Task Assignment

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Aviation Rulemaking Advisory Subcommittee; Transport Airplane and Engine Subcommittee; Flight Test Working Group

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of establishment of Flight Test Working Group.

SUMMARY: Notice is given of the establishment of a Flight Test Working Group by the Transport Airplane and Engine Subcommittee. This notice informs the public of the activities of the Transport Airplane and Engine Subcommittee of the Aviation Rulemaking Advisory Committee.

FOR FURTHER INFORMATION CONTACT: Mr. William J. (Joe) Sullivan, Executive Director, Transport Airplane and Engine Subcommittee, Aircraft Certification Service (AIR-3) 800 Independence Avenue, SW., Washington, DC 20591, Telephone: (202) 267-9554; FAC: (202) 267-9562.

SUPPLEMENTARY INFORMATION:

The Federal Aviation Administration (FAA) established an Aviation Rulemaking Advisory Committee (56 FR 2190, January 22, 1991) which held its first meeting on May 23, 1991 (56 FR 20492, May 3, 1991). The Transport Airplane and Engine Subcommittee was established at the meeting to provide advice and recommendations to the Director, Aircraft Certification Service, FAA, regarding the airworthiness standards for transport category airplanes and engines in parts 25, 33 and 35 of the Federal Aviation Regulations (14 CFR parts 25, 33, 35). At its meeting on September 26, 1991 (56 FR 43055, August 30, 1991), the subcommittee agreed to establish the Flight Test Working Group. Specifically, the working group's task is the following:

Task

The Flight Test Working Group is charged with making a recommendation to the Transport Airplane and Engine Subcommittee concerning disposition of the joint Aerospace Industries Association of America, Inc. (AIA) and Association Europenne des Constructeurs de Material Aerospatial (AECMA) petition for rulemaking dated May 22, 1990, requesting amendments to §§ 25.143(c) and (f), 25.149, and 25.201 of the Federal Aviation Regulations (Docket No. 26250). In completing this task, the working group should review comments received in response to this petition.

Reports

The working group will develop any combination of the following as it deems appropriate:

1. A draft Notice of Proposed Rulemaking proposing the requested or modified new standards, supporting economic and other required analysis, and any other collateral documents the working group determines are needed; or

2. A Denial of Petition stating the rationale for not adopting the new standards proposed in the petition.

The working group chair or an alternate should: (a) Recommend organizational structure(s) and time line(s) for completion of this effort, including rationale, for subcommittee consideration at the meeting scheduled for February 4, 1992; (b) give a status report on this task at each meeting of the subcommittee; and (c) give a detailed conceptual presentation to the subcommittee before proceeding with the drafting of documents described in paragraphs 1 and 2 above.

The Flight Test Working Group will be comprised of experts from those organizations having an interest in the task assigned to it. A working group member need not be a representative of one of the organizations of the parent Transport Airplane and Engine Subcommittee or of the full Aviation Rulemaking Advisory Committee. An individual who has expertise in the subject matter and wishes to become a member of the working group should write to the person listed under the caption **FOR FURTHER INFORMATION CONTACT** expressing that desire, describing his or her interest in the task, and stating the expertise he or she would bring to the working group. The request will be reviewed with the subcommittee chair and working group leader; and the individual will be advised whether or not the request can be accommodated.

The Secretary of Transportation has determined that the information and use of the Aviation Rulemaking Advisory Committee and its subcommittees are necessary in the public interest in connection with the performance of duties imposed on the FAA by law. Meetings of the full committee and any subcommittees will be open to the public except as authorized by section 10(d) of the Federal Advisory Committee Act. Meetings of the Flight Test Working Group will not be open to the public, except to the extent that individuals with an interest and expertise are selected to participate. No public announcement of working group meetings will be made.

Issued in Washington, DC, on January 3, 1992.

William J. Sullivan,

Executive Director, Transport Airplane and Engine Subcommittee, Aviation Rulemaking Advisory Committee.

[FR Doc. 92-755 Filed 1-10-92; 8:45 am]

BILLING CODE 4910-13-M

Recommendation Letter

ARM-20/ARM-20
Action ARM

Dale Warren
750 Los Altos Avenue
Long Beach, CA 90804

November 3, 1993

Mr. A. J. Broderick
Associate Administrator for
Regulation and Certification
Federal Aviation Administration
800 Independence Avenue SW
Washington, DC 20591

Dear Tony:

On behalf of the Aviation Rulemaking Advisory Committee, I am pleased to submit the enclosed recommendation for rule making action on following subjects.

1) 25.143 (c) Maximum Control Forces for Controllability and Maneuverability;

2) 25.143 (f) Control Force Characteristics;

3) 25.149 Minimum Control Speed;

4) 25.201 Stall Demonstration.

The enclosed package is in the form of a Notice of Proposed Rule Making, including preamble, draft rule, economic analysis and legal analysis. The package was developed by the Flight Test Harmonization Working Group chaired by Reg Grantham of the Boeing Company. The membership of the group is a good balance of interested parties in the US and Europe. The group is currently focusing on other issues but can be available if needed for docket review.

The enclosed package is Line Nos. 11-14 of FAA/JAA Harmonization Initiatives. Scheduled performance to date is shown in the following table.

	Tech Agree	Req for Support	Rep to ARAC	Rec to FAA	Publish Notice	Publish Final
Plan	1/93	-	4/12/93	10/8/93	4/8/94	10/95
Act	1/19/93	5/7/93	8/18/93	11/93		

The members of ARAC appreciate the opportunity to participate in the FAA rulemaking process and fully endorse this recommendation.

Sincerely,

Dale S. Warren
Asst Chair - ARAC -

Acknowledgement Letter

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

NOV 22 1993

Mr. Dale S. Warren
Assistant Chair for Transport Airplane
and Engine Issues
Aviation Rulemaking Advisory Committee
Long Beach, CA 90804

Dear Dale:

Thank you for your November 3 letter with which you transmitted a recommendation of the Aviation Rulemaking Advisory Committee. You provided a notice of proposed rulemaking (NPRM) concerning revision of certain flight airworthiness standards, and proposed revisions to Advisory Circular 25-7 - Flight Test Guide for Certification of Transport Category Airplanes. The Federal Aviation Administration (FAA) accepts this recommendation provided there are no legal or other reasons why we cannot adopt it.

The complete rulemaking package will be reviewed and coordinated within the FAA and the Offices of the Secretary of Transportation and Management and Budget. The FAA will publish the NPRM for public comment as soon as the coordination process is complete. The proposed revisions to the advisory circular will also be made available for public comment when the coordination process is complete. We will make every effort to handle this recommendation expeditiously.

I would like to thank the Aviation Rulemaking Advisory Committee, and particularly the Flight Test Working Group, for its action on this task.

Sincerely,

Anthony J. Broderick
Associate Administrator for
Regulation and Certification

U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

APR 10 1995

Mr. Gerald R. Mack
Aviation Rulemaking Advisory Committee
Boeing Commercial Airplane Group
P.O. Box 3707, M/S 67-UM
Seattle, WA 98124-2207

Dear Mr. Mack:

In response to the task announced in the Federal Register on January 13, 1992 (57 FR 1297), the Aviation Rulemaking Advisory Committee (ARAC) developed a notice of proposed rulemaking (NPRM) to amend airworthiness standards to harmonize with European airworthiness standards for transport category airplanes. Comments received in response to the NPRM were considered to be non-substantive; consequently, the final action will be developed internally by the Federal Aviation Administration (FAA).

Let me thank ARAC and, in particular, the Flight Test Harmonization Working Group for its dedicated efforts in completing the task assigned by the FAA.

If you have any questions, please contact Mr. Mike Borfitz at (617) 238-7110.

Sincerely,

/s/Anthony J. Broderick
Associate Administrator for
Regulation and Certification

Recommendation

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Proposed Revisions to Advisory Circular--Flight Test Guide for Certification of Transport Category Airplanes.

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed advisory circular and request for comments.

SUMMARY: This notice announces the availability of and requests comments regarding proposed revisions to Advisory Circular (AC) 25-7, "Flight Test Guide for Certification of Transport Category Airplanes." AC 25-7 provides guidance on acceptable means, but not the only means, of demonstrating compliance with the airworthiness standards for transport category airplanes. The proposed revisions complement revisions to the airworthiness standards that are being proposed by a separate notice. This notice provides interested persons an opportunity to comment on the proposed revisions to the AC.

DATES: Comments must be received on or before [insert date 90 days from date of publication].

ADDRESSES: Send all comments on the proposed AC revisions to the Federal Aviation Administration, Attention: Don Stimson, Flight Test and Systems Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Ave SW., Renton, Wa 98055-4056. Comments may be examined at the above address between 7:30 a.m. and 4:00 p.m. weekdays, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Patricia Siegrist, Regulations Branch, ANM-114, at the above address, telephone (206) 227-2126.

SUPPLEMENTARY INFORMATION:

Comments Invited

A copy of the subject AC may be obtained by contacting the person named above under "FOR FURTHER INFORMATION CONTACT." Interested persons are invited to comment on the proposed revisions to the AC by submitting such written data, views, or arguments as they may desire. Commenters must identify the title of the AC and submit comments in duplicate to the address specified above. All comments received on or before the closing date for comments will be considered by the Transport Standards Staff before issuing the final revised AC.

Discussion

On May 22, 1990, the Aerospace Industries Association of America, Inc. (AIA) and the Association Europeenne des Constructeurs de Material Aerospatial (AECMA) jointly petitioned the FAA and the European Joint Aviation Authorities (JAA) to harmonize certain airworthiness requirements that apply to transport category airplanes. In their petition, published in the July 17, 1990 edition of the Federal Register (55 FR 137), AIA and AECMA also recommended changes to Advisory Circular (AC) 25-7, "Flight Test Guide for Certification of Transport Category Airplanes," to ensure that the harmonized standards would be interpreted and applied consistently.

Part 25 of the Federal Aviation Regulations (FAR) prescribes the United States airworthiness standards for transport category airplanes. Advisory Circular (AC) 25-7 provides guidelines that the FAA has found

acceptable for flight testing transport category airplanes to demonstrate compliance with those airworthiness standards. Revisions to part 25, in response to the AIA/AECMA petition, are being proposed by the FAA in a notice of proposed rulemaking published elsewhere in this issue of the Federal Register. That notice also describes the use of the Aviation Rulemaking Advisory Committee (ARAC) to develop both the proposed revisions to Part 25 and the proposed revisions to AC 25-7.

The proposed revisions to AC 25-7 provide additional guidance material and one means, but not the only means, of complying with the part 25 revisions proposed in Notice No. 93-[insert notice number of NPRM entitled, "Revision of Certain Flight Airworthiness Standards to Harmonize with European Airworthiness Standards for Transport Category Airplanes," to be published in the same edition of the Federal Register]. Issuance of the revised AC is contingent on final adoption of the proposed revisions to part 25.

Issued in Renton, Washington, on

DRAFT WORKING MATERIAL
NOT FOR PUBLIC RELEASE 8/27/93

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

[14 CFR Parts 1 and 25]

[Docket No. 26250; Notice No.]

RIN:

Revision of Certain Flight Airworthiness Standards to Harmonize with European Airworthiness Standards for Transport Category Airplanes.

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Federal Aviation Administration proposes to amend part 25 of the Federal Aviation Regulations (FAR) to harmonize certain flight requirements with standards contained in the European Joint Aviation Requirements (JAR)-25. These proposals are in response to a petition from the Aerospace Industries Association of America, Inc. and the Association Europeenne des Constructeurs de Material Aerospatial. These changes are intended to benefit the public interest by standardizing certain requirements, concepts, and procedures contained in the airworthiness standards of the FAR and the JAR.

DATES: Comments must be received on or before [insert date 90 days from date of publication].

ADDRESSES: Comments on this notice may be mailed in duplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket (AGC-10), Docket No. 26250, 800 Independence Avenue S.W., Washington, D.C. 20591; or delivered in duplicate to: Room 915G, 800

Independence Avenue S.W., Washington, D.C. 20591. Comments delivered must be marked Docket No. 26250. Comments may be examined in Room 915G weekdays, except Federal holidays, between 8:30 a.m. and 5:00 p.m. In addition, the FAA is maintaining an information docket of comments in the Office of the Assistant Chief Counsel (ANM-7), Federal Aviation Administration, Northwest Mountain Region, 1601 Lind Avenue S.W., Renton, Washington 98055-4056. Comments in the information docket may be examined in the Office of the Regional Counsel weekdays, except Federal holidays, between 7:30 a.m. and 4:00 p.m.

FOR FURTHER INFORMATION CONTACT: Donald K. Stimson, Flight Test and Systems Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, FAA, 1601 Lind Avenue S.W., Renton, Washington 98055-4056; telephone (206) 227-1129; facsimile (206) 227-1320.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in this proposed rulemaking by submitting such written data, views, or arguments as they may desire. Comments relating to any environmental, energy, or economic impact that might result from adopting the proposals contained in this notice are invited. Substantive comments should be accompanied by cost estimates. Commenters should identify the regulatory docket or notice number and submit comments in duplicate to the Rules Docket address above. All comments received on or before the closing date for comments will be considered by the Administrator before taking action on this proposed rulemaking. The proposals contained in this notice may be changed in light of comments received. All comments received will be

available in the Rules Docket, both before and after the comment period closing date, for examination by interested persons. A report summarizing each substantive public contact with FAA personnel concerning this rulemaking will be filed in the docket. Persons wishing the FAA to acknowledge receipt of their comments must submit with those comments a self-addressed, stamped postcard on which is stated: "Comments to Docket No. 26250." The postcard will be date stamped and returned to the commenter.

Availability of the NPRM

Any person may obtain a copy of this notice by submitting a request to the Federal Aviation Administration (FAA), Office of Public Affairs, Attention: Public Information Center, APA-430, 800 Independence Avenue S.W., Washington, D.C. 20591; or by calling (202) 267-3484. The notice number of this NPRM must be identified in all communications. Persons interested in being placed on a mailing list for future rulemaking documents should also request a copy of Advisory Circular No. 11-2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Background

Part 25 of the Federal Aviation Regulations (FAR) contains the airworthiness standards for transport category airplanes. Manufacturers of transport category airplanes must show that each airplane they produce of a different type design complies with the relevant standards of part 25. These standards apply to airplanes manufactured within the U.S. for use by U.S.-registered operators and to airplanes manufactured

in other countries and imported under a bilateral airworthiness agreement.

In Europe, the Joint Aviation Requirements (JAR) were developed by the Joint Aviation Authorities (JAA) to provide a common set of airworthiness standards for use within the European aviation community. The airworthiness standards for European type certification of transport category airplanes, JAR-25, is based on part 25 of the FAR. Airplanes certificated to the JAR-25 standards, including airplanes manufactured in the U.S. for export to Europe, receive a type certificate that is accepted by the aircraft certification authorities of 19 European countries.

Although part 25 and JAR-25 are very similar, they are not identical. Differences between the FAR and the JAR can result in substantial additional costs when airplanes are type certificated to both standards. These additional costs, however, do not always bring about an increase in safety. For example, part 25 and JAR-25 may use different means to accomplish the same safety intent. In this case, the manufacturer is usually burdened with meeting both requirements, although the level of safety is not increased correspondingly. Recognizing that a common set of standards would not only economically benefit the aviation industry, but would also maintain the necessary high level of safety, the FAA and JAA consider harmonization to be a high priority.

On May 22, 1990, the Aerospace Industries Association of America, Inc. (AIA) and the Association Europeenne des Constructeurs de Material Aerospatial (AECMA) jointly petitioned the FAA and JAA to harmonize

certain requirements contained in FAR part 25 and JAR-25. In their petition, published in the July 17, 1990 edition of the Federal Register (55 FR 137), AIA and AECMA requested changes to §§ 25.143(c), 25.143(f), 25.149, and 25.201 to standardize the requirements, concepts, and procedures for certification flight testing and to enhance reciprocity between the FAA and JAA. In addition, AIA and AECMA recommended changes to FAA Advisory Circular (AC) 25-7, "Flight Test Guide for Certification of Transport Category Airplanes," to ensure that the harmonized standards would be interpreted and applied consistently. A copy of that petition is included in the docket for this rulemaking.

On September 26, 1991 the Aviation Rulemaking Advisory Committee (ARAC) established the Flight Test Working Group, assigning it the task of developing either a draft notice of proposed rulemaking (NPRM) or a denial of the AIA/AECMA petition. If accepted by the ARAC, the draft NPRM or petition denial would be delivered to the FAA as an advisory committee recommendation.

The public notice establishing the Flight Test Working Group appeared in the Federal Register on January 13, 1992 (57 FR 1297). The Flight Test Working Group was later renamed the Flight Test Harmonization Working Group and its scope was expanded to include developing a similar proposal to amend JAR-25, as necessary, to achieve harmonization.

The rulemaking proposal contained in this notice was developed by the Flight Test Harmonization Working Group. It was presented to the FAA by the ARAC as a recommended response to the AIA/AECMA petition. Rather than proposing a simple acceptance or denial of the petition, the

working group chose to use the petition as a starting point for developing a rulemaking proposal that would accomplish the goal of harmonizing not only the sections of FAR part 25 and JAR-25 addressed in the petition, but also related sections.

The Aviation Rulemaking Advisory Committee

The ARAC was formally established by the FAA on January 22, 1991 (56 FR 2190) to provide advice and recommendations concerning the full range of the FAA's safety-related rulemaking activity. This advice was sought to develop better rules in less overall time using fewer FAA resources than are currently needed. The committee provides the opportunity for the FAA to obtain firsthand information and insight from interested parties regarding proposed new rules or revisions of existing rules.

There are 56 member organizations on the committee, representing a wide range of interests within the aviation community. Meetings of the committee are open to the public, except as authorized by section 10(d) of the Federal Advisory Committee Act.

The ARAC establishes working groups to develop proposals to recommend to the FAA for resolving specific issues. Tasks assigned to working groups are published in the Federal Register. Although working group meetings are not generally open to the public, all interested parties are invited to participate as working group members. Working groups report directly to the ARAC, and the ARAC must concur with a working group proposal before that proposal can be presented to the FAA as an advisory committee recommendation.

The activities of the ARAC will not, however, circumvent the public rulemaking procedures. After an ARAC recommendation is received and found acceptable by the FAA, the agency proceeds with the normal public rulemaking procedures. Any ARAC participation in a rulemaking package will be fully disclosed in the public docket.

Discussion of the Proposals

The FAA proposes amending certain sections of the FAR, as recommended by the ARAC, to harmonize these sections with JAR-25. The JAA intend to publish a Notice of Proposed Amendment (NPA), also developed by the Flight Test Harmonization Working Group, to revise JAR-25 as necessary to ensure harmonization in those areas for which the proposed amendments differ from the current JAR-25. When it is published, the NPA will be placed in the docket for this rulemaking.

The FAA proposes to: (1) introduce the term "go-around power or thrust setting" to clarify certain part 25 flight requirements; (2) revise the maximum control forces permitted for demonstrating compliance with the controllability and maneuverability requirements; (3) provide requirements for stick force and stick force gradient in maneuvering flight; (4) revise and clarify the requirements defining minimum control speed during approach and landing; (5) clarify the procedural and airplane configuration requirements for demonstrating stalls and revise the list of acceptable flight characteristics used to define the occurrence of stall; and (6) require that stall characteristics be demonstrated for turning flight stalls at deceleration rates up to 3 knots per second.

Revisions are also proposed for AC 25-7 to ensure consistent application of these proposed revised standards. Public comments concerning the revisions to AC 25-7 are invited by separate notice published elsewhere in this issue of the Federal Register.

Proposal 1. Certain part 25 flight requirements involving flight conditions other than takeoff (i.e., §§ 25.119, 25.121(d), 25.145(b)(3), 25.145(b)(4), 25.145(b)(5), 25.145(c)(1), 25.149(f)(6), and 25.149(g)(7)(ii)), specify using the maximum available takeoff power or thrust as being representative of the appropriate maximum in-flight power or thrust. In practice, however, the power or thrust setting used to obtain the maximum in-flight power or thrust (commonly referred to as the go-around power or thrust setting) usually differs from the setting used for takeoff. In the past, the FAA interpreted the words "maximum available takeoff power or thrust" to mean the maximum in-flight power or thrust, with the takeoff power or thrust setting not always being "available" in flight. The FAA proposes changing the nomenclature to "go-around power or thrust setting" for clarity and to reflect terminology commonly used in the operational environment. (In the context of this discussion, the term "go-around" refers to a deliberate maneuver to abort a landing attempt prior to touchdown by applying the maximum available power or thrust, retracting flaps, and climbing to a safe level-off altitude.)

The go-around power or thrust setting may differ from the takeoff power or thrust setting, for example, due to the airspeed difference between the takeoff and go-around flight conditions. In addition, complying with the powerplant limitations of § 25.1521 may result in a

lower power setting at the higher airspeeds associated with a go-around. As another example, the controllability requirements of §§ 25.145(b)(3), 25.145(b)(4), 25.145(b)(5), 25.149(f), and 25.149(g) may also limit the go-around power or thrust setting to less than that used for takeoff. Another reason to separate the takeoff and go-around power (or thrust) nomenclature is that certification practice has not required, and applicants have not always proposed, changing the go-around power or thrust setting when a previously approved takeoff power or thrust is increased.

The FAA proposes to substitute the term "go-around power or thrust setting" for "maximum available takeoff power or thrust" in §§ 25.119, 25.121(d), 25.145(b)(3), 25.145(b)(4), 25.145(c)(1), 25.149(f)(6), and 25.149(g)(7)(ii). (Note that the requirement of § 25.145(b)(5) also uses the power specified in § 25.145(b)(4).) In addition, the FAA proposes to define "go-around power or thrust setting" in part 1 as "the maximum allowable in-flight power or thrust setting identified in the performance data." With this revision, the FAA intends to clarify that the applicable controllability requirements should be based on the same power or thrust setting used to determine the approach and landing climb performance contained in the approved Airplane Flight Manual (AFM).

The proposed terminology refers to a power or thrust "setting" rather than a power or thrust to make it clear that existing engine ratings are unaffected. The powerplant limitations of § 25.1521 would continue to apply at the go-around power (or thrust) setting. Existing certification practices also remain the same, including the relationship between the power or thrust values used to comply with the landing and

approach climb requirements of §§ 25.119 and 25.121(d). For example, the thrust value used to comply with § 25.121(d) may be greater than that used for § 25.119, if the operating engine(s) do not reach the maximum allowable in-flight thrust by the end of the eight second time period specified in § 25.119.

Proposal 2. The FAA proposes to revise the table in § 25.143(c) to match the control force limits currently provided in JAR 25.143(c). This table prescribes the maximum control forces for the controllability and maneuverability flight testing required by §§ 25.143(a) and 25.143(b). For transient application of the pitch and roll control, the revised table would contain more restrictive maximum control force limits for those maneuvers in which the pilot might be using one hand to operate other controls, relative to those maneuvers in which both hands are normally available for applying pitch and roll control. The revised table would retain the current control force limits for transient application of the yaw control, and for sustained application of the pitch, roll, and yaw controls.

If, for the particular maneuver, only one hand is assumed to be available for applying pitch and roll control, the FAA proposes to reduce the maximum permissible control forces from 75 pounds to 50 pounds for pitch control, and from 60 pounds to 25 pounds for roll control. These lower control forces would be more consistent with § 25.145(b), which states that a force of 50 pounds for longitudinal (pitch) control is "representative of the maximum temporary force that readily can be applied by one hand." In addition to adding more restrictive control force limits for maneuvers in which only one hand

may be available to apply pitch and roll control, the FAA proposes to reduce the maximum permissible force for roll control from 60 pounds to 50 pounds for maneuvers in which the pilot normally has both hands available to operate the control.

The FAA proposes to further revise Section 25.143(c) by specifying that the table of maximum permissible control forces applies only to conventional wheel type controls. This restriction, also specified in the current JAR 25.143(c), recognizes that different control force limits may be necessary when considering sidestick controllers or other types of control systems.

For clarification , the FAA proposes to replace the terms "temporary" and "prolonged," used in §§ 25.143(c), 25.143(d), 25.143(e), and 25.145(b), with "transient" and "sustained," respectively. "Transient" forces refer to those control forces resulting from maintaining the intended flight path during changes to the airplane configuration, normal transitions from one flight condition to another, or regaining control after a failure. The pilot is assumed to take immediate action to reduce or eliminate these forces by re-trimming or by changing the airplane configuration or flight condition. "Sustained forces," on the other hand, refer to those control forces resulting from normal or failure conditions that cannot readily be trimmed out or eliminated. The FAA is proposing to add these definitions of "transient" and "sustained" forces to AC 25-7.

In addition, the FAA proposes several minor editorial changes for §§ 25.143(c) through 25.143(e) to improve readability and correct grammatical errors. For example, the words "immediately preceding" are

proposed to replace "next preceding" in § 25.143(d). These editorial changes are intended to clarify the existing interpretation of the affected sections.

Proposal 3. The FAA proposes to add the JAR 25.143(f) requirements regarding control force characteristics during maneuvering flight to part 25 as a new § 25.143(f). By adding these requirements, the FAA intends to ensure that the force to move the control column, or "stick," must not be so great as to make excessive demands on the pilot's strength when maneuvering the airplane, and must not be so low that the airplane can easily be overstressed inadvertently.

These harmonized requirements would apply up to the speed V_{FC}/M_{FC} (the maximum speed for stability characteristics) rather than the speed V_{MO}/M_{MO} (the maximum operating limit speed) specified by the current JAR 25.143(f). Requiring these maneuvering requirements to be met up to V_{FC}/M_{FC} is consistent with other part 25 stability requirements. Section 25.253, which defines V_{FC}/M_{FC}, would then be revised to reference the use of this speed in the proposed § 25.143(f). An acceptable means of compliance with § 25.143(f), including detailed interpretations of the stick force characteristics that meet these requirements, would be added to AC 25-7.

Proposal 4. Section 25.149(f) requires that the minimum control speed be determined assuming the critical engine suddenly fails during (or just prior to) a go-around from an all-engines-operating approach. For airplanes with three or more engines, § 25.149(g) requires the minimum control speed to be determined for a one-engine-inoperative landing approach in which a second critical engine suddenly fails. The

FAA proposes to revise §§ 25.149(f) through 25.149(h) to clarify and revise the criteria for establishing these minimum control speeds, V_{MCL} and V_{MCL-2}, respectively, for use during approach and landing.

The FAA proposes to clarify that V_{MCL} and V_{MCL-2} apply not only to the airplane's approach configuration(s), as prescribed in the current standards, but also to the landing configuration(s). The FAA recognizes that configuration changes occur during approach and landing (e.g., flap setting and landing gear position) and considers that the minimum control speeds provided in the AFM should ensure airplane controllability, following a sudden engine failure, throughout the approach and landing.

Applicants would have the option of determining V_{MCL} and V_{MCL-2} either for the most critical of the approach and landing configurations (i.e., the configuration resulting in the highest minimum control speed), or for each configuration used for approach or for landing. By determining the minimum control speeds in the most critical configuration, applicants would not be required to conduct any additional testing to that already required by the current standards. Only if these resulting speeds proved too constraining for other configurations would the FAA expect applicants to exercise the option of testing multiple configurations.

The FAA also proposes to add provisions to state the position of the propeller, for propeller airplanes, when establishing these minimum control speeds. For the critical engine that is suddenly made inoperative, the propeller position must reflect the most critical mode of powerplant failure with respect to controllability, as required by

§ 25.149(a). Also, since credit cannot be given for pilot action to feather the propeller during this high flightcrew workload phase of flight, the FAA proposes that V_{MCL} and V_{MCL-2} be determined with the propeller position of the most critical engine in the position it automatically achieves. For V_{MCL-2}, the engine that is already inoperative before beginning the approach may be feathered, since the pilot is expected to ensure the propeller is feathered before initiating the approach.

To assure that airplanes have adequate lateral control capability at V_{MCL} and V_{MCL-2}, the FAA proposes to require the airplane to be capable of rolling, from an initial condition of steady straight flight, through an angle of 20 degrees in not more than 5 seconds, in the direction necessary to start a turn away from the inoperative engine. This proposed addition to § 25.149 is contained in the current JAR 25.149.

The FAA is proposing guidance material for AC 25-7 to permit the applicant to additionally determine the appropriate minimum control speeds for an approach and landing in which one engine, and, for airplanes with three or more engines, two engines, are already inoperative prior to beginning the approach. These speeds, $V_{MCL(1\ out)}$, and $V_{MCL-2(2\ out)}$, would be less restrictive than V_{MCL} and V_{MCL-2} because the pilot is assumed to have trimmed the airplane for the approach with an inoperative engine (for $V_{MCL(1\ out)}$) or two inoperative engines (for $V_{MCL-2(2\ out)}$). Also, the approach and landing procedures under these circumstances may use different approach and landing flaps than for the situations defining V_{MCL} or V_{MCL-2}. These additional speeds can be used as guidance in determining the recommended procedures and speeds for a

one-engine-inoperative, or, in the case of an airplane with three or more engines, a two-engine-inoperative approach and landing.

The FAA proposes to revise § 25.125 to require the approach speed used for determining the landing distance to be equal to or greater than V_{MCL}, the minimum control speed for approach and landing with all-engines-operating. This provision would ensure that the speeds used for normal landing approaches with all-engines-operating would provide satisfactory controllability in the event of a sudden engine failure during, or just prior to, a go-around.

Proposal 5. The FAA proposes to revise the stall demonstration requirements of § 25.201 to clarify the airplane configurations and procedures used in flight tests to demonstrate stall speeds and stall handling characteristics. The list of acceptable flight characteristics used to define the occurrence of stall would also be revised. To be consistent with current practice, § 25.201(b)(1) would require that stall demonstrations also be conducted with deceleration devices (e.g., speed brakes) deployed. Additionally, the FAA proposes clarifying the intent of § 25.201(b) to cover normal, rather than failure, conditions by requiring that stalls need only be demonstrated for the "approved" configurations.

Section 25.201(c) would be revised to more accurately describe the procedures used for demonstrating stall handling characteristics. The cross-reference to § 25.103(b), currently contained in § 25.201(c)(1), would be moved to a new § 25.201(b)(4) for editorial clarity and harmony with the JAR-25 format. Reference to the pitch control reaching the aft

stop, which would be interpreted as one of the indications that the airplane has stalled, would be moved from § 25.201(c)(1) to § 25.201(d)(3).

The list of acceptable flight characteristics that define the occurrence of a stall, used during the flight tests demonstrating compliance with the stall requirements, is provided in § 25.201(d). The FAA proposes to revise this list to conform with current practices. Section 25.201(d)(1)(ii) would be removed to clarify that a rolling motion, occurring by itself, is not considered an acceptable flight characteristic for defining the occurrence of a stall. The proposed § 25.201(d)(2) would replace the criteria of § 25.201(d)(1)(iii) and 25.201(d)(2) because only deterrent buffeting (i.e., a distinctive shaking of the airplane that is a strong and effective deterrent to further speed reduction) is considered to comply with those criteria. Finally, if the airplane does not continue to pitch up after the pitch control has been pulled back as far as it will go and held there for a short period of time, the proposed § 25.201(d)(3) would define this condition as a stall. Guidance material would be added to AC 25-7 to define the length of time that the control stick must be held in this full aft position when using § 25.201(d)(3) to define a stall.

Proposal 6. Section 25.201 currently requires stalls to be demonstrated at airspeed deceleration rates (i.e., entry rates) not exceeding one knot per second. JAR 25.201 currently requires, in addition, that turning flight stalls must also be demonstrated at accelerated rates of entry into the stall (i.e., dynamic stalls). According to the JAA, the intended procedure for demonstrating dynamic stalls begins with a 1 knot

per second deceleration from the trim speed (similar to normal stalls). Then, approximately halfway between the trim speed and the stall warning speed, the flight test pilot applies the elevator control to achieve an increase in the rate of change of angle-of-attack. The final angle-of-attack rate and the control input to achieve it should be appropriate to the type of airplane and its particular control characteristics.

The AIA/AECMA petition detailed various difficulties with interpretation of the JAR-25 requirement, noted that the requirement is not contained in the FAR, and proposed that dynamic stalls be removed from JAR-25. Some of the concerns with the JAR-25 dynamic stall requirement include: (1) a significant number of flight test demonstrations for compliance used piloting techniques inconsistent with the capabilities of transport category airplanes; (2) the stated test procedures depend, to a large extent, on pilot interpretation, resulting in test demonstrations that could vary significantly for different test pilots; (3) the safety objective of the requirement is not well understood within the aviation community; and (4) the flight test procedures that are provided are inconsistent with the flight characteristics being evaluated. As a result, applicants are unable to ensure that their designs will comply with the JAR-25 dynamic stall requirement prior to the certification flight test.

In practice, FAA certification testing has typically included stall demonstrations at entry rates higher than 1 knot per second. For airplanes with certain special features, such as systems designed to prevent a stall or that are needed to provide an acceptable stall indication, higher entry rates are demonstrated to show that the system

will continue to safely perform its intended function under such conditions. These higher entry rate stalls are different, however, from the JAR-25 dynamic stalls.

Rather than simply deleting the dynamic stall requirement from JAR-25, or adding this requirement to part 25 of the FAR, the ARAC recommended harmonizing the two standards by requiring turning flight stalls be demonstrated at steady airspeed deceleration rates up to 3 knots per second. The FAA agrees with this recommendation and proposes to add the requirement for a higher entry rate stall demonstration to part 25 as § 25.201(c)(2). The current § 25.201(c)(2) would be redesignated § 25.201(c)(3). The JAA is proposing to replace the JAR-25 dynamic stall requirement with the ARAC recommendation.

The proposed higher entry rate stall demonstration is a controlled and repeatable maneuver that meets the objective of evaluating stall characteristics over a range of entry conditions that might reasonably be encountered by transport category airplanes in operational service. Some degradation in characteristics would be accepted at the higher entry rates, as long as it does not present a major threat to recovery from the point at which the pilot has recognized the stall. Guidance material is being proposed for AC 25-7 to point out that the specified deceleration rate, and associated rate of increase in angle of attack, should be established from the trim speed specified in § 25.103(b)(1) and maintained up to the point at which the airplane stalls.

The FAA proposes to revise § 25.203(c) to specify a bank angle that must not be exceeded during the recovery from the turning flight stall demonstrations. Currently, § 25.203(c) provides only a

qualitative statement that a prompt recovery must be easily attainable using normal piloting skill. By specifying a maximum bank angle limit, the FAA proposes to augment this qualitative requirement with a quantitative one.

For deceleration rates up to 1 knot per second, the maximum bank angle would be approximately 60 degrees in the original direction of the turn, or 30 degrees in the opposite direction. These bank angle limits are currently contained in JAR-25 guidance material, and have been used informally during FAA certification programs as well. For deceleration rates higher than 1 knot per second, the FAA proposes to allow a greater maximum bank angle - approximately 90 degrees in the original direction of the turn, or 60 degrees in the opposite direction. These are the same acceptance criteria currently used by the JAA to evaluate dynamic stall demonstrations.

In addition to the amendments to part 25 proposed in this notice, revisions to AC 25-7 are being proposed to ensure that the harmonized standards would be interpreted and applied consistently. AC 25-7 provides guidelines that the FAA has found acceptable regarding flight testing transport category airplanes to demonstrate compliance with the applicable airworthiness requirements. Public comments concerning the proposed revisions to AC 25-7 are invited by separate notice published elsewhere in this issue of the Federal Register.

Preliminary Regulatory Evaluation, Initial Regulatory Flexibility Determination, and Trade Impact Assessment

Three principal requirements pertain to the economic impacts of regulatory changes to the FARs. First, Executive Order 12291 directs

Federal agencies to promulgate new regulations or modify existing regulations only if the expected benefits to society outweigh the expected costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Finally, the Office of Management and Budget directs agencies to assess the effect of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this rule: 1) would generate benefits exceeding costs and is neither major as defined in the Executive Order nor significant as defined in DOT's policies and procedures; 2) would not have a significant impact on a substantial numbers of small entities; and 3) would lessen restraints on international trade. These analyses, available in the docket, are summarized below.

Regulatory Evaluation Summary

Three of the proposed 48 revisions to the flight test airworthiness standards of part 25 would require additional flight testing and engineering analysis, resulting in compliance costs of $18,500 per type certification. When amortized over a representative production run of 500 airplanes, this total cost would result in a negligible incremental cost of $37 per airplane. The FAA solicits comments concerning the incremental flight test certification costs attributable to the proposed rule.

The primary benefits of the proposed rule would be harmonization of flight test airworthiness standards with the European Joint Aviation Requirements and clarification of existing standards. The resulting increased uniformity of flight test standards would simplify

airworthiness approval for import and export purposes and would avoid some of the costs that can result when manufacturers seek type certification under both sets of standards. While not readily quantifiable, the potential cost avoidance would exceed the relatively minor incremental costs of the proposed rule.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Federal regulations. The RFA requires a Regulatory Flexibility Analysis if a proposed rule would have a significant economic impact, either detrimental or beneficial, on a substantial number of small entities. Based on FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, the FAA has determined that the proposed amendments would not have a significant economic impact on a substantial number of small entities.

Trade Impact Assessment

The proposed rule would not constitute a barrier to international trade, including the export of American airplanes to foreign countries, and the import of foreign airplanes into the United States. Instead, the proposed flight testing standards have been harmonized with those of foreign aviation authorities, thereby lessening restraints on trade.

Federalism Implications

The amended regulations proposed in this rulemaking would not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore,

in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant preparing a Federalism Assessment.

Conclusion

Because the proposed changes to standardize specific flight requirements of part 25 of the FAR are not expected to result in substantial economic cost, the FAA has determined that this proposed regulation would not be major under Executive Order 12291. Because this is an issue which has not prompted a great deal of public concern, the FAA has determined that this action is not significant under DOT Regulatory Policies and Procedures (44 FR 11034, February 25, 1979). In addition since there are no small entities affected by this proposed rulemaking, the FAA certifies, under the criteria of the Regulatory Flexibility Act, that this rule, if adopted, will not have a significant economic impact, positive or negative, on a substantial number of small entities. An initial regulatory evaluation of the proposal, including a Regulatory Flexibility Determination and Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under **FOR FURTHER INFORMATION CONTACT.**

List of Subjects

14 CFR Part 1

Air transportation, Federal Aviation Administration

14 CFR Part 25

Aircraft, Aviation safety, Federal Aviation Administration, Reporting and recordkeeping requirements

The Proposed Amendments

Accordingly, the Federal Aviation Administration (FAA) proposes to amend 14 CFR Parts 1 and 25 of the Federal Aviation Regulations (FAR) as follows:

PART 1 - DEFINITIONS AND ABBREVIATIONS

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

Authority: 49 U.S.C. app. 1347, 1348, 1354(a), 1357(d)(2), 1372, 1421 through 1430, 1432, 1442, 1443, 1472, 1510, 1522, 1652(e), 1655(c), 1657(f), and 49 U.S.C. 106(g).

2. Section 1.1 is amended by adding a new definition to read as follows:

§ 1.1 General definitions.

* * * * *

"Go-around power or thrust setting" means the maximum allowable in-flight power or thrust setting identified in the performance data.

* * * * *

PART 25 - AIRWORTHINESS STANDARDS - TRANSPORT CATEGORY AIRPLANES

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

Authority: 49 U.S.C. app. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425, 1428, 1429, 1430; 49 U.S.C. 106(g); and 49 CFR 1.47(a).

4. Section 25.119 is amended by revising paragraph (a) to read as follows:

§ 25.119 Landing climb: All-engines-operating.

* * * * *

(a) The engines at the power or thrust that is available eight seconds after initiation of movement of the power or thrust controls

from the minimum flight idle to the go-around power or thrust setting; and

* * * * *

5. Section 25.121 is amended by revising paragraph (d)(1) to read as follows:

§ 25.121 Climb: One-engine-inoperative.

* * * * *

(d) * * *

(1) The critical engine inoperative, the remaining engines at the go-around power or thrust setting;

* * * * *

6. Section 25.125 is amended by revising paragraph (a)(2) to read as follows:

§ 25.125 Landing.

* * * * *

(a) * * *

(2) A stabilized approach, with a calibrated airspeed of not less than 1.3 V_S or V_{MCL}, must be maintained down to the 50 foot height.

* * * * *

7. Section 25.143 is amended by revising paragraphs (c), (d), and (e) and adding a new paragraph (f) to read as follows:

§ 25.143 General.

* * * * *

(c) The following table prescribes, for conventional wheel type controls, the maximum control forces permitted during the testing required by paragraphs (a) and (b) of this section:

Force, in pounds, applied to the control wheel or rudder pedals	Pitch	Roll	Yaw
For transient application for pitch and roll control - two hands available for control	75	50	-
For transient application for pitch and roll control - one hand available for control	50	25	-
For transient application for yaw control	-	-	150
For sustained application	10	5	20

(d) Approved operating procedures or conventional operating practices must be followed when demonstrating compliance with the control force limitations for transient application that are prescribed in paragraph (c) of this section. The airplane must be in trim, or as near to being in trim as practical, in the immediately preceding steady flight condition. For the takeoff condition, the airplane must be trimmed according to the approved operating procedures.

(e) When demonstrating compliance with the control force limitations for sustained application that are prescribed in paragraph (c) of this section, the airplane must be in trim, or as near to being in trim as practical.

(f) When maneuvering at a constant airspeed or Mach number (up to V_{FC}/M_{FC}), the stick forces and the gradient of the stick force versus maneuvering load factor must lie within satisfactory limits. The stick

forces must not be so great as to make excessive demands on the pilot's strength when maneuvering the airplane, and must not be so low that the airplane can easily be overstressed inadvertently. Changes of gradient that occur with changes of load factor must not cause undue difficulty in maintaining control of the airplane, and local gradients must not be so low as to result in a danger of overcontrolling.

8. Section 25.145 is amended by revising paragraphs (b), (b)(3), (b)(4), and (c)(1) to read as follows:

§ 25.145 Longitudinal control

* * * * *

(b) With the landing gear extended, no change in trim control, or exertion of more than 50 pounds control force (representative of the maximum transient force that can be applied readily by one hand) may be required for the following maneuvers:

* * * * *

(3) Repeat paragraph (b)(2) except at the go-around power or thrust setting.

(4) With power off, flaps retracted, and the airplane trimmed at 1.4 V_{S1}, rapidly set go-around power or thrust while maintaining the same airspeed.

* * * * *

(c) * * *

(1) Simultaneous movement of the power or thrust controls to the go-around power or thrust setting;

* * * * *

9. Section 25.149 is amended by revising paragraphs (f), (g) and (h) to read as follows:

§ 25.149 Minimum Control Speed.

* * * * *

(f) V_{MCL}, the minimum control speed during approach and landing 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--

(1) The airplane in the most critical configuration (or, at the option of the applicant, each configuration) for approach and landing with all engines operating;

(2) The most unfavorable center of gravity;

(3) The airplane trimmed for approach with all engines operating;

(4) The most unfavorable weight, or, at the option of the applicant, as a function of weight;

(5) The propeller of the inoperative engine, if applicable, in the position it automatically achieves; and

(6) Go-around power or thrust setting on the operating engine(s).

(g) For airplanes with three or more engines, V_{MCL-2}, the minimum control speed during approach and landing 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-2} must be established with--

(1) The airplane in the most critical configuration (or, at the option of the applicant, each configuration) for approach and landing with one critical engine inoperative;

(2) The most unfavorable center of gravity;

(3) The airplane trimmed for approach with one critical engine inoperative;

(4) The most unfavorable weight, or, at the option of the applicant, as a function of weight;

(5) If applicable, the propeller of the more critical engine in the position it automatically achieves and the propeller of the other inoperative engine feathered;

(6) The power or thrust on the operating engine(s) necessary to maintain an approach path angle of 3 degrees when one critical engine is inoperative; and

(7) The power or thrust on the operating engine(s) rapidly changed, immediately after the second critical engine is made inoperative, from the power or thrust prescribed in paragraph (g)(6) of this section to-

(i) Minimum power or thrust; and

(ii) Go-around power or thrust setting.

(h) In demonstrations of V_{MCL} and V_{MCL-2}--

(1) The rudder force may not exceed 150 pounds;

(2) The airplane may not exhibit hazardous flight characteristics or require exceptional piloting skill, alertness, or strength;

(3) Lateral control must be sufficient to roll the airplane, from an initial condition of steady straight flight, through an angle of 20 degrees in the direction necessary to initiate a turn away from the inoperative engine(s), in not more than 5 seconds; and

(4) For propeller airplanes, hazardous flight characteristics must not be exhibited due to any propeller position achieved when the engine fails or during any likely subsequent movements of the engine or propeller controls.

10. Section 25.201 is amended by revising paragraphs (b), (c), and (d), redesignating paragraph (c)(2) as (c)(3), and adding new paragraphs (b)(4) and (c)(2) to read as follows:

§ 25.201 Stall demonstration.

* * * * *

(b) In each condition required by paragraph (a) of this section, it must be possible to meet the applicable requirements of § 25.203 with--

(1) Flaps, landing gear, and deceleration devices in any likely combination of positions approved for operation;

(2) Representative weights within the range for which certification is requested;

(3) The most adverse center of gravity for recovery; and

(4) The airplane trimmed for straight flight at the speed prescribed in § 25.103(b)(1).

(c) The following procedures must be used to show compliance with § 25.203:

(1) Starting at a speed sufficiently above the stalling speed to ensure that a steady rate of speed reduction can be established, apply

the longitudinal control so that the speed reduction does not exceed one knot per second until the airplane is stalled.

(2) In addition, for turning flight stalls, apply the longitudinal control to achieve airspeed deceleration rates up to 3 knots per second.

(3) As soon as the airplane is stalled, recover by normal recovery techniques.

(d) The airplane is considered stalled when the behavior of the airplane gives the pilot a clear and distinctive indication of an acceptable nature that the airplane is stalled. Acceptable indications of a stall, occurring either individually or in combination, are--

(1) A nose-down pitch that cannot be readily arrested, which may be accompanied by a rolling motion that is not immediately controllable (provided that the rolling motion complies with § 25.203(b) or (c) as appropriate);

(2) Buffeting, of a magnitude and severity that is a strong and effective deterrent to further speed reduction; or

(3) The pitch control reaches the aft stop and no further increase in pitch attitude occurs when the control is held full aft for a short time before recovery is initiated.

11. Section 25.203 is amended by revising paragraph (c) and adding new paragraphs (c)(1) and (c)(2) to read as follows:

§ 25.203 Stall characteristics.

* * * * *

(c) For turning flight stalls, the action of the airplane after the stall may not be so violent or extreme as to make it difficult, with normal piloting skill, to effect a prompt recovery and to regain control

of the airplane. The maximum bank angle that occurs during the recovery may not exceed--

(1) Approximately 60 degrees in the original direction of the turn, or 30 degrees in the opposite direction, for deceleration rates up to 1 knot per second; and

(2) Approximately 90 degrees in the original direction of the turn, or 60 degrees in the opposite direction, for deceleration rates in excess of 1 knot per second.

12. Section 25.253 is amended by revising paragraph (b) to read as follows:

§ 25.253 High-speed characteristics.

* * * * *

(b) *Maximum speed for stability characteristics,* V_{FC}/M_{FC}. V_{FC}/M_{FC} is the maximum speed at which the requirements of §§ 25.143(f), 25.147(e), 25.175(b)(1), 25.177, and 25.181 must be met with flaps and landing gear retracted. It may not be less than a speed midway between V_{MO}/M_{MO} and V_{DF}/M_{DF}, except that, for altitudes where Mach number is the limiting factor, M_{FC} need not exceed the Mach number at which effective speed warning occurs.

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Proposed Revisions to Advisory Circular 25-7
Flight Test Guide for Certification of Transport Category Airplanes

Add the following sections to paragraph 20.a.:

(1) The maximum forces given in the table in § 25.143(c) for pitch and roll control for transient application are applicable to maneuvers in which the control force is only needed for a short period. Where the maneuver is such that the pilot will need to use one hand to operate other controls (such as the landing flare, or changes of configuration or power resulting in a change of control force that must be trimmed out) the single-handed maximum control forces will be applicable. In other cases (such as takeoff rotation, or maneuvering during en route flight), the two-handed maximum forces will apply.

(2) Transient and sustained forces should be interpreted as follows:

(i) Transient forces are those control forces that result from maintaining the intended flight path during configuration changes and normal transitions from one flight condition to another, or from regaining control following a failure. It is assumed that the pilot will take immediate action to reduce or eliminate such forces by re-trimming or changing configuration or flight conditions, and consequently transient forces are not considered to exist for any significant duration.

(ii) Sustained forces are those control forces that result from normal or failure conditions and that cannot readily be trimmed out or eliminated.

Add the following sections to paragraph 20.:

d. Acceptable Means of Compliance. An acceptable means of compliance with the requirement that stick forces may not be excessive when maneuvering the airplane is to demonstrate that, in a turn for 0.5g incremental normal acceleration (0.3g above 20,000 feet) at speeds up to V_{FC}/M_{FC}, the average stick force gradient does not exceed 120 lbs/g.

e. Interpretive Material.

(1) If flight testing indicates that the limit load factor would be exceeded in maneuvering flight with a 50 pound stick force, the airplane structure shall be evaluated and found satisfactory for the anticipated load at a 50 pound stick force. The airplane will be considered to have been overstressed if limit strength has been exceeded in any critical component.

(2) Minimum Stick Force to Reach Limit Strength.

(i) A stick force of 50 pounds to reach limit strength in steady maneuver or wind-up turns is considered acceptable to demonstrate adequate minimum force at limit strength in the absence of deterrent buffeting. If heavy buffeting occurs before the limit strength condition is reached, a somewhat lower stick force at limit strength may be acceptable. The acceptability of a stick force of less than 50 pounds at the limit strength condition will depend upon the intensity of the buffet, the adequacy of the warning margin (i.e., the load factor increment between the heavy buffet and the limit strength condition), and the stick force characteristics.

(ii) This minimum stick force applies in the en route configuration with the airplane trimmed for straight flight, at all speeds above the minimum speed at which the limit strength condition can be achieved without stalling. No minimum stick force is specified for other configurations, but the requirements of § 25.143(f) are applicable in these conditions.

(3) Stick Force Characteristics.

(i) At all points within the buffet onset boundary determined in accordance with § 25.251(e), but not including speeds above V_{FC}/M_{FC}, the stick force should increase progressively with increasing load factor. Any reduction in stick force gradient with change of load factor should not be so large or abrupt as to impair significantly the ability of the pilot to maintain control over the load factor and pitch attitude of the airplane.

(ii) Beyond the buffet onset boundary, hazardous stick force characteristics should not be encountered within the permitted maneuvering envelope as limited by paragraph 20.e.(3)(iii). It should be possible, by use of the primary longitudinal control alone, to pitch the airplane rapidly nose down so as to regain the initial trimmed conditions. The stick force characteristics demonstrated should comply with the following:

(A) For normal acceleration increments of up to 0.3g beyond buffet onset, where these can be achieved, local reversal of the stick force gradient may be acceptable, provided that any tendency to pitch up is mild and easily controllable.

(B) For normal acceleration increments of more than 0.3g beyond buffet onset, where these can be achieved, more marked reversals of the stick force gradient may be acceptable. It should be possible for any tendency to pitch up to be contained within the allowable maneuvering limits without applying push forces to the control column and without making a large and rapid forward movement of the control column.

(iii) In flight tests to satisfy paragraphs 20.e.(3)(i) and (ii), the load factor should be increased until either:

(A) The level of buffet becomes sufficient to provide a strong and effective deterrent to further increase of load factor; or

(B) Further increase of load factor requires a stick force in excess of 150 pounds (or in excess of 100 pounds when beyond the buffet onset boundary) or is impossible because of the limitations of the control system; or

(C) The positive limit maneuvering load factor established in compliance with § 25.337(b) is achieved.

(4) Negative Load Factors. It is not intended that a detailed flight test assessment of the maneuvering characteristics under negative load factors should necessarily be made throughout the specified range of conditions. An assessment of the characteristics in the normal flight envelope involving normal accelerations from 1g to zero g will normally be sufficient. Stick forces should also be assessed during other required flight testing involving negative load factors. Where these assessments reveal stick force gradients that are unusually low, or that are subject to significant variation, a more detailed assessment, in the most critical of the specified conditions, will be required. This may be based on calculations provided these are supported by adequate flight test or wind tunnel data.

Replace paragraph 21.a.(3) with the following:

(3) Section 25.145(c) contains requirements associated primarily with attempting a go-around maneuver from the landing configuration. Retraction of the high-lift devices from the landing configuration should not result in a loss of altitude if the power or thrust controls are moved to the go-around setting at the same time that flap/slat retraction is begun. The design features involved with this requirement are the rate of flap/slat retraction, the presence of any flap gates, and the go-around power or thrust setting.

(i) Flap gates, which prevent the pilot from moving the flap selector through the gated position without a separate and distinct movement of the selector, allow compliance with these requirements to be demonstrated in segments. High lift device retraction must be demonstrated beginning from the maximum landing position to the first gated position, between gated positions, and from the last gated position to the fully retracted position.

(ii) The go-around power or thrust setting should be the same as is used to comply with the approach and landing climb performance requirements of §§ 25.121(d) and 25.119, and the controllability requirements of §§ 25.145(b)(3), 25.145(b)(4), 25.145(b)(5), 25.149(f), and 25.149(g). The controllability requirements may limit the go-around power or thrust setting.

Replace paragraph 21.c.(6)(ii) with the following:

(ii) Test procedure: With the airplane stable in level flight at a speed of 1.1 V_s for propeller driven airplanes, or 1.2 V_s for turbojet powered airplanes, retract the flaps to the full up position, or the next gated position, while simultaneously setting go-around power. Use the same

power or thrust as is used to comply with the performance requirement of § 25.121(d), as limited by the applicable controllability requirements. It must be possible, without requiring exceptional piloting skill, to prevent losing altitude during the maneuver. Trimming is permissible at any time during the maneuver. If gates are provided, conduct this test beginning from the maximum landing flap position to the first gate, from gate to gate, and from the last gate to the fully retracted position. (The gate design requirements are specified within the rule.) Keep the landing gear extended throughout the test.

Revise the first sentence of paragraph 23.a. by replacing "landing approach (V_{MCL})" by "approach and landing V_{MCL} and V_{MCL-2})." Revise the second sentence in the same paragraph by replacing "V_{MCL}" with "V_{MCL} and V_{MCL-2}."

Replace paragraph 23.b.(2)(iii) with the following:

(iii) During determination of V_{MCG}, engine failure recognition should be provided by:

(A) The pilot feeling a distinct change in the directional tracking characteristics of the airplane, or

(B) The pilot seeing a directional divergence of the airplane with respect to the view outside the airplane.

Replace paragraph 23.b.(3) with the following:

(3) Minimum Control Speed During Approach and Landing (V_{MCL}) - § 25.149(f).

(i) This section is intended to ensure that the airplane is safely controllable following an engine failure during an all-engines-operating approach and landing. From a controllability standpoint, the most critical case consists of an engine failing after the power or thrust has been increased to perform a go-around from an all-engines-operating approach. Section 25.149(f) requires the minimum control speed to be determined that allows a pilot of average skill and strength to retain control of the airplane after the critical engine becomes inoperative and to maintain straight flight with less than five degrees of bank angle. Section 25.149(h) requires that sufficient lateral control be available at V_{MCL} to roll the airplane through an angle of 20 degrees, in the direction necessary to initiate a turn away from the inoperative engine, in not more than five seconds when starting from a steady straight flight condition.

(ii) Conduct this test using the most critical of the all-engines-operating approach and landing configurations, or at the option of the applicant, each of the all-engines-operating approach and landing configurations. The procedures given in paragraph 23.b.(1)(ii) for V_{MCA} may be used to determine V_{MCL}, except that flap and trim settings should be appropriate to the approach and landing configurations, the power or thrust on the operating engine(s) should be set to the go-around power or thrust

setting, and compliance with all V_{MCL} requirements of §§ 25.149(f) and (h) must be demonstrated.

Add the following new sections to paragraph 23b(3):

(iii) For propeller driven airplanes, the propeller must be in the position it automatically assumes following engine failure.

(iv) At the option of the applicant, a one-engine-inoperative landing minimum control speed, $V_{MCL(1\ out)}$, may be determined in the conditions appropriate to an approach and landing with one engine having failed before the start of the approach. In this case, only those configurations recommended for use during an approach and landing with one engine inoperative need be considered. The propeller of the inoperative engine, if applicable, may be feathered throughout. The resulting value of $V_{MCL(1\ out)}$ may be used in determining the recommended procedures and speeds for a one-engine-inoperative approach and landing.

Replace and re-designate paragraphs 23.b.(4), 23.b.4(ii), and 23.b.4(ii)(A) with the following:

(4) Minimum Control Speed with One Engine Inoperative During Approach and Landing (V_{MCL}-2) - § 25.149(g).

(iii) Conduct this test using the most critical approved one-engine-inoperative approach or landing configuration (usually the minimum flap deflection), or at the option of the applicant, each of the approved one-engine-inoperative approach and landing configurations. The following demonstrations are required to determine V_{MCL-2}:

(A) With the power or thrust on the operating engines set to maintain a -3 degree glideslope with one critical engine inoperative, the second critical engine is made inoperative and the remaining operating engine(s) are advanced to the go-around power or thrust setting. The V_{MCL-2} speed is established by the procedures presented in paragraph 23.b.(1)(ii) for V_{MCA}, except that flap and trim settings should be appropriate to the approach and landing configurations, the power or thrust on the operating engine(s) should be set to the go-around power or thrust setting, and compliance with all V_{MCL-2} requirements of §§ 25.149(g) and (h) must be demonstrated.

Add the following new sections to paragraph 23.b.(4):

(ii) For propeller driven airplanes, the propeller of the engine inoperative at the beginning of the approach may be in the feathered position. The propeller of the more critical engine must be in the position it automatically assumes following engine failure.

(iii) (C) Starting from a steady straight flight condition, demonstrate that sufficient lateral control is available at V_{MCL-2} to roll the airplane through an angle of 20 degrees in the direction necessary to initiate a turn away from the inoperative engines in not more than five seconds.

(iv) At the option of the applicant, a two-engines-inoperative landing minimum control speed, $V_{MCL-2(2\ out)}$, may be determined in the conditions appropriate to an approach and landing with two engines having failed before the start of the approach. In this case, only those configurations recommended for use during an approach and landing with two engines inoperative need be considered. The propellers of the inoperative engines, if applicable, may be feathered throughout. The values of V_{MCL-2} or $V_{MCL-2(2\ out)}$ should be used as guidance in determining the recommended procedures and speeds for a two-engines-inoperative approach and landing.

Add the following new section to paragraph 23.b.:

(5) Autofeather Effects. Where an autofeather or other drag limiting system is installed and will be operative at approach power settings, its operation may be assumed in determining the propeller position achieved when the engine fails. Where automatic feathering is not available the effects of subsequent movements of the engine and propeller controls should be considered, including fully closing the power lever of the failed engine in conjunction with maintaining the go-around power setting on the operating engine(s).

Replace paragraph 29.b.(3)(i) with the following:

(i) The pitch control reaches the aft stop and is held full aft for two seconds, or until the pitch attitude stops increasing, whichever occurs later. In the case of turning flight stalls, recovery may be initiated once the pitch control reaches the aft stop when accompanied by a rolling motion that is not immediately controllable (provided the rolling motion complies with § 25.203(c)).

Remove paragraph 29.b.(3)(iii) (and redesignate paragraphs 29.b.(3)(iv) and (v) as 29.b.(3)(iii) and (iv), respectively:

~~(iii) A roll that cannot be readily arrested with normal use of lateral/directional control.~~

Replace paragraph 29.d.(3)(i) with the following:

(i) The airplane should be trimmed for hands-off flight at a speed 20 percent to 40 percent above the stall speed, with the appropriate power setting and configuration. Then, using only the primary longitudinal control, establish and maintain a deceleration (entry rate) consistent with that specified in §§ 25.201(c)(1) or 25.201(c)(2), as appropriate, until the airplane is stalled. Both power and pilot selectable trim should remain constant throughout the stall and recovery (angle of attack has decreased to the point of no stall warning).

Replace paragraph 29.d.(3)(iii) with the following:

(iii) In addition, for turning flight stalls, apply the longitudinal control to achieve airspeed deceleration rates up to 3 knots per second. The intent of evaluating higher deceleration rates is to demonstrate

safe characteristics at higher rates of increase of angle of attack than are obtained from the 1 knot per second stalls. The specified airspeed deceleration rate, and associated angle of attack rate, should be maintained up to the point at which the airplane stalls.

Replace paragraph 29.d.(3)(iv) with the following:

(iv) For those airplanes where stall is defined by full nose-up longitudinal control for both forward and aft c.g., the time at full aft stick during characteristics testing should be not less than that used for stall speed determination. For turning flight stalls, however, recovery may be initiated once the pitch control reaches the aft stop when accompanied by a rolling motion that is not immediately controllable (provided the rolling motion complies with § 25.203(c)).

Add the following new section to paragraph 29.d.(3):

(vi) In level wing stalls the bank angle may exceed 20 degrees occasionally, provided that lateral control is effective during recovery.

DRAFT WORKING MATERIAL
NOT FOR PUBLIC RELEASE

PRELIMINARY REGULATORY EVALUATION, INITIAL REGULATORY FLEXIBILITY DETERMINATION, AND TRADE IMPACT ASSESSMENT (REVISED)

PROPOSED RULE
AIRWORTHINESS STANDARDS: FLIGHT

14 CFR
PART 1
PART 25

OFFICE OF POLICY, PLANS, AND MANAGEMENT ANALYSIS
AIRCRAFT REGULATORY ANALYSIS BRANCH, APO-320
Jules A. Ganoza
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EXECUTIVE SUMMARY

This regulatory evaluation examines the economic impacts of a proposed rule that would amend the flight airworthiness standards of part 25 of the Federal Aviation Regulations (FAR). The primary aim of the proposed amendments is to harmonize certain flight requirements with standards contained in the European Joint Aviation Requirements (JAR-25). In addition, the proposal would adopt into regulation certain manufacturer flight test procedures, clarify existing requirements, and introduce editorial changes to enhance interpretation and attain consistency between supporting sections.

Three of the proposed 48 revisions would collectively add a total of approximately $18,500 per certification. When amortized over a representative production run of 500 airplanes, these costs would result in an increase of $37 per airplane. The primary benefit of harmonization with the JAR-25 would be the cost avoidance realized by manufacturers from the elimination of costly duplication of certification activities. These benefits, although not directly quantifiable, would far exceed the cost of the proposed amendments.

The proposed amendments would not have a significant economic impact on a substantial number of small entities. Additionally, the proposed rule would not constitute a barrier to international trade but rather would lessen the restraints on international trade through harmonization.

I. INTRODUCTION

This regulatory evaluation examines the economic impacts of a proposed rule to amend part 25 of the Federal Aviation Regulations (FAR). The goal of the proposed rule is to harmonize certain flight test requirements for transport category airplanes with the standards of the European Joint Aviation Requirements (JAR) 25. The proposals result from joint efforts between the Federal Aviation Administration (FAA), the European Joint Aviation Authorities (JAA), and the Aviation Rulemaking Advisory Committee (ARAC) to standardize the requirements, concepts, and procedures for certification flight testing of airplanes certificated in the U.S. and JAA countries under the FAR and JAR. Forthcoming revisions to FAA Advisory Circular 25-7, "Flight Test Guide for Certification of Transport Category Airplanes" would ensure that harmonized standards are interpreted and applied consistently.

The proposal would harmonize four sections of part 25 and JAR-25 identified by the Aerospace Industries Association of America, Inc. (AIA), and the Association Europeenne des Constructeurs de Material Aerospatial (AECMA) as containing different standards resulting in additional costs to manufacturers. By providing nearly the same flight test requirements for both the FAR and JAR, the proposed rule would accelerate airworthiness approval by enabling manufacturers to obtain type certificates under common standards. During the past decade manufacturers have employed flight test concepts and procedures exceeding minimum FAR requirements. Accordingly, many of the proposed changes would codify these industry practices into the regulations. Codification of industry flight testing practices and harmonization of FAA and JAA requirements would simplify airworthiness approval for import and export.

Most of the proposed amendments would result in either no additional costs or potential cost relief for manufacturers electing certain options. Three proposals would result in minor costs stemming from the need to perform additional flight testing and analysis. These minor costs, however, would be substantially outweighed by the savings accruing to manufacturers from avoiding the burden of certifying airplanes to dual standards. The assumptions and factors used in calculating the cost of compliance with the proposed amendments are outlined in Appendix A of this report.

II. BACKGROUND

Part 25 of the FAR contains the airworthiness standards that manufacturers must meet before the issuance of a U.S. type certificate for a transport category airplane. The JAA developed JAR 25 as a common airworthiness standard for use by the 19 countries that make up the European aviation community. While JAR 25 and FAR Part 25 are similar, they are not identical. At times, the differences are substantial. The additional efforts necessitated by non-uniform standards cause manufactures to incur costs and delays without discernible safety improvements.

On May 22, 1990, the AIA and AECMA petitioned the FAA and JAA to harmonize certain requirements contained in FAR part 25 and JAR 25. In their petition, published in the July 17, 1990 edition of the Federal Register, AIA and AECMA requested FAA to amend FAR part 25 to standardize the requirements, concepts, and procedures for certification flight testing and to enhance reciprocity between FAA and JAA. On September 26, 1991, the ARAC established the Flight Test Working Group. The Flight Test Working Group was assigned the task of

developing either a draft notice of proposed rulemaking (NPRM) or a denial of the AIA/AECMA petition. Later, the Flight Test Working Group, now named the Flight Test Harmonization Working Group, was further tasked with developing a similar proposal to amend JAR 25, as necessary, to achieve harmonization.

The Flight Test Harmonization Working Group developed the rulemaking proposal in this notice, and FAA proposes to amend FAR part 25 accordingly. These revisions would: (1) introduce the term "go-around power or thrust setting" to clarify certain FAR part 25 flight requirements; (2) revise the maximum control forces permitted for demonstrating compliance with the controllability and maneuverability requirements; (3) provide requirements for stick force and stick force gradients in maneuvering flight; (4) clarify the requirements for minimum control speed during landing approach; (5) clarify the procedural and configuration requirements for demonstrating stalls and revise the list of acceptable flight characteristics used to define the occurrence of a stall; and (6) require that stall characteristics be demonstrated for turning flight stalls at deceleration rates of up to 3 knots per second.

III. DESCRIPTION AND EVALUATION OF THE PROPOSED RULE

The proposed rule would amend one section of Part 1 and nine sections of part 25. The major aim of the proposed rule is to harmonize certain FAA flight requirements with those of the JAA while maintaining an acceptable level of safety. In addition, the proposed rule would update flight test certification standards, clarify current requirements, introduce new definitions, correct editorial errors, and reorganize certain requirements to improve referencing.

The majority of the proposed changes would not impose additional costs. Several sections would require additional flight testing and engineering analysis to conform with FAA's certification pass/fail test criteria. Appendix A of this report outlines the factors and assumptions used to estimate the cost of additional flight testing and engineering analysis.

§ 1.1 General definitions Section 1.1 would be amended with a new definition as follows: "Go around power or thrust setting" means the maximum allowable inflight power or thrust setting identified in the performance data. The addition of this definition clarifies that the applicable controllability requirements should be based on the same power or thrust setting used to determine the approach and landing climb performance contained in the approved Airplane Flight Manual (AFM). The proposed amendment would not impose additional costs.

§ 25.119 Landing Climb: All-engines-operating This section prescribes the minimum required climb gradient in the landing configuration.

Analysis of paragraph 25.119(a)

The proposal would replace the term, "takeoff position" with "go-around power or thrust setting" in paragraph 25.119 (a). Certain part 25 flight requirements involving flight conditions, other than takeoff, specify using maximum available takeoff power or thrust as indicative of the appropriate maximum in-flight power or thrust. The proposed revision acknowledges that the power or thrust setting used to obtain the maximum in-flight power or thrust (commonly referred to as the go-around power or thrust setting) usually

differs from the setting used for takeoff. These variances stem from the airspeed difference between the takeoff and go-around flight conditions and certain powerplant limitations. In this context, the proposal refers to the term "go around" as a deliberate maneuver to abort a landing attempt prior to touchdown or thrust, retracting flaps, and climbing to a safe level-off altitude. The proposed revision clarifies the intent of this section and codifies into regulation terminology commonly used in the operational environment. This adoption of new terminology would not impose additional compliance costs.

§ 25.121 Climb: One-engine-inoperative This section prescribes the flight configurations and characteristics that applicants must demonstrate to meet the climb with one engine inoperative requirements of Part 25.

Analysis of subparagraph 25.121 (d)(1)

The proposal would substitute the term, "go-around power or thrust setting" for "available takeoff power or thrust." The proposal would not result in additional compliance costs. For the same reasons as cited above for proposed paragraph 25.119 (a), this proposed change would clarify the intent of this section and codify into regulation the terminology commonly used in the operational environment.

§ 25.125 Landing This section outlines the configurations and range of conditions that applicants must comply with to satisfy the horizontal landing distance requirements of part 25.

Analysis of subparagraph 25.125 (a)(2)

The proposed revision to subparagraph 25.125 (a)(2) would add the requirement that the approach speed used to determine landing distance be not less than V_{MCL}, the minimum control speed for approach and landing with all engines operating. The proposal would require applicants to compare V_{MCL} with 1.3 V_S, the landing approach speed, at all landing weights, to determine whether V_{MCL} is greater than 1.3 V_S. The FAA estimates that this task would require 24 hours of engineering analysis at a rate of $60 per hour, and a total cost of $1,440.

If the applicant's analytical comparison establishes that V_{MCL} is greater than 1.3 V_S, then V_{MCL} would be the landing approach speed. In this event, the distance needed to land would increase because approach speeds would be faster than required by the current standards. The resulting flight performance data would be published in the AFM to supply operators with the horizontal distance needed to land and come to a complete stop at each weight, altitude, and wind within the airplane's operational limits. Accordingly, the flight performance data published in the AFM could increase the landing distance required for a particular operation or reduce the allowable landing weight for a given runway length for airplanes certificated after this rule becomes effective. Because V_{MCL} will generally only limit the approach speed at very light weights, if at all, this proposal is not expected to affect airplanes operators. The FAA solicits information from interested parties about possible impacts and costs of this proposal.

§ 25.143 General The proposed change to paragraph 25.143 (c) and the addition of new paragraph 25.143 (f) would be to provide harmonization with the corresponding controllability and maneuverability forces and flight test procedures of JAR 25. The proposed amendments to paragraphs 25.143 (d) and 25.143 (e) would also clarify flight test controllability and maneuverability requirements and make editorial changes to correct grammatical errors and improve readability.

Analysis of paragraph 25.143 (c)

Proposed paragraph 25.143 (c) would revise the table prescribing the maximum control forces for controllability and maneuverability required by paragraphs 25.143 (a) and 25.143 (b). The proposed revisions to the table would: 1) distinguish between those maneuvers in which one or two of the pilot's hands is assumed to be available for control and operation of the aircraft, 2) adjust the permissible force to be applied when one or two hands are used, 3) specify that prescribed control forces apply only to conventional wheel type controls, and 4) replace the terms "temporary" and "prolonged" with "transient" and "sustained", respectively. Transient forces refer to those control forces resulting from maintaining the intended flight path during those conditions that can be readily eliminated or reduced by re-trimming or changing flight conditions. Sustained forces are defined as those control forces resulting from normal or failure conditions that cannot readily be trimmed out or eliminated.

The proposal would reduce the maximum permissible control forces to be applied during a maneuver when only one hand is assumed to be available. The proposed

lower control forces would be harmonized with the control force limits now prescribed by JAR 25.143 (a). The proposed revision would codify flight test procedures that recognize that control force limits may differ when using other than wheel type controls such as sidestick and other type of controls. Finally, the substitution of the terms "transient" and "sustained" in lieu of "temporary" and "prolonged" are included to enhance harmonization and promote understanding.

The proposed redefinitions of acceptable pilot forces clarify these requirements and improve interpretation. Manufacturers have estimated that the elimination of subjective and multiple pilot evaluations would reduce flight testing by one to two hours. Using the cost parameters presented in Appendix A of this report, the proposal could relieve manufacturers of costs ranging between $3,500 and $7,000 per type certification.

Analysis of paragraph 25.143 (d)

Proposed paragraph 25.143 (d) is rewritten to improve comprehension. The proposal would substitute the word "transient" for "temporary." The proposed revision is an editorial clarification of an existing requirement.

Analysis of paragraph 25.143 (e)

The proposal would editorially revise paragraph 25.143 (e) to clarify the requirements for control force limitations. The proposal substitutes the term "sustained" for "prolonged." The proposed change is an editorial clarification of an existing requirement.

Analysis of paragraph 25.143 (f)

The proposed amendment would introduce JAR 25.143 (f) requirements on control force characteristics during maneuvering flight into the FAR as a new paragraph 25.143 (f). Current JAR 25.143 (f) requirements apply to the speed $V_{MO}/_{MO}$ (maximum operating speed limit). Proposed FAR paragraph 25.143 (f) specifies that when maneuvering at a constant air speed or Mach number up to V_{FC}/M_{FC} (maximum speed for stability characteristics), the stick forces and the gradient of the stick force gradient versus maneuvering load factor must lie within satisfactory limits. The proposal would harmonize these requirements and adopt into rule a current industry practice. The proposal would not result in additional costs.

§ 25.145 Longitudinal control The proposal would make four changes to this section. The following revisions in terminology and editorial corrections would not impose additional costs on applicants.

Analysis of paragraph 25.145 (b)

The proposal would substitute the word "transient" with the word "temporary" in the phrase, "representative of the maximum temporary force." The proposed substitution is consistent with the proposed revisions to paragraphs 25.143 (d) and (e).

Analysis of subparagraph 25.145 (b)(3)

The proposal substitutes the term "takeoff power" with "go-round power or thrust setting." The term "go around power or thrust setting" more accurately describes that the power or thrust setting used to obtain the maximum in-

flight power or thrust usually differs from the setting used for takeoff. The proposed editorial substitution would make this subparagraph consistent with the proposed revisions to § 1.1 and §§ 25.119, 25.121 (d), 25.145 (b)(4), 25.145 (b)(5), 25.145 (c)(1), 25.149 (f)(6) and 25.149 (g)(7)(ii).

Analysis of subparagraph 25.145 (b)(4)

The proposed rule substitutes the phrase "apply takeoff power rapidly" with the phrase "rapidly set go-around power or thrust." The proposed editorial substitution would make this subparagraph consistent with the proposed revisions to § 1.1 and §§ 25.119, 25.121 (d), 25.145 (b)(3), 25.145 (b)(5), 25.145 (c)(1), 25.149 (f)(6) and 25.149 (g)(7)(ii).

Analysis of subparagraph 25.145 (c)(1)

This subparagraph would be editorially revised to clarify its intent. Additionally, the term "takeoff power" would be replaced by "go-around power or thrust setting" to adopt into regulation the terminology commonly used in the operational environment. The proposed change could make this consistent the proposed revisions to § 1.1, and §§ 25.119, 25.121 (d), 25.145 (b)(3), 25.145 (b)(4), 25.145 (b)(5), 25.149 (f)(6) and 25.149 (g)(7)(ii).

§ 25.149 Minimum Control Speed Current § 25.149 addresses the procedures applicants must use in establishing the minimum control speeds during landing approach. The FAA proposes to make 19 revisions to paragraphs (f) through (h) of this section to clarify and harmonize the criteria for establishing minimum control speeds, V_{MCL} and V_{MCL-2}, for use during approach and landing. The proposed amendments also include provisions for propeller airplanes when

establishing minimum control speed and add flight test requirements currently contained in JAR-25.149.

The existing rule requires applicants to establish a V_{MCL} value assuming that one critical engine fails during a go-around following an approach to landing with all engines operating. The existing rule also requires that applicants establish corresponding V_{MCL-2} values for failures of a second critical engine during an approach with one critical engine already inoperative. The existing rule requires applicants to consider the "approach" configuration in establishing V_{MCL} and V_{MCL-2}. The proposal would require that the "landing" configuration be considered as well. The proposed revisions would not require applicants to perform additional tests and analysis. Accordingly, no costs are attributed to the proposed changes. These proposals would merely harmonize the regulations, clarify existing requirements, and adopt into regulation existing industry practices. However, the proposed V_{MCL} and V_{MCL-2} standards could require applicants, electing certain options, to perform a small amount of additional flight testing and related engineering review and computer analysis. Past certification programs have analytically derived multiple configuration versions of V_{MCL-2} under various engine inoperative and weight conditions. The FAA believes that a significant amount of this data would apply in future certification programs.

Analysis of paragraph 25.149 (f)

The proposed editorial revision would replace the term "landing approach" with "landing and approach" to clarify that the minimum control speed applies to

both of these distinct but related phases of flight testing. No cost is attributed to this proposed amendment.

Analysis of subparagraph 25.149 (f)(1)

Current subparagraph 25.149 (f)(1) requires that minimum control speed be established with the airplane in the "most critical configuration" for approach with all engines operating. The proposal would allow applicants the option of establishing V_{MCL} in the "most critical configuration" or "each configuration" for approach and landing. If the applicant considers V_{MCL} from the most critical configuration to be too constraining when used to determine speeds, the proposed rule would allow the applicant the latitude of performing tests to establish V_{MCL} for other configurations. The FAA believes that applicants would exercise the option provided by the proposal only if they would derive some net benefit. No cost is attributed to this proposal because it permits the applicant to continue the current practice of testing only the most critical configuration.

The proposal further revises the word "approach" to read "approach and landing" to emphasize that the criteria for establishing minimum control speed is applicable to the two related but distinct phases of flight testing. The proposed amendment would harmonize this subparagraph and make it consistent with related revisions.

Analysis of subparagraph 25.149 (f)(4)

This subparagraph would be revised to state more clearly that V_{MCL} must be established with "the most unfavorable weight" rather than with "the maximum

sea level landing weight." The proposal acknowledges that the maximum sea level landing weight may not represent the most critical condition needed to determine the most unfavorable weight as a prerequisite for establishing minimum control speed. The proposed revision would allow applicants the option of establishing V_{MCL} "as a function of weight" instead of "any lesser weight." If the most critical weight constrains operations at other weights, the applicant may elect to determine V_{MCL} appropriate for each weight. The FAA believes that applicants would exercise the options provided by the proposal only if they would benefit. No cost is attributed to this proposal because it permits the applicant to continue the current practice of testing only the most unfavorable weight. The proposed change would harmonize this subparagraph and make it consistent with related revisions.

Analysis of subparagraph 25.149 (f)(5)

The proposal would redesignate current subparagraph (5) as new subparagraph (6). Proposed new subparagraph (5) adds a harmonizing provision prescribing the position of the propeller of the inoperative engine(s), if applicable, when establishing V_{MCL}. The proposal would codify the standing certification practice and FAA policy of leaving the propeller of the inoperative engine in the position it automatically achieves. There would be no additional cost associated with the proposed amendment.

Analysis of subparagraph 25.149 (f)(6)

The proposal would relocate the intent of current subparagraph 25.149 (f)(5) here. The proposal editorially revises this subparagraph by substituting the phrase "maximum available takeoff power" with "go-round power or thrust

setting." As discussed in the analysis of subparagraph 25.145 (b)(3) above, the phrase "go around power or thrust setting" more precisely defines that the power or thrust setting used to obtain maximum in-flight power or thrust usually differs from the setting used for takeoff. The proposed revision would make this subparagraph consistent with the proposed addition to § 1.1 and revisions to §§ 25.119, 25.121 (d), 25.145 (b)(3), 25.145 (b)(4), 25.145 (b)(5), 25.145 (c)(1), ~~25.149 (f)(6)~~ and 25.149 (g)(7)(ii).

Additionally, the proposed redesignation of the term "engine" to "engine(s)" would extend the applicability of this subparagraph to all operating engines. No additional costs are attributed to the proposed amendment. The proposal is a clarification and reflects existing industry practice and FAA certification policy.

Analysis of paragraph 25.149 (g)

The proposal editorially revises the word "approach" to read "approach and landing." The proposed revision would emphasize that the criteria for establishing minimum control speed for airplanes with three or more engines applies to these two related but distinct phases of flight testing. The proposal is a clarification and would not impose additional costs.

Analysis of subparagraph 25.149 (g)(1)

The current rule requires that the applicant establish V_{MCL-2}, the minimum control speed in the "most critical configuration" for "approach" with the critical engine inoperative. The proposed amendment would add the

requirement that V_{MCL-2} also be established for the "landing" phase of flight. The proposal would also provide the applicant the option of establishing V_{MCL-2} at each configuration. The revision recognizes that there may be more than one critical configuration and that the applicant may elect to extend testing to all configurations. If the applicant considers V_{MCL-2} from the most critical configuration to be too constraining when used to determine speeds, the proposed rule would allow the applicant the latitude of performing tests to establish V_{MCL-2} for other configurations. The FAA believes that applicants would exercise the option provided by the proposal only if they would derive some net benefit. No cost is attributed to this proposal because it permits the applicant to continue the current practice of testing only the most critical configuration.

The proposal further revises the word "approach" to read "approach and landing" to emphasize that the criteria for establishing minimum control speed is applicable to the two related but distinct phases of flight testing. The proposed editorial revision is a clarification and would make this section consistent with related revisions.

Analysis of subparagraph 25.149 (g)(3)

The proposal makes one minor editorial change to this subparagraph. The word "the" is replaced with the word "one" to affirm that airplanes with three or more engines may have more than one critical engine. The proposal would adopt into rule the current certification practice of considering more than one engine as critical when establishing minimum control speed during landing.

Analysis of subparagraph 25.149 (g)(4)

The proposal would amend this subparagraph to more clearly describe that V_{MCL-2} must be established with "the most unfavorable weight" rather than with "the maximum sea level landing weight." This acknowledges that the prescribed maximum sea level landing weight may not represent the condition needed to determine the most unfavorable weight for establishing minimum control speed. The proposed revision would also allow applicants the option of establishing V_{MCL-2} "as a function of weight" instead of "any lesser weight." If the most critical weight constrains operations at other weights, the applicant may elect to determine the V_{MCL-2} appropriate for each weight. The FAA believes that applicants would exercise the options provided by the proposal only if they would derive some net benefit. No cost is attributed to this proposal because it permits the applicant to continue the current practice of testing only the most unfavorable weight. The proposed amendment would harmonize this subparagraph and make it consistent with related revisions.

Analysis of subparagraph 25.149 (g)(5)

The proposal redesignates current subparagraph (5) as new subparagraph (6). Proposed new subparagraph (5) adds a harmonizing provision prescribing, if applicable, that the propeller of the engine that fails be in the position it automatically achieves when establishing V_{MCL-2}. The proposal permits credit for automatic feathering systems but recognizes that automatic feathering mechanisms do not always work. Accordingly, the proposal would require applicants to show that automatic feathering systems are sufficiently reliable. The proposed amendments would not result in additional costs. The

proposed revision would codify the present certification practice of demonstrating the reliability of automatic feathering systems.

Analysis of subparagraph 25.149 (g)(6)

The proposal renumbers current subparagraph (6) as paragraph (7). The word "engines" would be modified to read "engine(s)." The proposed revision explains that under certain conditions only one engine may be operational. The proposal clarifies that minimum control speed for approach and landing is to be maintained in situations where a second critical engine suddenly fails and only one or two engines remain operational.

Analysis of subparagraph 25.149 (g)(7)

The proposed rule would editorially revise the word "engines" to read "engine(s)." The proposed revision recognizes that under certain conditions only one engine may be operational. The proposal is a clarification and would codify the current certification practice of changing the power or thrust used when an engine is inoperative to a different power or thrust setting when a second engine suddenly becomes inoperative.

Analysis of subparagraph 25.149 (g)(7)(i)

The proposal deletes the unnecessary word "available" from this subparagraph.

Analysis of subparagraph 25.149 (g)(7)(ii)

The proposed rule substitutes the phrase "maximum available takeoff power or thrust" with "go-around power or thrust setting." The proposal would clarify that the term "go around power or thrust setting" more accurately describes

that the power or thrust setting used to obtain the maximum in-flight power or thrust usually differs from the setting used for takeoff. The proposed editorial change would make this subparagraph consistent with the proposed revisions to § 1.1 and §§ 25.119, 25.121 (d), 25.145 (b)(3), 25.145 (b)(4), 25.145 (b)(5), 25.145 (c)(1), 25.149 (f)(6).

Analysis of paragraph 25.149 (h)

This paragraph establishes the rudder control forces required to maintain control at V_{MCL} and V_{MCL-2}. The proposal would reorganize the paragraph to clarify and simplify its requirements. The proposal would delete the nonessential statement "nor may it be necessary to reduce the power or thrust of the operating engines," because the requirements concerning thrust levels are adequately addressed in proposed paragraphs 25.149 (f)(6), 25.149 (g)(6), and 25.149 (g)(7).

Analysis of subparagraph 25.149 (h)(1)

The proposal editorially revises paragraph 25.149 (h) by moving the requirement that rudder control forces may not exceed 150 pounds to proposed subparagraph 25.149 (h)(1).

Analysis of subparagraph 25.149 (h)(2)

The proposal designates the second sentence in paragraph 25.149 (h) as proposed new subparagraph 25.149 (h)(2). The sentence "the airplane may not assume any dangerous attitude" is replaced by "the airplane may not exhibit any hazardous flight characteristics." The proposed revision improves readability and clarifies the intent of the rule.

Analysis of subparagraph 25.149 (h)(3)

The proposal would add a requirement that airplanes have enough lateral roll capability at the minimum control speed to roll through an angle of 20 degrees in not more than 5 seconds to start a turn away from the inoperative engine. The proposed revision would harmonize this subparagraph with the corresponding requirements of JAR 25.149. The FAA estimates that this requirement would add 15 minutes flight testing, a cost of approximately $875. Analysis of the resulting flight data would be performed by an aerospace engineer in 16 hours at a burdened rate of $60 per hour, a cost of $960. The proposed amendment would therefore add an incremental cost of $1,835 per type certification.

Analysis of subparagraph 25.149 (h)(4)

New subparagraph (h)(4) would add a provision for propeller airplanes requiring that hazardous flight characteristics must not be exhibited due to any propeller position achieved when the engine fails or during any likely subsequent movement of the engine or propeller controls. There are no costs attributed to this proposal. The proposal would adopt into regulation existing certification flight test practice and policy.

§ 25.201 Stall demonstration This section describes the airplane configurations and procedures that applicants must use to demonstrate stall speeds and stall handling characteristics. The proposal would make 12 changes to this section. The proposed changes revise the list of acceptable flight characteristics used to define the occurrence of a stall and clarify and more accurately describe stall demonstration requirements.

Analysis of paragraph 25.201 (b)

The proposal substitutes the word "either" with "each" to clarify that the intent of this paragraph is to cover normal rather than failure conditions by requiring that stalls need only be demonstrated for the approved configurations specified in § 25.203. The proposal coincides with current industry practice.

Analysis of subparagraph 25.201 (b)(1)

The proposal would require the inclusion of "deceleration devices" in stall characteristics demonstrations in any likely combination of positions approved for operation. Past certification programs have included all deceleration devices (e.g., speed brakes) in this phase of flight testing. The proposal codifies into rule an existing industry practice and would not impose additional costs.

Analysis of subparagraph 25.201 (b)(2)

The proposal would make a minor editorial change by deleting the word "and" from the end of this subparagraph.

Analysis of subparagraph 25.201 (b)(3)

The proposal would make a minor editorial change by adding the word "and" to the end of this subparagraph.

Analysis of subparagraph 25.201 (b)(4)

Proposed new subparagraph 25.201 (b)(4) would add that for stall demonstration the airplane be trimmed for straight flight at the speed prescribed in

subparagraph 25.103 (b)(1). The proposal moves the cross-reference to subparagraph 25.103 (b) here for editorial clarity and harmony with the JAR 25 format. No incremental costs are attributed to the proposed revision since it reflects current industry practice and current FAA certification policy.

Analysis of paragraph 25.201 (c)

The proposal would revise this paragraph by replacing the word "procedure" with "procedures." The proposed editorial revision would harmonize this paragraph and would not impose additional costs.

Analysis of subparagraph 25.201 (c)(1)

Subparagraph (c)(1) would be editorially revised to more accurately describe the procedures for demonstrating stall handling characteristics. The proposal moves the cross reference to paragraph 25.103 (b) to new subparagraph 25.201 (b)(4) for editorial clarity and harmony with the JAR 25 format.

Analysis of subparagraph 25.201 (c)(2)

The proposal would harmonize these requirements with the stall demonstration provisions to be specified in the corresponding section of the JAR. The proposal would redesignate this subparagraph in its entirety as new subparagraph 25.201 (c)(3). Proposed new subparagraph 25.201 (c)(2) would add the requirement that turning flight stalls must also be met at airspeed deceleration rates up to 3 knots per second. In practice, FAA certification testing and manufacturer's flight stall maneuvers have routinely been accomplished at deceleration entry rates of 1 to 2 knots per second. The specific addition of a more stringent flight stall maneuver would require

applicants to perform additional tests during the preparatory and demonstration phases of flight testing. This would involve one to two stall maneuvers for each of the 6 to 8 probable flap/slat settings likely to exist on future airplane designs. FAA estimates that performing these tests would require an additional 3 hours of flight testing at a cost of $3,500 per hour, totalling $10,500. Evaluation of the resulting flight test data would require an additional 80 hours of engineering analysis at $60 per hour, a total cost of $4,800. Accordingly, the combined cost of compliance with the new requirements of proposed subparagraph 25.201 (c)(2) is estimated to be $15,300 per type certification.

Analysis of subparagraph 25.201 (c)(3)

The proposal would redesignate current subparagraph 25.201 (c)(2) as new 25.201 (c)(3).

Analysis of paragraph 25.201 (d)

Paragraph 25.201 (d) lists the acceptable flight characteristics that must be used by applicants when demonstrating compliance with part 25 stall requirements. The proposal reassigns the requirements and definitions in subparagraph 25.201 (d)(1) to new proposed paragraph 25.201 (d). The proposal revises this paragraph to clarify and more precisely describe the flight characteristics used to define the occurrence of a stall. The proposed amendment aligns with current certification practice and would not impose additional costs.

Analysis of subparagraph 25.201 (d)(1)

Subparagraphs 25.201 (d)(1)(i) and 25.201 (d)(1)(ii) would be redesignated as proposed 25.201 (d)(1). The proposal removes subparagraph 25.201 (d)(2)(ii) as a stand alone item to clarify that a rolling motion, occurring by itself, is not considered an acceptable flight characteristic for defining the occurrence of a stall. In addition, proposed new 25.201 (d)(1) would specify that an acceptable indication of a stall, occurring either individually or in combination, is defined as "a nose-down pitch that cannot be readily arrested, which may be accompanied by a rolling motion that is not immediately controllable (provided that the rolling motion complies with subparagraph 25.203 (b) or (c), as appropriate)." No costs are attributed to this provision. The proposal would revise this subparagraph to conform with current certification practice.

Analysis of subparagraph 25.201 (d)(2)

Proposed subparagraph 25.201 (d)(2) would replace the criteria of subparagraphs 25.201 (d)(1)(iii) and 25.201 (d)(2) now used to describe the occurrence of a stall. The proposal deletes the current criteria and replaces it with "Buffeting, of a magnitude and severity that is a strong and effective deterrent to further speed reduction; or". No cost is attributed to this provision. The proposal is clarifying and conforms with industry flight test practice that only deterrent buffeting is considered to comply with the criteria defining the occurrence of a stall.

Analysis of subparagraph 25.201 (d)(3)

Proposed new 25.201 (d)(3) would be added to the list of acceptable flight characteristics that define a stall. New subparagraph 25.201 (d)(3) proposes that if the airplane does not continue to pitch up after the pitch control has been pulled back as far as it will go and held there for a short period of time, this condition be defined as a stall. The proposed addition conforms with current flight testing certification practice and would not cause applicants to incur additional costs.

§ 25.203 Stall Characteristics This section describes the procedural and configuration requirements for demonstrating stalls. Current paragraph 25.203 (c) prescribes that, for turning flight stalls, the action of the airplane after the stall may not be so violent or extreme as to make it difficult to effect a prompt recovery.. The stated procedure is subjective in nature and test results could vary significantly for different test pilots. The proposal would add two new paragraphs to require that bank angle not exceed a specified value during the recovery from the turning flight stall demonstrations. The proposal would harmonize these requirements with the existing criteria contained in JAR 25 guidance material. Forthcoming revisions to AC 25-7 will further ensure uniform interpretation for turning flight stall criteria.

Analysis of paragraph 25.203 (c)

The proposed rule makes one editorial revision to this paragraph. The proposal adds the phrase, "The maximum bank angle that occurs during the recovery may not exceed" at the end of this paragraph. The proposed revision

would be placed here to provide a logical connection for the addition of proposed new subparagraphs 25.203 (c)(1) and (2).

Analysis of subparagraph 25.203 (c)(1)

The proposed rule would add the harmonizing requirement that for turning flight stalls, the maximum angle that occurs during the recovery period may not exceed "approximately 60 degrees in the original direction of the turn, or 30 degrees in the opposite direction, for deceleration rates up to 1 knot per second; and..." The proposal would codify into regulation an FAA flight policy certification practice patterned after the criteria used by European manufacturers. Hence, the proposed revision would not cause applicants to incur additional costs.

Analysis of subparagraph 25.203 (c)(2)

The proposal would add the harmonizing requirement that for turning flight stalls, the maximum angle that occurs during the recovery period may not exceed "approximately 90 degrees in the original direction of the turn, or 60 degrees in the opposite direction, for deceleration rates in excess of 1 knot per second; and...." The proposed amendment would adopt into regulation a flight certification practice based on the criteria contained in JAR 25 guidance material. For the same reasons as cited in proposed subparagraph 25.203 (c)(1), the proposal would not cause applicants to incur additional costs.

§ 25.253 High-speed characteristics This section prescribes the operating procedures and configuration requirements that applicants must meet for speed increase and recovery characteristics.

Analysis of paragraph 25.253 (b)

Paragraph 25.143 (f) would be added to this section as a reference. The editorial revision would make this section consistent with the proposed revision to § 25.143, General.

IV. SUMMARY OF COSTS

Table 1 summarizes estimates of the costs that the proposed rule would impose on manufacturers of transport category airplanes. The combined cost of $18,500 per type certification is attributed to the additional flight testing and engineering analysis that would result from the proposed rule. When amortized over a representative production run of 500 airplanes[1], this total cost results in an incremental cost of $37 per airplane. In comparison with the total cost of developing and certifying a transport category airplane to Part 25 standards (varying between $300 and $500 million), the cost of the proposed rule would be negligible.

Many of the proposed changes reflect current flight testing and analytical practices. Some of the proposed revisions are clarifications aimed at improving understanding of complex flight testing requirements. There is uncertainty, however, about the potential impact on operators that may result

[1] Source: World Jet Airplane Inventory - Year-End 1992 - Boeing Commercial Airplane Group - Table 4 -Total World Jet Airplane Deliveries 1952-1992

from the V_{MCL} requirements of proposed subparagraph 25.125 (a)(2). Accordingly, the FAA solicits comments on these and other certification costs that might result from the proposed rule.

TABLE 1

SUMMARY OF COSTS PER TYPE CERTIFICATION

Section	Type of Cost	Cost
25.125 (a)(2)	Analysis	$1,440
25.149 (h)(3)	Flight Test /Analysis	$1,835
25.201 (c)(2)	Flight Test /Analysis	$15,300
Total Costs		$18,575

V. BENEFITS

The primary benefits of the proposed rule would be harmonization and clarification of flight test airworthiness requirements. The proposed revisions reflect the efforts of the FAA and the JAA to develop a common set of airworthiness standards. The resulting increased uniformity of flight test standards would simplify airworthiness approval for import and export purposes and would avoid some of the costs that can result when manufacturers seek type certification to both standards. As a result of harmonization, applicants would be relieved of the costly burden of demonstrating, through validation flight testing and/or analytical processes, that designs certificated to U.S. standards also meet the requirements of the JAA. These additional expenditures frequently do not have a corresponding safety value. The FAA is

unable to quantitatively estimate the savings that would accrue to manufacturers from avoiding the duplication of certification activities. Other unquantifiable benefits would also result from the efficiency and clarification aspects of the proposals. Many provisions would clarify existing requirements, thereby eliminating confusion about specific flight testing configurations and standards needed for product certification. The FAA believes that the benefits of the proposed rule would far outweigh its relatively modest costs.

VI. OUTLINE SUMMARY OF PROVISIONS

The table below summarizes the sections that would be revised by the proposed rule and the estimated cost and benefit of each.

Section	Cost Per Type Certification	Benefits
Section 1.1 General	None	Editorial Reference
Section 25.119 Landing: Climb-All engines operating		
Paragraph 25.119 (a)	None	Clarification
Section 25.121 Climb:One engine-inoperative		
Subparagraph 25.121 (d)(1)	None	Clarification
Section 25.125 Landing		
Subparagraph 25.125 (a)(2)	$1,440	Clarification
Section 25.143 General		
Paragraph 25.143 (c)	None	Potential Cost Relief ($3,500 - $7,000) /Harmonization
Paragraph 25.143 (d)	None	Clarification
Paragraph 25.143 (e)	None	Clarification
Subparagraph 25.143 (f)	None	Harmonization
Section 25.145 Longitudinal Control		
Paragraph 25.145 (b)	None	Clarification
Subparagraph 25.145 (b)(3)	None	Clarification

Section	Cost Per Type Certification	Benefits
Subparagraph 25.145 (b)(4)	None	Clarification
Subparagraph 25.145 (c)(1)	None	Clarification
Section 25.149 Minimum Control Speed		
Paragraph 25.149 (f)	None	Clarification
Subparagraph 25.149 (f)(1)	None	Harmonization
Subparagraph 25.149 (f)(4)	None	Harmonization
Subparagraph 25.149 (f)(5)	None	Harmonization
Subparagraph 25.149 (f)(6)	None	Clarification
Paragraph 25.149 (g)	None	Clarification
Subparagraph 25.149 (g)(1)	None	Harmonization
Subparagraph 25.149 (g)(3)	None	Codification
Subparagraph 25.149 (g)(4)	None	Harmonization
Subparagraph 25.149 (g)(5)	None	Harmonization
Subparagraph 25.149 (g)(6)	None	Clarification
Subparagraph 25.149 (g)(7)	None	Clarification
Subparagraph 25.149 (g)(7)(i)	None	Clarification
Subparagraph 25.149 (g)(7)(i)(ii)	None	Clarification
Paragraph 25.149 (h)	None	Clarification
Subparagraph 25.149 (h)(1)	None	Editorial
Subparagraph 25.149 (h)(2)	None	Clarification
Subparagraph 25.149 (h)(3)	$1,835	Harmonization
Subparagraph 25.149 (h)(4)	None	Codification

Section	Cost Per Type Certification	Benefits
Section 25.201 Stall Demonstration		
Paragraph 25.201 (b)	None	Clarification
Subparagraph 25.201 (b)(1)	None	Codification
Subparagraph 25.201 (b)(2)	None	Clarification
Subparagraph 25.201 (b)(3)	None	Clarification
Subparagraph 25.201 (b)(4)	None	Harmonization
Subparagraph 25.201 (c)(1)	None	Harmonization
Subparagraph 25.201 (c)(2)	$15,300	Harmonization
Subparagraph 25.201 (c)(3)	None	Clarification
Paragraph 25.201 (d)	None	Codification
Subparagraph 25.201 (d)(1)	None	Codification
Subparagraph 25.201 (d)(2)	None	Codification
Subparagraph 25.201 (d)(3)	None	Codification
Section 25.203 Stall Characteristics		
Paragraph 25.203 (c)	None	Clarification
Subparagraph 25.203 (c)(1)	None	Harmonization
Subparagraph 25.203 (c)(2)	None	Harmonization
Section 25.253 High Speed Characteristics		
Subparagraph 25.253 (b)	None	Clarification

VII. REGULATORY FLEXIBILITY DETERMINATION

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Federal regulations. The RFA requires a Regulatory Flexibility Analysis if a proposed rule would have a significant economic impact, either detrimental or beneficial, on a substantial number of small entities. Based on FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, the FAA has determined that the proposed amendments would not have a significant economic impact on a substantial number of small entities.

VIII. TRADE IMPACT ASSESSMENT

The proposed rule would not constitute a barrier to international trade, including the export of American airplanes to foreign countries and the import of foreign airplanes into the United States. Instead, the proposed flight testing standards have been harmonized with those of foreign aviation authorities, thereby lessening restraints on trade.

APPENDIX A

ESTIMATING METHODS AND FACTORS

The following factors are used to calculate the incremental costs of flight testing and engineering analysis requirements.

- Cost of certification flight testing for a Part 25 airplane -- $3,500 per hour.
- Aircraft operating costs are based on the variable operating costs of a 2-engine wide-body airplane, consisting of flight crew, fuel and oil, and maintenance .
- Cost of fuel and oil per hour -- $860.
- Cost of maintenance per hour -- $70.
- Flight hour to maintenance ratio for a test aircraft -- 12 to 1.
- Maintenance cost per flight hour -- $840 ($70 X 12).
- An 8-person flight test crew is assumed, comprised of 2 flight deck crewmembers, 2 flight test (aerospace) engineers, and 4 flight test equipment technicians.
- Burdened rate of flight deck crewmembers -- $150 per hour.
- Burdened rate of aerospace engineers -- $60 per hour.
- Burdened rate of flight test technicians -- $45 per hour.
- All hourly flight test crew costs are multiplied by a factor of 3 to account for the time dedicated to pre-flight, test flight, and post-flight activities.
- Cost of performing engineering and computer analysis -- $60 per hour
- All monetary values are expressed in 1993 dollars.

ARAC WG Report #1
Report from the Flight Test Harmonization Working Group

Rule Section: FAR/JAR 25X1516 TASK #1

What is the underlying safety issue addressed by the FAR/JAR?:

There may be speeds above which it is unsafe to extend devices into the air stream, such as spoilers, speed brakes, ram air turbines, thrust reversers, and landing lights, or to open windows or doors. Limitations must be established and made available to the flightcrew to ensure safe operation.

What are the current FAR and JAR standards?: see below

Current FAR text:

None.

Current JAR text:

JAR 25X1516 Other speed limitations

Any other limitation associated with speed must be established. (See also ACJ 25X1516.)

What are the differences in the standards and what do these differences result in?:

The FAR does not have an explicit requirement to mandate that any other limitation associated with speed be established, while the JAR does. The FAR relies on § 25.1501(a), "Each operating limitation specified in §§25.1503 and 25.1533 **and other limitations and information necessary for safe operation must be established**," to accomplish the same goal. There are no practical differences resulting from the difference in the standards.

What, if any, are the differences in the means of compliance?:

FAA AC 25.1581-1 Airplane Flight Manual

Paragraph 2b(7)(vi)

(vi) Any other limiting speeds for extendable devices other than the landing gear should be included as applicable (e.g., spoilers, thrust reversers, landing lights, ram air turbines (RAT), windows that may be opened in flight, etc.).

ACJ 25X1516

Speed limitations for devices such as spoilers, speed brakes, high lift devices, thrust reversers, landing lights and the opening of doors and direct vision windows, should be included.

What is the proposed action?:

Harmonize to the JAR standard.

What should the harmonized standard be?:

See below

Proposed text of harmonized standard:

FAR/JAR 25.1516:

Any other limitation associated with speed must be established.

How does this proposed standard address the underlying safety issue?:

It continues to address the underlying safety issue by requiring the airspeed limitations to be established for devices that can open into the air stream in flight.

Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain

Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain

What other options have been considered and why were they not selected?:

This item was proposed as an enveloping item. No other options were considered.

Who would be affected by the proposed change?:

Manufacturers and operators of transport category airplanes could be affected by the proposed change. However, since the proposed change does not result in any practical changes in requirements, there will not be any effect.

To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?:

None.

Is existing FAA advisory material adequate? (If not, what advisory material should be adopted?):

No additional advisory material is needed. The advisory material will be fully harmonized when JAA AMJ 25.1581-1 is published as part of Change 15 to JAR-25. The JAA will delete ACJ 25X1516.

How does the proposed standard compare to the current ICAO standards?:

The proposed standards are consistent with, but more detailed than the ICAO standards.

Does the proposed standard affect other harmonization working groups?:

No.

What is the cost impact of complying with the proposed standard?:

None.

Does the working group want to review the draft NPRM prior to publication in the *Federal Register*?:

Yes.

In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain:

Yes, the "Fast Track" process is appropriate for this project. The project is neither too complex nor too controversial to use the "Fast Track" process.

ARAC WG Report #2
Report from the Flight Test Harmonization Working Group

Rule Section: FAR/JAR 25.1527

What is the underlying safety issue addressed by the FAR/JAR?:

Operation outside the environmental envelope established for the airplane may be unsafe. Therefore, the boundaries of that envelope must be established to ensure safe operations.

What are the current FAR and JAR standards?: see below

Current FAR text:

Maximum operating altitude. The maximum altitude up to which operation is allowed, as limited by flight, structural, powerplant, functional, or equipment characteristics, must be established.

Current JAR text:

The **extremes of the ambient air temperature and operating altitude for** which operation is allowed, as limited by flight, structural, powerplant, functional, or equipment characteristics, must be established.

What are the differences in the standards and what do these differences result in?:

The FAR standard only requires the maximum altitude portion of the environmental envelope to be established. The JAR requires both the minimum and maximum altitudes and ambient temperatures to be established. FAA policy is consistent with the JAR standard (as shown in AC 25.1581-1), but must rely on the general provisions of § 25.1501(a) ("other limitations and information necessary for safe operation must be established") for its regulatory basis.

What, if any, are the differences in the means of compliance?:

Although the explicit standards are different, there are no differences in the means of compliance. The FAA relies on the general provisions of § 25.1501(a) and the following AC 25-7A advisory material to apply the same requirement. There is no current JAA advisory material; however, the JAA will be adopting AMJ 25.1581 with Change 15 to JAR-25. AMJ 25.1581 is harmonized with FAA AC 25.1581-1.

FAA AC 25.1581-1 (paragraph 2b(3)):

(3) Operating Limitations. The extremes of the operational variables, including any appropriate descriptions for which compliance with parts 25 and 36 has been shown and for which the AFM data have been approved, should be listed with respect to the following:

(i) Operations.

(A) Maximum takeoff, landing, and zero fuel weight limits.

(B) Minimum in-flight gross weight.

(C) Minimum and maximum pressure altitude for which operation is limited for each flight phase (takeoff, en route, and landing). Further altitude limitations caused by changes to structure, powerplant, equipment characteristics, or flight characteristics (e.g., due to failures) should be provided.

(D) Ambient atmospheric temperature (maximum and minimum).

What is the proposed action?:

Codify current FAA policy by harmonizing to the JAR standard.

What should the harmonized standard be?:

See below

Proposed text of harmonized standard:

FAR/JAR 25.1527:

The extremes of the ambient air temperature and operating altitude for which operation is allowed, as limited by flight, structural, powerplant, functional, or equipment characteristics, must be established.

How does this proposed standard address the underlying safety issue?:

It continues to address the underlying safety issue in the same manner by codifying current FAA policy to harmonize with the JAR.

Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain.

Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain.

What other options have been considered and why were they not selected?:

This item was proposed as an enveloping item. No other options were considered.

Who would be affected by the proposed change?:

Manufacturers and operators of transport category airplanes could be affected by the proposed change; however, there will be no effect as it codifies current practices and policy.

To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?:

None.

Is existing FAA advisory material adequate? (If not, what advisory material should be adopted?):

Current advisory material is adequate. The advisory material will be fully harmonized when JAA AMJ 25.1581-1 is published as part of Change 15 to JAR-25.

How does the proposed standard compare to the current ICAO standards?:

The proposed standards are consistent with, but more detailed than the ICAO standards.

Does the proposed standard affect other harmonization working groups?:

No.

What is the cost impact of complying with the proposed standard?:

None.

Does the working group want to review the draft NPRM prior to publication in the Federal Register?:

Yes.

In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain:

Yes, the "Fast Track" process is appropriate for this project. The project is neither too complex nor too controversial to use the "Fast Track" process.

ARAC WG Report #3
Report from the Flight Test Harmonization Working Group

Rule Section: FAR/JAR 25.1583(c)

What is the underlying safety issue addressed by the FAR/JAR?:

Section/JAR 25.1583 is linked to §§/JAR 25.1501 through 25.1533 in that it requires the limitations established under those sections to be provided in the Airplane Flight Manual. To ensure safe operation, any limitations established for the airplane must be made known to the flightcrew. This is accomplished through instrument markings and placards, and the information provided in the Airplane Flight Manual.

What are the current FAR and JAR standards?:

Current FAR text:

25.1583(c): *Weight and loading distribution.* The weight and center of gravity limits required by §§ 25.25 and 25.27 must be furnished in the Airplane Flight Manual. All of the following information must be presented either in the Airplane Flight Manual or in a separate weight and balance control and loading document which is incorporated by reference in the Airplane Flight Manual:

(1) The condition of the airplane and the items included in the empty weight as defined in accordance with § 25.29.

(2) Loading instructions necessary to ensure loading of the airplane within the weight and center of gravity limits, and to maintain the loading within these limits in flight.

(3) If certification for more than one center of gravity range is requested, the appropriate limitations, with regard to weight and loading procedures, for each separate center of gravity range.

Current JAR text:

25.1583(c): *Weight and loading distribution.* The weight and centre of gravity limitations established under JAR 25.1519 must be furnished in the aeroplane Flight Manual. All the following information including weight distribution limitations established under JAR 25.1519 must be presented either in the aeroplane Flight Manual or in a separate weight and balance control and loading document which is incorporated by reference in the aeroplane Flight Manual (see ACJ 25.1583(c));

(1) The condition of the aeroplane and the items included in the empty weight as defined in accordance with JAR 25.29.

(2) Loading instructions necessary to ensure loading of the aeroplane within the weight and centre of gravity limits, and to maintain the loading within these limits in flight.

(3) If certification for more than one centre of gravity range is requested, the appropriate limitations, with regard to weight and loading procedures, for each separate centre of gravity range.

What are the differences in the standards and what do these differences result in?:

There are no practical differences in application of the standards. However, the JAR standard is more correct by referring to the requirement that establishes the weight and loading distribution limits as

operating limitations. Section/JAR 25.1519 contains the requirement to establish the limitations determined under §/JAR 25.23 to 25.27 as operating limitations.

JAR 25.1583(c) requires the operating limitations established under JAR 25.1519 to be provided in the Airplane Flight Manual. Instead of referencing § 25.1519, § 25.1583(c) specifically refers to the weight and center of gravity limitations determined under §§ 25.25 and 25.27. This mistakenly excludes any operating limitations established as a result of § 25.23.

What, if any, are the differences in the means of compliance?:

Although the explicit standards are different, there are no differences in the means of compliance. The FAA relies on the general provisions of § 25.1501(a) and the following AC 25-1581-1 advisory material to apply the same requirement. The JAA have a current ACJ that is relevant; however, the JAA will be adopting harmonized advisory material with Change 15 to JAR-25.

FAA AC 25.1581-1 (paragraphs 2b(1) and 2e):

2(b)(1) *Weight Limitations.* A statement of the maximum certified takeoff and landing weights must be provided. The maximum taxi/ramp weight, maximum zero fuel weight, and any other fixed limit on weight should also be included. Any limitations on airplane loading associated with the stated weight limitations must be included in the AFM or addressed in a separate weight and balance document. Separate takeoff and landing weight limits may be listed corresponding to each applicable constraint (e.g., structural or noise requirements, customer option, etc.), if the instructions in the Limitations Section clearly state that the most restrictive of these takeoff and landing weight limitations represent the maximum certified weights.

(i) For those performance weight limits that vary with runway length, altitude, temperature, or other variables, the variation in weight limitations may be presented as graphs in the Performance Section of the AFM and included as limitations by specific reference in the Limitations Section.

(ii) Only one set of takeoff and landing gross weight limits may be established under part 36 for a specific airplane model (i.e., hardware build).

. . .

e. Loading Instructions. Section 25.1583 requires instructions necessary to ensure loading of the airplane within the established limits of weight and center-of-gravity, and to maintain the loading within such limits in flight to be presented either in the AFM or included in a separate weight and balance document referenced in the AFM Limitations Section. If applicable, the loading instructions must refer to the flight procedures that consider the change to the airplane's center of gravity as fuel is consumed.

(1) Loading Instructions Presented in a Separate Document. If the loading instructions are presented in a separate document, the AFM Limitations Section should contain at least the following:

(i) Maximum taxi gross weight limits.

(ii) Maximum takeoff gross weight limits.

(iii) Maximum landing gross weight limits.

(iv) Maximum zero fuel weight limits.

(v) Minimum in-flight gross weight.

(vi) Center-of-gravity limits.

(vii) Information required to maintain the airplane within the above limits.

(2) Weight and Balance Data. Documentation of the weight and balance material outlined below is normally adequate for airplanes with conventional loading and fuel management techniques. For airplanes that require fuel to be redistributed (other than through normal consumption) to maintain loading within prescribed limits, the loading instructions should be expanded as necessary.

(i) Weight Limits. A list and identification of all weight limitations should be included.

(ii) Center-of-Gravity Limits. The approved center-of-gravity range, or ranges, should be presented with due accounting for airplane configuration (i.e., landing gear position, passenger loading, cargo distribution, etc.) such that loading limits can be maintained.

(iii) Dimensions, Datum, and MAC. The dimensions and relative location of airplane features associated with weighing and loading of the airplane and with weight and balance computations should be described or illustrated.

(iv) Configuration Checklist or Equipment List. The airplane should be defined or described sufficiently to identify the presence or absence of optional systems, features, or installations that are not readily apparent. In addition, all other items of fixed or removable equipment included in the empty weight should be listed.

(v) Fuel and Other Liquids. All fuel and other liquids, including passenger-service liquids, that are included in the empty weight should be identified and listed, together with the information necessary to enable ready duplication of the particular condition.

(vi) Weighing Computations. Computation of the empty weight and the empty weight c.g. location should be included.

(vii) Loading Schedule. The loading schedule should be included, if appropriate.

(viii) Loading Instructions. Complete instructions relative to the loading procedure or to the use of the loading schedule should be included.

(ix) Compartment and floor load limits should be included.

JAA ACJ 25.1583(c):

1. Indication should be given in tabular or graphic form of the c.g. limits for take-off and landing and for any other practicably separable flight condition, as appropriate for the range of weights between the maximum take-off weight and the minimum landing weight presented in accordance with JAR 25.1583(c). The landing gear position appropriate to each condition should be shown, or, alternatively, data should be presented for landing-gear-extended position only and should include the moment change due to gear retraction. C.g. limits should be presented in terms of both distance-from-datum and percentage of the mean aerodynamic chord (MAC). The datum for the former should be defined and the length and location of the MAC should be stated.
2. For those weight limitations which vary with runway length, altitude, temperature and other variables the variation in weight limitation may be presented as graphs in the performance section of the Flight Manual, and included as limitations by specific reference, in the limitations section, to the appropriate graph or page.

What is the proposed action?:

Codify current FAA policy by harmonizing to the JAR standard.

What should the harmonized standard be?:

FAR/JAR 25.1583(c):

Weight and loading distribution. The weight and center of gravity limitations established under §/JAR 25.1519 must be furnished in the Airplane Flight Manual. All of the following information, including the weight distribution limitations established under §/JAR 25.1519, must be presented either in the Airplane Flight Manual or in a separate weight and balance control and loading document that is incorporated by reference in the Airplane Flight Manual;

(1) The condition of the airplane and the items included in the empty weight as defined in accordance with §/JAR 25.29.

(2) Loading instructions necessary to ensure loading of the airplane within the weight and center of gravity limits, and to maintain the loading within these limits in flight.

(3) If certification for more than one center of gravity range is requested, the appropriate limitations, with regard to weight and loading procedures, for each separate center of gravity range.

How does this proposed standard address the underlying safety issue?:

It continues to address the underlying safety issue in the same manner by codifying current FAA policy to harmonize with the JAR.

Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain.

Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain.

What other options have been considered and why were they not selected?:

No other options were considered.

Who would be affected by the proposed change?:

Manufacturers and operators of transport category airplanes could be affected by the proposed change; however, there will be no effect as it codifies current practices and policy.

To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?:

None.

Is existing FAA advisory material adequate? (If not, what advisory material should be adopted?):

Existing FAA advisory material is adequate. The JAA intend to delete their ACJ when the harmonized JAA AMJ 25.1581-1 is published as part of Change 15 to JAR-25.

How does the proposed standard compare to the current ICAO standards?:

The proposed standards are consistent with, but more detailed than the ICAO standards.

Does the proposed standard affect other harmonization working groups?:

No.

What is the cost impact of complying with the proposed standard?:

None.

Does the working group want to review the draft NPRM prior to publication in the Federal Register?:

Yes.

In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain:

Yes, the "Fast Track" process is appropriate for this project. The project is neither too complex nor too controversial to use the "Fast Track" process.

ARAC WG Report #4
Report from the Flight Test Harmonization Working Group

Rule Section: FAR/JAR 25.1583(f)

What is the underlying safety issue addressed by the FAR/JAR?:

Section/JAR 25.1583 is linked to §§/JAR 25.1501 through 25.1533 in that it requires the limitations established under those sections to be provided in the Airplane Flight Manual. To ensure safe operation, any limitations established for the airplane must be made known to the flightcrew. This is accomplished through instrument markings and placards, and the information provided in the Airplane Flight Manual.

What are the current FAR and JAR standards?:

Current FAR text:

Altitudes. The altitude established under § 25.1527.

Current JAR text:

Ambient air temperatures and operating altitudes. The extremes of the ambient air temperatures and operating altitudes established under JAR 25.1527 and an explanation of the limiting factors must be furnished.

What are the differences in the standards and what do these differences result in?:

Consistent with § 25.1527, the FAR standard only requires the maximum altitude portion of the environmental envelope to be provided in the Airplane Flight Manual. Consistent with JAR 25.1527, the JAR requires both the minimum and maximum altitudes and ambient temperatures to be established. FAA policy is consistent with the JAR standard (as shown in AC 25.1581-1), but must rely on the general provisions of § 25.1501(a) ("other limitations and information necessary for safe operation must be established") for its regulatory basis.

What, if any, are the differences in the means of compliance?:

Although the explicit standards are different, there are no differences in the means of compliance. The FAA relies on the general provisions of § 25.1501(a) and the following AC 25.1581-1 advisory material to apply the same requirement. There is no current JAA advisory material, but AMJ 25.1581 is harmonized with FAA AC 25.1581-1 and will be published as part of Change 15 to JAR-25.

FAA AC 25.1581-1 (paragraph 2b(3)):

(3) *Operating Limitations.* The extremes of the operational variables, including any appropriate descriptions for which compliance with parts 25 and 36 has been shown and for which the AFM data have been approved, should be listed with respect to the following:

(i) Operations.

(A) Maximum takeoff, landing, and zero fuel weight limits.

(B) Minimum in-flight gross weight.

(C) **Minimum and maximum pressure altitude for which operation is limited for each flight phase (takeoff, en route, and landing). Further altitude limitations caused by**

changes to structure, powerplant, equipment characteristics, or flight characteristics (e.g., due to failures) should be provided.

(D) **Ambient atmospheric temperature (maximum and minimum).**

What is the proposed action?:

Codify current FAA policy by harmonizing to the JAR standard. The requirement for an explanation of the limiting factors would be deleted; however, as this does not represent current practice and is unnecessary for safety.

What should the harmonized standard be?:

see below

Proposed text of harmonized standard:

FAR/JAR 25.1583(f):
Ambient air temperatures and operating altitudes. The extremes of the ambient air temperatures and operating altitudes established under §/JAR 25.1527 must be furnished.

How does this proposed standard address the underlying safety issue?:

It continues to address the underlying safety issue in the same manner by codifying current FAA policy to harmonize with the JAR.

Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain.

Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain.

What other options have been considered and why were they not selected?:

This item was proposed as an enveloping item. No other options were considered.

Who would be affected by the proposed change?:

Manufacturers and operators of transport category airplanes could be affected by the proposed change; however, there will be no effect as it codifies current practices and policy.

To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?:

None.

Is existing FAA advisory material adequate? (If not, what advisory material should be adopted?):

Existing FAA advisory material is adequate. The advisory material will be fully harmonized when JAA AMJ 25.1581-1 is published as part of Change 15 to JAR-25.

How does the proposed standard compare to the current ICAO standards?:

The proposed standards are consistent with, but more detailed than the ICAO standards.

Does the proposed standard affect other harmonization working groups?:

No.

What is the cost impact of complying with the proposed standard?:

None.

Does the working group want to review the draft NPRM prior to publication in the Federal Register?:

Yes.

In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain:

Yes, the "Fast Track" process is appropriate for this project. The project is neither too complex nor too controversial to use the "Fast Track" process.

ARAC WG Report #5
Report from the Flight Test Harmonization Working Group

Rule Section: FAR/JAR 25.1585

What is the underlying safety issue addressed by the FAR/JAR?:

The primary purpose of the Airplane Flight Manual is to provide an authoritative and approved source of information considered necessary for safely operating the airplane. Consistent with this purpose, operating procedures related to airworthiness and necessary for safe operation, including those procedures that may be unique to that type of airplane, must be provided in the Airplane Flight Manual.

What are the current FAR and JAR standards?:

Current FAR text:

§ 25.1585 Operating procedures.

(a) Information and instructions regarding the peculiarities of normal operations (including starting and warming the engines, taxiing, operation of wing flaps, landing gear, and the automatic pilot) must be furnished, together with recommended procedures for--

(1) Engine failure (including minimum speeds, trim, operation of the remaining engines, and operation of flaps);

(2) Stopping the rotation of propellers in flight;

(3) Restarting turbine engines in flight (including the effects of altitude);

(4) Fire, decompression, and similar emergencies;

(5) Ditching (including the procedures based on the requirements of §§ 25.801, 25.807(d), 25.1411, and 25.1415(a) through (e));

(6) Use of ice protection equipment;

(7) Use of fuel jettisoning equipment, including any operating precautions relevant to the use of the system;

(8) Operation in turbulence for turbine powered airplanes (including recommended turbulence penetration airspeeds, flight peculiarities, and special control instructions);

(9) Restoring a deployed thrust reverser intended for ground operation only to the forward thrust position in flight or continuing flight and landing with the thrust reverser in any position except forward thrust; and

(10) Disconnecting the battery from its charging source, if compliance is shown with Sec. 25.1353(c)(6)(ii) or (c)(6)(iii).

(b) Information identifying each operating condition in which the fuel system independence prescribed in § 25.953 is necessary for safety must be furnished, together with instructions for placing the fuel system in a configuration used to show compliance with that section.

(c) The buffet onset envelopes, determined under § 25.251 must be furnished. The buffet onset envelopes presented may reflect the center of gravity at which the airplane is normally loaded during cruise if corrections for the effect of different center of gravity locations are furnished.

(d) Information must be furnished which indicates that when the fuel quantity indicator reads "zero" in level flight, any fuel remaining in the fuel tank cannot be used safely in flight.

(e) Information on the total quantity of usable fuel for each fuel tank must be furnished.

Current JAR text:

JAR 25.1585 Operating procedures

(a) Information and instructions regarding operating procedures must be furnished (see ACJ 25.1585(a)) in substantial accord with the categories described below –

(1) Emergency procedures which are concerned with foreseeable but unusual situations in which immediate and precise action by the crew, as detailed in the recommended procedures, may be expected to reduce the risk of catastrophe.

(2) Other procedures peculiar to the particular type or model encountered in connection with routine operations including malfunction cases and failure conditions, involving the use of special systems and/or the alternative use of regular systems not considered as emergency procedures.

(b) Information or procedures not directly related to airworthiness or not under the control of the crew, must not be included, nor must any procedure which is accepted as basic airmanship.

(c) The buffet onset envelopes, determined under JAR 25.251 must be furnished. The buffet onset envelopes presented may reflect the centre of gravity at which the aeroplane is normally loaded during cruise if corrections for the effect of different centre of gravity locations are furnished. (See ACJ 25.1585(c).)

(d) Information must be furnished which indicates that when the fuel quantity indicator reads "zero" in level flight, any fuel remaining in the fuel tank cannot be used safely in flight.

(e) Information on the total quantity of usable fuel for each fuel tank must be furnished.

What are the differences in the standards and what do these differences result in?:

The JAR does not include § 25.1585(b), the requirement that information identifying each operating condition in which the fuel system independence prescribed in § 25.953 is necessary for safety must be furnished, together with instructions for placing the fuel system in a configuration used to show compliance with that section. Lack of such information may compromise the intent of the rules regarding fuel system independence.

JAR 25.1585(a) and (b) essentially update the § 25.1585(a) requirements to better reflect current policy, practices, and interpretations. These differences are not thought to cause any material differences in technical requirements for procedural information in the Airplane Flight Manual. Any differences in this area are thought to result more from means of compliance and interpretation differences, which have recently been addressed by harmonizing the advisory material for compliance, FAA AC 25.1581-1 and JAA AMJ 25.1581.

What, if any, are the differences in the means of compliance?:

The advisory material related to the operating procedures section of the Airplane Flight Manual are reprinted below. Although there are differences between the texts of the FAA AC and the JAA ACJ's, the JAA will be adopting harmonized advisory material with Change 15 to JAR-25.

FAA AC 25.1581 (paragraph 2c):

c. Operating Procedures Section. The Operating Procedures Section of the AFM should contain, as a minimum, the essential information, peculiar to the particular airplane type or model, that is needed for safe operation under normal and other than normal conditions. Procedures not directly related to airworthiness, or not under control of the flightcrew, should not be included in the AFM. A notation similar to the following should be placed at the beginning of the Operating Procedures Section:

The operating procedures contained in this manual have been developed and recommended by the manufacturer and approved by the FAA for use in operating this airplane. These procedures are provided as guidance and should not be construed as prohibiting the operator from developing equivalent procedures in accordance with the applicable operating rules.

(1) Procedures Categories. Information should be presented for normal and non-normal/emergency procedures and be distinctly separated. The non-normal/emergency procedures may either be placed in one section or in separate non-normal and emergency procedures sections of the AFM. In either case, procedural tasks that are considered recall or immediate action items that must be accomplished from memory should be clearly identified.

(2) Format. Procedures should be presented in either a narrative or a checklist format, depending upon the intended use of the AFM.

(i) Narrative. This format is acceptable if sources of procedures information other than the AFM are intended for flightcrew use (e.g., a Flightcrew Operating Manual (FCOM)). Procedures presented in this format should be drafted in a manner from which the needed sequence can be easily established.

(ii) Checklist. This format should be used if the AFM is intended to be used directly by the flightcrew for operating procedures.

(3) Procedures Development. Prior to initial type certification, it is essential to verify that the proposed procedures are technically valid and operationally practicable. It is recognized that such procedures may have had only limited operational exposure at the time of certification and may need to be revised based on service experience.

(4) Procedures Content. The content and level of detail for the normal and non-normal procedures provided in the AFM should be based on the intended use of the AFM. More information and detail should be provided in AFMs that are intended to be the flightcrew's primary source of operating procedures information than for AFMs that are not intended to be used directly by the flightcrew.

(i) General. Classifying an operating procedure as normal or non-normal should reflect whether the airplane's systems are operating normally. Procedures associated with failed or inoperative systems should be considered non-normal. Procedures associated with glideslope deviation, ground proximity warning, all-engines-operating go-around, turbulent air penetration, windshear alerts, traffic advisories or resolution alerts from the traffic alerting and collision avoidance system, etc., which do not occur routinely, should be placed in the normal procedures subsection, provided the airplane's systems are operating normally.

(ii) Other Sources of Procedures Information. The flightcrew of large transport category airplanes typically use sources of operating procedures information other than the AFM. Examples of other sources of operating procedures information include manufacturer- or operator-produced operating manuals, Quick Reference Handbooks (QRH's), System Pilot's Guides, and Emergency or Abnormal Checklists. For these airplanes, items such as cockpit checklists, systems descriptions, and the associated normal procedures should not be presented in the AFM if they are provided in other documents acceptable to the FAA. Normal procedures that are necessary for safe operation should be presented in the

AFM, but the remaining normal procedures should be placed in the manufacturer-produced FCOM (or other acceptable source of operating procedures information). The non-normal procedures section of the AFM for these types of airplanes should include, as a minimum, procedures dictated by the airplane's systems and failure modes, and may also include those emergency procedures listed in paragraph 2c(5) of this AC.

(A) The system description and procedures provided in the AFM should be limited to that which is uniquely related to airplane safety or airworthiness. The AFM should include a brief general description of the system and its intended use. The limitations section of the AFM should reference the operating manual in which the detailed system description and procedures can be found. This reference should include the document title, the document or part number, and the date of issue, and may allow the use of later appropriate revisions. An example wording would be: "The *Manufacturer Unit Model* System Pilot's Guide, P/N XXXX, dated XXXX (or later appropriate revision) must be immediately available to the flightcrew whenever XXXX [e.g., navigation] is predicated on the use of the system. The software version [if applicable] stated in the Pilot's Guide must match that displayed on the equipment."

(B) Information that restricts or defines the operation of a particular system (e.g., authorizing or prohibiting specific types of approaches) should be located in the limitations section of the AFM. Emergency or abnormal procedures should be located in the appropriate procedures section(s) of the AFM.

(C) Detailed system descriptions and normal procedures that represent one means, but not the only means, of operation should be located in appropriate operating manuals with a reference placed in the procedures section of the AFM. This reference should include the document title, the document or part number, and the date of issue. The reference may also allow the use of later appropriate revisions of that document. An example wording would be: "Normal operating procedures are contained in the *Manufacturer Unit Model* System Pilot's Guide, P/N XXXX, dated XXXX (or later appropriate revision)."

(iii) AFM Used Directly. For those manufacturers and operators that do not produce other sources of procedures information (generally manufacturers and operators of small transports), the AFM is the only source of this information. In this circumstance, the AFM operating procedures information must be comprehensive and include information such as cockpit checklists, systems descriptions, and associated procedures.

(5) Emergency Procedures. The emergency procedures can be included either in a dedicated section of the AFM or in the non-normal procedures section. In either case, this section should include the procedures for handling any situation that is in a category similar to the following:

(i) Engine failure with severe damage or separation.

(ii) Multiple engine failure.

(iii) Fire in flight.

(iv) Smoke control. At least the following should be clearly stated in the AFM:

After conducting the fire or smoke procedures, land at the nearest suitable airport, unless it is visually verified that the fire has been extinguished.

(v) Rapid decompression.

(vi) Emergency descent.

(vii) Uncommanded reverser deployment in flight.

(viii) Crash landing or ditching.

(ix) Emergency evacuation.

JAA ACJ 25.1585(a):

1 In furnishing information and instructions, consideration should be given to the following. The lists do not necessarily include all items to be considered for a given aeroplane. The categorisation of certain items may need to be modified because of design features or other considerations.

2 *Emergency Procedures*

a. Engine and APU fire/separation/severe damage

b. Smoke or fire in cockpit/cabin/cargo compartment

c. Rapid decompression/emergency descent

d. Landing or go-around with jammed stabiliser

e. Runaway stabiliser

f. Flight with all engines inoperative

g. Ditching

3 *Other Procedures*

a. Engine starting

b. APU operation

c. Fuel management. The effect on unusable fuel quantity due to fuel booster pump failure should be stated.

d. Reverse thrust system.

e. Navigation system

f. Rain repellent system

g. Automatic flight control systems

h. Cabin pressurisation system

i. Oxygen system

j. Hydraulic system

k. Electrical system

l. Anti-ice/de-ice system

m. Operation in turbulence

n. Equipment cooling

o. Flight controls

p. Stall warning/stall identification system

q. Braking system

r. Fuel dumping

s. Go-around with minimum fuel

t. Landing in abnormal configurations

u. Engine shut-down and relight in flight

v. Approach and landing with engine(s) inoperative

w. Go-around with engine(s) inoperative

x. Landing gear alternate operation

4 Certain items listed in 3 may also need to be considered under 2.

5 Observance of these procedures may not be mandatory and approval of such procedures is not intended to prohibit or discourage development and use of improved or equivalent procedures based on operational experience with the aeroplane.

6 The procedures to be followed by the flight crew in the event of an engine fire, severe damage or separation of the engine should be similar, and should include identification of the failed engine as the primary action as far as the powerplant is concerned.

ACJ 25.1585(c):

The buffet onset envelopes should be accompanied by information of the maximum altitude at which it is possible to achieve a positive normal acceleration increment of 0.3 g without exceeding the buffet onset boundary, at any given combination of weight, centre of gravity location and airspeed. (See also ACJ 25.251(e).)

ACJ 25.251(e):

2 *Range of Load Factor for Normal Operations*

2.1.1 JAR 25.251(e) requires that the envelopes of load factor, speed, altitude and weight must provide a sufficient range of speeds and load factors for normal operations.

2.1.2 An acceptable means of compliance with the requirement is to establish the maximum altitude at which it is possible to achieve a positive normal acceleration increment of 0.3 g without exceeding the buffet onset boundary. See also ACJ 25.1585(c).

What is the proposed action?:

Harmonize to a standard using the FAR text for 25.1585(b) (the more stringent standard), and the JAR text for the rest of the section (with some editorial changes to simplify the text and make it better reflect current practices as exemplified by the AC/AMJ 25.1581 advisory material). Although the FAR text for § 25.1585(a)/JAR 25.1585(a) and (b) could be considered to be more stringent by virtue of its being more specific as to the procedures that must be furnished in the Airplane Flight Manual, it is considered outdated and not completely consistent with current practices. Some of the mandated procedures are no longer appropriate and other important procedures are not included. The proposed standard is intended to provide a better description of what types of procedures are required to be in the Airplane Flight Manual, the specifics of which will depend on the particular design. Current advisory material lists specific procedures corresponding to the general requirement that may be appropriate to include, depending on the design.

What should the harmonized standard be?:

FAR/JAR 25.1585:

(a) Operating procedures must be furnished for –

(1) Normal procedures peculiar to the particular type or model encountered in connection with routine operations;

(2) Non-normal procedures for malfunction cases and failure conditions involving the use of special systems or the alternative use of regular systems; and

(3) Emergency procedures for foreseeable but unusual situations in which immediate and precise action by the crew may be expected to substantially reduce the risk of catastrophe.

(b) Information or procedures not directly related to airworthiness or not under the control of the crew, must not be included, nor must any procedure that is accepted as basic airmanship.

(c) Information identifying each operating condition in which the fuel system independence prescribed in §/JAR 25.953 is necessary for safety must be furnished, together with instructions for placing the fuel system in a configuration used to show compliance with that section.

(d) The buffet onset envelopes, determined under §/JAR 25.251 must be furnished. The buffet onset envelopes presented may reflect the center of gravity at which the airplane is normally loaded during cruise if corrections for the effect of different center of gravity locations are furnished.

(e) Information must be furnished that indicates that when the fuel quantity indicator reads "zero" in level flight, any fuel remaining in the fuel tank cannot be used safely in flight.

(f) Information on the total quantity of usable fuel for each fuel tank must be furnished.

How does this proposed standard address the underlying safety issue?:

It continues to address the underlying safety issue in the same manner by requiring information and procedures necessary for airworthiness and operational safety to be furnished in the Airplane Flight Manual.

Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintains the same level of safety.

Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintains the same level of safety.

What other options have been considered and why were they not selected?:

This item was proposed as an enveloping item. Harmonizing to the most stringent standard could be interpreted as harmonizing to the FAR standard (see discussion of differences above), but the JAR standard for the proposed §§/JAR 25.1585(a) and 25.1585(b) is considered to be closer to current practices and the manner in which § 25.1585(a) is actually applied.

Who would be affected by the proposed change?:

Manufacturers and operators of transport category airplanes could be affected by the proposed change; however, there will be no effect as it is consistent with current regulatory requirements, practices and policy.

To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?:

None.

Is existing FAA advisory material adequate? (If not, what advisory material should be adopted?):

Existing FAA advisory material is adequate. The advisory material associated with §/JAR 25.1585 will be fully harmonized when JAA AMJ 25.1581-1 is published as part of Change 15 to JAR-25.

How does the proposed standard compare to the current ICAO standards?:

The proposed standards are consistent with, but more detailed than the ICAO standards.

Does the proposed standard affect other harmonization working groups?:

No.

What is the cost impact of complying with the proposed standard?:

None.

Does the working group want to review the draft NPRM prior to publication in the Federal Register?:

Yes.

In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain:

Yes, the "Fast Track" process is appropriate for this project. The project is neither too complex nor too controversial to use the "Fast Track" process.

ARAC WG Report #6
Report from the Flight Test Harmonization Working Group

Rule Section: FAR/JAR 25.1587

What is the underlying safety issue addressed by the FAR/JAR?:

The primary purpose of the Airplane Flight Manual is to provide an authoritative and approved source of information considered necessary for safely operating the airplane. Consistent with this purpose, performance information related to airworthiness and necessary for safe operation must be provided in the Airplane Flight Manual.

What are the current FAR and JAR standards?:

Current FAR text:

§ 25.1587 Performance information.

(a) Each Airplane Flight Manual must contain information to permit conversion of the indicated temperature to free air temperature if other than a free air temperature indicator is used to comply with the requirements of § 25.1303(a)(1).

(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:

(1) The conditions under which the performance information was obtained, including the speeds associated with the performance information.

(2) V_S determined in accordance with § 25.103.

(3) The following performance information (determined by extrapolation and computed for the range of weights between the maximum landing and maximum takeoff weights):

(i) Climb in the landing configuration.

(ii) Climb in the approach configuration.

(iii) Landing distance.

(4) Procedures established under § 25.101(f), (g) and (h) that are related to the limitations and information required by § 25.1533 and by this paragraph. These procedures must be in the form of guidance material, including any relevant limitations or information.

(5) An explanation of significant or unusual flight or ground handling characteristics of the airplane.

Current JAR text:

JAR 25.1587 Performance information

(a) Not required for JAR-25

(b) Each aeroplane Flight Manual must contain the performance information computed under the applicable provisions of this JAR-25 (including JAR 25.115, 25.123 and 25.125 for the weights, altitudes, temperatures, wind components, and runway gradients, as applicable) within the operational limits of the aeroplane, and must contain the following:

(1) The condition of power, configuration, speeds and the procedures for handling the aeroplane and any system having a significant effect on performance upon which the performance graphs are based must be stated in each case. (See ACJ 25.1587(b)(1).)

(2) Not required for JAR-25 as this sub-paragraph is covered by the opening sentence of sub-paragraph (b).

(3) The following gross performance information (determined by extrapolation and computed for the range of weights between the maximum landing weight and maximum takeoff weight) must be provided:

(i) Climb in the landing configuration.

(ii) Climb in the approach configuration.

(iii) Landing distance.

(4) Procedures established under § 25.101 (f) and (g) that are related to the limitations and information required by JAR 25.1533 and by this paragraph must be stated in the form of guidance material, including any relevant limitation or information.

(5) An explanation of significant or unusual flight or ground handling characteristics of the aeroplane.

(6) Corrections to indicated values of airspeed, altitude and outside air temperature.

(7) An explanation of operational landing runway length factors included in the presentation of the landing distance, if appropriate. (See ACJ 25.1587(b)(7).)

What are the differences in the standards and what do these differences result in?:

The JAR does not include § 25.1587(a) or § 25.1587(b)(2). The FAR does not include JAR 25.1587(b)(6) or 25.1587(b)(7). The JAR also contains some wording differences that primarily reflect an updating of the FAR wording to better reflect current interpretations and practices. These differences are not thought to cause any material differences in technical requirements for performance information in the Airplane Flight Manual. Any differences in this area are thought to result more from means of compliance and interpretation differences, which have recently been addressed by harmonizing the advisory material for compliance, FAA AC 25.1581-1 and JAA AMJ 25.1581.

What, if any, are the differences in the means of compliance?:

The advisory material related to the operating procedures section of the Airplane Flight Manual are reprinted below. Although there are differences between the texts of the FAA AC and the JAA ACJ's, the FAA AC represents a harmonized text. The JAA are in the process of publishing the JAA equivalent to the FAA AC as AMJ 25.1581. The ACJ's will be removed upon publication of this AMJ.

FAA AC 25.1581-1 (paragraph 2d):

d. Performance Section. This section of the AFM contains the performance limitations and other data required by parts 25 and 36, and any special conditions that may apply. Additional information may be provided to assist the operator in complying with the operating rules or for implementing unique operational needs. The performance information should cover the operating range of weights, altitudes, temperatures, airplane configurations, thrust ratings, and any other operational variables stated as operational performance limitations for the airplane. If additional performance information is presented for operation at a specific altitude, these performance data should cover a pressure altitude span of at least the specific altitude ±1,000 feet to allow an

operator to adequately account for pressure altitude variations. It is recommended that such data be included as a separate section or appendix to the AFM.

(1) **General**. Include all descriptive information necessary to identify the configuration and conditions for which the performance data are applicable. Such information should include the type or model designations of the airplane and its engines, the approved flap settings, a brief description of airplane systems and equipment that affect performance (e.g., anti-skid, automatic spoilers, etc.), and a statement indicating whether such systems and equipment are operative or inoperative. This section should also include definitions of terms used in the Performance Section (e.g., IAS, CAS, ISA, configuration, net flight path, icing conditions, etc.), plus calibration data for airspeed (flight and ground), Mach number, altimeter, air temperature, and other pertinent information. The airspeed, altitude, and air temperature calibration data should be presented for the following ranges:

(i) Takeoff configurations:

(A) Ground run, 0.8 V_{1MIN} to V_{2MAX}

(B) Inflight, V_{2MIN} to V_{FE}

(ii) Approach and landing configurations:

(A) Approach, 1.2 V_S to V_{FE}

(B) Landing, 1.3 V_S to V_{FE}

(iii) En route configuration:

(A) Airspeed and Altimeter: For the takeoff/takeoff path altitude range, 1.25 V_S to V_{MO}/M_{MO}.

(B) Airspeed and Altimeter: For higher altitudes, from 1.25 V_S or the speed for 1.2g buffet onset margin, whichever is lower, to V_{MO}/M_{MO}.

(C) Mach Number: From the lowest useful Mach number (generally in the range of 0.4 to 0.5) to M_{MO}.

(D) Total or Static Air Temperature: For Mach numbers corresponding to the speed ranges noted in paragraphs 2d(1)(iii)(A) and (B) of this AC.

(2) **Performance Procedures**. The procedures, techniques, and other conditions associated with the AFM performance data should be included. Performance procedures may be presented as a performance subsection or in connection with a particular performance graph. In the latter case, a comprehensive listing of the conditions associated with the particular performance data may serve as procedures if sufficiently complete. The AFM should also include adequate information to enable the operator to show compliance with § 25.1001 for each takeoff.

(3) **Thrust or Power Setting**. Thrust or power settings should be provided for at least takeoff, maximum continuous, and go-around thrust or power, along with the thrust or power setting procedures necessary to obtain the performance shown in the AFM. These data should be shown for each applicable thrust or power setting parameter. If backing the airplane by reverse thrust or power is proposed, thrust or power setting limits should be established considering contaminated runway, foreign object damage potential, environmental control system impact, airplane weight and c.g., cockpit visibility, effect of braking, etc.

(4) **Minimum Control Speeds**. Minimum control speed data may be located in the Performance Section with a reference in the Limitations Section as to its location.

(5) **Stall Speeds**. The stall speeds established in showing compliance with certification requirements should be presented, together with associated conditions. Data should be presented in terms of calibrated airspeed.

(6) **Takeoff Speeds**. The takeoff speeds, V_1, V_R, and V_2, must be presented in the AFM, together with the associated conditions. These speeds should be presented in units consistent with cockpit instrument indications. V_1 and V_R speeds should be based upon ground effect calibration data, while V_2 speeds should be based upon free air calibration data. The takeoff speeds associated with the minimum control speeds and the maximum energy absorption capability of the brakes should be included. At the option of the applicant, the AFM may also include the V_1 speeds associated with unbalanced field lengths. At all conditions and airplane configurations represented in the AFM (i.e., at all altitudes, temperatures, weights, winds, runway slopes, flap settings, etc.), the accuracy of the V_1 speed should either: 1) be within 1.5 knots of the V_1 speed used to calculate the takeoff and accelerate-stop distances, or 2) not cause an increase to these distances of more than the greater of 100 feet or the incremental increase resulting from a 1.5 knot variation in V_1 speed.

(7) **Takeoff and Accelerate-Stop Distances**. Takeoff and accelerate-stop distances, complying with §§ 25.105, 25.109 and 25.113, must be provided. At the option of the applicant, and with concurrence by the FAA, additional data may be provided for operations on other than smooth hard-surfaced runways.

(8) **Climb Limited Takeoff Weight**. The climb limited takeoff weight, which is the most limiting weight showing compliance with §§ 25.121(a), (b), and (c), must be provided.

(9) **Miscellaneous Takeoff Weight Limits**. Takeoff weight limits should be shown for any equipment or characteristic of the airplane that imposes an additional takeoff weight restriction (e.g., maximum tire speed, maximum brake energy, fuel jettison considerations, inoperative system(s), etc.).

(10) **Takeoff Climb Performance**. For the prescribed takeoff climb airplane configurations, the climb gradients must be presented, together with associated conditions. The scheduled climb speed(s) should be included.

(11) **Takeoff Flight Path Data**. Takeoff flight paths, or performance information necessary to construct such paths, together with the associated conditions (e.g., procedures and speeds), should be presented for each approved takeoff configuration. The presentation should include all flight path segments existing between the end of the takeoff distance and the end of the takeoff path, as defined in § 25.111(a). Such data must be based upon net performance, as prescribed in §§ 25.115(b) and (c).

(12) **En Route Flight Path Data**. The net flight path gradient data prescribed in § 25.123 must be presented, together with the associated conditions (e.g., procedures and speeds). Data must be presented for both one- and two-engines-inoperative cases, as applicable, throughout the approved operating altitude and temperature envelope.

(13) **Climb Limited Landing Weight**. The climb limited landing weight, which is the most limiting weight showing compliance with §§ 25.119 and 25.121(d), should be provided.

(14) **Miscellaneous Landing Weight Limits**. Landing weight limits for any equipment or characteristic of the airplane configuration that imposes an additional landing weight restriction should be shown.

(15) **Approach Climb Performance**. For the approach climb configuration(s), the climb gradients (§ 25.121(d)) and weights up to maximum takeoff weight (§ 25.1587(b)(3)) should be presented, together with associated conditions (e.g., procedures and speeds). The affects of ice accretion on unprotected portions of the airframe, and the effects of engine and wing ice protection systems should be provided.

(16) **Landing Climb Performance**. Data for the landing climb configuration(s) should be presented in a manner similar to that described for the approach configuration above.

(17) **Landing Approach Speeds.** The scheduled speeds associated with the approved landing distances and operational landing runway lengths (see paragraph 2d(18) of this AC) should be presented, together with associated conditions.

(18) **Landing Distance.** The landing distance from a height of 50 feet must be presented either directly or with the factors required by the operating regulations, together with associated conditions and weights up to the maximum takeoff weight. For all landplanes, landing distance data must be presented for level, smooth, dry, hard-surfaced runways for standard day temperatures. At the option of the applicant, and with concurrence by the FAA, additional data may be presented for other temperatures and runway slopes within the operational limits of the airplane, or for operations on other than smooth hard-surfaced runways. For Category III operations, additional landing performance data may be required.

(19) **Performance Limits and Information Variation with Center-of-Gravity.** If performance information (e.g., buffet boundary) is not presented for the most critical c.g. condition, the AFM should present the effect of variation with c.g.

(20) **Noise Data.** The noise levels achieved during type certification in accordance with the provisions of part 36 should be presented, together with associated conditions and with the note prescribed in § 36.1581(c). The noise levels achieved during type certification should be included in the AFM and consist of only one takeoff, one sideline, and one approach noise level for each airplane model (i.e., hardware build). The noise certification stage level should accompany the noise level information to indicate the compliance status. Supplementary information (labeled as such) may be added to the AFM concerning noise levels for other configurations or conditions.

(21) **Miscellaneous Performance Data.** Any performance information or data not covered in the previous items that are required for safe operation because of unusual design features or operating or handling characteristics should be furnished. For example, the maximum quick turnaround weight should be provided.

ACJ 25.1587(b)(1):

The bank angle used in showing compliance with JAR 25.121 should be scheduled in the Flight Manual. Where it is more practical to quote the degree of lateral control (e.g. control wheel level) instead of the bank angle, this would be acceptable.

ACJ 25.1587(b)(7):

1 The landing distance from a height of 50 ft determined in accordance with JAR 25.125 should be presented together with associated conditions for weights up to the maximum take-off weight, standard temperature and corrected for not more than 50% of nominal headwind component, and not less than 150% of nominal tailwind component.

2 Data should be presented for level, smooth, dry, hard-surfaced runways. At the option of the applicant, additional data may be presented to show the effect of runway slope and temperature, within the operational limits of the aeroplane.

3 To facilitate application of operating regulations, the landing distance may be presented in the form of the operational or "factored" runway length, using the appropriate factors prescribed by the operating regulations of the state of registry of the aeroplane. The factors applied should be stated together with associated conditions.

What is the proposed action?:

Harmonize to the most stringent standard. In general, where the standards are different, the JAR standard more properly reflects current practices and is proposed as the harmonized standard. In areas, where there is a requirement in one standard that does not appear in the other standard, that

requirement has been carried over into the proposed harmonized standard. Some minor non-substantive changes are also proposed for editorial reasons.

What should the harmonized standard be?:

FAR/JAR 25.1587 :

(a) Each Airplane Flight Manual must contain information to permit conversion of the indicated temperature to free air temperature if other than a free air temperature indicator is used to comply with the requirements of §/JAR 25.1303(a)(1).

(b) Each Airplane Flight Manual must contain the performance information computed under the applicable provisions of this part/JAR-25 (including §/JAR 25.115, 25.123 and 25.125 for the weights, altitudes, temperatures, wind components, and runway gradients, as applicable) within the operational limits of the airplane, and must contain the following:

(1) *In each case, the conditions of power, configuration, and speeds, and the procedures for handling the airplane and any system having a significant effect on the performance information.*

(2) V_S determined in accordance with §/JAR 25.103.

(3) The following performance information (determined by extrapolation and computed for the range of weights between the maximum landing weight and the maximum takeoff weight):

(i) Climb in the landing configuration.

(ii) Climb in the approach configuration.

(iii) Landing distance.

(4) *Procedures established under § 25.101 (f) and (g) that are related to the limitations and information required by §/JAR 25.1533 and by this paragraph in the form of guidance material, including any relevant limitations or information.*

(5) An explanation of significant or unusual flight or ground handling characteristics of the airplane.

(6) Corrections to indicated values of airspeed, altitude, and outside air temperature.

(7) An explanation of operational landing runway length factors included in the presentation of the landing distance, if appropriate.

How does this proposed standard address the underlying safety issue?:

It continues to address the underlying safety issue in the same manner by requiring performance information necessary for airworthiness and operational safety to be furnished in the Airplane Flight Manual

Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety?:

Although there are differences in wording between the proposed standard and the current FAR, these differences do not materially increase or decrease the level of safety.

Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety?:

Maintain. The proposed standard is consistent with current practices.

What other options have been considered and why were they not selected?:

This item was proposed as an enveloping item. No other options were considered.

Who would be affected by the proposed change?:

Manufacturers and operators of transport category airplanes could be affected by the proposed change; however, there is not expected to be a material effect from this proposed change.

To ensure harmonization, what current advisory material (e.g., ACJ, AMJ, AC, policy letters) needs to be included in the rule text or preamble?:

None.

Is existing FAA advisory material adequate? (If not, what advisory material should be adopted?):

Existing advisory material is adequate. The advisory material will be fully harmonized when JAA AMJ 25.1581-1 is published as part of Change 15 to JAR-25.

How does the proposed standard compare to the current ICAO standards?:

The proposed standards are consistent with, but more detailed than the ICAO standards.

Does the proposed standard affect other harmonization working groups?:

No.

What is the cost impact of complying with the proposed standard?:

None

Does the working group want to review the draft NPRM prior to publication in the Federal Register?:

Yes

In light of the information provided in this report, does the HWG consider that the "Fast Track" process is appropriate for this rulemaking project, or is the project too complex or controversial for the Fast Track Process. Explain:

Yes, the "Fast Track" process is appropriate for this project. The project is neither too complex nor too controversial to use the "Fast Track" process.

FAA Action

U.S. Department
of Transportation
Federal Aviation
Administration

800 Independence Ave., S.W.
Washington, D.C. 20591

APR 10 1995

Mr. Gerald R. Mack
Aviation Rulemaking Advisory Committee
Boeing Commercial Airplane Group
P.O. Box 3707, M/S 67-UM
Seattle, WA 98124-2207

Dear Mr. Mack:

In response to the task announced in the Federal Register on January 13, 1992 (57 FR 1297), the Aviation Rulemaking Advisory Committee (ARAC) developed a notice of proposed rulemaking (NPRM) to amend airworthiness standards to harmonize with European airworthiness standards for transport category airplanes. Comments received in response to the NPRM were considered to be non-substantive; consequently, the final action will be developed internally by the Federal Aviation Administration (FAA).

Let me thank ARAC and, in particular, the Flight Test Harmonization Working Group for its dedicated efforts in completing the task assigned by the FAA.

If you have any questions, please contact Mr. Mike Borfitz at (617) 238-7110.

Sincerely,

for Anthony J. Broderick
Associate Administrator for
Regulation and Certification

federal register

Friday
April 22, 1994

Part III

Department of Transportation

Federal Aviation Administration

14 CFR Parts 1 and 25
Revision of Certain Flight Airworthiness Standards To Harmonize With European Airworthiness Standards for Transport Category Airplanes; Proposed Rule and Notice

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 1 and 25

[Docket No. 27705; Notice No. 94–15]

RIN AF 25

Revision of Certain Flight Airworthiness Standards To Harmonize With European Airworthiness Standards for Transport Category Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Federal Aviation Administration (FAA) proposes to amend part 25 of the Federal Aviation Regulations (FAR) to harmonize certain flight requirements with standards proposed for the European Joint Aviation Requirements 25 (JAR–25). This action responds to a petition from the Aerospace Industries Association of America, Inc. and the Association Europeenne des Constructeurs de Materiel Aerospatial. These changes are intended to benefit the public interest by standardizing certain requirements, concepts, and procedures contained in the airworthiness standards of the FAR and the JAR.

DATES: Comments must be received on or before July 21, 1994.

ADDRESSES: Comments on this notice may be mailed in triplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket (AGC–10), Docket No. 27705, 800 Independence Avenue SW., Washington, DC 20591; or delivered in triplicate to: Room 915G, 800 Independence Avenue SW., Washington, DC 20591. Comments delivered must be marked Docket No. 27705. Comments may be examined in room 915G weekdays, except Federal holidays, between 8:30 a.m. and 5 p.m. In addition, the FAA is maintaining an information docket of comments in the Transport Airplane Directorate (ANM–100), Federal Aviation Administration, Northwest Mountain Region, 1601 Lind Avenue SW., Renton, WA 98055–4056. Comments in the information docket may be examined weekdays, except Federal holidays, between 7:30 a.m. and 4 p.m.

FOR FURTHER INFORMATION CONTACT: Donald K. Stimson, Flight Test and Systems Branch, ANM–111, Transport Airplane Directorate, Aircraft Certification Service, FAA, 1601 Lind Avenue SW., Renton, WA 98055–4056; telephone (206) 227–1129; facsimile (206) 227–1320.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in this proposed rulemaking by submitting such written data, views, or arguments as they may desire. Comments relating to any environmental, energy, or economic impact that might result from adopting the proposals contained in this notice are invited. Substantive comments should be accompanied by cost estimates. Commenters should identify the regulatory docket or notice number and submit comments in triplicate to the Rules Docket address above. All comments received on or before the closing date for comments will be considered by the Administrator before taking action on this proposed rulemaking. The proposals contained in this notice may be changed in light of comments received. All comments received will be available in the Rules Docket, both before and after the comment period closing date, for examination by interested persons. A report summarizing each substantive public contact with FAA personnel concerning this rulemaking will be filed in the docket. Persons wishing the FAA to acknowledge receipt of their comments must submit with those comments a self-addressed, stamped postcard on which is stated: "Comments to Docket No. 27705." The postcard will be date stamped and returned to the commenter.

Availability of the NPRM

Any person may obtain a copy of this notice by submitting a request to the Federal Aviation Administration (FAA), Office of Public Affairs, Attention: Public Inquiry Center, APA–230, 800 Independence Avenue SW., Washington, DC 20591; or by calling (202) 267–3484. The notice number of this NPRM must be identified in all communications. Persons interested in being placed on a mailing list for future rulemaking documents should also request a copy of Advisory Circular No. 11–2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Background

Part 25 of the Federal Aviation Regulations (FAR) contains the airworthiness standards for transport category airplanes. Manufacturers of transport category airplanes must show that each airplane they produce of a different type design complies with the relevant standards of part 25. These standards apply to airplanes manufactured within the U.S. for use by U.S.-registered operators and to airplanes manufactured in other countries and imported under a bilateral airworthiness agreement.

In Europe, the Joint Aviation Requirements (JAR) were developed by the Joint Aviation Authorities (JAA) to provide a common set of airworthiness standards for use within the European aviation community. The airworthiness standards for European type certification of transport category airplanes, JAR–25, are based on part 25 of the FAR. Airplanes certificated to the JAR–25 standards, including airplanes manufactured in the U.S. for export to Europe, receive type certificates that are accepted by the aircraft certification authorities of 23 European countries.

Although part 25 and JAR–25 are very similar, they are not identical. Differences between the FAR and the JAR can result in substantial additional costs when airplanes are type certificated to both standards. These additional costs, however, do not always bring about an increase in safety. For example, part 25 and JAR–25 may use different means to accomplish the same safety intent. In this case, the manufacturer is usually burdened with meeting both requirements, although the level of safety is not increased correspondingly. Recognizing that a common set of standards would not only economically benefit the aviation industry, but would also maintain the necessary high level of safety, the FAA and JAA consider harmonization to be a high priority.

On May 22, 1990, the Aerospace Industries Association of America, Inc. (AIA) and the Association Europeenne des Constructeurs de Materiel Aerospatial (AECMA) jointly petitioned the FAA and JAA to harmonize certain requirements contained in part 25 of the FAR and in JAR–25. In their petition, a summary of which was published in the July 17, 1990, edition of the Federal Register (55 FR 137), AIA and AECMA requested changes to §§ 25.143(c), 25.143(f), 25.149, and 25.201 to standardize the requirements, concepts, and procedures for certification flight testing and to enhance reciprocity between the FAA and JAA. In addition, AIA and AECMA recommended changes to FAA Advisory Circular (AC) 25–7, "Flight Test Guide for Certification of Transport Category Airplanes," to ensure that the harmonized standards would be interpreted and applied consistently. A copy of that petition is included in the docket for this rulemaking.

On September 26, 1991, the Aviation Rulemaking Advisory Committee (ARAC) established the Flight Test Working Group, assigning it the task of developing either a draft notice of proposed rulemaking (NPRM) or a denial of the AIA/AECMA petition. If accepted by the ARAC, the draft NPRM or petition denial would be delivered to the FAA as an advisory committee recommendation.

The public notice establishing the Flight Test Working Group appeared in the **Federal Register** on January 13, 1992 (57 FR 1297). The Flight Test Working Group was later renamed the Flight Test Harmonization Working Group and its scope was clarified to include developing a similar proposal to amend JAR–25, as necessary, to achieve harmonization.

The rulemaking proposal contained in this notice was developed by the Flight Test Harmonization Working Group. It was presented to the FAA by the ARAC as a recommended response to the AIA/AECMA petition. Rather than proposing a simple acceptance or denial of the petition, the working group used the petition as a starting point for developing a rulemaking proposal that would accomplish the goal of harmonizing not only the sections of part 25 and JAR–25 addressed in the petition, but also related sections.

The Aviation Rulemaking Advisory Committee

The ARAC was formally established by the FAA on January 22, 1991 (56 FR 2190), to provide advice and recommendations concerning the full range of the FAA's safety-related rulemaking activity. This advice was sought to develop better rules in less overall time using fewer FAA resources than are currently needed. The committee provides the opportunity for the FAA to obtain firsthand information and insight from interested parties regarding proposed new rules or revisions of existing rules.

There are over 60 member organizations on the committee, representing a wide range of interests within the aviation community. Meetings of the committee are open to the public, except as authorized by section 10(d) of the Federal Advisory Committee Act.

The ARAC establishes working groups to develop proposals to recommend to the FAA for resolving specific issues. Tasks assigned to working groups are published in the **Federal Register**. Although working group meetings are not generally open to the public, all interested parties are invited to participate as working group members. Working groups report directly to the ARAC, and the ARAC must concur with a working group proposal before that proposal can be presented to the FAA as an advisory committee recommendation.

The activities of the ARAC will not, however, circumvent the public rulemaking procedures. After an ARAC recommendation is received and found acceptable by the FAA, the agency proceeds with the normal public rulemaking procedures. Any ARAC participation in a rulemaking package will be fully disclosed in the public docket.

Discussion of the Proposals

The FAA proposes amending certain sections of the FAR, as recommended by the ARAC, to harmonize these sections with JAR–25. The JAA intend to publish a Notice of Proposed Amendment (NPA), also developed by the Flight Test Harmonization Working Group, to revise JAR–25, as necessary, to ensure harmonization in those areas for which the proposed amendments differ from the current JAR–25. When it is published, the NPA will be placed in the docket for this rulemaking.

The FAA proposes to: (1) Introduce the term "go-around power or thrust setting" to clarify certain part 25 flight requirements; (2) revise the maximum control forces permitted for demonstrating compliance with the controllability and maneuverability requirements; (3) provide requirements for stick force and stick force gradient in maneuvering flight; (4) revise and clarify the requirements defining minimum control speed during approach and landing; (5) clarify the procedural and airplane configuration requirements for demonstrating stalls and revise the list of acceptable flight characteristics used to define the occurrence of stall; and (6) require that stall characteristics be demonstrated for turning flight stalls at deceleration rates up to 3 knots per second.

Revisions are also proposed for AC 25–7 to ensure consistent application of these proposed revised standards. Public comments concerning the revisions to AC 25–7 are invited by separate notice published elsewhere in this issue of the **Federal Register**.

Proposal 1

Certain part 25 flight requirements involving flight conditions other than takeoff (i.e., §§ 25.119, 25.121(d), 25.145(b)(3), 25.145(b)(4), 25.145(b)(5), 25.145(c)(1), 25.149(f)(6), and 25.149(g)(7)(ii)) specify using the maximum available takeoff power or thrust as being representative of the appropriate maximum in-flight power or thrust. In practice, however, the power or thrust setting used to obtain the maximum in-flight power or thrust (commonly referred to as the go-around power or thrust setting) usually differs from the setting used for takeoff. In the past, the FAA interpreted the words "maximum available takeoff power or thrust" to mean the maximum in-flight power or thrust, with the takeoff power or thrust setting not always being "available" in flight. The FAA proposes changing the nomenclature to "go-around power or thrust setting" for clarity and to reflect terminology commonly used in the operational environment. (In the context of this discussion, the term "go-around" refers to a deliberate maneuver to abort a landing attempt prior to touchdown by applying the maximum available power or thrust, retracting flaps, and climbing to a safe level-off altitude).

(The go-around power or thrust setting may differ from the takeoff power or thrust setting, for example, due to the airspeed difference between the takeoff and go-around flight conditions. In addition, complying with the powerplant limitations of § 25.1521 may result in a lower power setting at the higher airspeeds associated with a go-around. As another example, the controllability requirements of §§ 25.145(b)(3), 25.145(b)(4), 25.145(b)(5), 25.149(f), and 25.149(g) may also limit the go-around power or thrust setting to less than that used for takeoff. Another reason to separate the takeoff and go-around power (or thrust) nomenclature is that certification practice has not required, and applicants have not always proposed, changing the go-around power or thrust setting when a previously approved takeoff power or thrust is increased.

The FAA proposes to substitute the term "go-around power or thrust setting" for "maximum available takeoff power or thrust" in §§ 25.119, 25.121(d), 25.145(b)(3), 25.145(b)(4), 25.145(c)(1), 25.149(f)(6), and 25.49(g)(7)(ii). (Note that the requirement of § 25.145(b)(5) also uses the power specified in § 25.145(b)(4)). In addition, the FAA proposes to define "go-around power or thrust setting" in part 1 as "the maximum allowable in-flight power or thrust setting identified in the performance data." With this revision, the FAA would clarify that the applicable controllability requirements should be based on the same power or thrust setting used to determine the approach and landing climb performance contained in the approved Airplane Flight Manual (AFM).

The proposed terminology refers to a power or thrust "setting" rather than a power or thrust to make it clear that existing engine ratings would be unaffected. The powerplant limitations of § 25.1521 would continue to apply at the go-around power (or thrust) setting. Existing certification practices would also remain the same, including the relationship between the power or thrust values used to comply with the landing and approach climb requirements of §§ 25.119 and 25.121(d). For example, the thrust value used to comply with § 25.121(d) may be greater than that used for § 25.119, if the operating engine(s) do not reach the maximum allowable in-flight thrust by the end of the eight second time period specified in § 25.119.

Proposal 2

The FAA proposes to revise the table in § 25.143(c) to match the control force limits currently provided in JAR 25.143(c). This table prescribes the maximum control forces for the controllability and maneuverability flight testing required by §§ 25.143(a) and 25.143(b). For transient application of the pitch and roll control, the revised table would contain more restrictive maximum control force limits for those maneuvers in which the pilot might be using one hand to operate other controls, relative to those maneuvers in which both hands are normally available for applying pitch and roll control. The revised table would retain the current control force limits for transient application of the yaw control, and for sustained application of the pitch, roll, and yaw controls.

For maneuvers in which only one hand is assumed to be available, the FAA proposes to reduce the maximum permissible control forces from 75 pounds to 50 pounds for pitch control, and from 60 pounds to 25 pounds for roll control. These lower control forces would be more consistent with § 25.145(b), which states that a force of 50 pounds for longitudinal (pitch) control is "representative of the maximum temporary force that readily can be applied by one hand." In addition to adding more restrictive control force limits for maneuvers in which only one hand may be available to apply pitch and roll control, the FAA proposes to reduce the maximum permissible force for roll control from 60 pounds to 50 pounds for maneuvers in which the pilot normally has both hands available to operate the control.

The FAA proposes to further revise § 25.143(c) by specifying that the table of maximum permissible control forces applies only to conventional wheel type controls. This restriction, also specified in the current JAR 25.143(c), recognizes that different control force limits may be necessary when considering sidestick controllers or other types of control systems.

For clarification, the FAA proposes to replace the terms "temporary" and "prolonged," used in §§ 25.143(c), 25.143(d), 25.143(e), and 25.145(b), with "transient" and "sustained," respectively. "Transient" forces refer to those control forces resulting from maintaining the intended flight path during changes to the airplane configuration, normal transitions from one flight condition to another, or regaining control after a failure. The pilot is assumed to take immediate action to reduce or eliminate these forces by retrimming or by changing the airplane configuration or flight condition. "Sustained forces," on the other hand, refer to those control forces resulting from normal or failure conditions that cannot readily be trimmed out or eliminated. The FAA is proposing to add these definitions of "transient" and "sustained" forces to AC 25–7.

In addition, the FAA proposes several minor editorial changes for §§ 25.143(c) through 25.143(e) to improve readability and correct grammatical errors. For example, the words "immediately preceding" are proposed to replace "next preceding" in § 25.143(d). These editorial changes are intended to clarify the existing interpretation of the affected sections.

Proposal 3

The FAA proposes to add the JAR 25.143(f) requirements regarding control force characteristics during maneuvering flight to part 25 as a *new* § 25.143(f). By adding these requirements, the FAA would ensure that the force to move the control column, or "stick," must not be so great as to make excessive demands on the pilot's strength when maneuvering the airplane, and must not be so low that the airplane can easily be overstressed inadvertently.

These harmonized requirements would apply up to the speed V_{FC}/M_{FC} (the maximum speed for stability characteristics) rather than the speed V_{MO}/M_{MO} (the maximum operating limit speed) specified by the current JAR 25.143(f). Requiring these maneuvering requirements to be met up to V_{FC}/M_{FC} is consistent with other part 25 stability requirements. Section 25.253, which defines V_{FC}/M_{FC}, would be revised to reference the use of this speed in the proposed § 25.143(f). An acceptable means of compliance with § 25.143(f), including detailed interpretations of the stick force characteristics that meet these requirements, would be added to AC 25–7.

Proposal 4

Section 25.149(f) requires that the minimum control speed be determined assuming the critical engine suddenly fails during (or just prior to) go-around from an all-engines-operating approach. For airplanes with three or more engines, § 25.149(g) requires the minimum control speed to be determined for a one-engine-inoperative landing approach in which a second critical engine suddenly fails. The FAA proposes to revise §§ 25.149(f) through 25.149(h) to clarify and revise the criteria for establishing these minimum control speeds, V_{MCL} and V_{MCL-2}, respectively, for use during approach and landing.

The FAA proposes to clarify that V_{MCL} and V_{MCL-2} apply not only to the airplane's approach configuration(s), as prescribed in the current standards, but also to the landing configuration(s). The FAA recognizes that configuration changes occur during approach and landing (e.g., flap setting and landing gear position) and considers that the minimum control speeds provided in the AFM should ensure airplane controllability, following a sudden engine failure, throughout the approach and landing.

Applicants would have the option of determining V_{MCL} and V_{MCL-2} either for the most critical of the approach and landing configurations (i.e., the configuration resulting in the highest minimum control speed), or for each configuration used for approach or for landing. By determining the minimum control speeds in the most critical configuration, applicants would not be required to conduct any additional testing to that already required by the current standards. Only if these resulting speeds proved too constraining for other configurations would the FAA expect applicants to exercise the option of testing multiple configurations.

The FAA also proposes to add provisions to state the position of the propeller, for propeller airplanes, when establishing these minimum control speeds. For the critical engine that is suddenly made inoperative, the propeller position must reflect the most critical mode of powerplant failure with respect to controllability, as required by § 25.149(a). Also, since credit cannot be given for pilot action to feather the propeller during this high flightcrew workload phase of flight, the FAA proposes that V_{MCL} and V_{MCL-2} be determined with the propeller position

of the most critical engine in the position it automatically achieves. For V_{MCL-2}, the engine that is already inoperative before beginning the approach may be feathered, since the pilot is expected to ensure the propeller is feathered before initiating the approach.

To assure that airplanes have adequate lateral control capability at V_{MCL} and V_{MCL-2}, the FAA proposes to require the airplane to be capable of rolling, from an initial condition of steady straight flight, through an angle of 20 degrees in not more than 5 seconds, in the direction necessary to start a turn away from the inoperative engine. This proposed addition to § 25.149 is contained in the current JAR 25.149.

The FAA is proposing guidance material for AC 25–7 to enable applicants to additionally determine the appropriate minimum control speeds for an approach and landing in which one engine, and, for airplanes with three or more engines, two engines, are already inoperative prior to beginning the approach. These speeds, $V_{MCL(1\ out)}$ and $V_{MCL-2(2\ out)}$, would be less restrictive than V_{MCL} and V_{MCL-2} because the pilot is assumed to have trimmed the airplane for the approach with an inoperative engine (for $V_{MCL(1\ out)}$) or two inoperative engines (for $V_{MCL-2(2\ out)}$). Also, the approach and landing procedures under these circumstances may use different approach and landing flaps than for the situations defining V_{MCL} or V_{MCL-2}. These additional speeds can be used as guidance in determining the recommended procedures and speeds for a one-engine-inoperative, or, in the case of an airplane with three or more engines, a two-engine-inoperative approach and landing.

The FAA proposes to revise § 25.125 to require the approach speed used for determining the landing distance to be equal to or greater than V_{MCL}, the minimum control speed for approach and landing with all-engines-operating. This provision would ensure that the speeds used for normal landing approaches with all-engines-operating would provide satisfactory controllability in the event of a sudden engine failure during, or just prior to, a go-around.

Proposal 5

The FAA proposes to revise the stall demonstration requirements of § 25.201 to clarify the airplane configurations and procedures used in flight tests to demonstrate stall speeds and stall handling characteristics. The list of acceptable flight characteristics used to define the occurrence of stall would also be revised. To be consistent with current practice, § 25.201(b)(1) would require that stall demonstrations also be conducted with deceleration devices (e.g., speed brakes) deployed. Additionally, the FAA proposes clarifying the intent of § 25.201(b) to cover normal, rather than failure, conditions by requiring that stalls need only be demonstrated for the approved configurations.

Section 25.201(c) would be revised to more accurately describe the procedures used for demonstrating stall handling characteristics. The cross-reference to § 25.103(b), currently contained in § 25.201(c)(1), would be moved to a new § 25.201(b)(4) for editorial clarity and harmony with the JAR–25 format. Reference to the pitch control reaching the aft stop, which would be interpreted as one of the indications that the airplane has stalled, would be moved from § 25.201(c)(1) to § 25.201(d)(3).

The list of acceptable flight characteristics that define the occurrence of a stall, used during the flight tests demonstrating compliance with the stall requirements, is provided in § 25.201(d). The FAA proposes to revise this list to conform with current practices. Section 25.201(d)(1)(ii) would be removed to clarify that a rolling motion, occurring by itself, is not considered an acceptable flight characteristic for defining the occurrence of a stall. The proposed § 25.201(d)(2) would replace the criteria of §§ 25.201(d)(1)(iii) and 25.201(d)(2) because only deterrent buffeting (i.e., a distinctive shaking of the airplane that is a strong and effective deterrent to further speed reduction) is considered to comply with those criteria. Finally, the proposed § 25.201(d)(3) would define as a stall a condition in which the airplane does not continue to pitch up after the pitch control has been pulled back as far as it will go and held there for a short period of time. Guidance material would be added to AC 25–7 to define the length of time that the control stick must be held in this full aft position when using § 25.201(d)(3) to define a stall.

Proposal 6

Section 25.201 currently requires stalls to be demonstrated at airspeed deceleration rates (i.e., entry rates) not exceeding one knot per second. JAR 25.201 currently requires, in addition, that turning flight stalls must also be demonstrated at accelerated rates of entry into the stall (i.e., dynamic stalls). According to the JAA, the intended procedure for demonstrating dynamic stalls begins with a 1 knot per second deceleration from the trim speed (similar to normal stalls). Then, approximately halfway between the trim speed and the stall warning speed, the flight test pilot applies the elevator control to achieve an increase in the rate of change of angle-of-attack. The final angle-of-attack rate and the control input to achieve it should be appropriate to the type of airplane and its particular control characteristics.

The AIA/AECMA petition detailed various difficulties with interpretation of the JAR–25 requirement, noted that the requirement is not contained in the FAR, and proposed that dynamic stalls be removed from JAR–25. Some of the concerns with the JAR–25 dynamic stall requirement include: (1) A significant number of flight test demonstrations for compliance used inappropriate piloting techniques considering the capabilities of transport category airplanes; (2) the stated test procedures depend, to a large extent, on pilot interpretation, resulting in test demonstrations that could vary significantly for different test pilots; (3) the safety objective of the requirement is not well understood within the aviation community; and (4) the flight test procedures that are provided are inconsistent with the flight characteristics being evaluated. As a result, applicants are unable to ensure that their designs will comply with the JAR–25 dynamic stall requirement prior to the certification flight test.

In practice, FAA certification testing has typically included stall demonstrations at entry rates higher than 1 knot per second. For airplanes with certain special features, such as systems designed to prevent a stall or that are needed to provide an acceptable stall indication, higher entry rates are demonstrated to show that the system will continue to safely perform its intended function under such conditions. These higher entry rate stalls are different, however, from the JAR–25 dynamic stalls.

Rather than simply deleting the dynamic stall requirement from JAR–25, or adding this requirement to part 25 of the FAR, the ARAC recommended harmonizing the two standards by requiring turning flight stalls be demonstrated at steady airspeed deceleration rates up to 3 knots per second. The FAA agrees with this recommendation and proposes to add the requirement for a higher entry rate stall demonstration to part 25 as § 25.201(c)(2). The current § 25.201(c)(2) would be redesignated § 25.201(c)(3). The JAA is proposing to replace the JAR–25 dynamic stall requirement with the ARAC recommendation.

The proposed higher entry rate stall demonstration is a controlled and repeatable maneuver that meets the objective of evaluating stall characteristics over a range of entry conditions that might reasonably be encountered by transport category airplanes in operational service. Some degradation in characteristics would be accepted at the higher entry rates, as long as it does not present a major threat to recovery from the point at which the pilot has recognized the stall. Guidance material is being proposed for AC 25–7 to point out that the specified deceleration rate, and associated rate of increase in angle of attack, should be established from the trim speed specified in § 25.103(b)(1) and maintained up to the point at which the airplane stalls.

The FAA proposes to revise § 25.203(c) to specify a bank angle that must not be exceeded during the recovery from the turning flight stall demonstrations. Currently, § 25.203(c) provides only a qualitative statement that a prompt recovery must be easily attainable using normal piloting skill. By specifying a maximum bank angle limit, the FAA proposes to augment this qualitative requirement with a quantitative one.

For deceleration rates up to 1 knot per second, the maximum bank angle would be approximately 60 degrees in the original direction of the turn, or 30 degrees in the opposite direction. These bank angle limits are currently contained in JAR–25 guidance material, and have been used informally during FAA certification programs as well. For deceleration rates higher than 1 knot per second, the FAA proposes to allow a greater maximum bank angle—approximately 90 degrees in the original direction of the turn, or 60 degrees in the opposite direction. These are the same acceptance criteria currently used by the JAA to evaluate dynamic stall demonstrations.

In addition to the amendments to part 25 proposed in this notice, revisions to AC 25–7 are being proposed to ensure that the harmonized standards would be interpreted and applied consistently. AC 25–7 provides guidelines that the FAA has found acceptable regarding flight testing transport category airplanes to demonstrate compliance with the applicable airworthiness requirements. Public comments concerning the proposed revisions to AC 25–7 are invited by separate notice published elsewhere in this issue of the Federal Register.

Regulatory Evaluation Summary

Preliminary Regulatory Evaluation, Initial Regulatory Flexibility Determination, and Trade Impact Assessment

Proposed changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic effect of the regulatory changes on small entities. Third, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. In conducting these analyses, the FAA has determined that this rule: (1) Would generate benefits that justify its costs and is not a "significant regulatory action" as defined in the Executive Order; (2) is not significant as defined in DOT's Policies and Procedures; (3) would not have a significant impact on a substantial number of small entities; and (4) would not constitute a barrier to international trade. These analyses, available in the docket, are summarized below.

Cost Benefit Analysis

Three of the proposed 48 revisions to the flight test airworthiness standards of part 25 would require additional flight testing and engineering analysis, resulting in compliance costs of $18,500 per type certification. When amortized over a representative production run of 500 airplanes, this total cost would result in a negligible incremental cost of $37 per airplane. The FAA solicits comments concerning the incremental flight test certification costs attributable to the proposed rule.

The primary benefits of the proposed rule would be harmonization of flight test airworthiness standards with the European Joint Aviation Requirements and clarification of existing standards. The resulting increased uniformity of flight test standards would simplify airworthiness approval for import and export purposes and would avoid some of the costs that can result when manufacturers seek type certification under both sets of standards. While not readily quantifiable, the potential cost avoidance would exceed the relatively minor incremental costs of the proposed rule.

The proposed rule would provide additional benefits by updating certain airworthiness standards. These updated standards would adopt terminology commonly used in airplane operations as well as better reflect current flight test practices.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily or disproportionately burdened by Federal regulations. The RFA requires a Regulatory Flexibility Analysis if a proposed rule would have a significant economic impact, either detrimental or beneficial, on a substantial number of small entities. Based on FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, the FAA has determined that the proposed amendments would not have a significant economic impact on a substantial number of small entities.

Trade Impact Assessment

The proposed rule would not constitute a barrier to international trade, including the export of American airplanes to foreign countries, and the import of foreign airplanes into the United States. Instead, the proposed flight testing standards have been harmonized with those of foreign aviation authorities, thereby lessening restraints on trade.

Federalism Implications

The amended regulations proposed in this rulemaking would not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant preparing a Federalism Assessment.

Conclusion

Because the proposed changes to standardize specific flight requirements of part 25 of the FAR are not expected to result in substantial economic cost, the FAA has determined that this proposed regulation would not be significant under Executive Order 12866. Because this is an issue which has not prompted a great deal of public concern, the FAA has determined that this action is not significant under DOT Regulatory Policies and Procedures (44 FR 11034, February 25, 1979). In addition since there are no small entities affected by this proposed rulemaking, the FAA certifies, under the criteria of the Regulatory Flexibility Act, that this rule, if adopted, will not have a significant economic impact, positive

or negative, on a substantial number of small entities. An initial regulatory evaluation of the proposal, including a Regulatory Flexibility Determination and Trade Impact Analysis, has been placed in the docket. A copy may be obtained by contacting the person identified under FOR FURTHER INFORMATION CONTACT.

List of Subjects

14 CFR Part 1

Air transportation.

14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The Proposed Amendments

Accordingly, the Federal Aviation Administration (FAA) proposed to amend 14 CFR parts 1 and 25 of the Federal Aviation Regulations (FAR) as follows:

PART 1—DEFINITIONS AND ABBREVIATIONS

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

Authority: 49 U.S.C. app. 1347, 1348, 1354(a), 1357(d)(2), 1372, 1421 through 1430, 1432, 1442, 1443, 1472, 1510, 1522, 1652(e), 1655(c), 1657(f), and 49 U.S.C. 106(g).

2. Section 1.1 is amended by adding a new definition to read as follows:

§ 1.1 General definitions.

* * * * *

"Go-around power or thrust setting" means the maximum allowable in-flight power or thrust setting identified in the performance data.

* * * * *

PART 25—AIRWORTHINESS STANDARDS—TRANSPORT CATEGORY AIRPLANES

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

Authority: 49 U.S.C. app. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425, 1428, 1429, 1430; 49 U.S.C. 106(g); and 49 CFR 1.47(a).

4. Section 25.119 is amended by revising paragraph (a) to read as follows:

§ 25.119 Landing climb: All-engines-operating.

* * * * *

(a) The engines at the power or thrust that is available eight seconds after initiation of movement of the power or thrust controls from minimum flight idle to the go-around power or thrust setting; and

* * * * *

5. Section 25.121 is amended by revising paragraph (d)(1) to read as follows:

§ 25.121 Climb: One-engine-inoperative.

* * * * *

(d) * * *

(1) The critical engine inoperative, the remaining engines at the go-around power or thrust setting;

* * * * *

6. Section 25.125 is amended by revising paragraph (a)(2) to read as follows:

§ 25.125 Landing.

* * * * *

(a) * * *

(2) A stabilized approach, with a calibrated airspeed of not less than 1.3 V_S or V_{MCL}, must be maintained down to the 50 foot height.

* * * * *

7. Section 25.143 is amended by revising paragraphs (c), (d), and (e) and adding a new paragraph (f) to read as follows:

§ 25.143 General.

* * * * *

(c) The following table prescribes, for conventional wheel type controls, the maximum control forces permitted during the testing required by paragraphs (a) and (b) of this section:

Force, in pounds, applied to the control wheel or rudder pedals	Pitch	Roll	Yaw
For transient application for pitch and roll control—two hands available for control	75	50	
For transient application for pitch and roll control—one hand available for control	50	25	
For transient application for yaw control	.....	.....	150
For sustained application	10	5	20

(d) Approved operating procedures or conventional operating practices must be followed when demonstrating compliance with the control force limitations for transient application that are prescribed in paragraph (c) of this section. The airplane must be in trim, or as near to being in trim as practical, in the immediately preceding steady flight condition. For the takeoff condition, the airplane must be trimmed according to the approved operating procedures.

(e) When demonstrating compliance with the control force limitations for sustained application that are prescribed in paragraph (c) of this section, the airplane must be in trim, or as near to being in trim as practical.

(f) When maneuvering at a constant airspeed or Mach number (up to V_{FC}/M_{FC}), the stick forces and the gradient of the stick force versus maneuvering load factor must lie within satisfactory limits. The stick forces must not be so great as to make excessive demands on the pilot's strength when maneuvering the airplane, and must not be so low that the airplane can easily be overstressed inadvertently. Changes of gradient that occur with changes of load factor must not cause undue difficulty in maintaining control of the airplane, and local gradients must not be so low as to result in a danger of overcontrolling.

8. Section 25.145 is amended by revising the introductory text of paragraph (b), and paragraphs (b)(3), (b)(4), and (c)(1) to read as follows:

§ 25.145 Longitudinal control.

* * * * *

(b) With the landing gear extended, no change in trim control, or exertion of more than 50 pounds control force (representative of the maximum transient force that can be applied readily by one hand) may be required for the following maneuvers:

* * * * *

(3) Repeat paragraph (b)(2) except at the go-around power or thrust setting.

(4) With power off, flaps retracted, and the airplane trimmed at 1.4 V_{S1}, rapidly set go-around power or thrust while maintaining the same airspeed.

* * * * *

(c) * * *

(1) Simultaneous movement of the power or thrust controls to the go-around power or thrust setting;

* * * * *

9. Section 25.149 is amended by revising paragraphs (f), (g) and (h) to read as follows:

§ 25.149 Minimum Control Speed.

* * * * *

(f) V_{MCL}, the minimum control speed during approach and landing 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—

(1) The airplane in the most critical configuration (or, at the option of the applicant, each configuration) for

approach and landing with all engines operating;

(2) The most unfavorable center of gravity;

(3) The airplane trimmed for approach with all engines operating;

(4) The most unfavorable weight, or, at the option of the applicant, as a function of weight;

(5) The propeller of the inoperative engine, if applicable, in the position it automatically achieves; and

(6) Go-around power or thrust setting on the operating engine(s).

(g) For airplanes with three or more engines, V_{MCL-2}, the minimum control speed during approach and landing 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-2} must be established with—

(1) The airplane in the most critical configuration (or, at the option of the applicant, each configuration) for approach and landing with one critical engine inoperative;

(2) The most unfavorable center of gravity;

(3) The airplane trimmed for approach with one critical engine inoperative;

(4) The most unfavorable weight, or, at the option of the applicant, as a function of weight;

(5) If applicable, the propeller of the more critical engine in the position it automatically achieves and the propeller of the other inoperative engine feathered;

(6) The power or thrust on the operating engine(s) necessary to maintain an approach path angle of 3 degrees when one critical engine is inoperative; and

(7) The power or thrust on the operating engine(s) rapidly changed, immediately after the second critical engine is made inoperative, from the power or thrust prescribed in paragraph (g)(6) of this section to—

(i) Minimum power or thrust; and

(ii) Go-around power or thrust setting.

(h) In demonstrations of V_{MCL} and V_{MCL-2}—

(1) The rudder force may not exceed 150 pounds;

(2) The airplane may not exhibit hazardous flight characteristics or require exceptional piloting skill, alertness, or strength;

(3) Lateral control must be sufficient to roll the airplane, from an initial condition of steady straight flight, through an angle of 20 degrees in the direction necessary to initiate a turn away from the inoperative engine(s), in not more than 5 seconds; and

(4) For propeller airplanes, hazardous flight characteristics must not be exhibited due to any propeller position achieved when the engine fails or during any likely subsequent movements of the engine or propeller controls.

10. Section 25.201 is amended by revising paragraphs (b), (c), and (d) to read as follows:

§ 25.201 Stall demonstration.

* * * * *

(b) In each condition required by paragraph (a) of this section, it must be possible to meet the applicable requirements of § 25.203 with—

(1) Flaps, landing gear, and deceleration devices in any likely combination of positions approved for operation;

(2) Representative weights within the range for which certification is requested;

(3) The most adverse center of gravity for recovery; and

(4) The airplane trimmed for straight flight at the speed prescribed in § 25.103(b)(1).

(c) The following procedures must be used to show compliance with § 25.203:

(1) Starting at a speed sufficiently above the stalling speed to ensure that a steady rate of speed reduction can be established, apply the longitudinal control so that the speed reduction does not exceed one knot per second until the airplane is stalled.

(2) In addition, for turning flight stalls, apply the longitudinal control to achieve airspeed deceleration rates up to 3 knots per second.

(3) As soon as the airplane is stalled, recover by normal recovery techniques.

(d) The airplane is considered stalled when the behavior of the airplane gives the pilot a clear and distinctive indication of an acceptable nature that the airplane is stalled. Acceptable indications of a stall, occurring either individually or in combination, are—

(1) A nose-down pitch that cannot be readily arrested, which may be accompanied by a rolling motion that is not immediately controllable (provided that the rolling motion complies with § 25.203 (b) or (c) as appropriate);

(2) Buffeting, of a magnitude and severity that is a strong and effective deterrent to further speed reduction; or

(3) The pitch control reaches the aft stop and no further increase in pitch attitude occurs when the control is held full aft for a short time before recovery is initiated.

11. Section 25.203 is amended by revising paragraph (c) to read as follows:

§ 25.203 Stall characteristics.

* * * * *

(c) For turning flight stalls, the action of the airplane after the stall may not be so violent or extreme as to make it difficult, with normal piloting skill, to effect a prompt recovery and to regain control of the airplane. The maximum bank angle that occurs during the recovery may not exceed—

(1) Approximately 60 degrees in the original direction of the turn, or 30 degrees in the opposite direction, for deceleration rates up to 1 knot per second; and

(2) Approximately 90 degrees in the original direction of the turn, or 60 degrees in the opposite direction, for deceleration rates in excess of 1 knot per second.

12. Section 25.253 is amended by revising paragraph (b) to read as follows:

§ 25.253 High-speed characteristics.

* * * * *

(b) *Maximum speed for stability characteristics,* V_{FC}/M_{FC}. V_{FC}/M_{FC} is the maximum speed at which the requirements of §§ 25.143(f), 25.147(e), 25.175(b)(1), 25.177, and 25.181 must be met with flaps and landing gear retracted. It may not be less than a speed midway between V_{MO}/M_{MO} and V_{DF}/M_{DF}, except that, for altitudes where Mach number is the limiting factor, M_{FC} need not exceed the Mach number at which effective speed warning occurs.

Issued in Washington, DC, on April 11, 1994.

Thomas E. McSweeny,

Director, Aircraft Certification Service.

[FR Doc. 94-9758 Filed 4-21-94; 8:45 am]

BILLING CODE 4910-13-M

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Proposed Revisions to Advisory Circular--Flight Test Guide for Certification of Transport Category Airplanes.

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of proposed advisory circular revision and request for comments.

SUMMARY: The Federal Aviation Administration requests comments regarding a proposed revision to Advisory Circular (AC) 25-7A, "Flight Test Guide for Certification of Transport Category Airplanes." The proposed revision provides revised guidance concerning proposed rulemaking published elsewhere in this issue of the Federal Register concerning the airspeed indicating system. This notice provides interested persons an opportunity to comment on the proposed revision to the AC concurrently with the proposed rulemaking.

DATES: Comments must be received on or before [insert date 60 days after date of publication]

ADDRESSES: Send all comments on the proposed AC revision to the Federal Aviation Administration, Attention: Don Stimson, Airplane & Flight Crew Interface Branch, ANM-111, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Ave SW., Renton, WA 98055-4056. Comments may be examined at the above address between 7:30 a.m. and 4:00 p.m. weekdays, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Patricia Siegrist, Program Management Branch, ANM-114, at the above address, telephone (425) 227-2126, or facsimile (425) 227-1320.

SUPPLEMENTARY INFORMATION:

Comments Invited

You are invited to comment on the proposed revision to the AC by submitting written data, views, or arguments. You must identify the title of the AC and submit comments in duplicate to the address specified above. The Transport Airplane Directorate will consider all comments received on or before the closing date for comments before issuing a revision to the AC.

Discussion

By a notice of proposed rulemaking published in this same issue of the Federal Register, the Federal Aviation Administration (FAA) proposes to amend the airworthiness standards for transport category airplanes concerning the airspeed indicating system. The proposed amendment would update the current standards by adding airspeed indication requirements for speeds greater than and less than the speed range for which airspeed indication accuracy requirements currently apply, would add a requirement that airspeed indications not cause the pilot undue difficulty between the initiation of rotation and the achievement of a steady climbing condition during takeoff, and would also add a requirement to limit the effects of airspeed lag. The proposed amendment would harmonize these standards with those being proposed for the European Joint Aviation Requirements (JAR-25).

To address the additional rulemaking requirements proposed for part 25, the FAA also proposes to revise Advisory Circular (AC) 25-7A to describe acceptable means of showing compliance with the proposed rule. This revision only addresses guidance material associated with the airspeed indicating system, and should not be confused with other proposed revisions of AC 25-7A for which the FAA is currently seeking comment. Issuance of a revised AC is contingent on adoption of the proposed revisions to part 25.

Proposed Revisions to AC 25-7A

1. *Replace existing paragraph 177a(1)(v) with new paragraphs a(1)(v) and (vi) to read as follows*:

(v) An acceptable means of compliance when demonstrating a perceptible speed change between 1.3 V_S to stall warning speed is for the rate of change of IAS with CAS to be not less than 0.75.

(vi) An acceptable means of compliance when demonstrating a perceptible speed change between V_{MO} to V_{MO} + 2/3 (V_{DF}- V_{MO}) is for the rate of change of IAS with CAS to be not less than 0.50.

2. *Redesignate existing paragraph 177a(1)(v), Airspeed Lag, as paragraph 177a(1)(vii).*

Issued in Renton, Washington, on May 2, 2001.

/s/ Lirio L. Nelson
Acting Manager, Transport Airplane Directorate
Aircraft Certification Service