comply with the requirements of part 29. This proposal is considered to be nonsignificant under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). A regulatory evaluation of the changes, including a Regulatory Flexibility Determination and International Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under **FOR FURTHER INFORMATION CONTACT.''**

List of Subjects in 14 CFR Part 29

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

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends part 29 of Title 14, Code of Federal Regulations (14 CFR part 29) as follows:

PART 29—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT

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

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

2. Section 29.1 is amended by revising paragraph (e) to read as follows:

§ 29.1 Applicability.

* * * * *

(e) Rotorcraft with a maximum weight of 20,000 pounds or less but with 10 or more passengers seats may be type certificated as category B rotorcraft provided the Category A requirements of §§ 29.67(a)(2), 29.87, 29.1517, and subparts C, D, E, and F of this part are met.

* * * * *

3. Section 29.73 is redesignated as § 29.49 and revised to read as follows:

§ 29.49 Performance at minimum operating speed.

(a) For each Category A helicopter, the hovering performance must be determined over the ranges of weight, altitude, and temperature for which takeoff data are scheduled—

(1) With not more than takeoff power;

(2) With the landing gear extended; and

(3) At a height consistent with the procedure used in establishing the takeoff, climbout, and rejected takeoff paths.

(b) For each Category B helicopter, the hovering performance must be determined over the ranges of weight, altitude, and temperature for which certificate is requested, with—

(1) Takeoff power;

(2) The landing gear extended; and

(3) The helicopter in ground effect at a height consistent with normal takeoff procedures.

(c) For each helicopter, the out-of-ground effect hovering performance must be determined over the ranges of weight, altitude, and temperature for which certification is requested with takeoff power.

(d) For rotorcraft other than helicopters, the steady rate of climb at the minimum operating speed must be determined over the ranges of weight, altitude, and temperature for which certification is requested with—

(1) Takeoff power; and

(2) The landing gear extended.

4. Section 29.51 is amended by revising the introductory text of paragraph (a) to read as follows:

§ 29.51 Takeoff data: general.

(a) The takeoff data required by §§ 29.53, 29.55, 29.59, 29.60, 29.61, 29.62, 29.63, and 29.67 must be determined—

* * * * *

5. Section 29.53 is revised to read as follows:

§ 29.53 Takeoff: Category A.

The takeoff performance must be determined and scheduled so that, if one engine fails at any time the start of takeoff, the rotocraft can—

(a) Return to, and stop safely on, the takeoff area; or

(b) Continue the takeoff and climbout, and attain a configuration and airspeed allowing compliance with § 29.67(a)(2).

6. A new § 29.55 is added to read as follows:

§ 29.55 Takeoff decision point (TDP): Category A.

(a) The TDP is the first point from which a continued takeoff capability is assured under § 29.59 and is the last point in the takeoff path from which a rejected takeoff is assured within the distance determined under §29.62.

(b) The TDP must be established in relation to the takeoff path using no more than two parameters; e.g., airspeed and height, to designate the TDP.

(c) Determination of the TDP must include the pilot recognition time interval following failure of the critical engine.

7. Section 29.59 is revised to read as follows:

§ 29.59 Takeoff path: Category A.

(a) The takeoff path extends from the point of commencement of the takeoff procedure to a point at which the rotorcraft is 1,000 feet above the takeoff surface and compliance with § 29.67(a)(2) is shown. In addition—

(1) The takeoff path must remain clear of the height-velocity envelope established in accordance with § 29.87;

(2) The rotocraft must be flown to the engine failure point; at which point, the critical engine must be made inoperative and remain inoperative for the rest of the takeoff;

(3) After the critical engine is made inoperative, the rotorcraft must continue to the takeoff decision point, and then attain V_{TOSS};

(4) Only primary controls may be used while attaining V_{TOSS} and while establishing a positive rate of climb. Secondary controls that are located on the primary controls may be used after a positive rate of climb and V_{TOSS} are established but in no case less than 3 seconds after the critical engine is made inoperative; and

(5) After attaining V_{TOSS} and a positive a climb, the landing gear may be retracted.

(b) During the takeoff path determination made in accordance with paragraph (a) of this section and after attaining V_{TOSS} and a positive rate of climb, the climb must be continued at a speed as close as practicable to, but not less than, V_{TOSS} until the rotocraft is 200 feet above the takeoff surface. During this interval, the climb performance must meet or exceed that required by § 29.67(a)(1).

(c) From 200 feet above the takeoff surface, the rotorcraft takeoff path must be level or positive until a height 1,000 feet above the takeoff surface is attained with not less than the rate of climb required by § 29.67(a)(2). Any secondary or auxiliary control may be used after attaining 200 feet above the takeoff surface.

(d) Takeoff distance will be determined in accordance with § 29.61.

(e) During the continued takeoff, the rotorcraft shall not descend below 15 feet above the takeoff surface when the takeoff decision point is above 15 feet.

8. A new § 29.60 is added to read as follows:

§ 29.60 Elevated heliport takeoff path: Category A.

(a) The elevated heliport takeoff path extends from the point of commencement of the takeoff procedure to a point in the takeoff path at which the rotorcraft is 1,000 feet above the takeoff surface and compliance with § 29.67(a)(2) is shown. In addition—

(1) The requirements of § 29.59(a) must be met;

(2) While attaining V_{TOSS} and a positive rate of climb, the rotocraft may descend below the level of the takeoff surface if, in so doing and when clearing the elevated heliport edge, every part of the rotocraft clears all obstacles by at least 15 feet;

(3) The vertical magnitude of any descent below the takeoff surface must be determined; and

(4) After attaining V_{TOSS} and a positive rate of climb, the landing gear may be retracted.

(b) The scheduled takeoff weight must be such that the climb requirements of § 29.67 (a)(1) and (a)(2) will be met.

(c) Takeoff distance will be determined in accordance with § 29.61.

9. A new § 29.61 is added to read as follows:

§ 29.61 Takeoff distance: Category A.

(a) The normal takeoff distance is the horizontal distance along the takeoff path from the start of the takeoff to the point at which the rotorcraft attains and remains at least 35 feet above the takeoff surface, attains and maintains a speed of at least V_{TOSS}, and establishes a positive rate of climb, assuming the critical engine failure occurs at the engine failure point prior to the takeoff decision point.

(b) For elevated heliports, the takeoff distance is the horizontal distance along the takeoff path from the start of the takeoff to the point at which the rotorcraft attains and maintains a speed of at least V_{TOSS} and establishes a positive rate of climb, assuming the critical engine failure occurs at the engine failure point prior to the takeoff decision point.

10. A new § 29.62 is added to read as follows:

§ 29.62 Rejected takeoff: Category A.

The rejected takeoff distance and procedures for each condition where takeoff is approved will be established with—

(a) The takeoff path requirements of §§ 29.59 and 29.60 being used up to the engine failure point, the rotorcraft continuing to takeoff decision point, and the rotorcraft landed and brought to a stop on the takeoff surface;

(b) The remaining engines operating within approved limits;

(c) The landing gear remaining extended throughout the entire rejected takeoff; and

(d) The use of only the primary controls until the rotorcraft is on the

ground. Secondary controls located on the primary control may not be used until the rotorcraft is on the ground. Means other than wheel brakes may be used to stop the rotorcraft if the means are safe and reliable and consistent results can be expected under normal operating conditions.

11. A new § 29.64 is added to read as follows:

§ 29.64 Climb: general.

Compliance with the requirements of §§ 29.65 and 29.67 must be shown at each weight, altitude, and temperature within the operational limits established for the rotorcraft and with the most unfavorable center of gravity for each configuration. Cowl flaps, or other means of controlling the engine-cooling air supply, will be in the position that provides adequate cooling at the temperatures and altitudes for which certification is requested.

12. Section 29.65 is amended by revising paragraph (a) to read as follows and by removing paragraph (c):

§ 29.65 Climb: all engines operating.

(a) The steady rate of climb must be determined—

(1) With maximum continuous power;

(2) With the landing gear retracted; and

(3) A V_y for standard sea level conditions and at speeds selected by the applicant for other conditions.

* * * * *

13. Section 29.67 is revised to read as follows:

§ Climb: one-engine-inoperative (OEI).

(a) For Category A rotorcraft, in the critical takeoff configuration existing along the takeoff path, the following apply:

(1) The steady rate of climb without ground effect, 200 feet above the takeoff surface, must be at least 100 feet per minute for each weight, altitude, and temperature for which takeoff data are to be scheduled with—

(i) The critical engine inoperative and the remaining engines within approved operating limitations, except that for rotorcraft for which the use of 30-second/2-minute OEI power is requested, only the 2-minute OEI power may be used in showing compliance with this paragraph;

(ii) The landing gear extended; and

(iii) The takeoff safety speed selected by the applicant.

(2) The steady rate of climb without ground effect at 1,000 feet above the takeoff surface must be at least 150 feet per minute for each weight altitude, and temperature for which takeoff data are to be scheduled with—

(i) The critical engine inoperative and the remaining engines at maximum continuous power including OEI maximum continuous power, if approved, or at 30-minute power for rotorcraft for which certification for use of 30-minute power is requested;

(ii) The most unfavorable center of gravity for climb following takeoff;

(iii) The landing gear retracted; and

(iv) The speed selected by the applicant.

(3) The steady rate of climb (or descent) in feet per minute, at each altitude and temperature at which the rotocraft is expected to operate and at any weight within the range of weights for which certification is requested, must be determined with—

(i) The critical engine inoperative and the remaining engines at maximum continuous power including OEI maximum continuous power, if approved, and at 30-minute power for rotorcraft for which certification for the use of 30-minute power is requested;

(ii) The landing gear retracted; and

(iii) The speed selected by the applicant.

(b) For multiengine Category B rotorcraft meeting the Category A engine isolation requirements, the steady rate of climb (or descent) must be determined at the speed for best rate of climb (or minimum rate of descent) at each altitude, temperature, and weight at which the rotorcraft is expected to operate, with the critical engine inoperative and the remaining engines at maximum continuous power including OEI maximum continuous power, if approved, and at 30-minute power for rotorcraft for which certification for the use of 30-minute power is requested.

14. Section 29.75 is revised as follows:

§ 29.75 Landing: general.

(a) For each rotorcraft—

(1) The corrected landing data must be determined for a smooth, dry, hard, and level surface;

(2) The approach and landing must not require exceptional piloting skill or exceptionally favorable conditions; and

(3) The landing must be made without excessive vertical acceleration or tendency to bounce, nose over, ground loop, porpoise, or water loop.

(b) The landing data required by §§ 29.77, 29.79, 29.81, 29.83, and 29.85 must be determined—

(1) At each weight, altitude, and temperature for which landing data are approved;

(2) With each operating engine within approved operating limitations; and

(3) With the most unfavorable center of gravity.

15. Section 29.77 is redesignated as § 29.85 and a new § 29.77 is added to read as follows:

§ 29.77 Landing decision point: Category A.

The landing decision point (LDP) must be established at not less than the last point in the approach and landing path at which a balked landing can be accomplished under § 29.85 with the critical engine failed or failing and with the engine failure recognized by the pilot.

16. Section 29.79 is redesignated as § 29.87 and a new § 29.79 is added to read as follows:

§ 29.79 Landing: Category A.

(a) For Category A rotorcraft—

(1) The landing performance must be determined and scheduled so that if the critical engine fails at any point in the approach path, the rotorcraft can either land and stop safely or climb out and attain a rotorcraft configuration and speed allowing compliance with the climb requirement of § 29.67(a)(2);

(2) The approach and landing paths must be established with the critical engine inoperative so that the transition between each stage can be made smoothly and safely;

(3) The approach and landing speeds must be selected by the applicant and must be appropriate to the type of rotorcraft; and

(4) The approach and landing path must be established to avoid the critical areas of the height-velocity envelope determined in accordance with § 29.87.

(b) It must be possible to make a safe landing on a prepared landing surface after complete power failure occurring during normal cruise.

17. A new § 29.81 is added to read as follows:

§ 29.81 Landing distance: Category A

The horizontal distance required to land and come to a complete stop (or to a speed of approximately 3 knots for water landings) from a point 50 feet above the landing surface (25 feet for Category A elevated heliport landing operations) must be determined from the approach and landing paths established in accordance with § 29.79.

18. A new § 29.83 is added to read as follows:

§ 29.83 Landing: Category B.

(a) For each Category B rotorcraft, the horizontal distance required to land and come to a complete stop (or to a speed of approximately 3 knots for water landings) from a point 50 feet above the landing surface must be determined with—

(1) Speeds appropriate to the type of rotocraft and chosen by the applicant to avoid the critical areas of the height-velocity envelope established under § 29.87; and

(2) The approach and landing made with power on and within approved limits.

(b) Each multiengined Category B rotorcraft that meets the powerplant installation requirements for Category A must meet the requirements of—

(1) Sections 29.79 and 29.81; or

(2) Paragraph (a) of this section.

(c) It must be possible to make a safe landing on a prepared landing surface if complete power failure occurs during normal cruise.

19. Redesignated § 29.85 is revised to read as follows:

§ 29.85 Balked landing: Category A.

For Category A rotocraft, the balked landing path must be established so that—

(a) With the critical engine inoperative, the transition from each stage of the maneuver to the next stage can be made smoothly and safely;

(b) With the critical engine failed and the failure recognized at the landing decision point on the approach path selected by the applicant, a safe climbout can be made at speeds allowing compliance with the climb requirements of § 29.67(a) (1) and (2); and

(c) The rotocraft does not descend below 15 feet above the landing surface. For elevated heliport operations, descent may be below the level of the landing surface provided the deck edge clearance of § 29.60 is maintained and the descent distance below the landing surface is determined.

20. Redesignated § 29.87 is revised to read as follows:

§ 29.87 Height-velocity envelope.

(a) If there is any combination of height and forward velocity (including hover) under which a safe landing cannot be made after failure of the critical engine and with the remaining engines (where applicable) operating within approved limits, a height-velocity envelope must be established for—

(1) All combinations of pressure altitude and ambient temperature for which takeoff and landing are approved; and

(2) Wright from the maximum weight (at sea level) to the highest weight approved for takeoff and landing at each altitude. For helicopters, this weight need not exceed the highest weight allowing hovering out-of-ground effect at each altitude.

(b) For single-engine or multiengine rotorcraft that do not meet the Category A engine isolation requirements, the height-velocity envelope for complete power failure must be established.

Section 29.1323 is amended by revising paragraph (b)(2)(ii) to read as follows:

§ 29.1323 Airspeed indicating system.

* * * * *

(b) * * *

(2) * * *

(ii) Avoidance of the critical areas of the height-velocity envelope as established under § 29.87.

* * * * *

22. Section 29.1587 is amended by revising (a)(4), (a)(5), (b)(3) and (b)(8) and adding a new (a)(6) to read as follows:

§ 29.1587 Performance information.

* * * * *

(a) * * *

(4) The rejected takeoff distance determined under § 29.62 and the takeoff distance determined under § 29.61 or § 29.63;

(5) The landing data determined under § 29.81 or § 29.83; and

(6) Out-of-ground effect hover performance determined under § 29.49 and the maximum safe wind demonstrated under the ambient conditions for data presented.

(b) * * *

(3) The landing distance, appropriate airspeed, and type of landing surface, together with all pertinent information that might affect this distance, including the effects of weight, altitude, and temperature;

* * * * *

(8) Out-of-ground effect hover performance determined under § 29.49 and the maximum safe wind demonstrated under the ambient conditions for data presented; and

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David R. Hinson,

Administrator.

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