(E) Ensure that employees working within the enclosure and/or using glove bags wear protective clothing and respirators as required by paragraphs (h) and (i) of this section;

(F) Ensure that employees are trained in the use of engineering controls, work practices, and personal protective equipment;

(G) Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in paragraph (j) of this section;

(H) Ensure that engineering controls are functioning properly; and,

(I) Ensure that notification requirement in paragraph (f)(6) are met.

(ii)(A) The competent person shall be trained in all aspects of asbestos, tremolite, anthophyllite, or actinolite handling relevant to the specific work involved, including abatement, installation, removal and handling; the contents of this standard; the identification of asbestos, tremolite, anthophyllite, or actinolite; removal procedures, where appropriate; and other practices for reducing the hazard. Such training shall be obtained in a comprehensive course, such as a course conducted by an EPA Asbestos Training Center, certified by the EPA or a State, or an equivalent course.

(B) For small-scale, short-duration operations, the competent person shall be trained in aspects of asbestos removal appropriate for small-scale, short-duration work, to include procedures for setting up glove bags and mini-enclosures, practices for reducing asbestos exposures, use of wet methods, the contents of this standard, and the identification of asbestos, anthophyllite, or actinolite. Such training shall be obtained in an appropriate course, such as a course conducted by an EPA Asbestos Training Center for supervisors of small-scale, short-duration work, or an equivalent course.

(p) *Notification to OSHA*—(1) *General.* Before engaging in demolition, renovation, or removal of materials containing asbestos, tremolite, anthophyllite, or actinolite which do not meet the definition of small-scale, short-duration operations, the employer shall provide the OSHA Area Office with written notice of intention to demolish, renovate, or remove asbestos-containing material.

(2) *Method of notification.* The employer shall ensure that OSHA receives written notice at least 10 working days before removal, demolition, or renovation, or other related activities such as site preparation which would disturb asbestos will begin.

(3) *Content.* The employer shall include the following in the notice:

(i) Name, address, and telephone number of employer;

(ii) Type of operation: demolition, renovation, or removal;

(iii) Description of the facility including the size (square feet) and number of floors, age, and present or prior use of the facility;

(iv) Procedure employed to detect the presence of materials containing asbestos;

(v) Estimate of the amount of materials containing asbestos, including separately identified non-friable material, to be affected by the demolition, renovation, or removal, in linear feet or area (square feet);

(vi) Location and address of the facility where demolition, renovation, or removal will occur;

(vii) Scheduled starting and completion date;

(viii) Description of planned demolition, renovation, or removal work to be performed and methods to be employed including demolition, renovation, or removal techniques to be used and description of affected facility components;

(ix) Description of work practices and engineering controls to be used to comply with the requirements of this standard;

(x) A certification that only a competent person trained as required by paragraph (o)(2)(ii)(A) of this section will supervise the demolition, renovation, or removal activity described in this notification; and

(xi) Description of procedures to be followed in the event that unexpected asbestos is found.

(4) *Compliance with EPA reporting.* An employer reporting to the Environmental Protection Agency's National Emissions Standards for Hazardous Air Pollutants for Asbestos (40 CFR part 61.146) may satisfy the notification requirements contained in this paragraph by forwarding a copy of the EPA notification to the OSHA area office.

(q) *Dates.*

* * * * *

(4) The requirements of paragraphs (c)(1), (d), (e) (1) and (6), (g)(2)(iv), (o) and (p) shall be complied with by (insert date 60 days from publication of final rule in **Federal Register**).

* * * * *

(r) *Appendices.* (1) Appendices A, C, D, E, and G to this section are incorporated as part of this section and the contents of these appendices are mandatory.

(2) Appendices B, F, H, and I to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

* * * * *

§ 1926.58 Appendix G [Amended]

5. Appendix G, to § 1926.58 would be revised by changing its heading to "Mandatory;" by removing the introductory paragraph; in the section under the heading "Glove Bags" by replacing the phrase "action level" with "PEL" in the first and third sentences; removing the sections entitled "Enclosure," "Maintenance Program" and "Prohibited Activities"; and by revising the section under the heading "Definition of Small-Scale, Short Duration Activities" to read as follows:

Small-scale, short-duration operations means only those demolition, renovation, repair, maintenance, and removal operations which are non-repetitive, affect small surfaces or volumes of material containing asbestos, tremolite, anthophyllite, or actinolite, and will be completed within one work day, and are not expected to expose bystanders to significant amounts of asbestos. The following operations are included within the definition of small-scale, short duration: Repair or removal of asbestos on pipes that is less than 21 linear feet; repair or removal of asbestos panel that is less than 9 square feet; pipe valve repair or replacement of pipe valves containing asbestos gaskets or electrical work that disturbs asbestos that is completed by one worker in less than four hours; removal of drywall which is completed for the facility within an eight-hour workday; renovation projects involving endcapping of pipes and tile removal that is completed in less than four hours; and installation of conduits that is completed within an eight-hour work shift."

* * * * *

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Friday,
July 20, 1990

Part III

Department of Transportation

Federal Aviation Administration

14 CFR Part 25

Special Review; Transport Category Airplane Airworthiness Standards; Final Rule

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. 24344; Amendment No. 25-72]

RIN 2120-AA47

Special Review: Transport Category Airplane Airworthiness Standards

AGENCY: Federal Aviation Administration, Transportation.

ACTION: Final rule.

SUMMARY: These amendments to the Federal Aviation Regulations (FAR) update the standards for type certification of transport category airplanes for clarity and accuracy, and ensure that the standards are appropriate and practicable for the smaller transport category airplanes common to regional air carrier operation.

EFFECTIVE DATE: August 20, 1990.

FOR FURTHER INFORMATION CONTACT: Gary L. Killion, Manager, Regulations Branch (ANM-114), Transport Standards Staff, Transport Airplane Directorate, Aircraft Certification Service, FAA Northwest Mountain Region, 17900 Pacific Highway South, C-68966, Seattle, Washington 98168; telephone (206) 431-2112.

SUPPLEMENTARY INFORMATION:

Background

These amendments are based on Notice of Proposed Rulemaking (NPRM) 84-21 which was published in the **Federal Register** on December 3, 1984, (49 FR 47358). The notice was based on a review of part 25 which was originally initiated to ensure that the type certification standards contained in that part remain appropriate and practicable for the smaller transport category airplanes. After the review was begun, the scope was expanded to include relieving the regulatory burden wherever possible without compromising the existing standards and to update part 25 for clarity and accuracy. As noted in the notice, relatively few changes were found to be warranted with respect to type certification of the smaller transport category airplanes or relieving the regulatory burden. Consequently, updating part 25 for clarity and accuracy became the dominant reason for the changes proposed in the notice.

Interested persons have been given an opportunity to participate in this rulemaking and due consideration has been given to all matters presented. The proposals and comments are discussed below. Substantive changes and changes of an editorial nature have been made to the proposed rules based on relevant comments received and further review within the FAA. Since the time Notice 84-21 was prepared, the following amendments to part 25 have been adopted:

25-58 (49 FR 43182; October 26, 1984) Floor Proximity Emergency Escape Path Marking.
25-59 (49 FR 43188; October 26, 1984) Flammability Requirement for Aircraft Cushions.
25-60 (51 FR 18236; May 16, 1986) Airworthiness Standards; Fire Protection Requirements for Cargo or Baggage Compartments.
25-61 (51 FR 26206; July 21, 1986) Improved Flammability Standards for Materials Used in the Interiors of Transport Category Airplane Cabins.
25-62 (52 FR 43152; November 9, 1987) Standards for Approval of an Automatic Takeoff Thrust Control System (ATTCS).
25-63 (53 FR 16360; May 6, 1988) Standards Governing the Noise Certification of Aircraft.
25-64 (53 FR 17640; May 17, 1988) Improved Seat Safety Standards.
25-65 (53 FR 26134; July 11, 1988) Cockpit Voice Recorder (CVR) and Flight Recorders.
25-66 (53 FR 32564; August 25, 1988) Improved Flammability Standards for Materials Used in the Interiors of Transport Category Airplane Cabins.
25-67 (54 FR 26688; June 23, 1989) Location of Passenger Emergency Exits in Transport Category Airplanes.
25-68 (54 FR 34284; August 18, 1989) Revision of General Operating and Flight Rules.
25-69 (54 FR 40352; September 29, 1989) Design Standards for Fuel Tank Access Covers.
25-70 (54 FR 43822; October 27, 1989) Independent Power Source for Public Address System in Transport Category Airplanes.

A number of editorial changes have been made for compatibility with the text of these recently adopted amendments. Except for these editorial changes and other minor editorial and clarifying changes and the substantive changes discussed below, these amendments and the reasons therefore are the same as those contained in Notice 84-21.

Discussion of Comments

General

A number of commenters suggest further changes that go beyond the scope of the notice. Because interested persons have not been given the opportunity to comment on these further changes, they can not be considered at this time. Those that are deemed to have merit will, however, be considered for future rulemaking proposals.

Two commenters express disappointment that the proposed changes would not result in significant relief in the type certification of smaller transport category airplanes. As noted in the preamble to the notice, no change considered to adversely affect the level of safety of any transport category airplane was proposed. Further changes were considered; however, they were not proposed because it was considered that they would have adversely affected the level of safety of certain transport category airplanes. One commenter requests that the FAA reopen the comment period, alleging that the explanations contained in this NPRM misinformed its members as to the effects of the proposals. The commenter further alleges that many of the proposals would impose substantial new criteria on manufacturers which would ultimately be borne by the airlines who buy the airplanes. The commenter fails, however, to cite specific examples. The FAA does not agree with the commenter; the explanations do accurately reflect the intent of the proposals. Reopening the comment period is, therefore, not considered justified.

The notice contained numerous printing errors that were noted by commenters. These errors have been corrected accordingly.

Comments on specific proposals. The following discussion corresponds to like-numbered proposals contained in the notice.

Proposal 1. Section 25.2 would be amended for clarity. Two commenters believe that the reference to § 25.721(d) in proposed § 25.2(a)(1) is in error because § 25.721(d) does not currently exist. Proposed § 25.2 is correct because the reference is to paragraph (d) of the rules in effect on October 24, 1967, rather than to current rules. Except for certain editorial changes resulting from the recent adoption of Amendment 25-67, § 25.2 is amended as proposed.

Proposal 2. Two commenters agree with the proposed deletion of § 25.21(b). These commenters also agree with the proposed new wording of § 25.21(d) and remind the FAA that they have offered extensive comments on this same subject in regard to Advisory Circular (AC) 25-7, Flight Test Guide for Certification of Transport Category Airplanes.

Another commenter states deletion of § 25.21(b) in itself is not objectionable, but expresses concern about the FAA explanation given for this change. The commenter's concern is that the explanation "seems to indicate that the FAA's philosophy is such that testing done at forward center of gravity (c.g.) stalling speeds is sufficient for

certification," and "that § 25.21(b) *unnecessarily* requires the testing of airplanes * * * to be based on the rearward c.g. stalling speeds." It appears by the commenter's remarks that there is confusion about testing of an airplane at forward and aft c.g. with the trim speed and possible speed range criteria for these tests. There is no intent to change the requirement of § 25.21(a) to show that all flight requirements can be met at each appropriate combination of weight and c.g. within the range of loading conditions for which certification is requested.

One commenter states an objection to the proposal on the grounds that it would remove provisions to simplify flight testing. He also states that it removes the option to reduce flight testing by accepting performance penalties, and removes a well established system of tolerances for flight testing. The FAA does not agree. The removal of a requirement that could force duplicate stall-speed and flying qualities testing is, in itself, considered a simplification. Removal of § 25.21(b) leaves only one stall speed (the forward c.g. stall speed) to serve as the reference basis for trim and speed range factors that are flown at speeds down to 110 percent of the stalling speed.

No other comments concerning this proposal were received. Section 25.21 is, therefore, adopted as proposed.

Proposal 3. The sole commenter agrees with this proposal. Section 25.29(a)(3)(iii) is, therefore, revised to refer to "* * * fluids intended for injection in the engine," as proposed.

Proposal 4. One commenter agrees with the proposal to amend § 25.33 to include terminology appropriate for turbopropeller engines, and to clarify the wind conditions.

Another commenter notes a typographical error in the third line of § 25.33(c)(3). The word "power" has been changed to "powered" accordingly.

One commenter objects to insertion of the words "or maximum takeoff torque limit for turbopropeller engine powered airplanes" in § 25.33(c)(3). The commenter asserts that the propeller flight fine (low) pitch stop setting on turbine engine powered airplanes normally is such that an increase in propeller speed during a go-around is not necessary. The commenter further states that the previous version of this requirement originated during the era of reciprocating-engined airplanes and was not applied to turbine-engined airplanes when § 25.101 and subsequent sections were introduced. In addition, the commenter states that it would be difficult, in practice, to ensure symmetrical propeller speed for a multi-engined airplane under this requirement. The FAA does not agree with the commenter since the basic purpose of § 25.33 is to limit the maximum propeller speed at maximum power with the governor inoperative. It has no bearing on the propeller/governor rigging or matching the engine/propeller combination in normal operational situations. Contrary to the commenter's assertion, this regulation has been applied to turbine-engine powered airplanes, and the proposed change reflects accepted practice. The adoption of § 25.101 is not relevant, as it refers to airplane performance determinations, not to propeller speed and pitch limits.

Another commenter objects to the "no wind" condition of § 25.33(c)(2), saying that the requirement would severely limit weather conditions under which flight testing could be conducted. The commenter recommends that the test be conducted in as much as 5 knots of wind. The FAA does not concur with allowing a tolerance on wind, such as that proposed, because the results of the test could be adversely affected. It should be noted, however, that "no wind" would not mean that testing could only be conducted when there is no wind blowing. As has been past practice, test data obtained under limited wind conditions could be corrected to "no wind" conditions.

The commenter also states that experience has shown that the definition of propeller pitch limits is not significantly affected by using the maximum engine values available on the day of the test, as required by proposed § 25.33(c)(3). The commenter states that the proposal, which would require testing at maximum torque, implies that test conditions must include very low temperatures and/or very low altitudes. The commenter does not believe that the FAA intended to impose such limitations on testing or to impose the burden of finding such test conditions and suggests an alternative to the proposal. The FAA agrees with the commenter in that rewriting this paragraph was intended to specify the amount of power to be applied to the propeller, and testing under a wide variety of conditions was not intended. The objective of the proposal is to define the maximum torque limit. Consequently, there would be no requirement to perform the testing in cold air or at very low altitudes. Rather, the testing should be performed in ambient conditions where the maximum torque limit can be obtained without exceeding other engine limits. Maximum torque does not occur as a point condition but is a function of a range of temperature and altitude combinations. When ambient conditions preclude obtaining maximum torque without exceeding other engine limits, the other limits are sometimes exceeded for test purposes with the concurrence of the engine manufacturer.

There were no other comments concerning this proposal. Except for correcting the above noted typographical error, § 25.33 is adopted as proposed.

Proposal 5. The sole commenter agrees with this proposal. Section 25.111 is, therefore, amended to correct an editorial error as proposed.

Proposal 6. As proposed, § 25.121 would be amended to clarify the intent of the section and to reflect actual certification practice. One commenter suggests a change to the proposal to incorporate a requirement to account for turbopropeller operation that assumes the propeller to be in the position it takes automatically. The commenter states that this change should also be applied to § 25.121(a)(1). The commenter assumes the word "automatic" refers to an airplane system that produces an automatic function, such as autofeather. In the context of this section, the word "automatic" means without crew action, since the propeller pitch may automatically change from a takeoff to a windmill pitch (but not a feather position) because of the engine failure, aerodynamics, and the related hydromechanical operation of the propeller pitch control system.

The commenter also suggests that the FAA proposal should be changed to require consideration of a lesser power or thrust if the thrust reduction is due to the expiration of takeoff augmented power or thrust. This suggestion is consistent with the intent of the proposal, but it would not allow for other conditions that may cause significant power or thrust reductions. Two commenters state that the normal altitude/thrust lapse rate of turbine engines at fixed revolutions per minute (rpm) and ambient temperature is approximately 1.4 percent per 1000 feet. In the opinion of those commenters, the −0.5 percent thrust change criterion is inappropriate since it would seem to require consideration of normal thrust lapse with altitude, which as stated in the FAA explanation, is not the intent of the proposal. The FAA policy concerning acceptable means of compliance with § 25.121(b)(1) is stated in AC 25–7. A rule change is, therefore, not needed for that purpose. The proposal is, therefore, withdrawn.

Proposal 7. Two commenters favor the proposal to amend § 25.125(a)(2) to substitute the word "stabilized" for

"steady gliding." They state that in their view, however, the amendment does not go far enough toward the real need, which is a fundamental reappraisal of the existing requirement for determining landing distances. The lack of a stated, operationally realistic, approach path angle is cited as an example. The FAA recognizes that there is interest in reevaluating the landing regulations and changes of this nature to the existing regulations have been discussed in the past. Such changes, would, however, be beyond the scope of the notice and could not be considered at this time. It is noted that AC 25-7 contains policy information, including approach path angles that are acceptable to the FAA.

Another commenter agrees with the proposed word change, but suggests an additional change to include specific approach path angles that would be a function of the short takeoff and landing characteristics of the airplane. A change of this nature could not be considered at this time because it too would be beyond the scope of this notice. It should be noted that a definition of short takeoff and landing characteristics would be required before this suggestion could be adopted. This would require consideration of many factors that would result in a long-term rulemaking process. Section 25.125 is, therefore, adopted as proposed.

Proposal 8. As proposed, the wording of § 25.147(a) would reflect the intent of the rule more accurately and would conform to actual type design certification practice. Three commenters note a typographical error in that proposed § 25.147(a) refers to yaw into the inoperative engine. As noted in the explanation for Proposal 8, the intent of § 25.147(a) is to "ensure that some directional control toward the operative engine remains." The intention is to require yaw into the operative engine. This typographical error has been corrected in the final rule.

Two commenters state that reference to c.g. position appears in at least 12 separate places in part 25, subpart B. They suggest that a single all-inclusive statement would be preferable. The FAA will consider this suggestion for possible incorporation in a future revision to part 25.

One commenter suggests that the FAA refer to § 25.147 of Joint Airworthiness Requirements-25 (JAR-25) for guidance. (Joint Airworthiness Requirements-25 is a document developed jointly and accepted by the airworthiness authorities of various European countries for type certification of large airplanes. Joint Airworthiness Requirements-25 is based on part 25 of the FAR; however, there are differences in the requirements of the two documents. Those differences are specified in JAR-25.) The FAA did consider § 25.147 of JAR-25 in making this proposal; however, the resulting proposal more closely reflects the FAA intent regarding this requirement.

One commenter states that the requirement should be for "wings approximately level" rather than "wings level," since there are no indicated tolerances on the latter. The FAA recognizes that literal compliance with a requirement to hold the wings absolutely level would be a most difficult task. The FAA intent in this test requirement is to hold the airplane in the most wings-level flight possible. It is not considered necessary or desirable to introduce a "relaxation factor" by adding "approximately." The policy material contained in AC 25-7 recognizes that wings cannot be held exactly level; however, the regulation encourages the most wings-level flight possible.

No other comments concerning this proposal were received. Except for correction of the above noted typographical error, § 25.147 is amended as proposed.

Proposal 9. As proposed, changes would be made to § 25.149 to clarify the actual intent of the rule. One commenter suggests deleting the words "maintain" and "of" in § 25.149(b) to avoid misinterpretation. The FAA does not consider "maintain control" likely to be misinterpreted, nor that "control" would provide any improvement in that regard.

The same commenter recommends that existing § 25.149(e) be rewritten to delete the words "recover," "of," and the parenthetical statement "without the use of nose-wheel steering." The commenter states that the proposal as written could be interpreted to mean that the demonstration would always be required on a critical runway surface, eliminating the alternative of demonstrating on a dry runway with nose-wheel rudder pedal steering inoperative. In addition, the commenter states there is no accepted definition of critical runway surface. The FAA agrees with the commenter's statement regarding the runway condition, but believes that clarification on the use of controls will resolve this concern. The rule has been rewritten to clarify these points.

The same commenter also proposes a revision to § 25.173. While this would be beyond the scope of the notice, the FAA will take the suggestion under advisement for possible future rulemaking action.

Two commenters suggest that V_{MC} should be the generic term, and that the term V_{MCA} should be used to describe the condition when airborne after takeoff. The FAA will also take these suggestions under advisement for possible future rulemaking action.

The same two commenters state there is no reason to disallow use of lateral control in V_{MCG} demonstrations. The FAA position to allow lateral control only to the extent of keeping the wings level is intended to prevent the use of arbitrary and unnatural pilot inputs, which could produce results that are misrepresentative and unconservative.

Five commenters question the proposed wording of § 25.149(e) with regard to the runway surface, saying that a critical runway surface is not defined. As stated above, the FAA agrees, and the current prohibition on the use of nose-wheel steering has been retained.

One commenter states that the word "recover" should be retained in § 25.149 (b), (f), and (g). The FAA does not agree. The word "recover" is removed because it incorrectly implies that the airplane would be allowed to go out of control before corrective action is taken. Two commenters question the statement in the explanation that the term "sideslip" would be used in lieu of "yaw." This was merely an inadvertent statement that did not reflect the final proposal.

Except as noted above, § 25.149 is amended as proposed.

Proposal 10. As proposed, § 25.177 would be revised to eliminate the requirement for testing that has been found to be unnecessary. It is considered unnecessary to define directional and lateral stability parameters as separate entities to determine whether an airplane has satisfactory directional-lateral stability. One commenter suggests deleting the words "* * * provide positive stability and * * *" in the first sentence of § 25.177(c) because the proposed language infers that the control movements produce positive stability. The FAA agrees, and the proposal has been amended accordingly. This commenter also notes that most airplanes are aileron-control limited and will reach the lateral control stops prior to the application of maximum rudder. The commenter notes, therefore, that the proposed rule, as written, would impose a control power requirement. The FAA does not concur. There is no intent to impose an additional burden. The FAA considers that the proposed regulation is sufficient to preclude misunderstanding in this regard.

One commenter objects to the proposed use of "positive" instead of "not negative" as contained in the

present rule. This commenter's concern is addressed by the change described above.

Two commenters state that the 180 pound rudder pedal force should be changed to 150 pounds. One states that the FAA inadvertently referred to the wrong force limit, and the other states that it should be changed to be consistent with the requirement of § 25.143(c). The FAA does not agree. The force limit in § 25.143(c) is 150 pounds because the intent of that section is to show that the airplane is safely controllable and maneuverable during certain probable operating conditions by a pilot who is capable of applying only 150 pounds of force to the rudder pedals. In § 25.177(c), the force limit is 180 pounds to demonstrate that the airplane remains stable if a stronger pilot applies up to 180 pounds of rudder pedal force.

Two commenters suggest a change to the proposal because the language infers that the control movements produce positive stability. The change described above should satisfy these commenters' concern.

The same two commenters also discuss the proposal and its meaning in considerable detail. The commenters suggest that interpretive material should be incorporated into AC 25-7. The FAA will consider this suggestion for a future revision of the AC.

The same two commenters suggest transposing V_{FC}/M_{FC} and V_{MO}/M_{MO} in § 25.177(d). The FAA agrees, as this would correspond to the sequence in which these speeds occur.

As amended, § 25.177 no longer relates to directional and lateral stability parameters as separate entities. Accordingly, the section title has been changed to "Static lateral-directional stability."

Except as noted above, § 25.177 is amended as proposed.

Proposal 11. Two commenters concur with the proposal to amend § 25.181 (a) and (b) by removing the words "stalling speed" and inserting "1.2 V_s" in their place. They do not, however, share the FAA view that flying qualities between stalling speed and 1.2 V_s are covered in §§ 25.143 and 25.203. The commenters suggest that interpretive material should be added to AC 25-7. The FAA will consider this suggestion for a future revision of the AC.

One commenter is opposed to the proposal because, according to the commenter, it would essentially extend the stalling characteristics out to 1.2 V_s. The FAA does not agree. If dynamic stability is satisfactory at 1.2 V_s it probably would not deteriorate to the extent of being described as "stall onset characteristics" immediately below 1.2 V_s. Dynamic V_{MCA} and stall demonstration tests would uncover undesirable dynamic features. These tests include stalls limited by changes in pitch, roll, abrupt change in control motion, or aerodynamic warning of a magnitude and severity to deter further speed reduction.

No other comments concerning this proposal were received. Section 25.181 is, therefore, amended as proposed.

Proposal 12. One commenter is opposed to the proposal to remove § 25.205 which requires demonstration of stall recovery from a pilot-induced sideslip with asymmetrical thrust and resultant large control deflections. The commenter does not agree with the FAA explanation that this is an unrealistic test. The commenter makes a comparison between the flight test environment, where the events are caused by deliberate actions, and in-service flight where events that result in a critical maneuver must be immediately recognized and corrected by the pilot. The FAA agrees with the commenter's statement. The arguments presented, however, do not indicate that the conditions required by the current regulation are applicable to the scenario the commenter creates. Although not an airworthiness requirement per se, except via interpretation of § 25.143, a "tameness maneuver" is conducted during flight testing, by delaying recovery from an engine cut at takeoff power and takeoff speed. Although not a stall, this maneuver, plus VMC testing, provides a more realistic test of sudden engine-out controllability than the current requirement for moderate asymmetry stalls.

Two commenters favor the proposal. An argument presented as justification for this proposal by one commenter, which is worthy of noting here, is as follows: "The requirement to demonstrate stalls with the critical engine inoperative is restricted to the en-route configuration and to a level or power asymmetry with which the airplane is controllable with wings level at the stalling speed. As a result, the power on the operating engines at the stall is normally fairly low, and thus neither the configuration nor the power setting are representative of the conditions most likely to accompany an inadvertent stall in service. Reduction of the power of the operating engines during the recovery is also permitted, and it is questionable whether such action would be taken promptly in the case of an inadvertent stall in service. Experience shows that stalls with significant power asymmetry can result in a spin; even on airplanes which are certificated to the present requirement. It is thus apparent that the requirement for demonstrating one-engine-inoperative stalls is not effective in ensuring that inadvertent stalls in service with one engine inoperative will have satisfactory characteristics or be recoverable.

"Despite the ineffectiveness of the present requirement as a means of ensuring airworthiness, the accident record does not show that modern transport category airplanes suffer a loss of airworthiness as a result of substandard stalling qualities with asymmetric power. It is considered that sufficient protection against the hazard of stalling with one-engine-inoperative is provided by the one-engine-inoperative performance requirements and operating speed margins, coupled with the requirements for determination of V_{MC} and demonstration of stalling characteristics with symmetric power." The FAA concurs with this comment. Section 25.205 is, therefore, removed as proposed.

Proposal 13. As proposed, § 25.251(e) would be revised to require a determination of the positive maneuvering load factors at which the onset of perceptible buffeting occurs only for faster airplanes or those which operate at higher altitudes. Two commenters support the proposal; however, they believe that it would be more appropriate to express the speed discriminant in terms of an appropriate operational value (e.g., M_{MO}) rather than M_D which is a design value. The FAA does not concur because this would be the basis for deciding whether a test will be conducted rather than determining an in-service operational limit. Furthermore, M_{MO} might not be established at the time this determination is made. Section 25.251 is, therefore, amended as proposed.

Proposal 14. One commenter states that the proposal to revise § 25.253(a)(3) to clarify the intent of the term "control reversal" should be withdrawn because it would require a stable slope of the elevator control force to V_{DF}/M_{DF}, whereas the present rule permits reversal of the stick force gradient from V_{FC}/M_{FC} to V_{DF}/M_{DF}. The FAA does not agree. The intent of the proposal is solely to clarify the term "control reversal" and not to impose more stringent requirements.

Two commenters support the intent of the proposal and suggest an editing change to achieve further clarification. The FAA agrees and has adopted the commenters' suggestion accordingly.

Except as noted above, § 25.253 is amended as proposed.

Proposal 15. As proposed, § 25.307 (b) and (c) would be removed because they contain only redundant references to §§ 25.571, 25.573 and 25.601. One commenter suggests that the proposed removal of paragraph 25.307(c) would create the impression that an analysis conforming to paragraph 25.307(a) would be acceptable for control surfaces which must always be tested in accordance with § 25.561. The FAA does not concur that removing this redundancy would create such an erroneous impression. Section 25.307 is, therefore, amended as proposed.

Proposal 16. No comments within the scope of the notice were received. Section 25.331 is, therefore, amended as proposed to correct existing editorial errors.

One commenter erroneously believes that A_1 and A_2 should be at V_A passing through Point A because V_A is defined in § 25.33S(c) as not less than V_{S1} N. The maneuvering envelope was revised in part 4b of the Civil Air Regulations (CAR) (the predecessor of part 25 of the FAR) in 1962 to reflect the actual C_N MAX curve. The calculation of $V_A = V_{S1}$ N assumes a constant value of C_N MAX from V_{S1} to V_A. The actual C_N MAX usually varies due to compressibility effects. Point A is the intersection of the actual C_N MAX curve with the maneuvering load factor line. Points A_1 and A_2 are, therefore, correctly defined in § 25.333.

Proposal 17. No comments concerning this proposal were received, therefore, § 25.341 is amended as proposed to correct existing editorial errors. Since the time Notice 84–21 was issued, two additional typographical errors have been noted in some printings of § 25.341(b)(3). In some printings, the numerator of the formula for the gust alleviation factor contains the lower Greek letter "mu" with the subscript "n" in lieu of the correct subscript "g." The denominator of the formula correctly contains "mu" with the subscript "g." In the formula for airplane mass ratio, the airplane mass ratio is incorrectly defined as "g." The correct definition is the Greek letter "mu" with the subscript "g." Section 25.341 is also amended to correct these printing errors as well.

Proposal 18. No comments concerning this proposal were received; therefore, § 25.345 is amended as proposed.

Proposal 19. One commenter supports the correction of § 25.361 to ensure application of the limit engine torque factor of 1.25 to the takeoff power condition as well as to the maximum continuous power condition. The commenter is, however, concerned that the application of this factor in combination with the 1.6 propeller malfunction factor of § 25.361(a)(3) would constitute a double failure. The FAA does not agree. The 1.25 factor is intended to account for expected torsional excursions and is, therefore, considered as a limit torque factor. The overall factor for the propeller malfunction is the product of the 1.25 factor and the 1.6 factor, which results in an overall factor of 2.0. This 2.0 factor is the worst case dynamic amplification factor to be used in the absence of a rational analysis of the propeller malfunction condition. Part 4b of the CAR, the predecessor of part 25, originally specified a factor of 2.0 for the propeller malfunction condition; however, this was later reduced to 1.6 to give an overall load factor of 2.0 when both factors are applied simultaneously. Another commenter suggests that the propeller malfunction condition should be considered as an ultimate condition. The FAA does not agree. From its initial inception as a special condition and subsequent adoption in part 4b of the CAR, this condition has been considered to be a limit design condition. It is an attempt to account for an actual load condition that can be expected to occur at the time of failure and is not analogous to maneuver and gust load conditions where the probability of obtaining the limit design load after the failure is unlikely. In the case of propeller malfunction where the loads result from the failure condition itself, a design margin is essential. Although it is true that the 1.6 factor may be conservative, it is a simplified load condition which may be used in lieu of a rational analysis. Section 25.361 is, therefore, amended as proposed.

Proposals 20 and 21. No comments concerning these proposals were received; therefore, §§ 25.365 and 25.373 are amended for clarity as proposed.

Proposal 22. One commenter generally supports the replacement of the words "rugged system" in § 25.395 with the requirement to meet the minimum pilot effort forces of § 25.397(c). No other comments concerning this proposal were received. Section 25.395 is, therefore, amended as proposed.

Proposal 23. As proposed, an editorial error in Footnote 3 of § 25.397 would be corrected. No comments concerning the proposed correction were received; however, two commenters believe that the referenced footnote should be 1, not 3. This discrepancy is due to the fact that the footnote in question has been identified as 1 in some printings of part 25 and as 3 in others. Regardless of which printing is used, the footnote should read, "The unsymmetrical forces must be applied at one of the normal handgrip points on the periphery of the control wheel," and § 25.397 is corrected accordingly.

Proposal 24. No comments were received concerning the proposal to reidentify the control surface area aft of the hinge line as S_s and add the parenthetical definition of W/S in § 25.415. Several commenters did, however, note that the formula in the equation should have read "$H = KcS_sq$." This printing error has been corrected, and § 25.415 is amended accordingly.

Proposal 25. As proposed, § 25.459 would be amended to specifically refer to slats, as well as to slots and spoilers, in order to ensure that slats are not overlooked in determining compliance with this section. One commenter does not believe that this section would be improved by giving an "exhaustive" list of examples of special devices using aerodynamic surfaces. The FAA does not concur. The inclusion of "slots, slats, and spoilers" is considered to clarify the intent of the rule. There were no other comments within the scope of the notice. Section 25.459 is, therefore, amended as proposed.

Proposal 26. Section 25.563 merely cross-references § 25.801(e) and would be removed for simplicity. One commenter believes that it is useful to retain § 25.563 even though it does serve only as a reference to § 25.801(e). The FAA concurs that this reference, which is located in Subchapter C—Structure, may be useful as § 25.801(e) requires a loads evaluation and is contained in Subchapter D—Design and Construction which does not generally contain loads evaluation criteria. The proposed removal of § 25.563 is, therefore, withdrawn.

Proposal 27. One commenter objects to the proposed deletion of the parenthetical expression "fail-safe" from the heading of § 25.571(b) because it would imply that compliance with the damage-tolerance requirements of that section, when combined with inspection provisions, does not result in a fail-safe structure. Fail-safe and damage-tolerance are not synonymous terms. Fail-safe generally means a design such that the airplane can survive the failure of an element of a system or, in some instances one or more entire systems, without catastrophic consequences. Fail-safe, as applied to structures prior to Amendment 25–45, meant complete element failure or obvious partial failure of large panels. It was assumed that a complete element failure or partial failure would be obvious during a general area inspection and would be corrected within a very short time. The probability of detecting damage during routine inspections before it could

progress to catastrophic limits was very high. Damage-tolerance, on the other hand, does not require consideration of complete element failures or obvious partial failures, although fail-safe features may be included in structure that is designed to damage-tolerance requirements. A part may be designed to meet the damage-tolerance requirements of § 25.571(b) even though cracks may develop in that part. In order to ensure that such cracks are detected before they grow to critical lengths, damage-tolerance requires an inspection program tailored to the crack progression characteristics of the particular part when subjected to the loading spectrum expected in service. Damage-tolerance places a much higher emphasis on these inspections to detect cracks before they progress to unsafe limits, whereas fail-safe allows the cracks to grow to obvious and easily detected dimensions. Deletion of the term "fail-safe" from the heading of § 25.571(b) is, therefore, considered appropriate.

One commenter is concerned that the proposed requirement of § 25.571(e) concerning a bird strike at "V_c at sea level" in lieu of "likely operational speeds up to 8,000 feet" would not be conservative for airplanes for which a variation of V_c versus altitude with a low value at sea level is defined. The FAA concurs that the proposed change would be unconservative for some airplanes which have a rapidly increasing V_c with altitude between sea level and 8,000 feet. The amended § 25.571(e), therefore, specifies impact with a 4-pound bird at V_c up to 8,000 feet.

One commenter believes that it would be more appropriate and consistent with previous compliance findings to replace "V_c" with "V_{mo} at sea level" and that this would assure that applicants may select and establish slower speeds as limitations at those altitudes where the airplane is considered more vulnerable to bird strikes. The commenter believes that this would confirm that V_c should be a single value function for use in basic loads determination. This comment goes beyond the scope of the notice; however, the FAA notes that the bird strike requirements of §§ 25.571(e)(1), 25.631 and 25.775 are structural requirements. V_{mo} is an operating speed rather than a structural design speed and is, therefore, not appropriate for structural design.

One commenter suggests that § 25.631 should be deleted as it would be unnecessary in view of the proposed change to § 25.571(e)(1) and would cause conflicting interpretations as to which section would apply. This comment goes beyond the scope of the notice; however, the FAA notes that the section should not cause any confusion because the former section requires consideration of an 8-pound bird while the latter concerns a 4-pound bird.

Two commenters are concerned about the proposal to require evaluation of the Power Spectral Density (PSD) gust loads on the damaged structure. They state that such analyses are not applicable to short time failure situations and would be costly. The PSD load level is determined using a frequency of exceedance of once per 50,000 flight hours. This is not considered frequent, but is on the order of frequency associated with other limit load conditions used in the damage-tolerance analysis. The FAA believes that certain types of structures, especially truss types, will experience significant changes in stiffness with failed elements. This may allow coalescence of modal response in the frequency regime which can result in a significant increase in loads. One commenter estimated that this would result in approximately $300,000 in additional costs to type certificate a new design transport category airplane; however, the commenter presented no data to support this estimation. Because no supporting data was presented, § 25.571 is amended as proposed in this regard.

No comments concerning other proposed changes to § 25.571 were received. Except as noted above, § 25.571 is amended as proposed.

Proposals 28 and 29. The probability bases contained in MIL–HDBK–5 for establishing materials strength allowables are currently incorporated by reference in §§ 25.613 and 25.615. As proposed, § 25.613 would be changed to state these bases explicitly, and the nonredundant portion of § 25.615 would be transferred to § 25.613. One commenter suggests that §§ 25.613 and 25.615 should provide two different approaches to establishing allowables, with § 25.615 allowing a simplified approach. The FAA does not agree. Section 25.613 requires the use of design values established on a probability basis so that the probability of materials being understrength is extremely remote. Section 25.615 provides for the use of design values from MIL–HDBK–5 which have already been established on probability bases. Under the proposed amendment, § 25.613 would be consolidated with some of the criteria from § 25.615. The remaining portions of § 25.615 would serve only to provide an acceptable means of compliance and would be deleted, accordingly. One commenter supports the consolidation of the two sections, but suggests that the reference to military handbooks be included in an AC. Another commenter is concerned that removing the reference to MIL–HDBK–5 would indicate that design criteria for materials and fasteners contained is this document would no longer be acceptable. On the contrary, the values of MIL–HDBK–5 would remain acceptable means of compliance because they are established by the same probability bases as those of proposed § 25.613. Section 25.613 is therefore amended, and § 25.615 is removed as proposed. There does not appear to be any need for an AC that references military handbooks, as suggested; however, the FAA will develop an AC of this nature if the need arises in the future.

Proposal 30. This would be a conforming change to § 25.625(d) necessitated by the proposed deletion of § 25.1413 (Proposal 80). No adverse comments concerning either proposal were received; however, one commenter does correctly note that the word "factors" in § 25.625(d) should be singular. Except for that correction, § 25.625(d) is revised as proposed.

Proposal 31. As proposed, § 25.629 would be amended by correcting an editorial error. One commenter objects to the use of the word "other" in proposed § 25.629(d)(ii). The word "other" is used to exclude the failure conditions specifically identified in the rule, which must be considered under the provisions of § 25.629(b)(1)(i) regardless of probability. The same commenter believes that proposed § 25.629(b)(1) should be reworded to reflect the stated intent. The FAA concurs with the latter comment, and § 25.629(b)(1) is changed to read, "* * * except that the envelope may be limited to a maximum Mach number of 1.0 when M_D is less than * * *." Except for this change, § 25.629 is amended as proposed.

Proposal 32. No comments concerning this proposal to remove redundant and possibly confusing § 25.673 were received. Section 25.673 is, therefore, removed as proposed.

Proposal 33. No comments concerning this proposal were received; therefore, § 25.693 is amended to remove the erroneous reference to MIL–HBDK–5 as proposed.

Proposal 34. This proposed amendment to § 25.697 was made in Amendment 25–57; therefore, no further action with regard to this proposal is necessary.

Proposal 35. As proposed, § 25.701 would be amended to ensure that the

consequences of asymmetrical slat retraction are not overlooked. One commenter suggests changing the title of § 25.701 to "Flap and slat interconnection" as the proposal applies to interconnecting elements as well as to the flap and slat surfaces. The FAA concurs that this addition would be a more descriptive title and has amended this section accordingly.

Two commenters suggest adding the words "or equivalent means" to § 25.701(b) for consistency with § 25.701(a). The FAA concurs that this addition would clarify that any equivalent means must also prevent flap movement under the prescribed loading conditions of this section. Section 25.701(b) is, therefore, amended accordingly.

One commenter prefers the word "asymmetrical" to "unsymmetrical"; however, "unsymmetrical" is retained for consistency with other usage in part 25.

One commenter suggests changing § 25.701(d) to read "* * * when interconnected flap or slat surfaces on one side * * *." The strength requirement for interconnections should apply to each interconnected set separately. The FAA concurs that this would clarify the requirements of this section. Section 25.701(d) is, therefore, amended accordingly.

Except as noted above, § 25.701 is amended as proposed.

Proposal 36. Section 25.723 would be amended to provide more latitude in the use of analyses in determining landing gear energy absorption characteristics. One commenter suggests using the expression "similar design characteristics" in lieu of "identical" since similar energy absorption characteristics could be obtained using different energy absorption methods which would not be valid for comparison analysis. In order to achieve the intent, the following wording, which is more explicit, has been adopted: "This must be shown by energy absorption tests except that analyses based on earlier tests conducted on the same basic landing gear system which has similar energy absorption characteristics may be used for increases in previously approved takeoff and landing weights." Except for this change in wording, § 25.723 is amended as proposed.

Proposal 37. No comments concerning this proposal were received. Section 25.731 is, therefore, amended to refer to maximum weight in lieu of takeoff weight, as proposed.

Proposal 38. As proposed, the requirement to consider the effects of engine thrust on tire loading would be deleted from § 25.733(a)(1).

One commenter objects to the proposed deletion and states that inertia loading should be taken into consideration notwithstanding that it is transient at the initiation of taxi. The commenter believes that tire inertia loading is a rational requirement and that safety considerations outweigh any regulatory burden. According to information available to the FAA, the inertial effects are less than three percent of the design static tire load. They are transient and occur at the initiation of or early in taxi where safety has not been an issue due to the low speeds involved. Furthermore, the inertial effects are insignificant when compared to the effects that taxi distance at maximum loads or the high energies associated with a rejected takeoff (RTO) have on tire design and safety. Technical Standard Order (TSO) TSO–C62c for aircraft tires specifies eight 35,000 feet taxi tests at the rated load and two 35,000-feet taxi tests at 1.2 times the rated load. In addition, the TSO specifies one overload takeoff cycle at 1.5 times the rated load. These tests, together with the taxi and RTO tests conducted for airplane type certification, provide more than ample margins to cover any tire load considerations due to engine thrust.

Another commenter suggests that the term "maximum ramp weight" should be replaced with the term "maximum weight" to account for those airplanes for which another condition, e.g., takeoff weight or taxi weight, is the maximum design weight. The FAA concurs, and the term "maximum weight" is used accordingly.

In addition to the proposed changes, one commenter suggests changes to § 25.733(b) (2) and (3) for clarification. According to the commenter, it is not clear whether vertical ground reactions are to be based on a deceleration of .31g due to braking or are to be based on a deceleration of .31 times the vertical load on the braked wheels. While the changes proposed by the commenter are beyond the scope of Notice 84–21 and cannot be considered at this time, the FAA notes that the vertical ground reactions are based on a deceleration of .31 times the vertical load. The commenter's suggested changes will be considered for future rulemaking if, as the commenter believes, the present wording of § 25.733(b) (2) and (3) is found to be causing confusion.

Except as noted above, § 25.733 is revised as proposed.

Proposal 39. One commenter supports the proposed clarification of § 25.735, but suggests that, in addition, the title should be changed to "Wheel brakes." The commenter correctly notes that there are other types of brakes to which this section does not apply, such as drag producing devices, propeller brakes, etc. The applicability of § 25.735 to only wheel brakes is, however, self evident because that section falls, in turn, under the heading "LANDING GEAR."

No other comments concerning this proposal were received. Section 25.735 is, therefore, amended as proposed.

Proposal 40. As proposed, § 25.772 would be amended to apply to an airplane with any lockable door between the pilot compartment and the passenger compartment, not just to one with a lockable door installed to comply with § 121.313 of this chapter. One commenter expressed a concern that a lockable door installed between the pilot compartment and the passenger compartment should be openable from the passenger compartment with a key. A requirement of this nature would, however, clearly be beyond the scope of the notice. No other comments concerning this proposal were received. Section 25.772 is, therefore, revised as proposed.

Proposal 41. As proposed, § 25.773(b)(1)(i) would be revised to specify that the means to maintain a clear portion of the windshield must be designed to function with all lift and drag devices, e.g., slats and spoilers as well as flaps, retracted. In addition, § 25.773(b)(2) would be amended to allow alternate means of maintaining clear vision in lieu of an openable window.

Three commenters address the proposed requirement of § 25.773(b)(2) to consider the probable damage due to a severe hail encounter. One concurs with the intent of the proposal, but believes that the term "severe hail" and the test condition should be defined. Another commenter asserts that the requirement to consider a severe hail encounter should be deleted because the term is not defined. Another asserts that the proposed requirement might be interpreted to permit no obstruction of any kind on any portion of the window. The commenter also asserts that the requirement of a severe hail encounter should be deleted since (according to the commenter) the intent of the provision for sufficient view, which is to permit continued safe flight and landing, is covered under § 25.775(e).

The FAA does not concur that the requirement to consider the effects of a severe hail encounter could be deleted without a possible degradation of safety. The purpose of the long-standing requirement of this section for an

openable window is to enable the flightcrew to make a safe landing in the event the windshield is obscured due to climatic conditions, insect encounters, or damage. One possible cause of obscuration is the pitting and crazing of the windshield that could result from a severe hail encounter. A nonopenable window would preclude the flightcrew from making a safe landing under these circumstances if the window were subjected to the same obscuration as the windshield. It is, therefore, essential that a nonopenable window used in lieu of the traditional openable window be capable of sustaining a severe hail encounter without obscuration.

As noted in the explanation of this proposal contained in the preamble to Notice 84–21, means of compliance other than an openable window have been found acceptable previously under the equivalent safety provisions of § 21.21(b)(2) of this chapter. The FAA is not aware of any difficulties with the definition of "severe hail encounter" that were experienced when each finding of equivalent safety was made. The FAA will, however, review the matter further to determine whether guidance concerning acceptable means of compliance is needed. If such guidance is needed, it will be published as an AC.

In regard to the commenters' concern that the requirement might be interpreted to permit no obstruction of any kind on any portion of the window, it must be noted the proposed rule would require a "means," not a window, per se. If the entire window were needed to safely land the airplane with the windshield obscured, the entire window would constitute the "means" and would have to be free from obstruction accordingly. If, on the other hand, a certain portion of the window were found to be sufficient to safely land the airplane with the windshield obscured, only that portion would have to be free from obstruction. In the latter case, whether other areas of the window were free from obstruction would be irrelevant insofar as compliance with the proposed rule would be concerned.

There were no comments concerning the proposed changes to § 25.773(b)(1)(i).

In view of the above, § 25.773 is amended as proposed.

Proposal 42. As proposed, § 25.779 would be amended to refer to "power or thrust" in lieu of "throttles," which is a misnomer when applied to turbine powered airplanes. One commenter recommends the use of the term "throttles/thrust" in lieu of "power or thrust." The FAA does not concur with this recommendation. Although "throttle" is an appropriate term for reciprocating-powered airplanes and "thrust" is appropriate for turbojet-powered airplanes, neither term is appropriate for turbopropeller-powered airplanes. "Power or thrust," on the contrary, is appropriate for all types of transport category airplanes. There were no other comments concerning this proposal. Section 25.779 is, therefore, amended as proposed.

Proposal 43. As proposed, § 25.781 would be amended to refer to "POWER OR THRUST CONTROL KNOB" in lieu of "THROTTLE CONTROL KNOB" and to "PROPELLER CONTROL KNOB" in lieu of "RPM CONTROL KNOB" in the diagram. The sole commenter recommends that the terms "THROTTLE" and "RPM" be retained for consistency with a proposal the commenter made on another occasion with regard to part 23 of this chapter. "THROTTLE" is a term appropriate to reciprocating-powered airplanes; but, as noted in the notice, it is a misnomer when applied to turbine-powered airplanes. "POWER or THRUST," on the contrary, are terms applicable to all transport category airplanes. Current industry practice is to refer to these controls as "power levers" or "thrust levers," as appropriate for the airplane involved. "RPM" is an ambiguous term in this context since there are, in some instances, engine speeds that are not proportional to the propeller speed. In other instances, the control in question may control propeller pitch rather than propeller speed, which is directly controlled by an engine governor. The term "PROPELLER" is, therefore, more accurate technically and, as noted in the notice, consistent with the terminology used in § 25.779. Section 25.781 is, therefore, amended as proposed.

Proposal 44. As noted in the explanation, the purpose of the proposed change to § 25.783(g) was to replace the reference to paragraph (f) that was inadvertently deleted during a previous revision. Unfortunately, the notice contained a printing error that left the incorrect impression that § 25.783(g) would also be changed substantively. No comments concerning the change actually intended were received; therefore, § 25.783(g) is amended as described in the explanation.

Proposal 45. As proposed, a number of changes would be made to § 25.785 for clarity. In addition, the requirement presently contained in § 25.1307 to provide a seat for each occupant would be transferred to this section for ease of reference and relaxed to allow the use of a berth in lieu of a seat for a nonambulant person. The requirement would also be clarified by specifically stating that it applies only to persons that are two years of age or older. Section 25.785(h) would be amended to permit placing a flight attendant seat at a location other than near a floor level emergency exit if the emergency egress of passengers would be enhanced by that location. The strength requirements presently contained in § 25.1413 (b) and (c) for safety belts and harnesses would be transferred to § 25.785 and combined with the corresponding requirements for seats and berths. The contents of § 25.1413(d) concerning belts with metal to metal latching devices would also be transferred to § 25.785 for ease of reference.

One commenter believes that the expression "* * * has reached his or her second birthday" in proposed § 25.785(a) would be confusing. The FAA does not concur. This expression has been used in corresponding § 121.311 of this chapter for some time without confusion. Another commenter believes that this expression could lead to the implied inclusion of operating rule criteria for child restraint wear when determining the maximum occupancy for certification purposes. As discussed in Notice 84–21, the change was proposed to reflect actual type certification practice and for consistency with the operating rule of § 121.311. The FAA, therefore, does not concur that any implication of additional requirements would result from this wording.

Three commenters express concern that the requirements of proposed § 25.785(h) for seats designated for the use of flight attendants would also be applied to seats for flight attendants not required by operating rules, e.g., "deadheading" flight attendants, flight attendants in excess of the minimum number required by operating rules, or a "barman" on an executive type transport. As one of the commenters correctly notes, § 121.311(f)(3) specifically states that "the requirements of § 25.785(h) do not apply to passenger seats occupied by flight attendants not required by § 121.391." Section 25.785(h) is revised to clarify the applicability in this regard.

One commenter brings to the attention of the FAA a discrepancy between proposed § 25.785(f)(1) and current § 25.561. As the commenter correctly notes, § 25.561 requires the structure of the airplane to be designed to protect the occupant from serious injury when the occupant experiences an upward ultimate inertia force as well as forces in other directions. (At the time Notice 84–21 was issued, the upward ultimate inertia force specified in § 25.561 was 2.0 g. Due to the recent adoption of

Amendment 25–64 (53 FR 17640; May 17, 1988), the upward ultimate inertia force has been increased to 3.0 g.) "Structure," in this context, includes seats, berths, and their attachments. Proposed § 25.785(f)(1), which would contain the requirements of current § 25.785(i)(1)(i), would require consideration of forward, sideward, downward, and rearward loads in the analysis and testing of seats, berths, and their supporting structure. Unlike § 25.561, proposed § 25.785(f)(1) and current § 25.785(i)(1)(i) do not specify consideration of upward loads. This omission resulted from an inadvertent error that occurred during the recodification of § 4b.358 of the CAR into § 25.785 of the FAR. To avoid confusion and for consistency with the requirements of § 25.561, § 25.785(f)(1) is changed to specify consideration of upward loads in addition to those in the other directions.

Another commenter states that proposed § 25.785(f)(1) should read, "* * * acts separately or using selected combinations * * *." The use of the word "and" in lieu of the word "or" has also been traced to an error that occurred during the codification of § 4b.358 into § 25.785. This section has been amended to correct that error.

One commenter notes a discrepancy in the expression " * * * items dislodged from service areas or service equipment * * * " in proposed § 25.785(h)(4) and the corresponding expression " * * * items dislodged in a galley, or from a stowage compartment or serving cart * * * " in current § 25.785(j). As the commenter correctly notes, stowage compartments, other than those in galley areas, would be exempt. Section 25.785(h)(4), therefore, specifies, " * * * service areas, stowage compartments, or service equipment."

No comments concerning the other proposed changes were received. Except as noted above, § 25.785 is amended as proposed.

Proposal 46. As proposed, the requirements of § 25.853 concerning "no smoking" signs, and signs indicating that disposal of cigarettes in receptacles intended for flammable waste is prohibited, would be transferred to § 25.791. In addition, § 25.791(e) would be added to allow the use of acceptable symbols in lieu of letters. One commenter questions whether the use of the word "either" in proposed § 25.791 (a) and (b) would mean that the passenger information signs must be operable from both pilot seats. The intent of the proposal is that the signs be operable by one member of the flightcrew, not by each member. In order to ensure that there will be no confusion in this regard, the phrase, " * * * operable from either pilot seat * * * " is replaced with the phrase, " * * * operable by a member of the flightcrew * * * " in both § 25.791(a) and (b). Another commenter objects to the proposed transfer from § 25.853 to § 25.791 of the requirement for "no smoking" signs and signs indicating that disposal of cigarettes in receptacles intended for flammable waste is prohibited. The commenter believes that this requirement would be obscured by the proposed transfer. The FAA does not concur with the commenter. Section 25.853 deals primarily with qualification standards for interior materials. The transfer of this requirement to § 25.791, which deals specifically with passenger information signs and placards, will actually make the requirement less likely to be overlooked. The same commenter notes that the present requirements for placards containing the specific words "no smoking" (in the lavatory) and "no cigarette disposal" are widely used and well understood in the industry and that substitution of corresponding objective requirements would lead to considerable variation in placard wording. The FAA concurs that the present requirements are well understood by the aviation industry (and, of equal importance, by the travelling public) and that the proposed substitution of objective requirements might prove to be counterproductive. The present requirements for specific placard wording will, therefore, be retained. This, of course, will not preclude acceptance of acceptable alternate wording under the equivalent safety provisions of § 21.21(b)(1) of this chapter, and acceptable symbols may be used in lieu of the specified wording under the provisions of § 25.791(e). Except as noted above, § 25.791 is revised as proposed.

Proposal 47. This is a conforming change necessitated by Proposal 50. Section 25.801(a) is, therefore, amended as proposed.

Proposal 48. As proposed, the emergency evacuation test criteria presently contained in § 25.803 would be transferred to new Appendix I for clarity and editorial consistency with part 121 of this chapter. One commenter suggests the addition of the words "using not more than 50 percent of the doors in the sides of the fuselage" at the end of the first sentence of proposed § 25.803(c). While this addition would not be incorrect, it reflects a test condition that is more properly presented in proposed appendix I with the other pertinent test conditions. The same commenter suggests the addition of the parenthetical expression "(full-scale or partial)" following the word "testing" in the second sentence of proposed § 25.803(c). Again, this addition would not be incorrect, but it is considered superfluous in the context of the sentence.

For reasons discussed below under Proposals 49–52, § 25.803(e) concerning emergency escape routes has been transferred to new § 25.810(c).

Except as noted, § 25.803 is amended and revised as proposed.

Proposals 49, 50, 51 and 52. As proposed, a number of related changes to §§ 25.805, 25.807, 25.809, and 25.813 would be made for consistency and clarity. The requirements for flightcrew exits would be transferred from § 25.805 to § 25.807. Ancillary requirements for Type A exits would be transferred to §§ 25.785, 25.809, or 25.813, as appropriate. The requirements of § 25.807(b) concerning exit accessibility would be transferred to § 25.813. The requirements of § 25.807(c) concerning uniform distribution of exits would also be transferred to § 25.813. Section 25.807 would provide for alternate emergency exit configurations. The provisions of § 25.803(b) concerning ventral and tail cone exits and other fuselage openings would be transferred to § 25.807 and combined with the related requirements of that section.

Two commenters suggest that § 25.807 should also define a door size that is larger than a Type I exit, but smaller than a Type A exit. The definition of this exit size, which is identified by the commenter as Type B, is beyond the scope of the notice. It, therefore, cannot be considered at this time because interested persons have not been given the opportunity to comment on its merits.

Separate emergency exits for flight crewmembers are not required for an airplane with a passenger capacity of 20 or less in which the proximity of passenger emergency exits offers a convenient and readily accessible means of evacuation for the flight crewmembers. One commenter believes that this exception should also be extended to airplanes with larger passenger capacities, such as 79. This comment is also beyond the scope of the notice; however, the FAA does not concur that adequate evacuation means would be provided for the flight crewmembers if this exception were extended to larger airplanes.

Since the time Notice 84–21 was prepared, considerable confusion has been noted regarding the requirements for means to assist passengers in egressing from nonoverwing exits to the

ground, means to assist passengers in egressing from overwing exits to the wing, and means to assist passengers in descending from the escape routes required by § 25.803(e). The requirements for escape routes are, in themselves, inappropriately contained in present § 25.803 which deals primarily with emergency evacuation demonstrations. In order to preclude further confusion and improve clarity, these requirements have been transferred to a new § 25.810 which deals specifically with emergency egress assist means and escape routes. This is an editorial change which does not affect the level of safety required or place any additional burden on any person.

Several commenters consider the phrase " * * * the most adverse anticipated wind conditions" in proposed § 25.809(h) to be too general and subject to varying interpretations. The FAA concurs, and this paragraph (which, as noted above, is now § 25.810(a)) has been changed to refer to " * * * 25-knot winds directed from the most critical angle," accordingly. This wording for escape route assist means is consistent with the corresponding wording of existing § 25.809(f)(1)(iv) for emergency exit assist means.

One commenter notes the inadvertent deletion from the proposal of the requirement that the assist means for escape routes leading from Type A exits "* * * must be automatically deployed and erected, concurrent with the opening of the exit, and self-supporting within 90 seconds [sic]." (Current § 25.807(a)(7)(ix) actually specifies 10 seconds rather than 90.) This inadvertent deletion has been corrected by placing the requirement in § 25.810(a).

Proposed § 25.807(d)(6)(ii) has been changed to read "door or exit" in lieu of "exit" for consistency with the present wording of § 25.803(d) and to clarify that any door that might be used by passengers for emergency egress must meet the applicable requirements, not just those designated by the applicant as "exits."

Section 25.813(b) is also revised to clarify that there must be adequate assist space next to each side of each Type A exit as required by current § 25.807(a)(7)(vii), and that such space is required for a Type A door regardless of whether it is located more than 6 feet from the ground.

Other editorial errors are noted by commenters. These are also corrected accordingly. Minor changes are made for compatibility with recently adopted Amendment 25–67.

Except as noted above, § 25.805 is removed, § 25.807 and § 25.809 are revised, § 25.810 is added, and § 25.813 is amended as proposed.

Proposal 53. No comments concerning this proposal were received. Section 25.833 is, therefore, revised to remove the redundant reference to engine exhaust heaters as proposed.

Proposal 54. The intent of this proposal was to correct the implication that the requirements of § 25.851(b) do not apply to fire extinguishing systems installed in addition to those required by the minimum standards of part 25. Although this intent was discussed in the Explanation for Proposal 54, the actual change to implement it was inadvertently omitted. Two commenters note this omission; however, no adverse comments concerning the stated intent were received. Section 25.851 is, therefore, amended as proposed except that § 25.851(b) reads, "Built-in fire extinguishers. If a built-in fire extinguisher is provided—* * *."

Proposals 55 and 56. As proposed, the test criteria presently contained in §§ 25.853, 25.855, and 25.1359 would be transferred to appendix F for editorial improvement and consistency. The requirement for "no smoking" signs and signs indicating that disposal of cigarettes in receptacles intended for flammable waste is prohibited would be transferred to § 25.791 for consistency with other passenger information sign requirements. The remaining nonredundant portions of § 25.855 for cargo or baggage compartments would be transferred to § 25.853 and combined with those for crew or passenger compartments. Section 25.853 would be amended to require lavatory entry ashtrays only if smoking is to be allowed in other areas of the airplane.

Since the time Notice 84–21 was issued, § 25.853 has been amended to include flammability requirements for seat cushions (Amendment 25–59; 49 FR 43188; October 26, 1984) and improved flammability standards for materials used in cabins (Amendment 25–61; 51 FR 26206; July 21, 1986 and Amendment 25–66; 53 FR 32564; August 25, 1988). Amendment 25–66 also includes a new requirement for smoke testing. In addition, § 25.855 has been amended to include new standards for cargo or baggage compartments (Amendment 25–60; 51 FR 18236; May 16, 1986). In view of these recent amendments, it is no longer considered advisable to combine the requirements for cargo or baggage compartments with those for crew or passenger compartments; therefore, those requirements proposed as § 25.853(a) remain in that section, and those proposed as § 25.853(b) are now identified as § 25.855. Other editorial changes are also made as necessary for compatibility with the recently adopted amendments.

As discussed under Proposal 46 above, one commenter objects to the proposed transfer of the requirement for "no smoking" signs and signs indicating that disposal of cigarettes in receptacles intended for flammable waste is prohibited to § 25.791. The FAA does not concur with the commenter's objection for the reasons discussed under Proposal 46.

The same commenter believes that the phrase, "If smoking is to be allowed," in proposed § 25.853(a)(2) may be misinterpreted to allow smoking in lavatories. The FAA concurs, and the phrase is changed to read, "Smoking is not to be allowed in the lavatories. If smoking is to be allowed in any other compartment occupied by the crew or passengers * * *." A corresponding change has also been made to retain the current requirement for ashtrays on lavatory doors regardless of whether smoking is allowed in any other part of the airplane.

The commenter notes that the phrase, "* * * or other approved equivalent methods," that formerly appeared in §§ 25.853 and 25.855 has been omitted from proposed § 25.853(a)(1) and (b)(1). This inadvertent error is corrected.

The commenter objects to the requirement in proposed § 25.853(a)(3) to demonstrate by test that receptacles have the capability to contain fires under all probable conditions of wear, misalignment, and ventilation expected in service. According to the commenter, this requirement, which is also contained in current § 25.853(e), is ambiguous and should be deleted. Any change of this nature would be beyond the scope of Notice 84–21; however, the FAA believes that this requirement is clearly stated as written.

Except as noted above, §§ 25.853 and 25.855 are amended as proposed.

Proposal 57. As proposed, § 25.867 would be removed on the assumption that § 25.1193(e) covers the same subject in a more comprehensive and objective manner. In light of the comments received, it appears that the requirements of § 25.867 are not entirely covered by those of § 25.1193(e). This proposal to remove § 25.867 is, therefore, withdrawn.

Proposal 58. As proposed, all fire protection requirements for systems would be combined and transferred to subpart D and designated as new § 25.869 for clarity. One commenter supports this proposal. Another states that the oxygen system fire protection

requirements should remain in § 25.1451 so that they are in close proximity to other safety considerations for oxygen systems. The ideal editorial structure for interrelated requirements is somewhat subjective. While this commenter's position has some merit, the FAA considers grouping fire protection requirements together to be more beneficial than grouping all oxygen system requirements together and, by doing so, placing fire protection requirements for the various systems in separate locations. The same commenter suggests adding the phrase "or other approved equivalent methods." This addition is unnecessary due to the provisions of existing § 21.21(b)(1) of this chapter which permit findings of an equivalent level of safety. Section 25.869 is, therefore, added as proposed.

Proposal 59. Section 25.901(c) would be revised to use the term "extremely improbable" in lieu of "extremely remote." While this proposed change is intended to merely substitute current terminology, several commenters believe that it would actually result in a change in the level of safety and present additional burden. The proposal is, therefore, withdrawn for further study.

Proposal 60. One commenter supports the change proposed to clarify the present requirement for qualification of the auxiliary power unit (APU). Another opposes the proposed § 25.903(f) as being ambiguous and failing to clearly state the requirement or intent of the rule. In lieu of stating that each APU must be approved, the commenter proposes a requirement that the APU be "* * * certified to TSO–C77 or FAA approved equivalent * * *" As noted in the explanation for Proposal 53, the term "approved," when used in part 25 in this context, means that the product must comply with an applicable Technical Standard Order (TSO) or, in lieu thereof, be approved in conjunction with the type certification process for the airplane on which it is to be installed. Because TSO–C77 is the TSO applicable to an APU, the proposed use of the term "approved" meets the intent of the commenter's proposal. It is also noted that the term "certified" (or the related term "certificated") is a misnomer with respect to products authorized under the TSO system. The commenter also proposes adding the parenthetical expression "essential or non-essential" following the word "category;" however, it does not appear that this addition would add clarity to the rule. Accordingly, § 25.903(f) is added as proposed.

Proposal 61. Under this proposal, which is related to Proposal 27, the following requirement would be added to § 25.905, "Design precautions must be taken to minimize the hazards to the airplane in the event a propeller blade fails or is released by a hub failure." One commenter suggests that the expression "design precautions" be replaced with the expression "practical design precautions." The FAA considers this change to be unnecessary, because these, like any other means of meeting type certification requirements, must be practical. Current § 25.571(e)(2), which would be replaced in part by § 25.905(d), requires consideration of damage only to structure due to the impact of a failed or released propeller blade. As noted in the preamble to Notice 84–21, the hazards that would have to be considered for compliance with § 25.905(d) also include damage to vital systems due to blade impact and unbalance due to the loss of a blade. In order to ensure that the expanded scope does not cause any confusion, § 25.905(d) has been amplified in this regard. Except for this clarification, new § 25.905(d) is adopted as proposed.

Proposal 62. No adverse comments were received concerning this proposal to clarify the applicability of § 25.925 to airplanes with dual wheels. Section 25.925 is, therefore, amended as proposed.

Proposal 63. As discussed in Notice 84–21, unwanted deployments of thrust reversing systems that were designed only for ground operation have occurred in flight on turbojet powered airplanes, sometimes with catastrophic results. Section 25.933 currently requires an applicant to show that the reverser can be restored to the forward flight position or that the airplane is capable of continued safe flight and landing under any possible position of the thrust reverser. An unwanted, inflight deployment is generally accompanied by damage to the reversing system due to the dynamic nature of the deployment, particularly at high speed. Although it might be possible to demonstrate that an undamaged reverser could be restored to the forward thrust position, there is no assurance that the reverser could be restored following an actual unwanted, inflight deployment due to the possibility of unpredictable damage. It is, therefore, essential that the airplane be capable of continued safe flight and landing with any possible position of the reverser. Conversely, it is also essential that an operable reverser be restored to the forward thrust position whenever possible. The word "or" would, therefore, be replaced with the word "and" to require showing that the reverser can be restored to the forward thrust position, if undamaged, and that the airplane is capable of continued safe flight and landing under any possible position of the thrust reverser. In addition, § 25.933 would be changed to clarify the applicability of the requirements of this section to other types of reversing systems, such as reversible pitch propellers.

As noted above, the applicant would have to show that the reverser can be restored to the forward thrust position, if undamaged, and that the airplane is capable of continued safe flight and landing under any possible position of the thrust reverser. Three commenters believe that this proposed requirement is unnecessary. One of the three commenters further speculates that safe flight cannot be assured should a reverser be deployed at liftoff. The FAA does not concur that showing both conditions is unnecessary. As discussed in Notice 84–21, an unwanted, inflight deployment is generally accompanied by damage to the reversing system due to the dynamic nature of the deployment, particularly at high speed. Although it might be demonstrated that an undamaged reverser could be restored to the forward thrust position, there is not assurance that the reverser could be restored in an actual unwanted, inflight deployment due to the possibility of unpredictable damage. It is, therefore, essential that the airplane be capable of continued safe flight and landing under any possible position of the thrust reverser. Conversely, it is also essential that an operable reverser be restored to the forward thrust position whenever possible. The FAA is aware of at least four incidents in which the thrust reversers of transport category airplanes could not be restowed following unwanted, inflight deployment. Each of the airplanes involved was landed safely with the reverser unstowed, because it had the capability for making a safe landing under such circumstances. Notwithstanding the option provided by current § 25.933(a), the manufacturers of transport category airplanes have recognized the need to show that the airplanes can be landed safely under these circumstances. The manufacturers of most, if not all, transport category, turbojet-powered airplanes certificated under part 25 have demonstrated this capability. The commenter's speculation that safe flight cannot be assured in the event a reverser is deployed at lift off is

inconsistent with past certification experience.

The capability of restowing an undamaged reverser in flight is considered to be equal in importance to having the capability for safe landing with an unstowed reversed. Inflight deployment of a reverser designed only for ground operation generally results in drag, buffeting, and possibly hazardous aerodynamic loads. Although initially undamaged, a deployed reverser may sustain damage from prolonged exposure to such buffeting and aerodynamic loads. It is, therefore, essential that a deployed reverser be restowed whenever possible so that the airplane can resume normal, hazard-free operation. One commenter suggests that § 25.933(a)(1) should read "* * *during inadvertent or deliberate reversal* * *" in lieu of "* * *during any reversal* * *." The FAA does not consider that this change would serve any purpose because any reversal is either inadvertent or deliberate.

Another commenter suggests that § 25.933(a)(1)(i) should contain the provision "if undamaged" for consistency with the explanation given in Notice 84–21. This change is also considered unnecessary because the requirement pertains to each operable reverser.

As discussed under Proposal 59 above, several commenters believe that the proposed use of the term "extremely improbable" would actually result in a change in the level of safety and present an additional burden. This aspect of the proposal is, therefore, withdrawn for further study.

One commenter suggests that § 25.933(a) (1) and (3) should refer to "* * *producing no more than reverse* * *" in lieu of "* * *producing no more than idle* * *." In addition to this suggested change being beyond the scope of the notice, the FAA does not agree with the change because it would represent a significant degradation in the established level of safety.

Another commenter suggested three editorial changes that are considered to be beyond the scope of the notice and unnecessary.

Except as noted above, § 25.933 is amended as proposed.

Proposal 64. Section 25.937 would be amended to use the word "improbable" in lieu of "remote." While this proposed change is intended to merely substitute current terminology, several commenters believe that it would actually result in a change in the level of safety and increased burden. The proposal is, therefore, withdrawn for further study.

Proposals 65 and 66. One commenter supports the proposed transfer of the requirement for marking the augmentation system tank filler openings from § 25.945 to § 25.1557 and removal of the redundant reference to § 25.1557(c) from § 25.973. Another commenter opposes deletion of marking requirements based on the rationale that the requirements are redundant. The commenter notes that, in other sections of part 25, the FAA proposes to add reference to requirements to ensure that important requirements are not overlooked and states that this policy is preferable from an airworthiness standpoint. The FAA concurs that references are appropriate, in some instances, to ensure that important requirements are not overlooked. In other instances, however, references are unnecessary and merely serve to obscure other requirements. The FAA does not concur that the transfer of the marking requirements of § 25.945(b)(4) to § 25.1557 and the elimination of the cross reference in § 25.979 will adversely affect airworthiness since the requirement continues to exist in another section appropriately identified as a marking section. Sections 25.945(b)(4) and 25.973(a) are, therefore, removed as proposed.

Proposal 67. One commenter supports the proposal to clarify the intent of the term "desired level" in § 25.979. Another makes a comment which, although it appears to be beyond the scope of the notice, may indicate a misunderstanding. Because there seems to be some misunderstanding of the intent of this section, the following clarification is provided. Each fuel tank must have an expansion space of 2 percent of the tank capacity, as required by § 25.969, to allow for thermal expansion of the fuel that might occur after the tank is filled. In order to clarify the intent of the term "desired level" in § 25.979, i.e., that this expansion space is not filled during refueling, each tank must have a corresponding maximum fuel quantity that does not include the expansion space. The purpose of § 25.979(b)(2) is to require a means to alert personnel when this maximum fuel quantity is exceeded so that corrective action may be taken before a hazardous situation develops. Exceeding a chosen intermediate quantity of fuels, as suggested by the commenter, is, therefore, not relevant to this requirement. The FAA has reviewed the comments and has determined that the proposal will eliminate the confusion that currently exists concerning the intent of this rule. Section 25.979 is, therefore, amended as proposed.

Proposal 68. One commenter supports the proposed removal of an unnecessary reference to § 25.1557(b)(2) from § 25.1013(c)(2). The commenter that opposes Proposal 66 opposes this proposal for the same reason. Again, the FAA does not consider that the deletion of the marking cross reference will adversely affect airworthiness since the requirement continues to exist in another section appropriately identified as a marking standard. Accordingly, § 25.1013(c) is amended as proposed. One commenter noted an editorial error in § 25.1013(a) as amended by Amendment 25–36. The preamble to Amendment 25–36 stated that the last sentence of § 25.1013(a) concerning a reciprocating engine with an integral oil sump was removed and placed in § 25.1183(a). The requirement was placed in § 25.1183(a); however, due to an inadvertent error, it was not removed from § 25.1013(a). As this is a correction and the change has previously been offered for public comment, § 25.1013(a) is amended to delete the last sentence.

Proposal 69. Two commenters respond to the proposal to correct an editorial error in § 25.1093(b)(1) concerning induction system anti-ice provisions. One commenter supports the proposal. The other commenter opposes the proposed change because, according to the commenter, it could be interpreted to require full ice protection at idle power conditions. The commenter further explains that this would impose undue limitations on induction system design and excessive economic operational penalties. The commenter also states that requirements for engine operation in icing conditions down to idle rpm should be specified in part 33 of this chapter. The commenter continues by disagreeing that the phrase, "* * * within the limitations established for the airplane," was introduced by an editorial error; finally, the commenter objected to "* * * the implication made in the notice that an operational limitation implies lack of providing the capability to operate the engines safely in icing conditions."

The FAA is concerned that the current regulatory wording implies that an operating limitation may be accepted in lieu of a design having the capability to operate the engines safely in icing conditions. For example, a statement such as, "Do not operate in icing conditions," would provide an operating limitation whereby no anti-icing provisions would need to be incorporated into the airplane design. This is considered unacceptable because airplanes do encounter

unexpected icing conditions during flight.

Certain engines and engine inlet configurations may be prone to ingesting snow in quantities sufficient to adversely affect engine operation, especially during ground operations. In contrast to icing conditions, snow can be detected visually. An airplane limitation prohibiting operation in falling and blowing snow would, therefore, be satisfactory in lieu of induction system redesign.

The FAA disagrees with the comment that anti-icing provisions should be specified in part 33. At the time of engine type certification, the engine manufacturer may not know the type of installations that will be made and the amount of engine bleed air or power extraction that will be necessary to protect the engine, as installed in the airplane, from icing. It is, therefore, inappropriate to address the issue in part 33.

The commenter is correct in the interpretation that "* * * full ice protection is required at idle power conditions." Some recent airplane designs have incorporated a conditional inflight idle setting that is activated when the flightcrew selects "anti-ice on." This feature increases the normal idle engine speed to a level sufficient to supply adequate engine bleed air for complete ice protection. Systems designed to incorporate a conditional in-flight idle setting would not suffer undue limitations on system design and excessive economic operational penalties.

The commenter is also correct in stating that the phrase "* * * within the limitations established for the airplane" was not introduced as an editorial error by Amendment 25–40; however, previous to Amendment 25–40, that phrase applied only to operation in snow. Amendment 25–40 addressed a minor change that made it clear that the engine air inlet system was also included with the engine under the deicing requirements. Inadvertently, the phrase "* * * within the limitations established for the airplane" was misplaced so that it appears to refer to the methods used to comply with the icing conditions specified in appendix C. This was never intended.

The commenter suggests that operation at idle engine power in icing conditions should be discouraged because, according to the commenter, the proposed regulatory change, which removes operating limitations as a means for finding compliance with appendix C, implies a lack of capability to operate safely in icing conditions. The suggestion is considered impractical because modern fuel-efficient airplanes are so streamlined that idle or near idle power is necessary for descent from cruise altitude.

In view of the above, § 25.1093(b)(1) is amended as proposed.

Proposal 70. As proposed, § 25.1141(e) would be added to require that the critical powerplant controls in the engine compartment be at least fire resistant. One commenter supports the proposal. Another suggests that the term "in a designated fire zone" should be used in lieu of "in the engine compartment." The FAA concurs that the former term would be more descriptive. Except for this change, § 25.1141(e) is amended as proposed.

Proposal 71. Section 25.1165 would be amended by adding a new paragraph which specifies that turbine engine ignition systems must be considered essential electrical loads. One commenter concurs with the proposal. Another commenter suggests that since each engine has dual ignition systems, the wording should be changed to, "At least one ignition system per engine * * *." The FAA does not concur with this commenter. Because most ignition system designs either require or allow selection of both ignitor systems (which would normally be the selection for certain flight conditions, such as icing), the complete ignition system should be considered an essential electrical load. Section 25.1165 is, therefore, amended as proposed.

Proposal 72. Section 25.1181(b) currently refers incorrectly to "* * * the requirements of §§ 25.1185 through 25.1205." Section 25.1205 was previously recodified as § 25.867, and § 25.1181(b) should have been amended to read, "* * * the requirements of § 25.867 and §§ 25.1185 through 25.1203," at that time. Section 25.867 was proposed to be removed (Proposal 57), and the wording proposed for § 25.1181(b) reflected that proposed removal. Because § 25.867 is not being removed as proposed, § 25.1181(b) is changed to refer to "* * * the requirements of § 25.867, and § 25.1185 through § 25.1203."

Proposal 73. Section 25.1305(e) currently requires both a means to indicate when the propeller blade angle is below the flight low-pitch position (Beta) and to indicate when the propeller is in reverse. No comments were received concerning this proposal to remove the requirement for indication of reverse pitch. Section 25.1305 is, therefore, amended as proposed.

Proposal 74. Section 25.1307 would be amended by transferring the contents of paragraph (a) to § 25.785, and removing paragraphs (f), (g), and (h). No comments concerning this proposal were received; therefore, § 25.1307 is amended as proposed.

Proposal 75. No comments concerning this proposal to clarify § 25.1351 were received. Section 25.1351 is, therefore, amended as proposed.

Proposal 76. No comments concerning this specific proposal were received; however, it is related to Proposals 58 and 98. In light of the disposition of those proposals, § 25.1359 is removed as proposed.

Proposal 77. Section 25.1381 would be clarified by indicating that sufficient illumination must be provided to make each instrument, switch, and other device necessary for safe operation easily readable, not just those arbitrarily chosen for illumination.

The sole commenter believes that it is not necessary to provide illumination for every control and instrument required for safe operation. The commenter cites power levers, landing gear levers, and flap controls where the size, location, and shape are sufficient (according to the commenter) for ready location of the control in the dark.

The FAA concurs that the shape and location of some items may be such that minimal illumination would be sufficient and that other lighting in the area may, in fact, provide sufficient illumination. Section 25.1381(a) has been changed to clarify that other available lighting may be acceptable in this regard. Nevertheless, the FAA does not concur that such items should be excluded without evaluation to determine that available lighting is sufficient. Except as noted above, § 25.1381 is amended as proposed.

Proposal 78. As proposed, the present requirements of § 25.1403 would be transferred to § 25.1419. This proposal is withdrawn for the reason discussed in Proposal 82 below.

Proposal 79. This proposal is withdrawn for the reason discussed in Proposal 81 below.

Proposal 80. No comments concerning this proposal were received. Section 25.1413 is, therefore, removed as proposed.

Proposal 81. The provisions of § 25.1411(d) through (g) were proposed to be transferred and combined with those of § 25.1415 for consistency and clarity. One commenter correctly notes that the applicability of these provisions would be changed by the proposal. As proposed, life rafts and life preservers would be required for all transport category airplanes approved with provisions for ditching. Current §§ 25.1411 and 25.1415, on the other hand merely provide standards for such equipment when the equipment is

required by operating rules, e.g., § 121.339 or § 125.209. Because this change in applicability was not intended, this proposal, along with related Proposal 79, is withdrawn. The present wording of § 25.1415(a) also appears to be somewhat misleading in this regard. It is, therefore, revised for clarity to read, "Ditching equipment used in airplanes to be certificated for ditching under § 25.801, and required by the operating rules of this chapter, must meet the requirements of this section."

A number of other comments were received; however, these are no longer relevant because the proposal is withdrawn.

Proposals 82 and 83. As proposed, §§ 25.1403, 25.1416, and 25.1455 pertaining to operation in icing conditions would be transferred to § 25.1419 for clarification and editorial improvement. In addition, the contents of present § 25.1416(c) would be revised to allow use of the "dark cockpit" concept, i.e., a warning when failure occurs rather than continual pilot monitoring of a healthy system.

One commenter objects to the proposed transfer of the contents of present § 25.1455 pertaining to the drainage of fluids subject to freezing to § 25.1419. As the commenter notes, present § 25.1455 deals primarily with design and installation of systems while present § 25.1419 basically contains test requirements. Although the commenter did not include § 25.1403 in the comment, the same observation could be made with respect to the proposed transfer of the standards for wing icing detection lights from § 25.1403 to § 25.1419. The best method of combining or grouping interrelated requirements is subjective. It is noted, in this regard, that §§ 25.1403 and 25.1455, as well as § 25.1419, contain requirements pertinent to protection from icing hazards. There is, therefore, merit to grouping the requirements in one section. The FAA does note, however, that present § 25.1419 contains test requirements that are applicable only if certification with ice protection provisions is desired. Section 25.1455, on the other hand, requires means to prevent the formation of hazardous quantities of ice on the airplane as a result of drainage regardless of whether certification with ice protection provisions is desired and whether the airplane is, in turn, approved for operation in icing conditions. Similarly, § 25.1403 requires wing icing detection lights unless operations at night in known or forecast icing conditions are prohibited. Section 25.1403 is, therefore not related to certification for daytime operation with ice protection provisions. In view of these circumstances, Proposals 78 and 88, and this aspect of this proposal, are withdrawn.

Two commenters suggest that minor editorial changes should be made to proposed § 25.1419(b)(2) for consistency with AC 20–73. One of the two notes that the term "* * * as found necessary * * *" could be incorrectly interpreted to apply to all of the testing required by proposed § 25.1419(b)(2) and not just to "* * * one or more of the following tests * * *" Accordingly, this paragraph is revised to read "* * * must be flight tested in the various operational configurations in measured natural atmospheric icing conditions and, as found necessary, by one or more of the following means * * *."

One commenter objects to the proposed requirement to test the airplane or its components in the various operational configurations. In this regard, the commenter notes that this could lead to conducting natural icing tests over a range of airplane and engine speeds, flight attitudes, altitudes, flap settings, etc. The commenter contends that the present wording of § 25.1419 allows flexibility in demonstrating only the most critical airplane operational configurations. The proposed wording does not reduce the latitude of the rule in this regard; however, the commenter's concern is moot. Due to the widely differing icing conditions that may be encountered in service and the subtle differences in airplane design, it would be extremely difficult to predict the effects of icing that would be experienced with different airplane configurations. Consequently, it is impossible in most instances to predict which configuration will be the most critical from an icing standpoint. Contrary to the commenter's contention, it is generally necessary to conduct icing tests over a range of configurations under the present wording of § 25.1419. The proposed wording does not change the scope of testing required. Instead, it merely clarifies the existing requirement.

One commenter suggests that the requirement of proposed § 2S.1419(b)(3) for flightcrew caution indication is unnecessary as system failure indication requirements are adequately covered in § 25.1309(c). The FAA concurs that such indication would be required by current § 25.1309(c) in the absence of a specific rule, such as proposed § 25.1419(b)(3). The general nature of § 25.1309(c), however, introduces a degree of uncertainty as to its applicability to specific airplane systems. It is, therefore, considered appropriate to retain the specific requirement of proposed § 25.1419(b)(3).

Another commenter objects to the proposed requirement for flightcrew caution information because, according to the commenter, it implies that adding an annunciator is the only acceptable means of compliance. Contrary to the commenter's belief, the proposed requirement is for flightcrew caution information, not for a caution light, per se. While the proposed rule does cite a caution light as one means of providing the necessary cautionary information, it would permit other equivalent means of providing this information to the flightcrew.

One commenter suggests that if the "warning when failure occurs" concept is adopted, it should be readily possible to determine, under all lighting conditions, that correct or intended switching has been selected. This determination is accomplished during the evaluation of the cockpit for compliance with current §§ 25.1309, 25.1381, 25.1541, and 25.1543; therefore, no further action is needed in this regard.

Except as noted above, § 25.1416 is removed, and § 25.1419 is amended as proposed.

Proposal 84. As proposed, § 25.1421 would be removed in order to remove a redundancy. In light of the comment received, it appears that the requirements of § 25.1421 are not entirely duplicated by those of § 25.561(b)(3). This proposal is, therefore, withdrawn.

Proposal 85. No comments concerning this specific proposal were received; however, it is related to Proposal 58. In light of the disposition of that proposal, § 25.1433 is amended by removing § 25.1433 (b) and (c) as proposed.

Proposal 86. As proposed, the provisions of § 25.1435(a)(2) pertaining to crew indication of hydraulic system pressure and quantity would be deleted because such requirements are covered by the provisions of § 25.1309. In addition, the provisions of § 25.1435(a)(4) (i) and (ii), which presently establish hydraulic system pressure limits expressed in terms of pump discharge pressure, would be replaced with a requirement that limits be established to meet the safety requirements of § 25.1309. Other changes would also be made to clarify this section.

Several commenters disagreed with the proposed deletion of § 25.1435(a)(2), noting that there is no requirement for indication of normal system pressure or quantity in § 25.1309. One commenter

believes that this deletion would be inconsistent with the retention of similar requirements for electrical systems.

As discussed in the preamble to Amendment 25–41 (42 FR 36960; July 18, 1977), Proposal 5–32, the FAA does not consider that pressure and quantity gauges are needed for all hydraulic systems. Indicating means other than gauges, including warning lights, are considered adequate for some hydraulic systems. Generally, indication of normal operation is necessary only for systems for which trends must be monitored by the flightcrew, e.g., fuel quantity and pressure, engine oil temperature and pressure, etc. The warning information required by the provisions of § 25.1309 is, therefore, considered appropriate and adequate for the hydraulic system.

One commenter generally concurs with the proposed changes to § 25.1435, but believes that proposed § 25.1435(b)(1) should be deleted in its entirety. According to the commenter, the test of the complete hydraulic system to 1.5 times the design operating pressure would be unnecessary in view of the requirement in proposed § 25.1435(a)(2) to test each component to 1.5 times the design operating pressure. This comment is beyond the scope of the notice, as it was not proposed to delete this requirement. The FAA does not, however, concur. Proposed § 25.1435(a)(2) contains a design requirement for elements of the hydraulic system. Proposed § 25.1435(b)(1), on the other hand, would require a proof test of the complete system to verify the integrity and function of the complete system. For example, the proof test would verify that deformation would not preclude the system from performing its intended function, that adequate clearance with structural members is maintained and that there are no leaks or weaknesses. One commenter believes that § 25.1435(b)(2)(ii) implies that a test rig must be vibrated in a representative fashion. In this regard, the commenter notes that vibration is normally accounted for on a component qualification basis and by flight experience. The FAA concurs that vibration testing can be completed on a component basis and supplemented with flight test surveys. The FAA does not concur, however, that the proposed wording implies that a test rig must be vibrated.

Another commenter suggests that policy and guidance concerning this section should be published in the form of an AC. The FAA will review this subject to determine whether an AC is warranted.

In view of the above, § 25.1435 is amended as proposed.

Proposal 87. No comments concerning this specific proposal were received; however, it is related to Proposal 58. In light of the disposition of that proposal, § 25.1451 is removed as proposed.

Proposal 88. As proposed, the present requirements of § 25.1455 would be transferred to § 25.1419. This proposal is withdrawn for the reason discussed under Proposal 82 above.

Proposal 89. The only commenter on this proposal to clarify the powerplant limitations of § 25.1521 states that the phrase "* * * and do not exceed the values on which compliance with any other requirements of this part is based" is unnecessary and too general. The commenter further notes that compliance with certain requirements (e.g., § 25.175) is based on less than rated power or thrust. The FAA does not concur with the commenter's assessment of the proposed clarification. The limitations of the powerplant, as installed, have been, by definition, the corresponding limits for which the engines and propellers have been type certificated under parts 33 and 35 of this chapter (or predecessor regulations) or, in the case of derated engine installations, lesser values on which compliance with other requirements of part 25 is based. The use of derated engine installations in transport category airplanes is becoming more prevalent. It is therefore necessary that the basis for establishing powerplant limitations be well understood. The commenter correctly notes that compliance with certain requirements is based on less than rated power or thrust; however, by definition, compliance with those requirements would have no bearing on compliance with proposed § 25.1521(a). The same commenter recommends the use of the phrase "* * * must be established * * *" in lieu of the phrase "* * * established * * *" in proposed § 25.1521 (b) and (c). The FAA concurs that the former phrase is preferable. Except for this change, § 25.1521 is revised as proposed.

Proposal 90. The only commenter on this proposal is in support of the proposed change to clarify the requirements for APU limitations. Section 25.1522 is, therefore, amended as proposed.

Proposal 91. There were no comments on this proposal within the scope of the notice. Section 25.1533 is, therefore, revised to correct an existing editorial error as proposed.

Proposal 92. No comments were received on this proposal concerning the visibility of instrument markings. Section 25.1543 is, therefore, revised as proposed.

Proposal 93. No comments were received concerning this proposal. Section 25.1551 is, therefore, revised to clarify the requirements for oil quantity indication as proposed.

Proposal 94. No adverse comments were received concerning this proposal to transfer the requirement for marking the augmentation system tank filler openings from § 25.945 to § 25.1557. Section 25.1557 is, therefore, amended as proposed.

Proposal. 95. Under this proposal, § 25.1581 would be amended to specify that the Airplane Flight Manual must contain any limitation established as a condition of compliance with the applicable noise standards of part 36 of this chapter. The sole commenter recommends insertion of the word "airworthiness" between "any" and "limitation," asserting that the insertion would clearly delineate other aspects of noise findings from part 25 certification. The FAA does not concur with this recommendation because it would negate the intent of the proposal. The limitations in question are those established for noise certification purposes, not those established for airworthiness.

Since the time Notice 84–21 was issued, it has been noted that § 36.1581 also specifies that the Airplane Flight Manual (AFM) must also contain procedures and other information approved under § 36.1501. Section 25.1581 is, therefore, amended as proposed, except that paragraph(a)(3) reads, "Any limitation, procedure, or other information established * * *," for consistency with § 36.1581. This addition presents no additional burden as § 36.1581 already contains the same requirement.

Proposal 96. As proposed, § 25.1583 would be amended to add a reference to § 25.1522 in § 25.1583(b)(1). In addition, § 25.1583(b)(3), which contains the requirement to furnish information concerning instrument markings in the AFM would be removed; and § 25.1583(f) would be revised to delete the requirement to explain the altitude limiting factors in the AFM. The sole commenter believes that it is necessary to furnish information concerning instrument markings in the AFM so that the pilot will have access to such information. The FAA concurs, and § 25.1583(b)(3) is retained accordingly. Except for the retention of § 25.1583(b)(3), § 25.1583 is amended as proposed.

Proposal 97. As discussed in Notice 84–21, the parenthetical phrase, "* * * including §§ 25.115, 25.123, and 25.125 for the weights, altitudes, temperatures, wind components, and runway gradients, as applicable," presently contained in § 25.1587(b) has created confusion because some of the items cited are inconsistent with those mentioned in the specified sections. The parenthetical phrase would, therefore, be deleted. The sole commenter objects to this proposed deletion and asserts that, although there may be confusion, the parameters listed are legitimate performance criteria. The FAA concurs, and paragraph (b) is amended to exclude only the reference to particular sections.

Proposal 98. As proposed, the test criteria presently contained in §§ 25.853, 25.855, and 25.1359 would be transferred to appendix F for editorial improvement and accuracy. In addition, the term "acrylic" would be replaced by the generic term "clear plastic." One commenter recommends extensive changes to appendix F to reflect current industry practices and standards. While these recommendations may have merit, they go beyond the scope of the notice and cannot be considered at this time. They will, however, be considered for future rulemaking action. Another commenter states that a sentence in proposed appendix F is redundant; however, the cited location of the redundancy does not exist in the text of the proposal. It is also noted that appendix F was redesignated as appendix F, part I, subsequent to issuance of Notice 84–21. Appendix F, part I, is, therefore, amended as proposed.

Proposal 99. No comments were received concerning this proposal. Appendix G is, therefore, amended to correct an error as proposed.

Proposal 100. Subsequent to issuance of Notice 84–21, emergency evacuation demonstrations became the subject of considerable public interest. As a result, a public technical conference on that subject was held by the FAA in Seattle, Washington, on September 3 through 6, 1985. In light of the further study being given to emergency evacuation demonstrations, any substantive changes to the requirements for emergency evacuation demonstration will be deferred for future rulemaking action. The existing test criteria and procedures are, however, transferred from § 25.803 to new appendix J, as proposed, for editing improvement. (Subsequent to the issuance of Notice 84–21, Amendment 25–62 was adopted to include standards for automatic takeoff thrust control systems. Because those standards became appendix I, the standards for evacuation demonstrations have been redesignated appendix J accordingly.)

Correction of miscellaneous editing and typographical errors. Since the time Notice 84–21 was issued, a number of editing and typographical errors have been brought to the attention of the FAA.

Prior to Amendment 25–38, the performance requirements for reciprocating engine-powered airplanes were contained in §§ 25.45 through 25.75. With the adoption of that amendment, those sections were removed, and the performance requirements for reciprocating engine-powered airplanes were combined with those for turbine engine-powered airplanes contained in §§ 25.101 through 25.125. Although § 25.49(c)(2)(i) no longer exists, § 25.145 erroneously refers to that section as well as the correctly referenced § 25.103(b)(1). Similarly, § 25.729 erroneously refers to "* * * when the wing flaps are extended beyond the maximum approach position determined under § 25.67(e) * * *." (Actually, the reference was inaccurate prior to Amendment 25–38, as well, because the maximum approach flap position was used for compliance with, not determined by, § 25.67(e).) As these are corrections and the substance of the changes has already been offered for public comment in conjunction with Amendment 25–38, § 25.145 and § 25.729 are amended to delete the references to § 25.49 and § 25.67, respectively.

At the time Amendment 25–57 (49 FR 6848; February 23, 1984) was adopted, paragraphs (h) and (i) of § 25.1001 were redesignated (e) and (f), respectively. Due to an inadvertent error, an existing reference in § 25.343(a) to § 25.1001 (e) and (f) was not changed to conform to the redesignation. This error is corrected accordingly.

In some printings of paragraph (b) of § 25.351, the air density is erroneously denoted by the lower case letter "p" in lieu of the Greek letter "rho." In some printings of this paragraph, the superscript "2" has been omitted from the expression

$$\frac{\text{"(K)"}}{\text{"(lt)"}}$$

in the formula for lateral mass ratio. In addition, the word "ration" incorrectly appears in lieu of the word "ratio." These typographical errors in § 25.351 are corrected accordingly.

Regulatory Evaluation

This Regulatory Evaluation analyzes the cost and benefit of the amendments. A more detailed Regulatory Evaluation has been placed in the docket. The majority of the amendments contain numerous changes to clarify rules that have been shown to be confusing, to correct editing errors, to reflect current terminology, and to update the rules to reflect actual certification practices. The administrative savings associated with such clarifications cannot be readily determined and benefits are not estimated. There are nine amendments, addressed below, which relieve manufacturers of certain costly current requirements. None of the amendments impose additional costs. As discussed below, in some cases the benefits are not quantifiable. The total benefit of all the changes is more than $100,000 for type certification of smaller transport category airplanes and exceeds $400,000 for type certification of larger transport category airplanes.

Section 25.21 Proof of Compliance

The change to § 25.21 deletes current § 25.21(b) and changes § 25.21(d) to delete specific tolerances specified in the current regulation. Section 25.21(b) is to be deleted to simplify the regulation. It has no applicability to existing or envisioned airplanes, and it incorrectly implies that specific testing is required to meet the conditions of the section.

Benefits

The FAA does not require the tests that § 25.21(b) might be interpreted to require. Thus, there is no specific test eliminated by this portion of the amendment.

Section 25.21(d) is changed to make it more objective. This may generate savings in future applications because placing the specific tolerance into advisory circular material provides for more flexibility in establishing a specific test program. Such flexibility will doubtless make future certification test programs more efficient and therefore less costly.

Based on FAA field estimates, the future savings would involve approximately two hours of airplane flight test time, and about two personweeks of associated analyses and reporting. The value of flight test time varies greatly with the size and type of airplanes being certificated. FAA field estimates set the approximate range as between $20,000 per hour for smaller turbopropeller-driven or business jet airplanes to $100,000 for larger turbojet airplanes. In addition to flight test time, this proposal involves a saving of

engineering time for reduced analysis and test reporting. The FAA estimates an average engineer's daily salary and overhead at $400, or approximately $4,000 for the two-person weeks of time saved. The range of total saving, therefore, is from $44,000 to $204,000, depending on the size of the airplane. This saving occurs during each certification program.

Section 25.177 Static lateral-directional stability

This amendment to § 25.177 clarifies and simplifies the regulations involving certain stability testing. The purpose of the amendment is to relieve certain test burdens, and simplify the current regulation. The practical impact of the amendment is a change in the test procedures for each Part 25 certification approval program. There will be reduced airplane test time, because the amendment will enable the applicants to restructure their stability test programs. The value of potential savings is based on a reduction in airplane test time of approximately 2 hours. Additionally, an estimated two weeks of engineering time would be eliminated because of reduced need for analysis and test reporting. Based on estimates discussed above, the amendment would save between $40,000 and $200,000 of the cost of airplane test time in each certification program. The two weeks of additional engineering time is valued at an estimated $4,000 based on the same assumptions as in the discussion above.

Section 25.181 Dynamic stability

This amendment to § 25.181 relieves applicants from having to test between stalling speed and 1.2 times stalling speed. The purpose of the amendment is to eliminate one or two specific conditions and thus release the test airplane for other tests. It is anticipated that the equivalent of 10 minutes of test time will be saved. Using the range established above for an hour of test time, the benefit for each certification program will be in the range of $3,300 for smaller airplanes to $16,700 for larger airplanes.

Section 25.205 Stalls; Critical engine inoperative

This amendment deletes § 25.205, which requires demonstration of stall recovery with the critical engine inoperative. The purpose of the amendment is to reduce the testing required. The practical impact of the amendment is to eliminate approximately one hour of test time. In addition, the change would reduce engineering time by eliminating an estimated two weeks of analysis and test reporting. Based on the estimates discussed above under § 25.21, adopting this change would save between $20,000 and $100,000 for airplane test time in a certification program, and $4,000 in engineering time.

Section 25.251 Vibration and buffeting

This amendment to § 25.251 relieves certain applicants from particular test burdens. The practical impact of the amendment is to eliminate a test program for airplanes which fit the characteristics outlined. Certain turbopropeller-driven airplanes and slower turbojet-powered airplanes, for example, would have a simpler test program under the amendment. The previously required test program is not justified for those airplanes, as the required tests have not been found critical. This amendment could save up to five hours of flight testing, and four weeks of associated engineering time for analysis and reporting. Using the factors developed above, the airplane test time is valued at up to $100,000. This analysis assumes that the airplane would probably be a smaller airplane. The engineering time is valued at $8,000. These savings apply to each certification program for affected airplanes.

Section 25.571 Damage-tolerance and fatigue evaluation of structure

There are four changes to § 25.571. One is editorial, two are clarifying changes that will not cause any additional costs to be incurred, and one is relieving an impracticable test.

The change to the heading of § 25.571(b) is editorial only.

The change to § 25.571(b)(2) is a clarification of the present rule. While this clarification appears to add conditions which must be met for damage-tolerance, any such testing is at no cost, since it can be accomplished at the same time as other damage-tolerance evaluation. Further, the FAA expects that there should be no design-cost difference resulting from this requirement.

The change to § 25.571(e)(1) clarifies the requirements of the bird impact test of the present rule. Confusion exists as a result of § 91.70(a) of the FAR, which limits operational speed to 250 knots within the continental U.S. Section 91.70(a) does not apply to operations outside the continental U.S., and the FAA has interpreted the current rule as meaning cruise velocity at sea level. The test criteria are similar, and it is expected that no redesign or testing changes will be required as a result of this proposal.

Service experience has shown compliance with a requirement for propeller-driven airplanes to be impossible. As a result of the granting of exemptions for good cause, no manufacturer has, in fact, been required to show compliance with the current requirement. The safety of propeller airplanes is not diminished, however, as a more practical means of compliance is required by new § 25.905(d). The benefits of the proposal are not quantifiable because the FAA cannot predict how many certification programs there will be for transport category propeller-driven airplanes.

Section 25.723 Shock, absorption tests

This amendment to § 25.723 allows the use of analysis in lieu of testing in more instances when there are changes in landing gears and in takeoff and landing weights. The purpose of the change is to relieve a regulatory burden and clarify the intent of the rule. Because of the use of the phrase "identical energy absorption characteristics" in the current rule, some testing could be required when increases are sought in previously approved takeoff and landing weights. The amendment allows for greater use of analysis in lieu of testing. In practice, considerable analysis is allowed today, so there is no quantifiable saving associated with the proposal. However, if it saves a future landing gear retest program, the potential savings are considerable.

Section 25.733 Tires

This amendment to § 25.733 deletes the requirement to consider the effects of inertia in tire ratings. The purpose of the change is to relieve a regulatory burden. For example, when engine thrust ratings are changed, an analysis must be completed under present regulations to evaluate the impact the change might have on tire ratings. Experience has shown that this impact is not significant. The relief from preparing an analysis saves approximately one day of engineering time whenever engine thrust ratings are increased. This is approximately $400, using the labor rate developed above.

Section 25.773 Pilot compartment view

This amendment to § 25.773 clarifies the current regulation and allows an alternative means of compliance with the requirement for an openable window. The purpose of the amendment is to relieve a current burden, and clarify the rules. There is no impact as a result of the change to § 25.773(b)(1)(ii) since this is the present certification

practice today. The change to § 25.733(b)(2) provides alternative means of achieving the objective of a clear view for the pilot under adverse conditions. Such alternative means have been approved as equivalent safety findings under the provision of § 21.21 in recent certification programs. Generally, these alternative means are additional windows which provide a clear view for the flight pilot and which, because of their design, will not be affected by severe weather situations, such as hailstorms. While hailstorms, for example, may fracture a forward-facing windshield, side windows are not harmed by hail. The potential benefit associated with this relief is considerable, and could amount to over $200,000 over the production life of a large transport category airplane. Not only is design and engineering complex for an openable window, but there are recurring production costs with each airplane. Pressure seals, special latching devices and waterproofing must all be incorporated in design and production of such openable windows. Also, there are occasional maintenance problems associated with openable windows which are eliminated with an alternative means of compliance. The actual benefit associated with this change is hypothetical, since equivalency has been granted in recent certification programs. However, it is not unreasonable to estimate that use of alternate means of compliance could easily save at least $200,000 over the production life of a large transport category airplane. This is a very general estimate covering both engineering and production costs.

Discussion of Comments

There were no comments which directly addressed the economic evaluation in the NPRM or the Regulatory Evaluation placed in the docket. Nor were there any comments relating to the Regulatory Flexibility Determination. In addressing each of the proposals there were some comments made relating to costs and these have been addressed in previous sections which discussed the comments relating to each of the proposals.

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 Act requires agencies to review rules which may have "a significant economic impact on a substantial number of small entities." Since the Act applies to U.S. entities, only U.S. manufacturers of transport category airplanes will be affected.

In the United States, there are two manufacturers that specialize in commercial transport category airplanes, The Boeing Company and McDonnell Douglas Corporation. In addition, there are manufacturers that specialize in the manufacture of other transport category airplanes, such as those designed for executive transportation. These are Cessna Aircraft Corporation, Beech Aircraft Corporation, Gulfstream American Corporation and Gates Learjet Corporation.

The FAA size threshold for a determination of a small entity for U.S. airplane manufacturers is 75 employees; any manufacturer with more than 75 employees is considered not to be a small entity. Because none of the U.S. manufacturers of transport category airplanes is a small entity, this final rule will have no impact on any manufacturer that is a "small entity."

Because this final rule will not have a "significant economic impact on a substantial number of small entities," no review is required in this regard by the Act.

International Trade Impact Assessment

This rule is not expected to have an adverse impact on the trade opportunities of either U.S. manufacturers of transport category airplanes doing business abroad or foreign aircraft manufacturers doing business in the United States. Since the certification rules are applicable to both foreign and domestic manufacturers, which sell their products in the United States, there will be no competitive trade advantage to either.

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 this final rule will not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

Because the regulations adopted herein are not expected to result in significant costs, the FAA has determined that this final rule is not major as defined in Executive Order 12291. For the same reason and because this is an issue that has not prompted a great deal of public concern, this final rule is not considered to be significant as defined in Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979). In addition, since there are no small entities affected by this rulemaking, it is certified, under the criteria of the Regulatory Flexibility Act, that this final rule will not have a significant economic impact, positive or negative on a substantial number of small entities. The regulatory evaluation prepared for this final rule remains has been placed in the docket. A copy of this evaluation may be obtained by contacting the person identified under the caption "**FOR FURTHER INFORMATION CONTACT.**"

List of Subjects in 14 CFR Part 25

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

Adoption of the Amendment

Accordingly, part 25 of the Federal Aviation Regulations (FAR) (14 CFR part 25) is amended as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

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

Authority: 49 U.S.C. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425, 1428, 1429, 1430; 49 U.S.C. 106(g) (Revised Pub. L. 97-449, January 12, 1983); 49 CFR 1.47(a).

2. By revising § 25.2 to read as follows:

§ 25.2 Special retroactive requirements.

The following special retroactive requirements are applicable to an airplane for which the regulations referenced in the type certificate predate the sections specified below—

(a) Irrespective of the date of application, each applicant for a supplemental type certificate (or an amendment to a type certificate) involving an increase in passenger seating capacity to a total greater than that for which the airplane has been type certificated must show that the airplane concerned meets the requirements of:

(1) Sections 25.721(d), 25.783(g), 25.785(c), 25.803(c) (2) through (9), 25.803 (d) and (e), 25.807 (a), (c), and (d), 25.809 (f) and (h), 25.811, 25.812, 25.813 (a), (b), and (c), 25.815, 25.817, 25.853 (a) and (b), 25.855(a), 25.993(f), and 25.1359(c) in effect on October 24, 1967, and

(2) Sections 25.803(b) and 25.803(c)(1) in effect on April 23, 1969.

(b) Irrespective of the date of application, each applicant for a

supplemental type certificate (or an amendment to a type certificate) for an airplane manufactured after October 16, 1987, must show that the airplane meets the requirements of § 25.807(c)(7) in effect on July 24, 1989.

(c) Compliance with subsequent revisions to the sections specified in paragraph (a) or (b) above may be elected in accordance with § 21.101(a)(2) of this chapter or may be required in accordance with § 21.101(b) of this chapter.

3. By amending § 25.21 by removing paragraph (b) and marking it "reserved" and revising paragraph (d) to read as follows:

§ 25.21 Proof of compliance.

* * * * *

(b) [Reserved]

* * * * *

(d) Parameters critical for the test being conducted, such as weight, loading (center of gravity and inertia), airspeed, power, and wind, must be maintained within acceptable tolerances of the critical values during flight testing.

* * * * *

4. By amending § 25.29 by revising paragraph (a)(3)(iii) to read as follows:

§ 25.29 Empty weight and corresponding center of gravity.

(a) * * *

(3) * * *

(iii) Other fluids required for normal operation of airplane systems, except potable water, lavatory precharge water, and fluids intended for injection in the engine.

* * * * *

5. By amending § 25.33 by revising paragraph (c) to read as follows:

§ 25.33 Propeller speed and pitch limits.

* * * * *

(c) The means used to limit the low pitch position of the propeller blades must be set so that the engine does not exceed 103 percent of the maximum allowable engine rpm or 99 percent of an approved maximum overspeed, whichever is greater, with—

(1) The propeller blades at the low pitch limit and governor inoperative;

(2) The airplane stationary under standard atmospheric conditions with no wind; and

(3) The engines operating at the takeoff manifold pressure limit for reciprocating engine powered airplanes or the maximum takeoff torque limit for turbopropeller engine-powered airplanes.

§ 25.111 [Amended]

6. By amending § 25.111, paragraph (a)(1), by removing the regulatory reference "§ 25.101(c)" and inserting "§ 25.101(f)" in its place.

§ 25.125 [Amended]

7. By amending § 25.125, paragraph (a)(2), by removing the words "steady gliding" and inserting the word "stabilized" in their place.

8. By amending § 25.145 by revising paragraphs (a) and (a)(1) to read as follows:

§ 25.145 Longitudinal control.

(a) It must be possible at any speed between the trim speed prescribed in § 25.103(b)(1) and V_{y_1}, to pitch the nose downward so that the acceleration to this selected trim speed is prompt with—

(1) The airplane trimmed at the trim speed prescribed in § 25.103(b)(1).

* * * * *

9. By amending § 25.147, by revising paragraph (a) introductory text to read as follows and by removing and reserving paragraph (b)(2):

§ 25.147 Directional and lateral control.

(a) *Directional control; general.* It must be possible, with the wings level, to yaw into the operative engine and to safely make a reasonably sudden change in heading of up to 15 degrees in the direction of the critical inoperative engine. This must be shown at $1.4V_{s1}$ for heading changes up to 15 degrees (except that the heading change at which the rudder pedal force is 150 pounds need not be exceeded), and with—

* * * * *

(b) * * *

(2) [Reserved]

* * * * *

10. By amending § 25.149 by revising paragraph (b), and the introductory text of (e), (f) and (g) to read as follows:

§ 25.149 Minimum control speed.

* * * * *

(b) V_{mc} is the calibrated airspeed at which, when the critical engine is suddenly made inoperative, it is possible to maintain control of the airplane with that engine still inoperative and maintain straight flight with an angle of bank of not more than 5 degrees.

* * * * *

(e) V_{mcg}, the minimum control speed on the ground, is the calibrated airspeed during the takeoff run at which, when the critical engine is suddenly made inoperative, it is possible to maintain control of the airplane using the rudder control alone (without the use of nosewheel steering), as limited by 150 pounds of force, and the lateral control to the extent of keeping the wings level to enable the takeoff to be safely continued using normal piloting skill. In the determination of V_{mcg}, assuming that the path of the airplane accelerating with all engines operating is along the centerline of the runway, its path from the point at which the critical engine is made inoperative to the point at which recovery to a direction parallel to the centerline is completed may not deviate more than 30 feet laterally from the centerline at any point. V_{mcg} must be established with—

* * * * *

(f) V_{mcl}, the minimum control speed during landing approach with all engines operating, is the calibrated airspeed at which, when the critical engine is suddenly made inoperative, it is possible to maintain control of the airplane with that engine still inoperative and maintain straight flight with an angle of bank of not more than 5 degrees. V_{mcl} must be established with—

* * * * *

(g) For airplanes with three or more engines, $V_{mcl\text{-}2}$, the minimum control speed during landing approach with one critical engine inoperative, is the calibrated airspeed at which, when a second critical engine is suddenly made inoperative, it is possible to maintain control of the airplane with both engines still inoperative and maintain straight flight with an angle of bank of not more than 5 degrees. $V_{mcl\text{-}2}$ must be established with—

* * * * *

11. By revising § 25.177 to read as follows:

§ 25.177 Static lateral-directional stability.

(a) [Reserved]

(b) [Reserved]

(c) In straight, steady sideslips, the aileron and rudder control movements and forces must be substantially proportional to the angle of sideslip in a stable sense; and the factor of proportionality must lie between limits found necessary for safe operation throughout the range of sideslip angles appropriate to the operation of the airplane. At greater angles, up to the angle at which full rudder is used or a rudder force of 180 pounds is obtained, the rudder pedal forces may not reverse; and increased rudder deflection must be needed for increased angles of sideslip. Compliance with this paragraph must be demonstrated for all landing gear and flap positions and symmetrical power conditions at speeds from 1.2 V_{s1} to V_{fc}, V_{lc}, or V_{fc}/M_{fc}, as appropriate.

(d) The rudder gradients must meet the requirements of paragraph (c) at speeds between V_{mo}/M_{mo} and V_{fc}/M_{fc} except that the dihedral effect (aileron deflection opposite the corresponding rudder input) may be negative provided the divergence is gradual, easily recognized, and easily controlled by the pilot.

§ 25.181 [Amended]

12. By amending § 25.181, paragraphs (a) and (b), by removing the words "stalling speed" and inserting "1.2 V_s" in their place.

§ 25.205 [Removed]

13. By removing § 25.205.

14. By amending § 25.251 by revising paragraph (e) to read as follows:

§ 25.251 Vibration and buffeting.

* * * * *

(e) For an airplane with M_D greater than .6 or with a maximum operating altitude greater than 25,000 feet, the positive maneuvering load factors at which the onset of perceptible buffeting occurs must be determined with the airplane in the cruise configuration for the ranges of airspeed or Mach number, weight, and altitude for which the airplane is to be certificated. The envelopes of load factor, speed, altitude, and weight must provide a sufficient range of speeds and load factors for normal operations. Probable inadvertent excursions beyond the boundaries of the buffet onset envelopes may not result in unsafe conditions.

15. By amending § 25.253 by revising paragraph (a)(3) to read as follows:

§ 25.253 High-speed characteristics.

(a) * * *

(3) With the airplane trimmed at any speed up to V_{MO} /M_{MO}, there must be no reversal of the response to control input about any axis at any speed up to V_{DF}/M_{DF}. Any tendency to pitch, roll, or yaw must be mild and readily controllable, using normal piloting techniques. When the airplane is trimmed at V_{MO}/M_{MO}, the slope of the elevator control force versus speed curve need not be stable at speeds greater than V_{FC}/M_{FC}, but there must be a push force at all speeds up to V_{DF}/M_{DF} and there must be no sudden or excessive reduction of elevator control force as V_{DF}/M_{DF} is reached.

* * * * *

§ 25.307 [Amended]

16. By amending § 25.307 by removing paragraphs (b) and (c) and marking them [Reserved].

§ 25.331 [Amended]

17. By amending § 25.331, paragraph(c)(2)(i), by removing the expression "A to D" following the word "Points" and inserting the expression "A_1 to D_1" in its place and, paragraph (c)(2)(ii), by removing the expression "A to D" following the word "Points" and inserting the expression. "A^2 to D^{2}" in its place.

18. By amending § 25.341, by revising paragraph (b)(1) as follows, and by redesignating existing paragraph (b)(3) as paragraph (c) and revising the text as follows:

§ 25.341 Gust loads.

* * * * *

(b) * * *

(1) The shape of the gust is

$$U = \frac{U_{de}}{2}\left(1-\cos\frac{2\pi s}{25C}\right)$$

where—

s=distance penetrated into gust (ft);
C=mean geometric chord of wing (ft); and
U_{de}=derived gust velocity referred to in paragraph (a) (fps).

(2) * * *

(c) In the absence of a more rational analysis, the gust load factors must be computed as follows:

$$n = 1 + \frac{K_g U_{de} V a}{498\,(W/S)}$$

where—

$$K_g = \frac{0.88\mu_g}{5.3+\mu_g} = \text{gust alleviation factor;}$$

$$\mu_g = \frac{2(W/S)}{\rho \overline{C}_{ag}} = \text{airplane mass ratio:}$$

U_{de}=derived gust velocities referred to in paragraph (a) (fps);
ρ=density of air (slugs cu. ft.);
W/S=wing loading (psf);
$\overline{C}$=mean geometric chord (ft);
g=acceleration due to gravity (ft/sec^2);
V=airplane equivalent speed (knots); and
a=slope of the airplane normal force coefficient curve C_{NA} per radian if the gust loads are applied to the wings and horizontal method. The wing lift curve slope C_{AL} per radian may be used when the gust load is applied to the wings only and the horizontal tail gust loads are treated as a separate condition.

§ 25.343 [Amended]

19. By amending § 25.343, paragraph (a), by removing the reference to § 25.1001 (h) and (i) and inserting a reference to § 25.1001 (e) and (f) in its place.

20. By amending § 25.345 by revising paragraph (c)(1) to read as follows:

§ 25.345 High lift devices.

* * * * *

(c) * * *

(1) Maneuvering to a positive limit load factor as prescribed in § 25.337(b); and

* * * * *

21. By amending § 25.351, by revising paragraph (b) as follows:

§ 25.351 Yawing conditions.

* * * * *

(b) *Lateral gusts.* The airplane is assumed to encounter derived gusts normal to the plane of symmetry while in unaccelerated flight. The derived gusts and airplane speeds corresponding to conditions B' through J' (in § 25.333(c)) (as determined by §§ 25.341 and 25.345(a)(2) or § 25.345(c)(2)) must be investigated. The shape of the gust must be as specified in § 25.341. In the absence of a rational investigation of the airplane's response to a gust, the gust loading on the vertical tail surfaces must be computed as follows:

$$L_t = \frac{K_{gg} U_{de} V_{ag} S_t}{498}$$

where—

L_t=vertical tail load (lbs.);

$$K_{gg} = \frac{0.88\mu_{gg}}{5.3+\mu_{gg}} = \text{gust alleviation factor;}$$

$$\mu_{gg} = \frac{=_{\rho}12W}{\overline{pC_t g a_t S_t}} \left(\frac{K_z}{l_t}\right)^2 = \text{lateral mass ratio;}$$

U_{de} = derived gust velocity (fps);
ρ = air density (slugs/cu. ft.);
W = airplane weight (lbs.);
S_t = area of vertical tail (ft.^{2});
$\overline{C_t}$ = mean geometric chord of vertical surface (ft.);
a_t = lift curve slope of vertical tail (per radian);
K = radius of gyration in yaw (ft).;
l_t = distance from airplane c.g., to lift center of vertical surface (ft.);
g = acceleration due to gravity (ft./sec.^{2}); and
V = airplane equivalent speed (knots).

22. By amending § 25.361 by revising paragraphs (a) introductory text, (a)(2) and (c) introductory text to read as follows:

§ 25.361 Engine torque.

(a) Each engine mount and its supporting structure must be designed for the effects of—

(1) * * *

(2) A limit torque corresponding to the maximum continuous power and propeller speed, acting simultaneously with the limit loads from flight condition A of § 25.333(b); and

(3) * * *

* * * * *

(c) The limit engine torque to be considered under paragraph (a) of this section must be obtained by multiplying mean torque for the specified power and speed by a factor of—

* * * * *

§ 25.365 [Amended]

23. By amending the introductory sentence of § 25.365 by removing the words "for occupants."

24. By amending § 25.373 by revising paragraph (a), to read as follows:

§ 25.373 Speed control devices.

* * * * *

(a) The airplane must be designed for the symmetrical maneuvers and gusts prescribed in §§ 25.333, 25.337, and 25.341, and the yawing maneuvers and lateral gusts in § 25.351, at each setting and the maximum speed associated with that setting; and

* * * * *

25. By amending § 25.395 by revising paragraph (b) and adding a new paragraph (c) to read as follows:

§ 25.395 Control system.

* * * * *

(b) The system limit loads, except the loads resulting from ground gusts, need not exceed the loads that can be produced by the pilot (or pilots) and by automatic or power devices operating the controls.

(c) The loads must not be less than those resulting from application of the minimum forces prescribed in § 25.397(c).

§ 25.397 [Amended]

26. By amending Footnote 3 to § 25.397 by removing the word "most" and inserting the words "must be" in its place.

27. By amending § 25.415 by revising paragraph (a)(2), to read as follows:

§ 25.415 Ground gust conditions.

(a) * * *

(2) The control system stops nearest the surfaces, the control system locks, and the parts of the systems (if any) between these stops and locks and the control surface horns, must be designed for limit hinge moments H obtained from the formula, $H = KcS_sq$, where—

H = limit hinge moment (ft. lbs.);
c = mean chord of the control surface aft of the hinge line (ft.);
S_s = area of the control surface aft of the hinge line (sq. ft.);
q = dynamic pressure (p.s.f.) based on a design speed not less than $14.6(W/S)^{\frac{1}{2}} + 14.6$ (f.p.s.), except that the design speed need not exceed 88 f.p.s. (W/S is wing loading based on maximum airplane weight and wing area); and
K = limit hinge moment factor for ground gusts derived in paragraph (b) of this section.

* * * * *

§ 25.459 [Amended]

28. By amending § 25.459 by inserting the word "slats," after the word "slots," and before the word "and spoilers."

29. By amending § 25.571 by revising the heading of paragraph (b) and by revising paragraphs (b)(2), (e)(1), and (e)(2) to read as follows:

§ 25.571 Damage-tolerance and fatigue evaluation of structure.

* * * * *

(b) *Damage-tolerance evaluation.* * * *

(2) The limit gust condition specified in §§ 25.305(d), 25.341, and 25.351(b) at the specified speeds up to V_c, and in § 25.345.

* * * * *

(e) * * *

(1) Impact with a 4-pound bird at V_c at sea level to 8,000 feet;

(2) Uncontained fan blade impact;

* * * * *

30. By amending § 25.613 by revising paragraphs (b) and (e) to read as follows:

§ 25.613 Material strength properties and design values.

* * * * *

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

(1) Where applied loads are eventually distributed through a single member within an assembly, the failure of which would result in loss of structural integrity of the component, 99 percent probability with 95 percent confidence.

(2) For redundant structure, in which the failure of individual elements would result in applied loads being safely distributed to other load carrying members, 90 percent probability with 95 percent confidence.

* * * * *

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

§ 25.615 [Removed]

31. By removing § 25.615.

32. By amending § 25.625, by revising paragraph (d), to read as follows:

§ 25.625 Fitting factors.

* * * * *

(d) For each seat, berth, safety belt, and harness, the fitting factor specified in § 25.785(f)(3) applies.

33. By amending § 25.629 by revising paragraphs (b)(1) and (d)(1)(ii) to read as follows:

§ 25.629 Flutter, deformation, and fail-safe criteria.

* * * * *

(b) * * *

(1) The airplane must be designed to be free from flutter and divergence (unstable structural distortion due to aerodynamic loading) for all combinations of altitude and speed encompassed by the V_D/M_D versus altitude envelope enlarged at all points by an increase of 20 percent in equivalent airspeed at both constant Mach number and constant altitude, except that the envelope may be limited to a maximum Mach number of 1.0 when M is less than 1.0 at all design altitudes and the following is established—

* * * * *

(d) * * *

(1) * * *

(ii) Any other combination of failures, malfunctions, or adverse conditions not shown to be extremely improbable.

* * * * *

§ 25.673 [Removed]

34. By removing § 25.673.

35. By revising § 25.693 to read as follows:

§ 25.693 Joints.

Control system joints (in push-pull systems) that are subject to angular motion, except those in ball and roller bearing systems, must have a special factor of safety of not less than 3.33 with respect to the ultimate bearing strength of the softest material used as a bearing. This factor may be reduced to 2.0 for joints in cable control systems. For ball or roller bearings, the approved ratings may not be exceeded.

36. By revising § 25.701 to read as follows:

§ 25.701 Flap and slat interconnection.

(a) Unless the airplane has safe flight characteristics with the flaps or slats retracted on one side and extended on the other, the motion of flaps or slats on opposite sides of the plane of symmetry must be synchronized by a mechanical interconnection or approved equivalent means.

(b) If a wing flap or slat interconnection or equivalent means is used, it must be designed to account for the applicable unsymmetrical loads, including those resulting from flight with the engines on one side of the plane of symmetry inoperative and the remaining engines at takeoff power.

(c) For airplanes with flaps or slats that are not subjected to slipstream conditions, the structure must be designed for the loads imposed when the wing flaps or slats on one side are carrying the most severe load occurring in the prescribed symmetrical conditions and those on the other side are carrying not more than 80 percent of that load.

(d) The interconnection must be designed for the loads resulting when interconnected flap or slat surfaces on one side of the plane of symmetry are jammed and immovable while the surfaces on the other side are free to move and the full power of the surface actuating system is applied.

37. By amending § 25.723 by revising paragraph (a) to read as follows:

§ 25.723 Shock absorption tests.

(a) It must be shown that the limit load factors selected for design in accordance with § 25.473 for takeoff and landing weights, respectively, will not be exceeded. This must be shown by energy absorption tests except that analyses based on earlier tests conducted on the same basic landing gear system which has similar energy absorption characteristics may be used for increases in previously approved takeoff and landing weights.

* * * * *

38. By amending § 25.729 by revising paragraph (e)(4) to read as follows:

§ 25.729 Retracting mechanism.

* * * * *

(e) * * *

(4) Landplanes must have an aural warning device that will function continuously, when the wing flaps are extended beyond the maximum approach position, if the gear is not fully extended and locked. There must not be a manual shutoff for this warning device. The flap position sensing unit may be installed at any suitable location. The system for this device may use any part of the system (including the aural warning device) for the device required in paragraph (e)(2) of this section.

* * * * *

§ 25.731 [Amended]

39. By amending § 25.731, paragraph (b)(1), by removing the word "takeoff" and inserting the word "maximum" in its place.

40. By amending § 25.733 by revising paragraphs (a)(1), (c), introductory text and (c)(1) to read as follows:

§ 25.733 Tires.

(a) * * *

(1) The loads on the main wheel tire, corresponding to the most critical combination of airplane weight (up to maximum weight) and center of gravity position, and

* * * * *

(c) When a landing gear axle is fitted with more than one wheel and tire assembly, such as dual or dual-tandem, each wheel must be fitted with a suitable tire of proper fit with a speed rating approved by the Administrator that is not exceeded under critical conditions, and with a load rating approved by the Administrator that is not exceeded by—

(1) The loads on each main wheel tire, corresponding to the most critical combination of airplane weight (up to maximum weight) and center of gravity position, when multiplied by a factor of 1.07; and

* * * * *

41. By amending § 25.735 by revising paragraph (b), to read as follows:

§ 25.735 Brakes.

* * * * *

(b) The brake system and associated systems must be designed and constructed so that if any electrical, pneumatic, hydraulic, or mechanical connecting or transmitting element (excluding the operating pedal or handle) fails, or if any single source of hydraulic or other brake operating energy supply is lost, it is possible to bring the airplane to rest under conditions specified in § 25.125, with a mean deceleration during the landing roll of at least 50 percent of that obtained in determining the landing distance as prescribed in that section. Subcomponents within the brake assembly, such as brake drum, shoes, and actuators (or their equivalents), shall be considered as connecting or transmitting elements, unless it is shown that leakage of hydraulic fluid resulting from failure of the sealing elements in these subcomponents within the brake assembly would not reduce the braking effectiveness below that specified in this paragraph.

* * * * *

42. By revising § 25.772 to read as follows:

§ 25.772 Pilot compartment doors.

For an airplane that has a maximum passenger seating configuration of more than 20 seats and that has a lockable door installed between the pilot compartment and the passenger compartment:

(a) The emergency exit configuration must be designed so that neither crewmembers nor passengers need use

that door in order to reach the emergency exits provided for them; and

(b) Means must be provided to enable flight crewmembers to directly enter the passenger compartment from the pilot compartment if the cockpit door becomes jammed.

43. By amending § 25.773, by revising paragraphs (b)(1)(i) and (b)(2), to read as follows:

§ 25.773 Pilot compartment view.

* * * * *

(b) * * *

(1) * * *

(i) Heavy rain at speeds up to 1.6 V_{s1} with lift and drag devices retracted; and

(ii) * * *

(2) The first pilot must have—

(i) A window that is openable under the conditions prescribed in paragraph (b)(1) of this section when the cabin is not pressurized, provides the view specified in that paragraph, and gives sufficient protection from the elements against impairment of the pilot's vision; or

(ii) An alternate means to maintain a clear view under the conditions specified in paragraph (b)(1) of this section, considering the probable damage due to a severe hail encounter.

* * * * *

§ 25.779 [Amended]

44. By amending § 25.779, paragraph (b)(1), by removing the word "Throttles" and inserting the words "Power or thrust" in its place.

45. By amending § 25.781 by revising the chart as follows:

* * * * *

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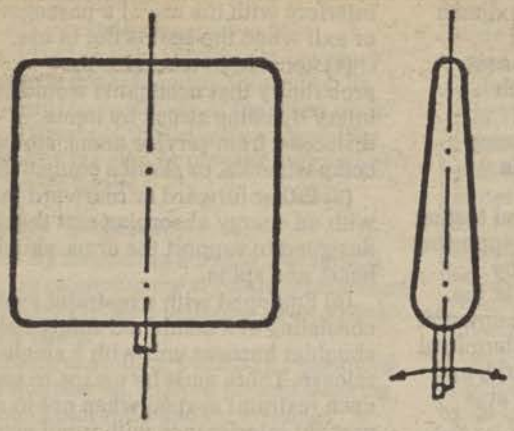
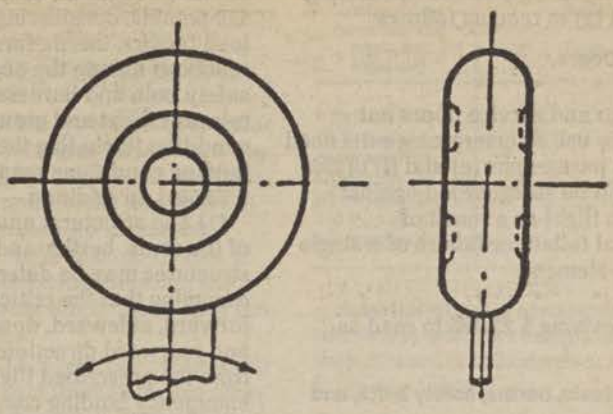
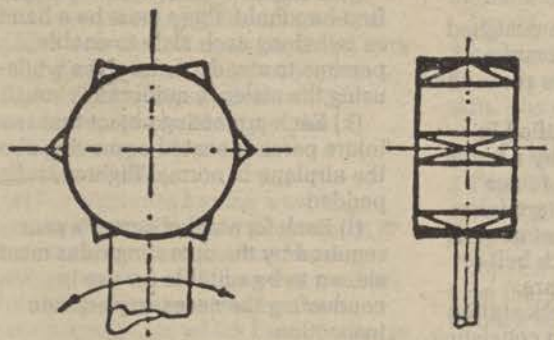


FLAP CONTROL KNOB



LANDING GEAR CONTROL KNOB



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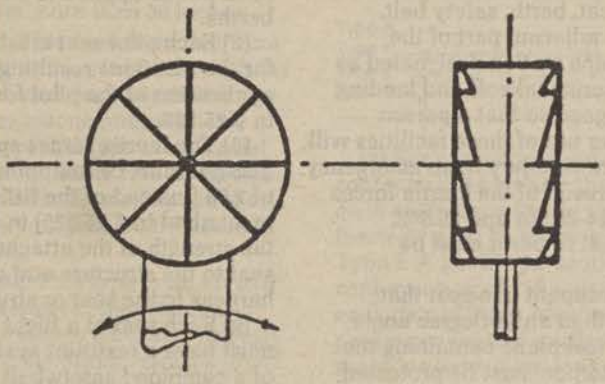
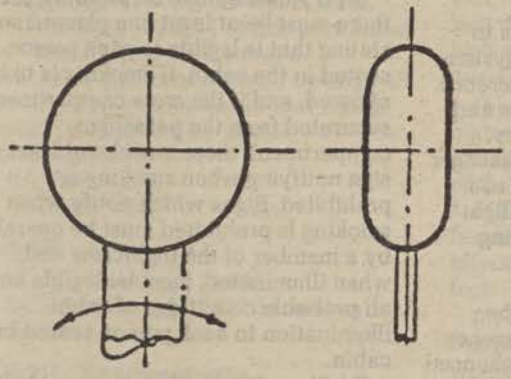


SUPERCHARGER CONTROL KNOB



POWER OR THRUST KNOB

PROPELLER CONTROL KNOB

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46. By amending § 25.783 by revising paragraph (g) to read as follows:

§ 25.783 Doors.

* * * * *

(g) Cargo and service doors not suitable for use as emergency exits need only meet paragraphs (e) and (f) of this section and be safeguarded against opening in flight as a result of mechanical failure or failure of a single structural element.

* * * * *

47. By revising § 25.785 to read as follows:

§ 25.785 Seats, berths, safety belts, and harnesses.

(a) A seat (or berth for a nonambulant person) must be provided for each occupant who has reached his or her second birthday.

(b) Each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of these facilities will not suffer serious injury in an emergency landing as a result of the inertia forces specified in §§ 25.561 and 25.562.

(c) Each seat or berth must be approved.

(d) Each occupant of a seat that makes more than an 18-degree angle with the vertical plane containing the airplane centerline must be protected from head injury by a safety belt and an energy absorbing rest that will support the arms, shoulders, head, and spine, or by a safety belt and shoulder harness that will prevent the head from contacting any injurious object. Each occupant of any other seat must be protected from head injury by a safety belt and, as appropriate to the type, location, and angle of facing of each seat, by one or more of the following:

(1) A shoulder harness that will prevent the head from contacting any injurious object.

(2) The elimination of any injurious object within striking radius of the head.

(3) An energy absorbing rest that will support the arms, shoulders, head, and spine.

(e) Each berth must be designed so that the forward part has a padded end board, canvas diaphragm, or equivalent means, that can withstand the static load reaction of the occupant when subjected to the forward inertia force specified in § 25.561. Berths must be free from corners and protuberances likely to cause injury to a person occupying the berth during emergency conditions.

(f) Each seat or berth, and its supporting structure, and each safety belt or harness and its anchorage must be designed for an occupant weight of 170 pounds, considering the maximum load factors, inertia forces, and reactions among the occupant, seat, safety belt, and harness for each relevant flight and ground load condition (including the emergency landing conditions prescribed in § 25.561). In addition—

(1) The structural analysis and testing of the seats, berths, and their supporting structures may be determined by assuming that the critical load in the forward, sideward, downward, upward, and rearward directions (as determined from the prescribed flight, ground, and emergency landing conditions) acts separately or using selected combinations of loads if the required strength in each specified direction is substantiated. The forward load factor need not be applied to safety belts for berths.

(2) Each pilot seat must be designed for the reactions resulting from the application of the pilot forces prescribed in § 25.395.

(3) The inertia forces specified in § 25.561 must be multiplied by a factor of 1.33 (instead of the fitting factor prescribed in § 25.625) in determining the strength of the attachment of each seat to the structure and each belt or harness to the seat or structure.

(g) Each seat at a flight deck station must have a restraint system consisting of a combined safety belt and shoulder harness with a single-point release that permits the flight deck occupant, when seated with the restraint system fastened, to perform all of the occupant's necessary flight deck functions. There must be a means to secure each combined restraint system when not in use to prevent interference with the operation of the airplane and with rapid egress in an emergency.

(h) Each seat located in the passenger compartment and designated for use during takeoff and landing by a flight attendant required by the operating rules of this chapter must be:

(1) Near a required floor level emergency exit, except that another location is acceptable if the emergency egress of passengers would be enhanced with that location. A flight attendant seat must be located adjacent to each Type A emergency exit. Other flight attendant seats must be evenly distributed among the required floor level emergency exits to the extent feasible.

(2) To the extent possible, without compromising proximity to a required floor level emergency exit, located to provide a direct view of the cabin area for which the flight attendant is responsible.

(3) Positioned so that the seat will not interfere with the use of a passageway or exit when the seat is not in use.

(4) Located to minimize the probability that occupants would suffer injury by being struck by items dislodged from service areas, stowage compartments, or service equipment.

(5) Either forward or rearward facing with an energy absorbing rest that is designed to support the arms, shoulders, head, and spine.

(6) Equipped with a restraint system consisting of a combined safety belt and shoulder harness unit with a single point release. There must be means to secure each restraint system when not in use to prevent interference with rapid egress in an emergency.

(i) Each safety belt must be equipped with a metal to metal latching device.

(j) If the seat backs do not provide a firm handhold, there must be a handgrip or rail along each aisle to enable persons to steady themselves while using the aisles in moderately rough air.

(k) Each projecting object that would injure persons seated or moving about the airplane in normal flight must be padded.

(l) Each forward observer's seat required by the operating rules must be shown to be suitable for use in conducting the necessary enroute inspection.

48. By revising § 25.791 to read as follows:

§ 25.791 Passenger information signs and placards.

(a) If smoking is to be prohibited, there must be at least one placard so stating that is legible to each person seated in the cabin. If smoking is to be allowed, and if the crew compartment is separated from the passenger compartment, there must be at least one sign notifying when smoking is prohibited. Signs which notify when smoking is prohibited must be operable by a member of the flightcrew and, when illuminated, must be legible under all probable conditions of cabin illumination to each person seated in the cabin.

(b) Signs that notify when seat belts should be fastened and that are installed to comply with the operating rules of this chapter must be operable by a member of the flightcrew and, when illuminated, must be legible under all probable conditions of cabin illumination to each person seated in the cabin.

(c) A placard must be located on or adjacent to the door of each receptacle used for the disposal of flammable waste materials to indicate that use of

the receptacle for disposal of cigarettes, etc., is prohibited.

(d) Lavatories must have "No Smoking" or "No Smoking in Lavatory" placards conspicuously located on or adjacent to each side of the entry door.

(e) Symbols that clearly express the intent of the sign or placard may be used in lieu of letters.

§ 25.801 [Amended]

49. By amending § 25.801, paragraph (a), by removing the regulatory reference "§ 25.807(d)" and inserting "§ 25.807(e)" in its place.

50. By amending § 25.803 by removing paragraphs (b), (d) and (e) and marking them [Reserved], and by revising paragraphs (a) and (c) to read as follows:

§ 25.803 Emergency evacuation.

(a) Each crew and passenger area must have emergency means to allow rapid evacuation in crash landings, with the landing gear extended as well as with the landing gear retracted, considering the possibility of the airplane being on fire.

(b) [Reserved]

(c) For airplanes having a seating capacity of more than 44 passengers, it must be shown that the maximum seating capacity, including the number of crewmembers required by the operating rules for which certification is requested, can be evacuated from the airplane to the ground under simulated emergency conditions within 90 seconds. Compliance with this requirement must be shown by actual demonstration using the test criteria outlined in appendix J of this part unless the Administrator finds that a combination of analysis and testing will provide data equivalent to that which would be obtained by actual demonstration.

(d) [Reserved]

(e) [Reserved]

§ 25.805 [Removed]

51. By removing § 25.805.

52. By revising § 25.807 to read as follows:

§ 25.807 Emergency exits.

(a) *Type.* For the purpose of this part, the types of exits are defined as follows:

(1) *Type I.* This type is a floor level exit with a rectangular opening of not less than 24 inches wide by 48 inches high, with corner radii not greater than one-third the width of the exit.

(2) *Type II.* This type is a rectangular opening of not less than 20 inches wide by 44 inches high, with corner radii not greater than one-third the width of the exit. Type II exits must be floor level exits unless located over the wing, in which case they may not have a step-up inside the airplane of more than 10 inches nor a step-down outside the airplane of more than 17 inches.

(3) *Type III.* This type is a rectangular opening of not less than 20 inches wide by 36 inches high, with corner radii not greater than one-third the width of the exit, and with a step-up inside the airplane of not more than 20 inches. If the exit is located over the wing, the step-down outside the airplane may not exceed 27 inches.

(4) *Type IV.* This type is a rectangular opening of not less than 19 inches wide by 26 inches high, with corner radii not greater than one-third the width of the exit, located over the wing, with a step-up inside the airplane of not more than 29 inches and a step-down outside the airplane of not more than 36 inches.

(5) *Ventral.* This type is an exit from the passenger compartment through the pressure shell and the bottom fuselage skin. The dimensions and physical configuration of this type of exit must allow at least the same rate of egress as a Type I exit with the airplane in the normal ground attitude, with landing gear extended.

(6) *Tail cone.* This type is an aft exit from the passenger compartment through the pressure shell and through an openable cone of the fuselage aft of the pressure shell. The means of opening the tailcone must be simple and obvious and must employ a single operation.

(7) *Type A.* This type is a floor level exit with a rectangular opening of not less than 42 inches wide by 72 inches high with corner radii not greater than one-sixth of the width of the exit.

(b) *Step down distance.* Step down distance, as used in this section, means the actual distance between the bottom of the required opening and a usable foot hold, extending out from the fuselage, that is large enough to be effective without searching by sight or feel.

(c) *Over-sized exits.* Openings larger than those specified in this section, whether or not of rectangular shape, may be used if the specified rectangular opening can be inscribed within the opening and the base of the inscribed rectangular opening meets the specified step-up and step-down heights.

(d) *Passenger emergency exits.* Except as provided in paragraphs (d) (3) through (7) of this section, the minimum number and type of passenger emergency exits is as follows:

(1) For passenger seating configurations of 1 through 299 seats:

Passenger seating configuration (crewmember seats not included)	Emergency exits for each side of the fuselage			
	Type I	Type II	Type III	Type IV
1 through 9				1
10 through 19			1	
20 through 39		1	1	
40 through 79	1		1	
80 through 109	1		2	
110 through 139	2		1	
140 through 179	2		2	

Additional exits are required for passenger seating configurations greater than 179 seats in accordance with the following table:

Additional emergency exits (each side of fuselage)	Increase in passenger seating configuration allowed
Type A	110
Type I	45
Type II	40
Type III	35

(2) For passenger seating configurations greater than 299 seats, each emergency exit in the side of the fuselage must be either a Type A or Type I. A passenger seating configuration of 110 seats is allowed for each pair of Type A exits and a passenger seating configuration of 45 seats is allowed for each pair of Type I exits.

(3) If a passenger ventral or tail cone exit is installed and that exit provides at least the same rate of egress as a Type III exit with the airplane in the most adverse exit opening condition that would result from the collapse of one or more legs of the landing gear, an increase in the passenger seating configuration beyond the limits specified in paragraph (d) (1) or (2) of this section may be allowed as follows:

(i) For a ventral exit, 12 additional passenger seats.

(ii) For a tail cone exit incorporating a floor level opening of not less than 20 inches wide by 60 inches high, with corner radii not greater than one-third the width of the exit, in the pressure shell and incorporating an approved assist means in accordance with § 25.809(h), 25 additional passenger seats.

(iii) For a tail cone exit incorporating an opening in the pressure shell which is at least equivalent to a Type III emergency exit with respect to dimensions, step-up and step-down distance, and with the top of the opening not less than 56 inches from the passenger compartment floor, 15 additional passenger seats.

(4) For airplanes on which the vertical location of the wing does not allow the installation of overwing exits, an exit of at least the dimensions of a Type III exit must be installed instead of each Type IV exit required by subparagraph (1) of this paragraph.

(5) An alternate emergency exit configuration may be approved in lieu of that specified in paragraph (d) (1) or (2) of this section provided the overall evacuation capability is shown to be equal to or greater than that of the specified emergency exit configuration.

(6) The following must also meet the applicable emergency exit requirements of §§ 25.809 through 25.813:

(i) Each emergency exit in the passenger compartment in excess of the minimum number of required emergency exits.

(ii) Any other floor level door or exit that is accessible from the passenger compartment and is as large or larger than a Type II exit, but less than 46 inches wide.

(iii) Any other passenger ventral or tail cone exit.

(7) For an airplane that is required to have more than one passenger emergency exit for each side of the fuselage, no passenger emergency exit shall be more than 60 feet from any adjacent passenger emergency exit on the same side of the same deck of the fuselage, as measured parallel to the airplane's longitudinal axis between the nearest exit edges.

(e) *Ditching emergency exits for passengers.* Ditching emergency exits must be provided in accordance with the following requirements whether or not certification with ditching provisions is requested:

(1) For airplanes that have a passenger seating configuration of nine seats or less, excluding pilots seats, one exit above the waterline in each side of the airplane, meeting at least the dimensions of a Type IV exit.

(2) For airplanes that have a passenger seating configuration of 10 seats or more, excluding pilots seats, one exit above the waterline in a side of the airplane, meeting at least the dimensions of a Type III exit for each unit (or part of a unit) of 35 passenger seats, but no less than two such exits in the passenger cabin, with one on each side of the airplane. The passenger seat/exit ratio may be increased through the use of larger exits, or other means, provided it is shown that the evacuation capability during ditching has been improved accordingly.

(3) If it is impractical to locate side exits above the waterline, the side exits must be replaced by an equal number of readily accessible overhead hatches of not less than the dimensions of a Type III exit, except that for airplanes with a passenger configuration of 35 seats or less, excluding pilots seats, the two required Type III side exits need be replaced by only one overhead hatch.

(f) *Flightcrew emergency exits.* For airplanes in which the proximity of passenger emergency exits to the flightcrew area does not offer a convenient and readily accessible means of evacuation of the flightcrew, and for all airplanes having a passenger seating capacity greater than 20, flightcrew exits shall be located in the flightcrew area. Such exits shall be of sufficient size and so located as to permit rapid evacuation by the crew. One exit shall be provided on each side of the airplane; or, alternatively, a top hatch shall be provided. Each exit must encompass an unobstructed rectangular opening of at least 19 by 20 inches unless satisfactory exit utility can be demonstrated by a typical crewmember.

§ 25.809 [Amended]

53. By amending § 25.809 by removing paragraphs (f) and (h), and by redesignating existing paragraphs (d), (e), (i), (g) and (j) as paragraphs (f), (g), (d), (e) and (h), respectively.

54. By adding a new § 25.810 to read as follows:

§ 25.810 Emergency egress assist means and escape routes.

(a) Each nonoverwing landplane emergency exit more than 6 feet from the ground with the airplane on the ground and the landing gear extended and each nonoverwing Type A exit must have an approved means to assist the occupants in descending to the ground.

(1) The assisting means for each passenger emergency exit must be a self-supporting slide or equivalent; and, in the case of a Type A exit, it must be capable of carrying simultaneously two parallel lines of evacuees. In addition, the assisting means must be designed to meet the following requirements:

(i) It must be automatically deployed and deployment must begin during the interval between the time the exit opening means is actuated from inside the airplane and the time the exit is fully opened. However, each passenger emergency exit which is also a passenger entrance door or a service door must be provided with means to prevent deployment of the assisting means when it is opened from either the inside or the outside under nonemergency conditions for normal use.

(ii) It must be automatically erected within 10 seconds after deployment is begun.

(iii) It must be of such length after full deployment that the lower end is self-supporting on the ground and provides safe evacuation of occupants to the ground after collapse of one or more legs of the landing gear.

(iv) It must have the capability, in 25-knot winds directed from the most critical angle, to deploy and, with the assistance of only one person, to remain usable after full deployment to evacuate occupants safely to the ground.

(v) For each system installation (mockup or airplane installed), five consecutive deployment and inflation tests must be conducted (per exit) without failure, and at least three tests of each such five-test series must be conducted using a single representative sample of the device. The sample devices must be deployed and inflated by the system's primary means after being subjected to the inertia forces specified in § 25.561(b). If any part of the system fails or does not function properly during the required tests, the cause of the failure or malfunction must be corrected by positive means and after that, the full series of five consecutive deployment and inflation tests must be conducted without failure.

(2) The assisting means for flightcrew emergency exits may be a rope or any other means demonstrated to be suitable for the purpose. If the assisting means is a rope, or an approved device equivalent to a rope, it must be—

(i) Attached to the fuselage structure at or above the top of the emergency exit opening, or, for a device at a pilot's emergency exit window, at another approved location if the stowed device, or its attachment, would reduce the pilot's view in flight;

(ii) Able (with its attachment) to withstand a 400-pound static load.

(b) Assist means from the cabin to the wing are required for each Type A exit located above the wing and having a stepdown unless the exit without an assist means can be shown to have a rate of passenger egress at least equal to that of the same type of nonoverwing exit. If an assist means is required, it must be automatically deployed and automatically erected, concurrent with the opening of the exit and self-supporting within 10 seconds.

(c) An escape route must be established from each overwing emergency exit, and (except for flap surfaces suitable as slides) covered with a slip resistant surface. Except where a means for channeling the flow of evacuees is provided—

(1) The escape route must be at least 42 inches wide at Type A passenger emergency exits and must be at least 2

feet wide at all other passenger emergency exits, and

(2) The escape route surface must have a reflectance of at least 80 percent, and must be defined by markings with a surface-to-marking contrast ratio of at least 5:1.

(d) If the place on the airplane structure at which the escape route required in paragraph (c) of this section terminates, is more than 6 feet from the ground with the airplane on the ground and the landing gear extended, means to reach the ground must be provided to assist evacuees who have used the escape route. If the escape route is over a flap, the height of the terminal edge must be measured with the flap in the takeoff or landing position, whichever is higher from the ground. The assisting means must be usable and self-supporting with one or more landing gear legs collapsed and under a 25-knot wind directed from the most critical angle. The assisting means provided for each escape route leading from a Type A emergency exit must be capable of carrying simultaneously two parallel lines of evacuees. For other than Type A exits, the assist means must be capable of carrying simultaneously as many parallel lines of evacuees as there are required escape routes.

55. By amending § 25.813 by adding a new introductory paragraph and by revising paragraphs (a) and (b) to read as follows:

§ 25.813 Emergency exit access.

Each required emergency exit must be accessible to the passengers and located where it will afford an effective means of evacuation. Emergency exit distribution must be as uniform as practical, taking passenger distribution into account; however, the size and location of exits on both sides of the cabin need not be symmetrical. If only one floor level exit per side is prescribed, and the airplane does not have a tail cone or ventral emergency exit, the floor level exit must be in the rearward part of the passenger compartment, unless another location affords a more effective means of passenger evacuation. Where more than one floor level exit per side is prescribed, at least one floor level exit per side must be located near each end of the cabin, except that this provision does not apply to combination cargo/passenger configurations. In addition—

(a) There must be a passageway leading from each main aisle to each Type I, Type II, or Type A emergency exit and between individual passenger areas. If two or more main aisles are provided, there must be a cross aisle leading directly to each passageway between the exit and the nearest main aisle. Each passageway leading to a Type A exit must be unobstructed and at least 36 inches wide. Other passageways and cross aisles must be unobstructed and at least 20 inches wide. Unless there are two or more main aisles, each Type A exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft directions.

(b) Adequate space to allow crewmember(s) to assist in the evacuation of passengers must be provided as follows:

(1) The assist space must not reduce the unobstructed width of the passageway below that required for the exit.

(2) For each Type A exit, assist space must be provided at each side of the exit regardless of whether the exit is covered by § 25.810(a).

(3) For any other type exit that is covered by § 25.810(a), space must at least be provided at one side of the passageway.

* * * * *

56. By revising § 25.833 to read as follows:

§ 25.833 Combustion heating systems.

Combustion heaters must be approved.

57. By amending § 25.851 by revising paragraphs (a), (b) introductory text, and (b)(1) to read as follows:

§ 25.851 Fire extinguishers.

(a) *Hand fire extinguishers.* (1) The following minimum number of hand fire extinguishers must be conveniently located in passenger compartments:

Passenger capacity	Number of extinguishers
7 through 30	1
31 through 60	2
61 or more	3

(2) At least one hand fire extinguisher must be conveniently located in the pilot compartment.

(3) A readily accessible hand fire extinguisher must be available for use in each Class A or Class B cargo compartment.

(4) Each hand fire extinguisher must be approved.

(5) The types and quantities of each extinguishing agent used must be appropriate to the kinds of fires likely to occur where used.

(6) Each extinguisher for use in a personnel compartment must be designed to minimize the hazard of toxic gas concentration.

(b) *Built-in fire extinguishers.* If a built-in fire extinguisher is provided—

(1) The capacity must be adequate for any fire likely to occur in the compartment where used, considering the volume of the compartment and the ventilation rate; and

* * * * *

58. By revising § 25.853 to read as follows:

§ 25.853 Compartment interiors.

For each compartment occupied by the crew or passengers, the following apply:

(a) Materials (including finishes or decorative surfaces applied to the materials) must meet the applicable test criteria prescribed in part I of appendix F of this part or other approved equivalent methods.

(b) In addition to meeting the requirements of paragraph (a), seat cushions, except those on flight crewmember seats, must meet the test requirements of part II of appendix F of this part, or equivalent.

(c) For airplanes with passenger capacities of 20 or more, interior ceiling and wall panels (other than lighting lenses), partitions, and the outer surfaces of galleys, large cabinets and stowage compartments (other than underseat stowage compartments and compartments for stowing small items, such as magazines and maps) must also meet the test requirements of parts IV and V of appendix F of this part, or other approved equivalent method, in addition to the flammability requirements prescribed in paragraph (a) of this section.

(d) Smoking is not to be allowed in lavatories. If smoking is to be allowed in any compartment occupied by the crew or passengers, an adequate number of self-contained, removable ashtrays must be provided for all seated occupants, and

(e) Regardless of whether smoking is allowed in any other part of the airplane, lavatories must have self-contained removable ashtrays located conspicuously on or near the entry side of each lavatory door, except that one ashtray may serve more than one lavatory door if the ashtray can be seen readily from the cabin side of each lavatory served.

(f) Each receptacle used for the disposal of flammable waste material must be fully enclosed, constructed of at least fire resistant materials, and must contain fires likely to occur in it under normal use. The ability of the receptacle to contain those fires under all probable conditions of wear, misalignment, and

ventilation expected in service must be demonstrated by test.

59. By revising § 25.855 to read as follows:

§ 25.855 Cargo or baggage compartments.

For each cargo and baggage compartment not occupied by crew or passengers, the following apply:

(a) The compartment must meet one of the class requirements of § 25.857.

(b) Class B through Class E cargo or baggage compartments, as defined in § 25.857, must have a liner, and the liner must be separate from (but may be attached to) the airplane structure.

(c) Ceiling and sidewall liner panels of Class C and D compartments must meet the test requirements of part III of appendix F of this part or other approved equivalent methods.

(d) All other materials used in the construction of the cargo or baggage compartment must meet the applicable test criteria prescribed in part I of appendix F of this part or other approved equivalent methods.

(e) No compartment may contain any controls, wiring, lines, equipment, or accessories whose damage or failure would affect safe operation, unless those items are protected so that—

(1) They cannot be damaged by the movement of cargo in the compartment, and

(2) Their breakage or failure will not create a fire hazard.

(f) There must be means to prevent cargo or baggage from interfering with the functioning of the fire protective features of the compartment.

(g) Sources of heat within the compartment must be shielded and insulated to prevent igniting the cargo or baggage.

(h) Flight tests must be conducted to show compliance with the provisions of § 25.857 concerning—

(1) Compartment accessibility,

(2) The entries of hazardous quantities of smoke or extinguishing agent into compartments occupied by the crew or passengers, and

(3) The dissipation of the extinguishing agent in Class C compartments.

(i) During the above tests, it must be shown that no inadvertent operation of smoke or fire detectors in any compartment would occur as a result of fire contained in any other compartment, either during or after extinguishment, unless the extinguishing system floods each such compartment simultaneously.

60. By adding a new § 25.869 as follows:

§ 25.869 Fire protection: systems.

(a) Electrical system components:

(1) Components of the electrical system must meet the applicable fire and smoke protection requirements of §§ 25.831(c) and 25.863.

(2) Electrical cables, terminals, and equipment in designated fire zones, that are used during emergency procedures, must be at least fire resistant.

(3) Main power cables (including generator cables) in the fuselage must be designed to allow a reasonable degree of deformation and stretching without failure and must be—

(i) Isolated from flammable fluid lines; or

(ii) Shrouded by means of electrically insulated, flexible conduit, or equivalent, which is in addition to the normal cable insulation.

(4) Insulation on electrical wire and electrical cable installed in any area of the fuselage must be self-extinguishing when tested in accordance with the applicable portions of part I, appendix F of this part.

(b) Each vacuum air system line and fitting on the discharge side of the pump that might contain flammable vapors or fluids must meet the requirements of § 25.1183 if the line or fitting is in a designated fire zone. Other vacuum air systems components in designated fire zones must be at least fire resistant.

(c) Oxygen equipment and lines must—

(1) Not be located in any designated fire zone,

(2) Be protected from heat that may be generated in, or escape from, any designated fire zone, and

(3) Be installed so that escaping oxygen cannot cause ignition of grease, fluid, or vapor accumulations that are present in normal operation or as a result of failure or malfunction of any system.

61. By amending § 25.903 by adding a new paragraph (f) to read as follows:

§ 25.903 Engines.

* * * * *

(f) *Auxiliary Power Unit.* Each auxiliary power unit must be approved or meet the requirements of the category for its intended use.

62. By amending § 25.905 by adding a new paragraph (d) to read as follows:

§ 25.905 Propellers.

* * * * *

(d) Design precautions must be taken to minimize the hazards to the airplane in the event a propeller blade fails or is released by a hub failure. The hazards which must be considered include damage to structure and vital systems due to impact of a failed or released blade and the unbalance created by such failure or release.

§ 25.925 [Amended]

63. By amending § 25.925, paragraph (a), by removing the word "tire" in the last sentence and inserting the word "tire(s)" in its place.

64. By revising § 25.933 to read as follows:

§ 25.933 Reversing systems.

(a) For turbojet reversing systems—

(1) Each system intended for ground operation only must be designed so that during any reversal in flight the engine will produce no more than flight idle thrust. In addition, it must be shown by analysis or test, or both, that—

(i) Each operable reverser can be restored to the forward thrust position; and

(ii) The airplane is capable of continued safe flight and landing under any possible position of the thrust reverser.

(2) Each system intended for inflight use must be designed so that no unsafe condition will result during normal operation of the system, or from any failure (or reasonably likely combination of failures) of the reversing system, under any anticipated condition of operation of the airplane including ground operation. Failure of structural elements need not be considered if the probability of this kind of failure is extremely remote.

(3) Each system must have means to prevent the engine from producing more than idle thrust when the reversing system malfunctions, except that it may produce any greater forward thrust that is shown to allow directional control to be maintained, with aerodynamic means alone, under the most critical reversing condition expected in operation.

(b) For propeller reversing systems—

(1) Each system intended for ground operation only must be designed so that no single failure (or reasonably likely combination of failures) or malfunction of the system will result in unwanted reverse thrust under any expected operating condition. Failure of structural elements need not be considered if this kind of failure is extremely remote.

(2) Compliance with this section may be shown by failure analysis or testing, or both, for propeller systems that allow propeller blades to move from the flight low-pitch position to a position that is substantially less than that at the normal flight low-pitch position. The analysis may include or be supported by the analysis made to show compliance with the requirements of § 35.21 of this

chapter for the propeller and associated installation components.

§ 25.945 [Amended]

65. By amending § 25.945 by removing paragraph (b)(4) and marking it:

* * * * *

(b) * * *

(4) [Reserved].

* * * * *

§ 25.973 [Amended]

66. By amending § 25.973 by removing paragraph (a) and marking it:

* * * * *

(a) [Reserved].

* * * * *

67. By amending § 25.979 by revising paragraph (b)(2), to read as follows:

§ 25.979 Pressure fueling system.

* * * * *

(b) * * *

(2) Provide indication at each fueling station of failure of the shutoff means to stop the fuel flow at the maximum quantity approved for that tank.

* * * * *

68. By amending § 25.1013 by revising paragraphs (a) and (c), to read as follows:

§ 25.1013 Oil tanks.

(a) *Installation.* Each oil tank installation must meet the requirements of § 25.967.

(b) * * *

(c) *Filler connection.* Each recessed oil tank filler connection that can retain any appreciable quantity of oil must have a drain that discharges clear of each part of the airplane. In addition, each oil tank filler cap must provide an oil-tight seal.

* * * * *

69. By amending § 25.1093 by revising paragraph (b)(1) to read as follows:

§ 25.1093 Induction system deicing and anti-icing provisions.

* * * * *

(b) *Turbine engines.* (1) Each turbine engine must operate throughout the flight power range of the engine (including idling), without the accumulation of ice on the engine, inlet system components, or airframe components that would adversely affect engine operation or cause a serious loss of power or thrust—

(i) Under the icing conditions specified in appendix C, and

(ii) In falling and blowing snow within the limitations established for the airplane for such operation.

* * * * *

70. By amending § 25.1141 by adding a new paragraph (e) to read as follows:

§ 25.1141 Powerplant controls: general.

* * * * *

(e) The portion of each powerplant control located in a designated fire zone that is required to be operated in the event of fire must be at least fire resistant.

* * * * *

71. By amending § 25.1165 by adding a new paragraph (h) to read as follows:

§ 25.1165 Engine ignition systems.

* * * * *

(h) Each engine ignition system of a turbine powered airplane must be considered an essential electrical load.

72. By amending § 25.1181 by revising paragraph (b) to read as follows:

§ 25.1181 Designated fire zones; regions included.

(a) * * *

(b) Each designated fire zone must meet the requirements of §§ 25.867, and 25.1185 through 25.1203.

§ 25.1305 [Amended]

73. By amending § 25.1305 by removing paragraph (e)(3).

§ 25.1307 [Amended]

74. By amending § 25.1307 by removing paragraph (a) and marking it [Reserved], and by removing paragraphs (f), (g) and (h).

75. By amending § 25.1351 by revising paragraphs (d) (1) and (2) to read as follows and by removing paragraph (d)(3):

§ 25.1351 General.

* * * * *

(d) * * *

(1) A single malfunction, including a wire bundle or junction box fire, cannot result in loss of both the part turned off and the part turned on; and

(2) The parts turned on are electrically and mechanically isolated from the parts turned off.

§ 25.1359 [Removed]

76. By removing § 25.1359.

77. By amending § 25.1381 by revising paragraph (a)(1) to read as follows:

§ 25.1381 Instrument lights.

(a) * * *

(1) Provide sufficient illumination to make each instrument, switch and other device necessary for safe operation easily readable unless sufficient illumination is available from another source; and

* * * * *

§ 25.1413 [Removed]

78. By removing § 25.1413.

79. By amending § 25.1415 by revising paragraph (a) to read as follows:

§ 25.1415 Ditching equipment.

(a) Ditching equipment used in airplanes to be certificated for ditching under § 25.801, and required by the operating rules of this chapter, must meet the requirements of this section.

* * * * *

§ 25.1416 [Removed]

80. By removing § 25.1416.

81. By revising § 25.1419 to read as follows:

§ 25.1419 Ice protection.

If certification with ice protection provisions is desired, the airplane must be able to safely operate in the continuous maximum and intermittent maximum icing conditions of appendix C. To establish that the airplane can operate within the continuous maximum and intermittent maximum conditions of appendix C:

(a) An analysis must be performed to establish that the ice protection for the various components of the airplane is adequate, taking into account the various airplane operational configurations; and

(b) To verify the ice protection analysis, to check for icing anomalies, and to demonstrate that the ice protection system and its components are effective, the airplane or its components must be flight tested in the various operational configurations, in measured natural atmospheric icing conditions and, as found necessary, by one or more of the following means:

(1) Laboratory dry air or simulated icing tests, or a combination of both, of the components or models of the components.

(2) Flight dry air tests of the ice protection system as a whole, or of its individual components.

(3) Flight tests of the airplane or its components in measured simulated icing conditions.

(c) Caution information, such as an amber caution light or equivalent, must be provided to alert the flightcrew when the anti-ice or de-ice system is not functioning normally.

(d) For turbine engine powered airplanes, the ice protection provisions of this section are considered to be applicable primarily to the airframe. For the powerplant installation, certain additional provisions of subpart E of this part may be found applicable.

§ 25.1433 [Amended].

82. By amending § 25.1433 by removing paragraphs (b) and (c) and by redesignating paragraph (a) as the whole of § 25.1433.

83. By amending § 25.1435 by revising paragraphs (a) and (b) to read as follows:

§ 25.1435 Hydraulic systems.

(a) *Design.* (1) Each element of the hydraulic system must be designed to withstand, without deformation that would prevent it from performing its intended function, the design operating pressure loads in combination with limit structural loads which may be imposed.

(2) Each element of the hydraulic system must be able to withstand, without rupture, the design operating pressure loads multiplied by a factor of 1.5 in combination with ultimate structural loads that can reasonably occur simultaneously. Design operating pressure is maximum normal operating pressure, excluding transient pressure.

(b) *Tests and analysis.* (1) A complete hydraulic system must be static tested to show that it can withstand 1.5 times the design operating pressure without a deformation of any part of the system that would prevent it from performing its intended function. Clearance between structural members and hydraulic system elements must be adequate and there must be no permanent detrimental deformation. For the purpose of this test, the pressure relief valve may be made inoperable to permit application of the required pressure.

(2) Compliance with § 25.1309 for hydraulic systems must be shown by functional tests, endurance tests, and analyses. The entire system, or appropriate subsystems, must be tested in an airplane or in a mock-up installation to determine proper performance and proper relation to other aircraft systems. The functional tests must include simulation of hydraulic system failure conditions. Endurance tests must simulate the repeated complete flights that could be expected to occur in service. Elements which fail during the tests must be modified in order to have the design deficiency corrected and, where necessary, must be sufficiently retested. Simulation of operating and environmental conditions must be completed on elements and appropriate portions of the hydraulic system to the extent necessary to evaluate the environmental effects. Compliance with § 25.1309 must take into account the following:

(i) Static and dynamic loads including flight, ground, pilot, hydrostatic, inertial and thermally induced loads, and combinations thereof.

(ii) Motion, vibration, pressure transients, and fatigue.

(iii) Abrasion, corrosion, and erosion.

(iv) Fluid and material compatibility.

(v) Leakage and wear.

* * * * *

§ 25.1451 [Removed].

84. By removing § 25.1451.

85. By revising § 25.1521 to read as follows:

§ 25.1521 Powerplant limitations.

(a) *General.* The powerplant limitations prescribed in this section must be established so that they do not exceed the corresponding limits for which the engines or propellers are type certificated and do not exceed the values on which compliance with any other requirement of this part is based.

(b) *Reciprocating engine installations.* Operating limitations relating to the following must be established for reciprocating engine installations:

(1) Horsepower or torque, r.p.m., manifold pressure, and time at critical pressure altitude and sea level pressure altitude for—

(i) Maximum continuous power (relating to unsupercharged operation or to operation in each supercharger mode as applicable); and

(ii) Takeoff power (relating to unsupercharged operation or to operation in each supercharger mode as applicable).

(2) Fuel grade or specification.

(3) Cylinder head and oil temperatures.

(4) Any other parameter for which a limitation has been established as part of the engine type certificate except that a limitation need not be established for a parameter that cannot be exceeded during normal operation due to the design of the installation or to another established limitation.

(c) *Turbine engine installations.* Operating limitations relating to the following must be established for turbine engine installations:

(1) Horsepower, torque or thrust, r.p.m., gas temperature, and time for—

(i) Maximum continuous power or thrust (relating to augmented or unaugmented operation as applicable).

(ii) Takeoff power or thrust (relating to augmented or unaugmented operation as applicable).

(2) Fuel designation or specification.

(3) Any other parameter for which a limitation has been established as part of the engine type certificate except that a limitation need not be established for a parameter that cannot be exceeded during normal operation due to the design of the installation or to another established limitation.

(d) *Ambient temperature.* An ambient temperature limitation (including limitations for winterization installations, if applicable) must be established as the maximum ambient atmospheric temperature established in accordance with § 25.1043(b).

86. By revising § 25.1522 to read as follows:

§ 25.1522 Auxiliary power unit limitations.

If an auxiliary power unit is installed in the airplane, limitations established for the auxiliary power unit, including categories of operation, must be specified as operating limitations for the airplane.

87. By amending § 25.1533 by revising paragraph (a)(2) to read as follows:

§ 25.1533 Additional operating limitations.

(a) * * *

(2) The maximum landing weights must be established as the weights at which compliance is shown with the applicable provisions of this part (including the landing and approach climb provisions of §§ 25.119 and 25.121(d) for altitudes and ambient temperatures).

* * * * *

88. By amending § 25.1543 by revising paragraph (b) to read as follows:

§ 25.1543 Instrument markings: general.

* * * * *

(b) Each instrument marking must be clearly visible to the appropriate crewmember.

89. By revising § 25.1551 to read as follows:

§ 25.1551 Oil quantity indication.

Each oil quantity indicating means must be marked to indicate the quantity of oil readily and accurately.

90. By amending § 25.1557, by revising the heading of paragraph (b), and adding a new paragraph (b)(3) to read as follows:

§ 25.1557 Miscellaneous markings and placards.

* * * * *

(b) Powerplant fluid filler openings.

(1) * * *

(2) * * *

(3) Augmentation fluid filler openings must be marked at or near the filler cover to identify the required fluid.

* * * * *

91. By amending § 25.1581 by adding a new paragraph (a)(3) to read as follows:

§ 25.1581 General.

(a) * * *

(1) * * *

(2) * * *

(3) Any limitation, procedure, or other information established as a condition

of compliance with the applicable noise standards of part 36 of this chapter.

* * * * *

92. By amending § 25.1583, by revising paragraphs (b)(1), (f) and (i) to read as follows:

§ 25.1583 Operating limitations.

* * * * *

(b) * * *

(1) Limitations required by § 25.1521 and § 25.1522.

(2) * * *

(3) * * *

* * * * *

(f) *Altitudes.* The altitude established under § 25.1527.

* * * * *

(i) *Maneuvering flight load factors.* The positive maneuvering limit load factors for which the structure is proven, described in terms of accelerations, must be furnished.

93. By amending § 25.1587 by revising the introductory text of paragraph (b) to read as follows:

§ 25.1587 Performance information.

* * * * *

(b) Each Airplane Flight Manual must contain the performance information computed under the applicable provisions of this part for the weights, altitudes, temperatures, wind components, and runway gradients, as applicable, within the operational limits of the airplane, and must contain the following:

* * * * *

94. By revising appendix F, part I, to read as follows:

Appendix F to Part 25

Part I—Test Criteria and Procedures for Showing Compliance with § 25.853, or 25.855.

(a) *Material test criteria*—(1) *Interior compartments occupied by crew or passengers.* (i) Interior ceiling panels, interior wall panels, partitions, galley structure, large cabinet walls, structural flooring, and materials used in the construction of stowage compartments (other than underseat stowage compartments and compartments for stowing small items such as magazines and maps) must be self-extinguishing when tested vertically in accordance with the applicable portions of part I of this appendix. The average burn length may not exceed 6 inches and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than an average of 3 seconds after falling.

(ii) Floor covering, textiles (including draperies and upholstery), seat cushions, padding, decorative and nondecorative coated fabrics, leather, trays and galley furnishings, electrical conduit, thermal and acoustical insulation and insulation covering, air ducting, joint and edge covering, liners of Class B and E cargo or baggage compartments, floor panels of Class B, C, D, or E cargo or baggage compartments, insulation blankets, cargo covers and transparencies, molded and thermoformed parts, air ducting joints, and trim strips (decorative and chafing), that are constructed of materials not covered in subparagraph (iv) below, must be self-extinguishing when tested vertically in accordance with the applicable portions of part I of this appendix or other approved equivalent means. The average burn length may not exceed 8 inches, and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than an average of 5 seconds after falling.

(iii) Motion picture film must be safety film meeting the Standard Specifications for Safety Photographic Film PH1.25 (available from the American National Standards Institute, 1430 Broadway, New York, NY 10018). If the film travels through ducts, the ducts must meet the requirements of subparagraph (ii) of this paragraph.

(iv) Clear plastic windows and signs, parts constructed in whole or in part of elastomeric materials, edge lighted instrument assemblies consisting of two or more instruments in a common housing, seat belts, shoulder harnesses, and cargo and baggage tiedown equipment, including containers, bins, pallets, etc., used in passenger or crew compartments, may not have an average burn rate greater than 2.5 inches per minute when tested horizontally in accordance with the applicable portions of this appendix.

(v) Except for small parts (such as knobs, handles, rollers, fasteners, clips, grommets, rub strips, pulleys, and small electrical parts) that would not contribute significantly to the propagation of a fire and for electrical wire and cable insulation, materials in items not specified in paragraphs (a)(1) (i), (ii), (iii), or (iv) of part I of this appendix may not have a burn rate greater than 4.0 inches per minute when tested horizontally in accordance with the applicable portions of this appendix.

(2) *Cargo and baggage compartments not occupied by crew or passengers.*

(i) Thermal and acoustic insulation (including coverings) used in each cargo and baggage compartment must be constructed of materials that meet the requirements set forth in paragraph (a)(1)(ii) of part I of this appendix.

(ii) A cargo or baggage compartment defined in § 25.857 as Class B or E must have a liner constructed of materials that meet the requirements of paragraph (a)(1)(ii) of part I of this appendix and separated from the airplane structure (except for attachments). In addition, such liners must be subjected to the 45 degree angle test. The flame may not penetrate (pass through) the material during application of the flame or subsequent to its removal. The average flame time after removal of the flame source may not exceed 15 seconds, and the average glow time may not exceed 10 seconds.

(iii) A cargo or baggage compartment defined in § 25.857 as Class B, C, D, or E must have floor panels constructed of materials which meet the requirements of paragraph (a)(1)(ii) of part I of this appendix and which are separated from the airplane structure (except for attachments). Such panels must be subjected to the 45 degree angle test. The flame may not penetrate (pass through) the material during application of the flame or subsequent to its removal. The average flame time after removal of the flame source may not exceed 15 seconds, and the average glow time may not exceed 10 seconds.

(iv) Insulation blankets and covers used to protect cargo must be constructed of materials that meet the requirements of paragraph (a)(1)(ii) of part I of this appendix. Tiedown equipment (including containers, bins, and pallets) used in each cargo and baggage compartment must be constructed of materials that meet the requirements of paragraph (a)(1)(v) of part I of this appendix.

(3) *Electrical system components.* Insulation on electrical wire or cable installed in any area of the fuselage must be self-extinguishing when subjected to the 60 degree test specified in part I of this appendix. The average burn length may not exceed 3 inches, and the average flame time after removal of the flame source may not exceed 30 seconds. Drippings from the test specimen may not continue to flame for more than an average of 3 seconds after falling.

(b) *Test Procedures*—(1) *Conditioning.* Specimens must be conditioned to 70±5 F., and at 50 percent ±5 percent relative humidity until moisture equilibrium is reached or for 24 hours. Each specimen must remain in the conditioning environment until it is subjected to the flame.

(2) *Specimen configuration.* Except for small parts and electrical wire and cable insulation, materials must be tested either as section cut from a fabricated part as installed in the airplane or as a specimen simulating a cut section, such as a specimen cut from a flat sheet of the material or a model of the fabricated part. The specimen may be cut from any location in a fabricated part; however, fabricated units, such as sandwich panels, may not be separated for test. Except as noted below, the specimen thickness must be no thicker than the minimum thickness to be qualified for use in the airplane. Test specimens of thick foam parts, such as seat cushions, must be ½-inch in thickness. Test specimens of materials that must meet the requirements of paragraph (a)(1)(v) of part I of this appendix must be no more than ⅛-inch in thickness. Electrical wire and cable specimens must be the same size as used in the airplane. In the case of fabrics, both the warp and fill direction of the weave must be tested to determine the most critical flammability condition. Specimens must be mounted in a metal frame so that the two long edges and the upper edge are held securely during the vertical test prescribed in subparagraph (4) of this paragraph and the two long edges and the edge away from the flame are held securely during the horizontal test prescribed in subparagraph (5) of this paragraph. The exposed area of the specimen must be at least 2 inches wide and 12 inches long, unless the actual size used in the airplane is smaller. The edge to which the burner flame is applied must not consist of the finished or protected edge of the specimen but must be representative of the actual cross-section of the material or part as

installed in the airplane. The specimen must be mounted in a metal frame so that all four edges are held securely and the exposed area of the specimen is at least 8 inches by 8 inches during the 45° test prescribed in subparagraph (6) of this paragraph.

(3) *Apparatus.* Except as provided in subparagraph (7) of this paragraph, tests must be conducted in a draft-free cabinet in accordance with Federal Test Method Standard 191 Model 5903 (revised Method 5902) for the vertical test, or Method 5906 for horizontal test (available from the General Services Administration, Business Service Center, Region 3, Seventh & D Streets SW., Washington, DC 20407). Specimens which are too large for the cabinet must be tested in similar draft-free conditions.

(4) *Vertical test.* A minimum of three specimens must be tested and results averaged. For fabrics, the direction of weave corresponding to the most critical flammability conditions must be parallel to the longest dimension. Each specimen must be supported vertically. The specimen must be exposed to a Bunsen or Tirrill burner with a nominal ⅜-inch I.D. tube adjusted to give a flame of 1½ inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame must be 1550 °F. The lower edge of the specimen must be ¾-inch above the top edge of the burner. The flame must be applied to the center line of the lower edge of the specimen. For materials covered by paragraph (a)(1)(i) of part I of this appendix, the flame must be applied for 60 seconds and then removed. For materials covered by paragraph (a)(1)(ii) of part I of this appendix, the flame must be applied for 12 seconds and then removed. Flame time, burn length, and flaming time of drippings, if any, may be recorded. The burn length determined in accordance with subparagraph (7) of this paragraph must be measured to the nearest tenth of an inch.

(5) *Horizontal test.* A minimum of three specimens must be tested and the results averaged. Each specimen must be supported horizontally. The exposed surface, when installed in the aircraft, must be face down for the test. The specimen must be exposed to a Bunsen or Tirrill burner with a nominal ⅜-inch I.D. tube adjusted to give a flame of 1½ inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame must be 1550 °F. The specimen must be positioned so that the edge being tested is centered ¾-inch above the top of the burner. The flame must be applied for 15 seconds and then removed. A minimum of 10 inches of specimen must be used for timing purposes, approximately 1½ inches must burn before the burning front reaches the timing zone, and the average burn rate must be recorded.

(6) *Forty-five degree test.* A minimum of three specimens must be tested and the results averaged. The specimens must be supported at an angle of 45° to a horizontal surface. The exposed surface when installed in the aircraft must be face down for the test. The specimens must be exposed to a Bunsen or Tirrill burner with a nominal ⅜-inch I.D. tube adjusted to give a flame of 1½ inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame must be 1550 °F. Suitable precautions must be taken to avoid drafts. The flame must be applied for 30 seconds with one-third contacting the material at the center of the specimen and then removed. Flame time, glow time, and whether the flame penetrates (passes through) the specimen must be recorded.

(7) *Sixty degree test.* A minimum of three specimens of each wire specification (make and size) must be tested. The specimen of wire or cable (including insulation) must be placed at an angle of 60° with the horizontal in the cabinet specified in subparagraph (3) of this paragraph with the cabinet door open during the test, or must be placed within a chamber approximately 2 feet high by 1 foot by 1 foot, open at the top and at one vertical side (front), and which allows sufficient flow of air for complete combustion, but which is free from drafts. The specimen must be parallel to and approximately 6 inches from the front of the chamber. The lower end of the specimen must be held rigidly clamped. The upper end of the specimen must pass over a pulley or rod and must have an appropriate weight attached to it so that the specimen is held tautly throughout the flammability test. The test specimen span between lower clamp and upper pulley or rod must be 24 inches and must be marked 8 inches from the lower end to indicate the central point for flame application. A flame from a Bunsen or Tirrill burner must be applied for 30 seconds at the test mark. The burner must be mounted underneath the test mark on the specimen, perpendicular to the specimen and at an angle of 30° to the vertical plane of the specimen. The burner must have a nominal bore of ⅜-inch and be adjusted to provide a 3-inch high flame with an inner cone approximately one-third of the flame height. The minimum temperature of the hottest portion of the flame, as measured with a calibrated thermocouple pyrometer, may not be less than 1750 °F. The burner must be positioned so that the hottest portion of the flame is applied to the test mark on the wire. Flame time, burn length, and flaming time of drippings, if any, must be recorded. The burn length determined in accordance with paragraph (8) of this paragraph must be measured to the nearest tenth of an inch. Breaking of the wire specimens is not considered a failure.

(8) *Burn length.* Burn length is the distance from the original edge to the farthest evidence of damage to the test specimen due to flame impingement, including areas of partial or complete consumption, charring, or embrittlement, but not including areas sooted, stained, warped, or discolored, nor areas where material has shrunk or melted away from the heat source.

* * * * *

95. By adding a new appendix J to read as follows:

Appendix J to Part 25 Emergency Demonstration

The following test criteria and procedures must be used for showing compliance with § 25.803:

(a) The emergency evacuation must be conducted either during the dark of the night or during daylight with the dark of night simulated. If the demonstration is conducted indoors during daylight hours, it must be conducted with each window covered and each door closed to minimize the daylight effect. Illumination on the floor or ground may be used, but it must be kept low and shielded against shining into the airplane's windows or doors.

(b) The airplane must be in a normal attitude with landing gear extended.

(c) Stands or ramps may be used for descent from the wing to the ground, and safety equipment such as mats or inverted life rafts may be placed on the floor or ground to protect participants. No other equipment that is not part of the airplane's emergency evacuation equipment may be used to aid the participants in reaching the ground.

(d) Except as provided in paragraph (a) of this Appendix, only the airplane's emergency lighting system may provide illumination.

(e) All emergency equipment required for the planned operation of the airplane must be installed.

(f) Each external door and exit, and each internal door or curtain, must be in the takeoff configuration.

(g) Each crewmember must be seated in the normally assigned seat for takeoff and must remain in the seat until receiving the signal for commencement of the demonstration. Each crewmember must be a person having knowledge of the operation of exits and emergency equipment and, if compliance with § 121.291 is also being demonstrated, a member of a regularly scheduled line crew.

(h) A representative passenger load of persons in normal health must be used as follows:

(1) At least 30 percent must be females.

(2) At least 5 percent must be over 60 years of age with a proportionate number of females.

(3) At least 5 percent, but not more than 10 percent, must be children under 12 years of age, prorated through that age group.

(4) Three life-size dolls, not included as part of the total passenger load, must be carried by passengers to simulate live infants 2 years old or younger.

(5) Crewmembers, mechanics, and training personnel, who maintain or operate the airplane in the normal course of their duties, may not be used as passengers.

(i) No passenger may be assigned a specific seat except as the Administrator may require. Except as required by subparagraph (g) of this paragraph, no employee of the applicant may be seated next to an emergency exit.

(j) Seat belts and shoulder harnesses (as required) must be fastened.

(k) Before the start of the demonstration, approximately one-half of the total average amount of carry-on baggage, blankets, pillows, and other similar articles must be distributed at several locations in aisles and emergency exit access ways to create minor obstructions.

(l) No prior indication may be given to any crewmember or passenger of the particular exits to be used in the demonstration.

(m) The applicant may not practice, rehearse, or describe the demonstration for the participants nor may any participant have

taken part in this type of demonstration within the preceding 6 months.

(n) The pretakeoff passenger briefing required by § 121.571 may be given. The passengers may also be advised to follow directions of crewmembers but not be instructed on the procedures to be followed in the demonstration.

(o) If safety equipment as allowed by paragraph (c) of this appendix is provided, either all passenger and cockpit windows must be blacked out or all of the emergency exits must have safety equipment in order to prevent disclosure of the available emergency exits.

(p) Not more than 50 percent of the emergency exits in the sides of the fuselage of an airplane that meets all of the requirements applicable to the required emergency exits for that airplane may be used for the demonstration. Exits that are not to be used in the demonstration must have the exit handle deactivated or must be indicated by red lights, red tape, or other acceptable means placed outside the exits to indicate fire or other reason why they are unusable. The exits to be used must be representative of all of the emergency exits on the airplane and must be designated by the applicant, subject to approval by the Administrator. At least one floor level exit must be used.

(q) All evacuees, except those using an over-the-wing exit, must leave the airplane by a means provided as part of the airplane's equipment.

(r) The applicant's approved procedures must be fully utilized during the demonstration.

(s) The evacuation time period is completed when the last occupant has evacuated the airplane and is on the ground. Provided that the acceptance rate of the stand or ramp is no greater than the acceptance rate of the means available on the airplane for descent from the wing during an actual crash situation, evacuees using stands or ramps allowed by paragraph (c) of this Appendix are considered to be on the ground when they are on the stand or ramp.

Issued in Washington, DC, on June 26, 1990.

James B. Busey,

Administrator.

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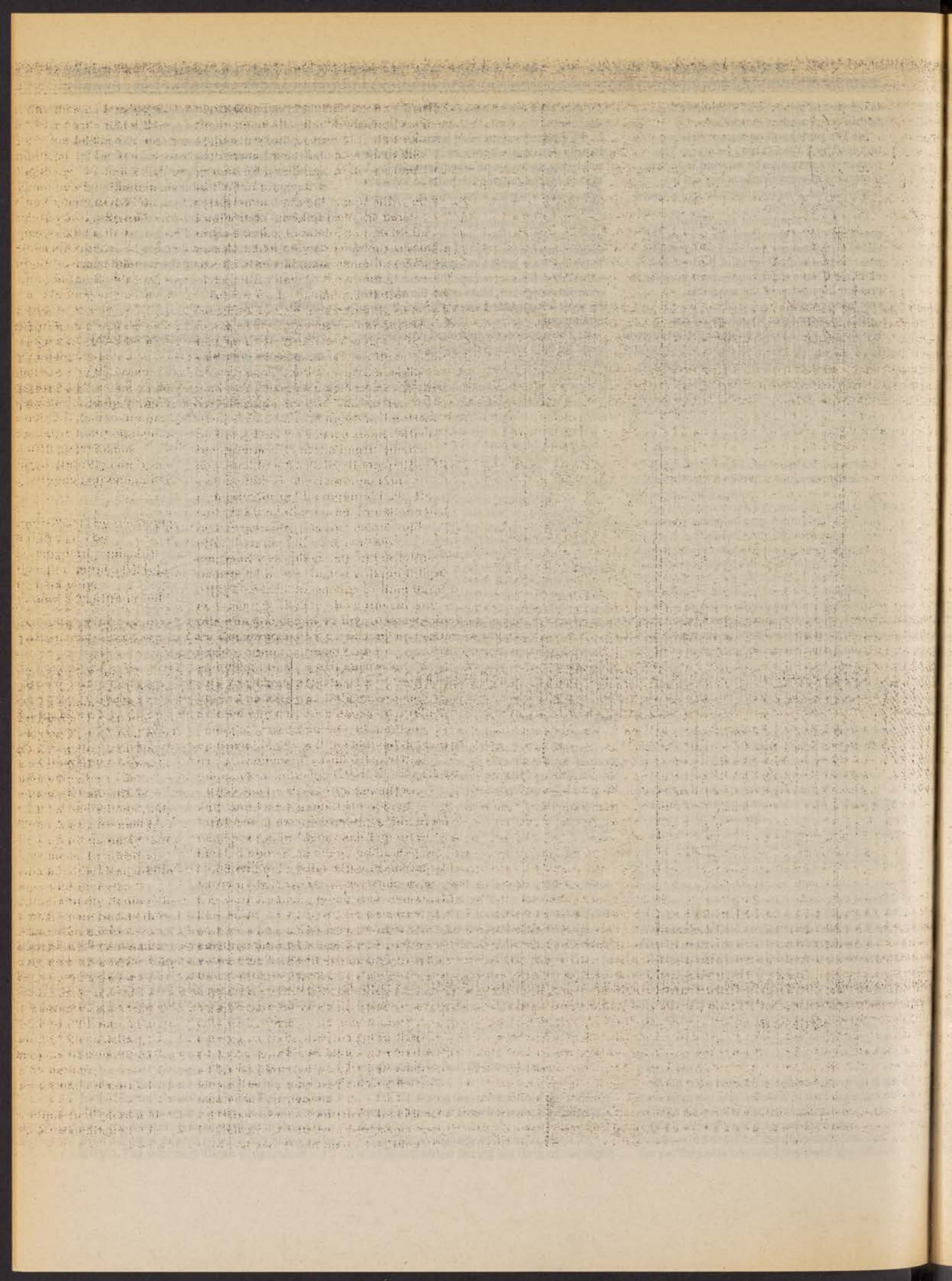

federal register

Friday
July 20, 1990

Part IV

Department of Commerce

National Oceanic and Atmospheric Administration

50 CFR Part 227

Listing of Steller Sea Lions as Threatened Under the Endangered Species Act; Proposed Rules

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 227

[Docket No. 900387-0183]

RIN 0648-AD13

Listing of Steller Sea Lions as Threatened Under the Endangered Species Act

AGENCY: National Marine Fisheries Service (NMFS) NOAA, Commerce.

ACTION: Advance notice of proposed rulemaking and request for comments.

SUMMARY: An emergency rule published April 5, 1990 (55 FR 12645) listing the Steller (northern) sea lion as threatened will expire December 3, 1990. In a separate notice of proposed rulemaking, NMFS is proposing to list the Steller sea lion as a threatened species under the Endangered Species Act of 1973 (ESA) with protective measures similar to those contained in the emergency rule. In this advance notice of proposed rulemaking, NMFS is requesting comments to assist in developing a proposed rule that will consider the designation of critical habitat and a broader range of conservation measures. Public comments received will be considered in conjunction with recommendations by the Steller Sea Lion Recovery Team and the Marine Mammal Commission.

DATES: Comments must be received by August 20, 1990.

ADDRESSES: Comments should be mailed to Dr. Nancy Foster, Director, Office of Protected Resources (F/PR), NMFS, 1335 East-West Highway, Silver Spring, MD 20910.

FOR FURTHER INFORMATION CONTACT: Dr. Charles Karnella, Chief, Protected Species Management Division, Silver Spring, MD, 301-427-2322.

SUPPLEMENTARY INFORMATION: On November 21, 1989, the Environmental Defense Fund and 17 other environmental organizations petitioned NMFS for an emergency rule listing the Steller sea lion as endangered and to initiate a rulemaking to make that emergency listing permanent. Under section 4 of the Endangered Species Act, NMFS determined that the petition presented substantial information indicating the action may be warranted and requested comments (February 22, 1990, 55 FR 6301).

On April 5, 1990, NMFS published an emergency interim rule (55 FR 12645) listing the Steller sea lion as a threatened species under ESA and establishing conservation regulations as emergency interim measures to begin the population recovery process. The interim measures prohibit shooting at or near Steller sea lions, establish a 3-nautical mile buffer zone around certain rookeries in Alaska in which all vessel traffic is prohibited, and limit the number of Steller sea lions that may be killed incidental to commercial fishing. Also, as a result of the emergency listing, Federal agencies will have to consult in accordance with section 7 of the ESA to ensure that their actions are not likely to jeopardize the continued existence of the species.

In March 1990, NMFS commissioned a recovery team for the Steller sea lion. The team held its first meeting on April 27, 1990. A second meeting was held on June 13, 1990. The team is scheduled to meet again on July 23, 1990 in Anchorage, Alaska. A draft recovery plan describing site-specific management actions necessary for recovery and criteria for determining when the species can be removed from the list of endangered and threatened species is scheduled to be available in late July. In addition, the team will provide estimates of the time and cost to carry out the recommended recovery measures and any areas that should be considered for critical habitat.

Current Steller sea lion research conducted by NMFS includes aerial surveys from the Kenai Peninsula to Kiska Island, Alaska. Adults and juveniles will be counted from photographs obtained by flying in fixed-wing airplanes at low levels over rookeries and haul-out sites. Counts will be compared to historical data for significant differences. Pups will be counted by spook counts at most Gulf of Alaska and Aleutian Island rookeries. Counts obtained in 1990 will be compared to historical data for statistical significance. Under an existing scientific research permit, 24 satellite monitored tags will be attached to female sea lions at selected rookeries. The tags will transmit information on location, depth of dive, and water temperature by depth. The at-sea position information obtained from the satellite tag will be mapped and compared to rookery or haul-out location to determine the maximum, minimum, and mean distance travelled during feeding trips. Another 20 tags will be placed on females during November, 1990. The satellite tags deployed will fall from the animal during the autumn molt. Two or three satellite tags will be placed on females in Oregon during fall, 1990, and about 12 will be placed on females in the Kuril Islands during summer, 1991.

A body fitness, physiological status, and foraging energetics study will assess the relative health and fitness of sea lions in Alaska and Oregon. Body fitness will be measured by blubber thickness, lean body mass, and water content. Physiological status will be measured by blood and tissue levels of important metabolites, hematocrit, and other blood measures. Milk samples will be analyzed for nutrient content.

A stock identification study to determine if different genetic and morphological characters exist between Steller sea lions that breed in the Kuril Islands from those that breed in the Aleutian Islands, Gulf of Alaska, or Oregon and California.

Other studies to be conducted by NMFS include an analysis of fisheries data and a blood and tissue analysis. Commercial catch data, fisheries abundance data, and sea lion abundance data will be summarized by 60 square nautical mile areas near existing sea lion rookeries. These data will be statistically analyzed to determine the relative influence of commercial fish catch on sea lion abundance by correlation analysis and other statistical procedures. Existing tissue samples will be analyzed for pollutants. Blood samples will be analyzed for disease antibodies.

In proposing a rule, NMFS will consider the measures that may be needed to avoid or control impacts that may be contributing to the decline of the species, including but not limited to, the following: (1) Prey deprivation and food stress; (2) commercial fishery interactions, including incidental and direct mortality from fishing; (3) biological interactions; (4) subsistence harvesting; (5) nonhuman predator interactions; (6) effect of marine debris; (7) rookery disturbance; and (8) oil and gas development.

NMFS is requesting comments on the need for and types of conservation regulations that should be proposed. The range of alternatives suggested in comments to previous rulemaking and at public meetings have included the following: Reducing the quota for allowed mortalities incidental to commercial fishing operations; limiting trawling to daylight hours; prohibiting fishing for pollock when they are carrying roe and reducing the overall quota of groundfish; increasing the buffer zones and including buffer zones around other rookeries and haul-out areas throughout the species range; regulating subsistence taking; and designating critical habitat.

In proposing critical habitat, NMFS will consider physical and biological factors essential to the conservation of the species that may require special management consideration or protection. These habitat requirements include breeding rookeries, haulout sites, feeding areas and nutritional requirements. In describing critical habitat, NMFS will take into consideration terrestrial habitats adjacent to rookeries and their need for protection from development and other uses, such as logging or mining.

In a separate rulemaking, NMFS is proposing to list the Steller sea lion as threatened with conservation regulations similar to those contained in the previous emergency rule. The listing is being done separately to expedite the final listing of the Stellar sea lion. The final listing is scheduled to be in place within the 240-day period as described in which the emergency rule is effective.

Authority: 16 U.S.C. 1531 et seq.
Date: July 13, 1990.

William W. Fox, Jr.
Assistant Administrator for Fisheries, National Marine Fisheries Service.

[FR Doc. 90-17002 Filed 7-19-90; 8:45 am]
BILLING CODE 3510-22-M

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50 CFR Part 227

[Docket No. 900387-0162]

RIN 0648-AD13

Listing of Steller Sea Lions as Threatened Under the Endangered Species Act

AGENCY: National Marine Fisheries Service (NMFS), NOAA, Commerce.

ACTION: Proposed rule and request for comments.

SUMMARY: The number of Steller (northern) sea lions (*Eumetopias jubatus*) observed on certain rookeries in Alaska has declined by 63% since 1985 and by 82% since 1960. Declines are occurring in previously stable areas and are accelerating. Significant declines have also occurred on the Kuril Islands, USSR. NMFS is proposing to list the Steller sea lion throughout its range as threatened under the Endangered Species Act of 1973, 16 U.S.C. 1531 *et seq.* (ESA) and is proposing to establish protective measures similar to those contained in the previous emergency rule (April 5, 1990, 55 FR 12645). More comprehensive protective regulations and critical habitat designation are being considered in a separate rulemaking. These actions are being separated to expedite the final listing of the Steller sea lion.

DATES: Comments on the proposed rule must be received by September 18, 1990. Requests for public hearings must be received by September 4, 1990.

ADDRESSES: Comments on this proposed rule, requests for supporting documents, and requests for a public hearing should be sent to Dr. Nancy Foster, Director, Office of Protected Resources and Habitat Programs (F/PR), NMFS, 1335 East-West Highway, Silver Spring, MD 20910.

FOR FURTHER INFORMATION CONTACT: Dr. Charles Karnella, Chief, Protected Species Management Division, Silver Spring, MD, 301-427-2322.

SUPPLEMENTARY INFORMATION:

Background

On November 21, 1989, the Environmental Defense Fund and 17 other environmental organizations petitioned NMFS for an emergency rule listing the Steller sea lion as an endangered species and to initiate a rulemaking to make the listing permanent. Under section 4 of the ESA, NMFS determined that the petition presented substantial information indicating the action may be warranted and requested comments (February 22, 1990, 55 FR 6301). On April 5, 1990 (55 FR 12645), NMFS issued an emergency interim rule listing the Steller sea lion as threatened and requested comments.

In response to the emergency listing, NMFS appointed a Steller sea lion recovery team, which held its first meeting on April 27, 1990. The team is responsible for drafting a recovery/conservation plan and providing recommendations to NMFS on necessary protective regulations for the Steller sea lion. A draft recovery plan is expected to be made available to NMFS by late July.

The emergency listing is effective for 240 days and expires on December 3, 1990. There is not sufficient time to issue a proposed rule with comprehensive protective regulations including a proposed critical habitat designation, solicit public comments, provide an opportunity for public hearings, conduct the required regulatory and economic analyses, and issue a final rule by December 3, 1990. NMFS believes it is imperative to avoid a lapse in listing and to continue protective measures similar to those in the emergency rule. Further, NMFS believes it is preferable to consider the views of the recovery team prior to publishing comprehensive proposed protective regulations. Therefore, NMFS issues this proposed rule with protective regulations similar to those of the emergency rule. More comprehensive protective regulations and critical habitat will be proposed in a separate rulemaking, after considering the recommendations of the Recovery Team, the Marine Mammal Commission, and the public (See Advance Notice of Proposed Rulemaking in this issue of the Federal Register).

Comments on Emergency Interim Rule

NMFS received eight comments specifically in response to the emergency rule, including comments from Congressman Norm Dicks and the Marine Mammal Commission. Comments pertinent to the listing classification and regulations are discussed below. The comments received concerning the recovery team, funding priorities, necessary research and other actions necessary for the conservation of the species are being considered by NMFS in developing an overall recovery program.

Process

One commenter objected to the publication of the emergency rule without the opportunity for public comment on the draft.

NMFS does not release draft proposed or final rules for public comment. Under section 4(b)(7) of the ESA, emergency regulations may be issued without prior opportunity for public comment if there is a significant risk to the well-being of the species. On February 22, 1990, NMFS published a notice in the Federal Register concerning the petition to list the Steller sea lion as endangered and requested public comment.

Listing Classification

Some commenters believed that the species should be listed as endangered rather than threatened based on the dramatic and continuing declines in abundance in Alaska. One commenter noted that if the rate of decline observed between 1985 and 1989 persists, by the year 2000, the population in the area from Kiska Island to Kenai Peninsula will have been reduced to about 1% of its 1960 level. Further, Steller sea lion numbers in other areas have experienced substantial declines. Other commenters believed that the available information about the decline and threats does not support listing as endangered because the "danger of extinction" standard cannot be met. One commenter believed that NMFS did not justify even a threatened listing based on the listing criteria because evidence of a decline without knowledge of the causes of the decline is not sufficient justification for listing.