Federal Aviation Administration
Aviation Rulemaking Advisory Committee

Transport Airplane and Engine Issue Area
Loads and Dynamics Harmonization Working Group

Task 17 – Harmonize 14 CFR Part 25.415

Task Assignment

[Federal Register: November 26, 1999 (Volume 64, Number 227)]
[Notices]
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From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr26no99-123]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Aviation Rulemaking Advisory Committee; Transport Airplane and Engine Issues--New and Revised Tasks

AGENCY: Federal Aviation Administration (**FAA**), DOT.

ACTION: Notice of new and revised task assignments for the Aviation Rulemaking Advisory Committee (ARAC).

SUMMARY: Notice is given of new tasks assigned to and accepted by the Aviation Rulemaking Advisory Committee (ARAC) and of revisions to a number of existing tasks. This notice informs the public of the activities of ARAC.

FOR FURTHER INFORMATION CONTACT: Dorenda Baker, Transport Airplane Directorate, Aircraft Certification Service (ANM-110), 1601 Lind Avenue, SW., Renton, WA 98055; phone (425) 227-2109; fax (425) 227-1320.

SUPPLEMENTARY INFORMATION:

Background

The **FAA** has established an Aviation Rulemaking Advisory Committee to provide advice and recommendations to the **FAA** Administrator, through the Associate Administrator for Regulation and Certification, on the full range of the **FAA**'s rulemaking activities with respect to aviation-related issues. This includes obtaining advice and recommendations on the **FAA**'s commitment to harmonize its Federal Aviation Regulations (FAR) and practices with its trading partners in Europe and Canada.

One area ARAC deals with is transport airplane and engine issues. These issues involve the airworthiness standards for transport category

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airplanes and engines in 14 CFR parts 25, 33, and 35 and parallel provisions in 14 CFR parts 121 and 135. The corresponding Canadian standards are contained in Parts V, VI, and VII of the Canadian Aviation Regulations. The corresponding European standards are contained in Joint Aviation Requirements (JAR) 25, JAR-E, JAR-P, JAR-OPS-Part 1, and JAR-26.

As proposed by the U.S. and European aviation industry, and as

agreed between the Federal Aviation Administration (**FAA**) and the European Joint Aviation Authorities (JAA), an accelerated process to reach harmonization has been adopted. This process is based on two procedures:

(1) Accepting the more stringent of the regulations in Title 14 of the Code of Federal Regulations (FAR), Part 25, and the Joint Airworthiness Requirements (JAR); and

(2) Assigning approximately 41 already-tasked significant regulatory differences (SRD), and certain additional part 25 regulatory differences, to one of three categories:

<bullet> Category 1--Envelope
<bullet> Category 2--Completed or near complete
<bullet> Category 3--Harmonize

The Revised Tasks

ARAC will review the rules identified in the ``FAR/JAR 25 Differences List,'' dated June 30, 1999, and identify changes to the regulations necessary to harmonize part 25 and JAR 25. ARAC will submit a technical report on each rule. Each report will include the cost information that has been requested by the **FAA**. The tasks currently underway in ARAC to harmonize the listed rules are superseded by this tasking.

New Tasks

The **FAA** has submitted a number of new tasks for the Aviation Rulemaking Advisory Committee (ARAC), Transport Airplane and Engine Issues. As agreed by ARAC, these tasks will be accomplished by existing harmonization working groups. The tasks are regulatory differences identified in the above-referenced differences list as Rule type = P-SRD.

New Working Group

In addition to the above new tasks, a newly established Cabin Safety Harmonization Working Group will review several FAR/JAR paragraphs as follows:

ARAC will review the following rules and identify changes to the regulations necessary to harmonize part 25 and JAR:

(1) Section 25.787;
(2) Section 25.791(a) to (d);
(3) Section 25.810;
(4) Section 25.811;
(5) Section 25.819; and
(6) Section 25.813(c).

ARAC will submit a technical report on each rule. Each report will include the cost information that has been requested by the **FAA**.

The Cabin Safety Harmonization Working Group would be expected to complete its work for the first five items (identified as Category 1 or 2) before completing item 6 (identified as Category 3).

Schedule

Within 120 days of tasking/retasking:

<bullet> For Category 1 tasks, ARAC submits the Working Groups' technical reports to the **FAA** to initiate drafting of proposed rulemaking documents.

<bullet> For Category 2 tasks, ARAC submits technical reports, including already developed draft rules and/or advisory materials, to the **FAA** to complete legal review, economic analysis, coordination, and issuance.

June 2000: For Category 3 tasks, ARAC submits technical reports including draft rules and/or advisory materials to the **FAA** to complete legal review, economic analysis, coordination, and issuance.

ARAC Acceptance of Tasks

ARAC has accepted the new tasks and has chosen to assign all but one of them to existing harmonization working groups. A new Cabin Safety Harmonization Working Group will be formed to complete the remaining tasks. The working groups serve as staff to ARAC to assist ARAC in the analysis of the assigned tasks. Working group recommendations must be reviewed and approved by ARAC. If ARAC accepts a working group's recommendations, it forwards them to the **FAA** and ARAC recommendations.

Working Group Activity

All working groups are expected to comply with the procedures adopted by ARAC. As part of the procedures, the working groups are expected to accomplish the following:

1. Document their decisions and discuss areas of disagreement, including options, in a report. A report can be used both for the enveloping and for the harmonization processes.

2. If requested by the **FAA**, provide support for disposition of the comments received in response to the NPRM or review the **FAA**'s prepared disposition of comments. If support is requested, the Working Group will review comments/disposition and prepare a report documenting their recommendations, agreement, or disagreement. This report will be submitted by ARAC back to the **FAA**.

3. Provide a status report at each meeting of ARAC held to consider Transport Airplane and Engine Issues.

Partcipation in the Working Groups

Membership on existing working groups will remain the same, with the formation of subtask groups, if appropriate. The Cabin Safety Harmonization Working Group will be composed of technical experts having an interest in the assigned task. A working group member need not be a representative of a member of the full committee.

An individual who has expertise in the subject matter and wishes to become a member of the Cabin Safety Harmonization 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 tasks, and stating the expertise he or she would bring to the working group. All requests to participate must be received no later than December 30, 1999. The requests will be reviewed by the assistant chair, the assistant executive director, and the working group chair, and the individuals will be advised whether or not the request can be accommodated.

Individuals chosen for membership on the Cabin Safety Harmonization Working Group will be expected to represent their aviation community segment and participate actively in the working group (e.g., attend all meetings, provide written comments when requested to do so, etc.). They also will be expected to devote the resources necessary to ensure the ability of the working group to meet any assigned deadline(s). Members are expected to keep their management chain advised of working group activities and decisions to ensure that the agreed technical solutions do not conflict with their sponsoring organization's position when the subject being negotiated is presented to ARAC for a vote.

Once the working group has begun deliberations, members will not be added or substituted without the approval of the assistant chair, the assistant executive director, and the working group chair.

The Secretary of Transportation has determined that the formation and use of ARAC are necessary and in the public interest in connection with the performance of duties imposed on the **FAA** by law.

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Meetings of ARAC will be open to the public. Meetings of the working groups 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 November 19, 1999.

Anthony F. Fazio,

Executive Director, Aviation Rulemaking Advisory Committee.

[FR Doc. 99-30774 Filed 11-24-99; 8:45 am]
BILLING CODE 4910-13-M

Recommendation Letter

Action: ARM

Pratt & Whitney
400 Main Street
East Hartford, CT 06108

Pratt & Whitney
A United Technologies Company

July 18, 2001

Federal Aviation Administration
800 Independence Avenue, SW
Washington, D.C. 20591

Attention: Mr. Thomas McSweeny, Associate Administrator for Regulation and Certification

Subject: ARAC Report, FAR 25.415, Ground Gust Conditions

Dear Tom:

The Transport Airplane and Engine Issues Group is pleased to forward the attached Report (including proposed NPRM and AC) for FAR 25.415, Ground Gust Conditions to the FAA as an ARAC recommendation. This report was prepared by the Loads and Dynamics HWG under the "Fast Track" tasking.

Also attached are comments and concerns from the Airline Pilots Association that were provided at TAEIG meetings. These concerns relate to assumptions made as a part of the proposed Part 25 design requirements and the relationship to operational requirements. The ALPA document is provided for FAA consideration during the processing of this report.

Sincerely yours,

Craig R. Bolt

C. R. Bolt
Assistant Chair, TAEIG

Copies*: Larry Hanson – Gulfstream
Chuck Huber – FAA-NWR
Effie Upshaw – FAA-Washington, D.C.
Jim Bettcher – ALPA
Jim Wallace – ALPA
Jill DeMarco – FAA-NWR

*letter only

crb071801

ANM-00-080-A

Acknowledgement Letter

SEP 27 2001

Mr. Craig R. Bolt
Assistant Chair, Aviation Rulemaking
Advisory Committee
Pratt & Whitney
400 Main Street
East Hartford, CT 06108

Dear Mr. Bolt:

This letter acknowledges receipt of your July 18, letter transmitting a recommendation for harmonizing § 25.415, ground gust conditions.

I would like to thank the Aviation Rulemaking Advisory Committee particularly those members associated with the Transport Airplane and Engine (TAE) Issues and the Loads and Dynamics Harmonization Working Group for their cooperation in completing the working group report in a timely manner. The recommendation will be forwarded to the Transport Airplane Directorate for review. Progress on the documents will be reported at the TAE meetings.

Sincerely,

ORGINIAL SIGNED BY
ANTHONY F. FAZIO

Anthony F. Fazio
Director, Office of Rulemaking

ARM-209:EUpshaw:fs:9/25/01:PCDOCS #16015
cc: ARM-1/20/200/209; APO-300/320, ANM-115/110
File #ANM-00-552-A
CONTROL NO. 20012470 -0

Recommendation

Loads and Dynamics ARAC WG Report for 25.415 Ground Gust
18 June 2001
Harmonization (Category 3) and New Projects

1 - What is underlying safety issue to be addressed by the FAR/JAR?

CFR 14 Amendment 25-91 increased the ground gust velocity requirement for § 25.415 from 60 MPH (52 Knots) TAS to 65 KTAS. However based on several incidents that have occurred to aircraft on the United Kingdom register and at least one aircraft on the US register, it has been determined that the effects of control system flexibility can lead to internal loads greater than those corresponding to the hinge moments prescribed by § 25.415. Although damage from ground gusts may not be an immediate hazard, the rule is intended to prevent damage to the control system that may not be detected before take-off. The JAA Structures Study Group has developed a draft NPA 25C-284 in response to this issue.

The L&D HWG was assigned the task of harmonizing FAR and JAR 25.415 as a Fast Track Category 1 item. However the existence of the draft NPA 25C-284 and the safety issues addressed therein caused the L&D HWG to successfully petition for a change in the Fast rack Category to Category 3. Currently the rules § 25.391 through § 25.415 are convoluted and confusing and have lead to differing interpretations being utilized as the basis for compliance.

2 - What are the current FAR and JAR standards relative to this subject?

Current FAR text:

(a) The control system must be designed as follows for control surface loads due to ground gusts and for taxiing downwind:
  (1) The control system between the stops nearest the surfaces and the cockpit controls must be designed for loads corresponding to the limit hinge moment of paragraph (a)(2) of this section. These loads need not exceed -
  (i) The loads corresponding to the maximum pilot forces in 25.397(c) for any pilot alone or
  (ii) O.75 times these maximum loads for each pilot when the pilot forces are applied in the same direction
  (2) The control system stops nearest the surfaces , the control system locks and the parts of the system (if any) between these stops and locks and the control surface horns, must be designed for the limit hinge moments H, in foot pounds, obtained from the formula,

$H = .0034KV^2cS$, where__
$V = 65$ (wind speed in knots)

K = limit hinge moment factor for ground gusts derived in paragraph (b) of this section.
c = mean chord of the control surface aft of the hinge line (ft);
S = area of the control surface aft of the hinge line (sq ft);

(b) The limit hinge moment factor K for ground gusts must be derived as follows:

	Surface	*K*	Position of controls
	(a) Aileron ----------	0.75	Control column locked or lashed in mid-position.
	(b) Aileron ---------- (c) Elevator---------- (d) Elevator---------- (e) Rudder---------- (f) Rudder----------	*±0.50 *±0.75 *±0.75 0.75 0.75	Ailerons at full throw. (c) Elevator full down. (d) Elevator full up. (e) Rudder in neutral. (f) Rudder at full throw.

* A positive value of *K* indicates a moment tending to depress the surface, while a negative value of *K* indicates a moment tending to raise the surface.

Current JAR text (As of Change 15):

Same as above FAR text.

2a – If no FAR or JAR standard exists, what means have been used to ensure this safety issue is addressed?

Not applicable.

3 - What are the differences in the FAA and JAA standards or policy and what do these differences result in?

There are no differences in current standards. It is however a JAA policy that for aircraft where the dynamic response of control systems may be significant for ground gusts, the dynamic effects of control systems be taken into account. The JAA requires consideration of the control systems "locked" while moored and "unlocked" when taxing downwind.

4 - What, if any, are the differences in the current means of compliance?

Discussed in item 3.

5 – What is the proposed action?

Develop an NPRM with the following requirements:

§ 25.391 Control surface loads: general.

The control surfaces must be designed for the limit loads resulting from the flight conditions in §§ 25.331, 25.341(a) and (b), 25.349 and 25.351 ~~and the ground gust conditions in Sec. 25.415~~, considering the requirements for -

(a) Loads parallel to hinge line, in § 25.393;
(b) Pilot effort effects, in § 25.397;
(c) Trim tab effects, in § 25.407;
(d) Unsymmetrical loads, in § 25.427; and
(e) Auxiliary aerodynamic surfaces, in § 25.445.

§ 25.395 Control Systems

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

§ 25.415 Ground gust conditions.

(a) The flight control systems and surfaces must be designed for the limit loads generated when the aircraft is subjected to a horizontal 65 knots ground gust from any direction, while taxiing with the controls locked and unlocked and while parked with the controls locked.

(b) The control system and surface loads due to ground gust may be assumed to be static loads and the hinge moments H, in foot pounds, must be computed from the formula,

$H=K\ 1/2\rho_o V_{fps}^2 cS$

where:
K = hinge moment factor for ground gusts derived in paragraph (c) of this paragraph
ρ_o = density of air at sea level = .0023769 (slugs/ft^3) = .0023769 (lb-sec^2/ ft$^{4)}$
V = 65 knots = 109.71 fps relative to the aircraft
S = area of the control surface aft of the hinge line (ft^2)
c = mean aerodynamic chord of the control surface aft of the hinge line (ft)

(c) The hinge moment factor K for ground gusts must be taken from the following table:

	Surface	*K*	Position of controls
	(a) Aileron ----------	0.75	Control column locked or lashed in mid-position.
	(b) Aileron ---------- (c) Elevator---------- (d) Elevator---------- (e) Rudder---------- (f) Rudder----------	*±0.50 *±0.75 *±0.75 0.75 0.75	Ailerons at full throw. (c) Elevator full down. (d) Elevator full up. (e) Rudder in neutral. (f) Rudder at full throw.

* A positive value of *K* indicates a moment tending to depress the surface, while a negative value of *K* indicates a moment tending to raise the surface.

(d) The computed hinge moment of paragraph (b) must be used to determine the limit loads due to ground gust conditions for the control surface. A 1.25 factor on the computed hinge moments must be used in calculating limit control system loads.

(e) Where control system flexibility is such that the rate of load application in the ground gust conditions might produce transient stresses appreciably higher than those corresponding to static loads, in the absence of a rational analysis an additional factor of 1.6 must be applied to the control system loads of paragraph (d) to obtain limit loads. If a rational analysis is used, the additional factor must not be less than 1.20.

(f) For the condition of the control locks engaged, the control surfaces, the control system locks and the parts of the control systems (if any) between the surfaces and the locks must be designed to the respective resultant limit loads. Where control locks are not provided then the control surfaces, the control system stops nearest the surfaces and the parts of the control systems (if any) between the surfaces and the stops must be designed to the resultant limit loads. If the control system design is such as to allow any part of the control system to impact with the stops due to flexibility, then the resultant impact loads must be taken into account in deriving the limit loads due to ground gust.

(g) For the condition of taxiing with the control locks disengaged, the following apply:

(1) The control surfaces, the control system stops nearest the surfaces and the parts of the control systems (if any) between the surfaces and the stops must be designed to the resultant limit loads.

(2) The parts of the control systems between the stops nearest the surfaces and the cockpit controls must be designed to the resultant limit loads, except that the parts of the control system where loads are eventually reacted by the pilot need not exceed:

(i) The loads corresponding to the maximum pilot loads in § 25.397 (c) for each pilot alone; or

(ii) 0.75 times these maximum loads for each pilot when the pilot forces are applied in the same direction.

For each proposed change from the existing standard, answer the following questions:

6 - What should the harmonized standard be?

See question 5.

7 - How does this proposed standard address the underlying safety issue (identified under #1)?

An improved standard has been developed that removes ambiguities in the current regulations and also accounts for dynamic affects by requiring the simple use of factors that are applied to the loads. An additional factor is required for systems where dynamic effects may be significant. The approach is simple and will lead to consistent design requirements.

8 - Relative to the current FAR, does the proposed standard increase, decrease, or maintain the same level of safety? Explain.

Current level of safety is increased due to the elimination of confusing requirements and by requiring higher control system and control surface design loads requirements for ground gust where it is appropriate.

9 - Relative to current industry practice, does the proposed standard increase, decrease, or maintain the same level of safety? Explain.

Increases the level of safety. Many manufacturers have designed their control systems to account for the dynamic effects for ground gust. However such analyses are very complex and lead to a wide range of possible results. The proposed changes are based upon factors that are applied to static analyses that will result in more reliable and uniform certification compliance. Dynamic analysis is still allowed as an option. However, when dynamic analysis is used minimum increases in loads due to dynamic effects are specified as a floor design level.

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

The JAA has required that the dynamic effects be accounted for by analysis. Due to the difficulties in doing such analysis, the HWG believes that the proposed standard is more appropriate.
The L&DHWG reviewed the issue of potential control system damage during aircraft ground operations in ground gust conditions. An issue had been raised regarding the potential for control system damage due to impact of the surfaces with the stop with the gust locks disengaged and with the control system not constrained by the pilot.

The concern is for reversible systems such as manual systems that do not have a significant amount of damping.

The following conclusions have been reached:

1. The design load level has been increased by a factor of at least 2.5 relative to earlier design requirements for systems with significant flexibility.

2. The proposed rule addresses the effect of control surface impact with the control stops for flexible systems.

3. The L&DHWG does not feel that it is reasonable to operate an aircraft with manual control systems in design ground gust conditions with the pilot not constraining the control systems. This is supported by the FAA Flying Handbook FAA-H-8083-3 Chapter 2 for Ground Operations.

4. Some aircraft have operational procedures that require the gust lock to remain engaged until shortly before takeoff.

5. The L&D HWG is not aware of conclusive evidence of failure of the control systems when the pilot is not constraining the flight controls.

6. Therefore the L&DHWG believes that the requirements that have been developed for the instance where the pilot constrains the flight controls are adequate.

7. The L&DHWG recommends that the TAEIG consider the need for additional operational procedures or the development of pilot informative material regarding the need for constraint of the flight controls during ground operations.

11 - Who would be affected by the proposed change?

Airplane manufacturers.

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

A new ACJ is recommended based upon the draft AC per below.

13 - Is existing FAA advisory material adequate? If not, what advisory material should be adopted?

There is no existing FAA advisory material. A draft AC 25.415-1 , as attached, is proposed along with a corresponding ACJ.

14 - How does the proposed standard compare to the current ICAO standard?

The current ICAO standard has no specific criteria for ground gust analysis.

15 - Does the proposed standard affect other HWG's?

No.

16 - What is the cost impact of complying with the proposed standard?

Economic analysis still to be done but it is expected to be small in comparison to standard industry practice.

17. - If advisory or interpretive material is to be submitted, document the advisory or interpretive guidelines. If disagreement exists, document the disagreement.

Draft Advisory Circular AC 25.415-1 is submitted.

18. - Does the HWG wish to answer any supplementary questions specific to this project?

Not at this time.

19. – Does the HWG want to review the draft NPRM at "Phase 4" prior to publication in the Federal Register?

Yes

20. – 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.

It is appropriate for the "Fast Track" process.

[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. ; Notice No.]

RIN: 2120-

Ground Gust Conditions.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The Federal Aviation Administration proposes to amend the airworthiness standards for transport category airplanes in regard to ground gust design conditions for control systems and surfaces. The proposed amendment would revise the regulations to require an additional multiplying factor on design loads to account for dynamic loading conditions. Several near accidents have occurred as a result of the dynamic effects of ground gusts conditions which have caused damage to control systems that was not detected before take-off. This proposal is based on a recommendation by the Aviation Rulemaking Advisory Committee (ARAC) and is intended to ensure that control systems and surfaces can withstand the ground gust conditions expected in service. The Joint Aviation Authorities (JAA) of Europe are considering a similar proposal to amend the Joint Aviation Requirements (JAR-25). Adopting this proposal would maintain similar requirements between the airworthiness standards of the U.S. and the Joint Aviation Requirements of Europe.

DATES: Send your comments on or before [Insert date 60 days after date of publication in the Federal Register.]

ADDRESSES:

Comments: Address your comments to Dockets Management System, U.S. Department of Transportation Dockets, Room Plaza 401, 400 Seventh Street SW., Washington, DC 20590-0001. You must identify the docket number _____ at the beginning of your comments, and you should submit two copies of your comments. If you wish to receive confirmation that the FAA has received your comments, please include a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. _____." We will date-stamp the postcard and mail it back to you.

You also may submit comments electronically to the following Internet address: http://dms.dot.gov.

Public Docket: You may review the public docket containing comments to this proposed regulation at the Department of Transportation Dockets Office, located on the plaza level of the Nassif Building at the above address. You may review the public docket in person at this address between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. Also, you may review the public dockets on the Internet at http://dms.dot.gov.

Information Docket: In addition, the FAA is maintaining an "information docket" of comments in the Transport Airplane Directorate, FAA, Aircraft Certification Service, Program Management Branch (ANM-114), 1601 Lind Avenue SW., Renton, Washington 98055-4056. You may review the information docket in person at this address between 7:30 a.m. and 4:00 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: James Haynes, FAA, Airframe and Cabin Safety Branch (ANM-115), Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Ave S.W., Renton, Washington 98055-4056; telephone (425) 227-2131; facsimile (425) 227-1320; e-mail: jim.haynes@faa.gov.

SUPPLEMENTARY INFORMATION:

How Do I Submit Comments to this NPRM?

Interested persons are invited to participate in the making of the proposed action by submitting such written data, views, or arguments, as they may desire. Comments relating to the environmental, energy, federalism, or economic impact that might result from adopting the proposals in this document are also invited. Substantive comments should be accompanied by cost estimates. Comments must identify the regulatory docket number and be submitted in duplicate to the DOT Rules Docket address specified above.

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

We will consider all comments received on or before the closing date before taking action on this proposed rulemaking. Comments filed late will be considered as far as possible without incurring expense or delay. The proposals in this document may be changed in light of the comments received.

How Can I Obtain a Copy of this NPRM?

You may download an electronic copy of this document using a modem and suitable communications software from the FAA regulations section of the Fedworld electronic bulletin board service (telephone: 703-321-3339); the Government Printing Office (GPO)'s electronic bulletin board service (telephone: 202-512-1661); or, if applicable, the FAA's Aviation Rulemaking Advisory Committee bulletin board service (telephone: 800-322-2722 or 202-267-5948).

Internet users may access recently published rulemaking documents at the FAA's web page at http://www.faa.gov/avr/arm/nprm/nprm.htm or the GPO's web page at http://www.access.gpo.gov/nara.

Any person may obtain a copy of this document by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, and 800 Independence Avenue, SW., Washington, DC 20591; or by calling 202- 267-9680. Communications must identify the docket number of this NPRM.

Any person interested in being placed on the mailing list for future rulemaking documents should request from the above office a copy of Advisory Circular 11-2A, "Notice of Proposed Rulemaking Distribution System," which describes the application procedure.

What Are the Relevant Airworthiness Standards in the United States?

In the United States, the airworthiness standards for type certification of transport category airplanes are contained in 14 Code of Federal Regulations (CFR) part 25, commonly referred to as the Federal Aviation Regulations (FAR). Manufacturers of transport category airplanes must show that each airplane they produce of a different type design complies with the appropriate part 25 standards. These standards apply to:

- airplanes manufactured within the U.S. for use by U.S.-registered operators, and
- airplanes manufactured in other countries and imported to the U.S. under a bilateral airworthiness agreement.

What Are the Relevant Airworthiness Standards in Europe?

In Europe, the airworthiness standards for type certification of transport category airplanes are contained in Joint Aviation Requirements (JAR)-25, which are based on part 25. These were developed by the Joint Aviation Authorities (JAA) of Europe to provide a common set of airworthiness standards within the European aviation community. Twenty-three European countries accept airplanes type certificated to the JAR-25 standards, including airplanes manufactured in the U.S. that are type certificated to JAR-25 standards for export to Europe.

What is "Harmonization" and How Did it Start?

Although part 25 and JAR-25 are very similar, they are not identical in every respect. When airplanes are type certificated to both sets of standards, the differences between part 25 and JAR-25 can result in substantial additional costs to manufacturers and operators. These additional costs, however, frequently do not bring about an increase in safety. In many cases, part 25 and JAR-25 may contain different requirements to accomplish the same safety intent. Consequently, manufacturers are usually burdened with meeting the requirements of both sets of standards, although the level of safety is not increased correspondingly.

Recognizing that a common set of standards would not only benefit the aviation industry economically, but also maintain the necessary high level of safety, the FAA and the JAA began an effort in 1988 to "harmonize" their respective aviation standards. The goal of the harmonization effort is to ensure that:

- where possible, standards do not require domestic and foreign parties to manufacture or operate to different standards for each country involved; and
- the standards adopted are mutually acceptable to the FAA and the foreign aviation authorities.

Both the FAA and the JAA consider "harmonization" of the two sets of standards a high priority.

What is ARAC and What Role Does it Play in Harmonization?

After initiating the first steps towards harmonization, the FAA and JAA soon realized that traditional methods of rulemaking and accommodating different administrative procedures was neither sufficient nor adequate to make appreciable progress towards fulfilling the goal of harmonization. The FAA then identified the Aviation Rulemaking Advisory Committee (ARAC) as an ideal vehicle for assisting in

resolving harmonization issues, and, in 1992, the FAA tasked ARAC to undertake the entire harmonization effort.

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

There are 64 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 recommendations for resolving specific airworthiness issues. Tasks assigned to working groups are published in the Federal Register. Although working group meetings are not generally open to the public, the FAA solicits participation in working groups from interested members of the public who possess knowledge or experience in the task areas. Working groups report directly to the ARAC, and the ARAC must accept a working group proposal before ARAC presents the proposal to the FAA as an advisory committee recommendation.

The activities of the ARAC will not, however, circumvent the public rulemaking procedures; nor is the FAA limited to the rule language "recommended" by ARAC. If the FAA accepts an ARAC recommendation, the agency proceeds with the normal public rulemaking procedures. Any ARAC participation in a rulemaking package is fully disclosed in the public docket.

What is the Status of the Harmonization Effort Today?

Despite the work that ARAC has undertaken to address harmonization, there remain a large number of regulatory differences between part 25 and JAR-25. The current

harmonization process is extremely costly and time-consuming for industry, the FAA, and the JAA. Industry has expressed a strong desire to conclude the harmonization program as quickly as possible to alleviate the drain on their resources and to finally establish one acceptable set of standards.

Recently, representatives of the aviation industry [including Aerospace Industries Association of America, Inc. (AIA), General Aviation Manufacturers Association (GAMA), and European Association of Aerospace Industries (AECMA)] proposed an accelerated process to reach harmonization. These representatives recommended that the FAA and JAA harmonize differences between parallel part 25 and JAR-25 standards by accepting the more "stringent" of the two standards. "Stringent," in this case, indicates the relative higher level of safety, or greater applicability to modern technology, between a part 25 standard and the parallel JAR-25 standard.

Aviation industry groups further refined their proposed process by suggesting that the 42 part 25 standards that have already been tasked to ARAC for harmonization be divided into three categories:

Category 1: Envelope – For these standards, parallel part 25 and JAR-25 standards would be compared, and harmonization would be reached by accepting the more stringent of the two standards. In some cases, it may be necessary to incorporate parts of both the part 25 and JAR standard to achieve the final, more stringent standard. (This may necessitate that each authority revises its current standard to incorporate more stringent provisions of the other.).

Category 2: Completed or near complete – For these standards, ARAC has reached, or has nearly reached, technical agreement or consensus on the new wording of the proposed harmonized standards.

Category 3: Harmonize – For these standards, ARAC is not near technical agreement on harmonization, and the parallel part 25 and JAR-25 standards cannot be

"enveloped" (as described under Category 1) for reasons of safety or unacceptability. A standard developed under Category 3 would be mutually acceptable to the FAA and JAA, with a consistent means of compliance.

What is the "Fast Track Harmonization Program"?

In light of the general agreement among the affected industries and authorities to expedite the harmonization program, and a willingness to consider "enveloping" of parallel standards, the FAA and JAA in March 1999 agreed upon a method to achieve these goals. This method, which the FAA has titled "The Fast Track Harmonization Program," is aimed at expediting the rulemaking process for harmonizing not only the 42 standards that are currently tasked to ARAC for harmonization, but approximately 80 additional standards for part 25 airplanes.

The FAA initiated the Fast Track program on November 26, 1999 (64 FR 66522), by re-tasking ARAC to accomplish the following:

- Review a list of part 25/JAR-25 standards (approximately 120 parallel pairs) identified by industry, FAA, and JAA as having differences that should be harmonized in order to establish one single set of standards that represent the highest level of safety.
- Identify changes necessary to the standards to harmonize part 25 and JAR-25.
- Submit to the FAA a technical report on each standard and recommend what the requirements of the harmonized standard should be.

The FAA then considers the recommendations submitted by ARAC and initiates rulemaking action, as appropriate, based on those recommendations.

As implemented, the Fast Track program achieves its aims by:

- considering the fundamentals of the industry proposals,
- defining a process for expeditiously adopting the harmonized requirements,

- maintaining an emphasis on using ARAC in making a group decision on the harmonization proposal, and
- incorporating an improved ARAC rulemaking process that does not overburden the FAA and industry due to additional workload.

DISCUSSION OF THE PROPOSAL

How Does This Proposed Regulation Relate to "Fast Track"?

This proposed regulation results from the recommendations of ARAC submitted under the FAA's Fast Track Harmonization Program. Although the existing standards for § 25.415 "Ground gust conditions" are identical between FAR and JAR, the Joint Aviation Authorities has raised a safety issue as a result of some near accidents in Europe and they have been in the process of preparing a notice of proposed rulemaking that would improve the standard. It has also been recent JAA policy to request manufacturers to address these safety concerns during certification. Since this has created a difference in practice, this effort was included as part of the fast track program (category 3) in order to ensure a harmonized proposal would be achieved to address the safety concerns. In this notice, the FAA proposes to amend § 25.415, concerning ground gust conditions. The JAA plans a similar revision to the JAR.

What is the Underlying Safety Issue Addressed by the Current Standards?

The current standard is intended to protect the airplane flight control system from damage due to ground winds and gusts. Although damage from ground gusts may not be an immediate hazard, the rule is intended to prevent damage to the control system that may not be detected before take-off.

The current airworthiness standards contained in 14 CFR part 25 require that control systems and surfaces be designed for ground gusts and taxiing downwind. This implies two conditions. One in which the airplane is parked and unattended with gust

locks (if applicable) engaged, and the other, a taxi condition with the gust locks disengaged with the controls system powered (if applicable) and/or restrained by the pilot.

The requirement to consider the effects of ground gusts has been applied to transport airplane since 1950. The purpose of the requirement has been to protect the flight control system from excessive peak ground wind loads while the airplane is parked or while taxiing downwind. Although damage by ground gusts may not be an immediate hazard, the rule is intended to prevent damage to the control systems that may go unnoticed until the airplane is airborne.

For developing the original regulation, the control surface load distribution was considered to be triangular with the peak at the trailing edge representing reversed flow over the control surface. This assumption, along with assumptions about the wind approach angle and typical control surface geometries were developed into a table of hinge moment factors and set forth in the regulation. These hinge moment factors have been carried forward to the existing table in § 25.415. The maximum design wind speed was originally set at a maximum of 88 feet per second (52 knots) under the presumption that higher speeds were predictable conditions and the aircraft owner could take additional precautions (such as sheltering, additional tiedowns, or external bracing) beyond engaging the standard gust locks.

Amendment 25-91 (62 FR 40704) incorporated a new condition into the FAR for jacking and tie down loads which was similar to the existing Joint Aviation Requirement in paragraph 25.519. Those conditions required consideration of the airplane in a moored or jacked condition in peak wind speeds up to 65 knots. In order to be consistent in the treatment of ground winds, section 25.415, concerning ground gust conditions on control surfaces, was increased to 65 knots.

What are the Current JAR-25 and 14 CFR Standards?

The current texts of 14 CFR § 25.415 (amendment 25-91) and JAR-25 (change 15) are essentially identical:

25.415 Ground gust conditions.

(a) The control system must be designed as follows for control surface loads due to ground gusts and taxiing downwind:

(1) The control system between the stops nearest the surfaces and the cockpit controls must be designed for loads corresponding to the limit hinge moments H of paragraph (a)(2) of this section. These loads need not exceed--

(i) The loads corresponding to the maximum pilot loads in Sec. 25.397(c) for each pilot alone; or

(ii) 0.75 times these maximum loads for each pilot when the pilot forces are applied in the same direction.

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

$H = .0034KV^2cS$, where___

V = 65 (wind speed in knots)

K = limit hinge moment factor for ground gusts derived in paragraph (b) of this section.

c = mean chord of the control surface aft of the hinge line (ft);

S = area of the control surface aft of the hinge line (sq ft);]

(b) The limit hinge moment factor K for ground gusts must be derived as follows:

Surface	*K*	Position of controls
(a) Aileron ----------	0.75	Control column locked or lashed in mid-position.
(b) Aileron ----------	*±0.50	Ailerons at full throw.
(c) Elevator----------	*±0.75	(c) Elevator full down.
(d) Elevator----------	*±0.75	(d) Elevator full up.
(e) Rudder----------	0.75	(e) Rudder in neutral.
(f) Rudder----------	0.75	(f) Rudder at full throw.

*A positive value of *K* indicates a moment tending to depress the surface, while a negative value of *K* indicates a moment tending to raise the surface.

How Have the Standards Been Applied?

Most of the experience in complying with the requirement are for airplanes with certification bases prior to amendment 25-91 (or JAR Change 15) so they were required to be designs to a speed of 52 knots rather than the existing 65 knots. The requirement has been applied as a static "steady" load condition to develop loads on the control surfaces, and loads in the control system between the pilots controls and the surface. Two conditions are considered, one with the aircraft parked and unattended with any available gust locks engaged, and the other with the aircraft taxiing with controls unlocked and restrained by the pilot, or control system power, or both. Section 25.391 "Control System Loads", requires an additional multiplying factor of 1.25 on the control system loads due to the control surface aerodynamic hinge moments but this regulation is confusing as to its applicability to the hinge moments derived for ground gusts and many manufacturers have not used this additional multiplying factor for the ground gust condition.

Why is a Revision to the Current Standards Needed?

The ground gust requirement was never intended to completely protect the airplane against all possible ground wind conditions that may occur. Wind conditions with

gusts in excess of the original design speed of 52 knots are relatively common around the world, however, they are considered to be reasonably predictable and the airplane operator has been expected to take additional precautions to protect the airplane if necessary. As airplanes have became larger, and operations more demanding, airplanes have become more difficult and inconvenient to protect in service and the need for higher ground gust design speeds has become evident. The speeds were increased to 65 knots in amendment 25-91 and that speed was derived from an existing design speed for ground wind conditions for airplanes that were tied down or on jacks.

Several incidents that have occurred to aircraft on the United Kingdom register and at least one aircraft on the US register where the aircraft sustained severe ground gust damage to the flight control system which went undetected until after takeoff. These incidents occurred on airplanes with unpowered mechanical controls with significant flexibility between the contol surface and the gust locking devices. This flexibility allows dynamic loads, well in excess of the static design gust loads, to occur.

Since amendment 25-91 has already raised the requirement from 52 knots to 65 knots (a 56 percent increase in design load) a considerable improvement in the resistance to ground gusts has already been achieved. There remains a need for clarification to ensure the application of the existing 1.25 factor in section 25.391 for the the ground gust condition and to provide additional design criteria for those airplanes which are susceptible to dynamic load amplification because of the control system and gust lock configuration.

What Is the Proposed Action and How Does It Address the Underlying Safety Issue?

This proposal would revise § 25.415 to stand alone in regard to the required multiplying factors and provide and additional multiplying factor to account for dynamic amplification. The design conditions would be set forth as two design cases; one with gust locks engaged and another as a taxiing case with the gust locks disengaged but

controls restrained by the pilot and/or powered system. The 1.25 factor would apply to the design hinge moments to obtain static limit loads for the design of the control system. A further multiplying factor of 1.6 (total multiplying factor of 2.0) would be applied for those parts of the control system where dynamic effects could be significant. These actions should eliminate any confusion as to the required multiplying factors and the net effect (including the speed increase resulting from amendment 25-91 and use of the 1.25 factor) over the past practices could be on the order of a 95 percent increase in the static ground gust design loads for the control system. For those parts of the control systems where dynamic amplification is of concern a total load increase of over 200 percent in the required design load may be realized along with a coresponding increase in strength. These load levels should be sufficient to account for the expected ground gust loads that are likely to occur in operation.

These changes would provide the greatest affect on mechanical, unpowered, control systems which have shown the greatest susceptability to damage. Powered control system normally possess natural protection from ground gusts by means of their hydraulic actuators.

What Changes Would Be Made to the Current 14 CFR

Sections 25.391 and 25.395 would be revised to eliminate any reference to ground gust conditions and section 25.415 would stand on its own in regard to the design multiplying factors. Section 25.415 would include the 1.25 multiplying factor currently contained in section 25.395. An additional multiplying factor of 1.6 would be required for parts of the control system where dynamic effects are expected to be significant. The rule would be organized to clarify the cases to be considered and to identify the components and parts of the control system and surface to which each of the conditions apply.

The JAA plans parallel changes to JAR-25.

Is Existing FAA Advisory Material Adequate?

The FAA is preparing to issue a new proposed Advisory Circular 25.415-1, "Ground gust conditions," to describe a means of compliance with the proposed regulation, which would meet the intended level of safety and promote consistent and effective application of the proposed revised standards. Public comments concerning the proposed AC are invited by separate notice published elsewhere in this issue of the Federal Register

REGULATORY ANALYSES AND ASSESSMENTS

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1995 [44 U.S.C. 3507(d)], the FAA had determined there are no requirements for information collection associated with this proposed rule.

Compatibility with ICAO Standards

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA determined that there are no ICAO Standards and Recommended Practices that correspond to this proposed regulation.

Regulatory Evaluation Summary

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic effect of regulatory changes on small entities. Third, the Office of Management and Budget directs agencies to assess the effects of regulatory changes on international trade. And fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L.

104-4) requires agencies to prepare a written assessment of the cots, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation).

In conducting these analyses, the FAA has determined that this proposed rule: (1) would generate benefits that justify its costs and would not be "a significant regulatory action" as defined in section 3(f) of Executive Order 12866 and, therefore, is not subject to review by the Office of Management and Budget; (2) would not have a significant impact on a substantial number of small entities; (3) would not constitute a barrier to international trade; and (4) would not contain a significant intergovernmental or private sector mandate. These analyses, available in the docket, are summarized below. The FAA invites the public to provide comments and supporting data on the assumptions made in this evaluation. All comments received will be considered in the final regulatory evaluation.

Initial Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the Act requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The Act covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed rule will have a significant economic impact on a substantial number of small entities. If the determination

is that it will, the agency must prepare a regulatory flexibility analysis as described in the Act.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the 1980 Act provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

[APO to add economic evaluation here.]

International Trade Impact Assessment

The provisions of this proposed rule would have little or no impact on trade for U.S. firms doing business in foreign countries and foreign firms doing business in the United States.

Federalism Implications

The regulation proposed herein would not have a substantial direct effect on the States, on the relationship between the national Government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this proposal would not have sufficient federalism implications to warrant the preparation of a federalism assessment.

Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (the Act), codified in 2 U.S.C. 1501-1571, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more (adjusted annually for inflation) in any one year. Section 204(a) of the Act, 2 U.S.C. 1534(a), requires the

Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, local, and tribal governments on a proposed "significant intergovernmental mandate." A "significant intergovernmental mandate" under the Act is any provision in a Federal agency regulation that will impose an enforceable duty upon State, local, and tribal governments, in the aggregate, of $100 million (adjusted annually for inflation) in any one year. Section 203 of the Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

This proposed rule does not contain a Federal intergovernmental or private sector mandate that exceeds $100 million in any one year.

Environmental Analysis

FAA Order 1050.1D defines FAA actions that may be categorically excluded from preparation of a National Environmental Policy Act (NEPA) environmental assessment or environmental impact statement. In accordance with FAA Order 1050.1D, appendix 4, paragraph 4(j), this rulemaking qualifies for a categorical exclusion.

Energy Impact

The energy impact of the proposed rule has been assessed in accordance with the Energy Policy and Conservation Act (EPCA) and Public Law 94-163, as amended (42 U.S.C. 6362). It has been determined that it is not a major regulatory action under the provisions of the EPCA.

Regulations Affecting Intrastate Aviation in Alaska

Section 1205 of the FAA Reauthorization Act of 1996 (110 Stat. 3213) requires the Administrator, when modifying regulations in Title 14 of the CFR in a manner affecting intrastate aviation in Alaska, to consider the extent to which Alaska is not served by transportation modes other than aviation, and to establish such regulatory distinctions as he or she considers appropriate. Because this proposed rule would apply to the certification of future designs of transport category airplanes and their subsequent operation, it could, if adopted, affect intrastate aviation in Alaska. The FAA therefore specifically requests comments on whether there is justification for applying the proposed rule differently to intrastate operations in Alaska.

List of Subjects in 14 CFR Part 25:

Aircraft, Aviation safety, Reporting and record keeping requirements

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend part 25 of Title 14, Code of Federal Regulations, as follows:

Part 25 - AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

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

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

2. Amend § 25.391 by removing the reference to § 25.415 as follows:

§ 25.391 Control surface loads: general.

The control surfaces must be designed for the limit loads resulting from the flight conditions in §§ 25.331, 25.341(a) and (b), 25.349 and 25.351, considering the requirements for__

(a) Loads parallel to hinge line, in § 25.393;

(b) Pilot effort effects, in § 25.397;

(c) Trim tab effects, in § 25.407;

(d) Unsymmetrical loads, in § 25.427; and

(e) Auxiliary aerodynamic surfaces, in § 25.445.

3. Amend paragraph (b) of § 25.395 by removing the reference to § 25.415 and clarifying the reference to the limit loads of paragraph (a) of § 25.395.

§ 25.395 Control System

* * *

(b) The system limit loads of paragraph (a) need not exceed the loads that can be produced by the pilot (or pilots) and by automatic or power devices operating the controls.

4. Revise § 25.415 "Ground gust conditions" to read as follows.

§ 25.415 Ground gust conditions.

(a) The flight control systems and surfaces must be designed for the limit loads generated when the aircraft is subjected to a horizontal 65 knots ground gust from any direction, while taxiing with the controls locked and unlocked and while parked with the controls locked.

(b) The control system and surface loads due to ground gust may be assumed to be static loads and the hinge moments H, in foot pounds, must be computed from the formula,

$H=K\ 1/2\rho_o V_{fps}^2 cS$

where:

K = hinge moment factor for ground gusts derived in paragraph (c) of this paragraph

ρ_o = density of air at sea level = .0023769 (slugs/ft^3) = .0023769 (lb-sec^2/ ft$^{4)}$

V = 65 knots = 109.71 fps relative to the aircraft

S = area of the control surface aft of the hinge line (ft^2)

c = mean aerodynamic chord of the control surface aft of the hinge line (ft)

(c) The hinge moment factor K for ground gusts must be taken from the following table:

	Surface	*K*	Position of controls
	(a) Aileron ----------	0.75	Control column locked or lashed in mid-position.
	(b) Aileron ---------- (c) Elevator---------- (d) Elevator---------- (e) Rudder---------- (f) Rudder----------	*±0.50 *±0.75 *±0.75 0.75 0.75	Ailerons at full throw. (c) Elevator full down. (d) Elevator full up. (e) Rudder in neutral. (f) Rudder at full throw.

- A positive value of *K* indicates a moment tending to depress the surface, while a negative value of *K* indicates a moment tending to raise the surface.

(d) The computed hinge moment of paragraph (b) must be used to determine the limit loads due to ground gust conditions for the control surface. A 1.25 factor on the computed hinge moments must be used in calculating limit control system loads.

(e) Where control system flexibility is such that the rate of load application in the ground gust conditions might produce transient stresses appreciably higher than those corresponding to static loads, in the absence of a rational analysis an additional factor of 1.6 must be applied to the control system loads of paragraph (d) to obtain limit loads. If a rational analysis is used, the additional factor must not be less than 1.20.

(f) For the condition of the control locks engaged, the control surfaces, the control system locks and the parts of the control systems (if any) between the surfaces and the locks must be designed to the respective resultant limit loads. Where control locks are not provided then the control surfaces, the control system stops nearest the surfaces, and the parts of the control systems (if any) between the surfaces and the stops must be designed to the resultant limit loads. If the control system design is such as to allow any part of the

control system to impact with the stops due to flexibility, then the resultant impact loads must be taken into account in deriving the limit loads due to ground gust.

(g) For the condition of taxiing with the control locks disengaged, the following apply:

(1) The control surfaces, the control system stops nearest the surfaces and the parts of the control systems (if any) between the surfaces and the stops must be designed to the resultant limit loads.

(2) The parts of the control systems between the stops nearest the surfaces and the cockpit controls must be designed to the resultant limit loads, except that the parts of the control system where loads are eventually reacted by the pilot need not exceed:

(i) The loads corresponding to the maximum pilot loads in § 25.397 (c) for each pilot alone; or

(ii) 0.75 times these maximum loads for each pilot when the pilot forces are applied in the same direction.

Issued in _____on

Aircraft Certification Service

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

Advisory Circular

GROUND GUST CONDITIONS

Date: 26 September, 2000
Initiated by: ANM-110

AC No. 25.415-1
Change:

1. PURPOSE. This advisory circular (AC) sets forth acceptable methods of compliance with the provisions of part 25 of the Federal Aviation Regulations (FAR) dealing with the certification requirements for ground conditions. Guidance information is provided for showing compliance with § 25.415 of the FAR, relating to structural design of the control surfaces and systems while taxiing with control locks engaged and disengaged and when parked with control locks engaged. Other methods of compliance with the requirements may be acceptable.

2. RELATED FAR SECTIONS. The contents of this AC are considered by the Federal Aviation Administration (FAA) in determining compliance with § 25.415 of the FAR.

3. BACKGROUND.

a. The requirement to consider the effects of ground gusts has been applied to transport airplane since 1950. The purpose of the requirement was to protect the flight control system from excessive peak ground wind loads while the airplane is parked or while taxiing downwind. For developing the original regulation, the control surface load distribution was considered to be triangular with the peak at the trailing edge representing reversed flow over the control surface. This assumption, along with assumptions about the wind approach angle and typical control surface geometries were developed into a table of hinge moment factors and set forth in the regulation. These hinge moment factors have been carried forward to the existing table in section § 25.415. The maximum design wind speed was originally set at 88 feet per second (52 knots) under the presumption that higher speeds were predictable storm conditions and the aircraft owner could take additional precautions beyond engaging the standard gust locks.

b. Amendment 25-91 incorporated a new condition into the FAR for jacking and tie down loads which was similar to the existing Joint Aviation Requirement 25.519. Those conditions required consideration of the airplane in a moored or jacked condition in wind speeds up to 65 knots. In order to be consistent in the treatment of ground winds, § 25.415, concerning ground gust conditions on control surfaces, was increased to 65 knots at the same time.

c. There have been several incidents and accidents caused by hidden damage that had previously occurred in ground gust conditions. Although many of these events were for airplanes that had used the lower wind speeds from the earlier rules, analysis indicates that the most significant contributor to the damage was the dynamic load effect. The dynamic effects were most significant for control system designs in which the gust locks were designed to engage the control system at locations far from the control surface horn. Based on these events, Amendment 25-XX, in addition to clarifying the rule, added additional factors for use in those portions of the system and surface that could be affected by dynamic effects.

d. The flight control system and surface loads prescribed by section 25.415 are limit loads based on a peak wind speed of 65 knots EAS. In operation, the peak wind speed would most often be caused by an incremental fluctuation in velocity imposed on top of a less rapidly changing mean wind speed. Therefore, an appropriate peak wind speed limitation should be reflected in the applicable documents, when there is a potential risk of structural damage.

4. COMPLIANCE.

a. The ground gust requirements take into account the conditions of the airplane parked with controls locked, and taxiing with controls either locked or unlocked. In either of the locked conditions the control surface loads are assumed to be reacted at the control system locks. In the unlocked condition the pilot is assumed to be at the controls and the controls are assumed to be powered, if applicable. In the latter condition, the control surface loads are assumed to be reacted, if necessary, at the cockpit controls by the pilot(s) up to the limits of the maximum pilot forces and torques given in § 25.397(c).

b. Where loads are eventually reacted at the cockpit controls, the loads in those parts of the control system between the control system stops nearest the control surfaces and the cockpit controls need not exceed those that would result from the application of the specified maximum pilot effort effects. However, higher loads can be reacted by the control system stops. Those parts of the control system from the control surfaces to the control system stops nearest the surfaces should be designed to the resultant limit loads regardless of pilot effort limitations. Similarly, pilot effort limitations would not apply to parts of control systems where the loads are not eventually reacted at the cockpit controls, for example an aileron control system where the right hand side aileron loads are reacted by the left hand side aileron, without participation by the pilot(s).

c. In either the taxiing condition (controls locked or unlocked) or the parked condition (controls locked), if the control system flexibility is such that the rate of load application in the ground gust conditions might produce transient stresses appreciably higher than those corresponding to static loads, the effects of this rate of application are required to be considered. Manually powered control systems and control systems where the gust lock is located remotely from the control surface are examples of designs that might fall in this category. In such cases the control system loads are required by § 25.415(e) to be increased by an additional factor over the standard factor of 1.25.

AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

535 HERNDON PARKWAY □ P.O. BOX 1169 □ HERNDON, VIRGINIA 20172-1169 □ 703-689-2270
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July 9, 2001

Pratt & Whitney
Attn: Craig R. Bolt M/S 162-24
400 Main Street
East Hartford, CT 06108

PW6000 Chief Systems Engineer-Validation and Certification
M/S 162-14

Dear Mr. Bolt:

The Air Line Pilots Association, International (ALPA) does not concur with the Loads and Dynamics Harmonization Working Group (L&DHWG) report presented to TAEIG at the June 26-27, 2001 meeting. We believe that operational considerations have not been appropriately included in determining certification standards. As noted in the report, ALPA previously commented that, for an aircraft with reversible flight controls, developing a design standard predicated on the assumption that pilots would physically restrain the controls during ground operation without a specific requirement to do so was not operationally realistic. The current HWG report has no provision to either fully account for reversible controls being unrestrained by the pilot(s) or a requirement that pilots be made aware of the design assumption that the controls would be restrained during ground operation.

The report gives reasons for not making the provisions noted above, saying in part, "The L&DHWG does not feel that it is reasonable to operate an aircraft with manual control systems in design ground gust conditions with the pilot not constraining the control systems. This is supported by the FAA Flying Handbook FAA-H-8083-3 Chapter 2 for Ground Operations". This makes it clear that the certification standard relies on pilot actions to prevent control system damage. However, the proposed rule contains no provision that would ensure this design assumption becomes a part of the operational procedures for the airplane. In addition, we do not believe the citation of FAA-H 8083-3 is valid. That handbook, the re-titled Advisory Circular 61-21, is intended for pilot training in general aviation aircraft. Although the basic principles of flight remain the same regardless of aircraft size or intended use, the referenced document is clearly not intended to reflect the size, sophistication of systems, or the cockpit workload of multi-pilot aircraft in air carrier operations certified under Part 25. Some aircraft in air carrier service today (e.g. DC-9 series aircraft) have reversible controls that pilots are not able to keep from moving to the stops when blown by the wind. Irreversible control designs do not blow against the stops so pilot restraint is not required. Thus, most aircraft in airline service today are either reversible control designs in which pilot input is ineffective or irreversible control designs where pilot input is not required - further basis for pilots not knowing they are required by a particular design to resist control movement or risk control system damage and perhaps failure.

ALPA is concerned that this is an additional example of inconsistency between a certification rule and operation of the aircraft. If the rule is promulgated as proposed, we do not see how an FAA operations inspector can insure a specific carrier's aircraft operating procedure meets the needs of certification if the assumptions used in certification are not communicated to the inspector and the carrier.

Thank you for the opportunity to comment.

Sincerely,

Jim Bettcher

Captain Jim Bettcher
Director, Aircraft Certification Program

JRB:ak

cc: J. Wallace

{AE1}

Mr. Ron Priddy
President, Operations
National Air Carrier Association
1100 Wilson Blvd., Suite 1700
Arlington, VA 22209

Dear Mr. Priddy:

The Federal Aviation Administration (FAA) recently completed a regulatory program review. That review focused on prioritizing rulemaking initiatives to more efficiently and effectively use limited industry and regulatory rulemaking resources. The review resulted in an internal Regulation and Certification Rulemaking Priority List that will guide our rulemaking activities, including the tasking of initiatives to the Aviation Rulemaking Advisory Committee (ARAC). Part of the review determined if some rulemaking initiatives could be addressed by other than regulatory means, and considered products of ARAC that have been or are about to be forwarded to us as recommendations.

The Regulatory Agenda will continue to be the vehicle the FAA uses to communicate its rulemaking program to the public and the U.S. government. However, the FAA also wanted to identify for ARAC those ARAC rulemaking initiatives it is considering to handle by alternative actions (see the attached list). At this time, we have not yet determined what those alternative actions may be. We also have not eliminated the possibility that some of these actions in the future could be addressed through rulemaking when resources are available.

If you have any questions, please feel free to contact Gerri Robinson at (202) 267-9678 or gerri.robinson@faa.gov.

Sincerely,

Anthony F. Fazio
Executive Director, Aviation Rulemaking Advisory Committee

Enclosure

cc:
William W. Edmunds, Air Carrier Operation Issues
Sarah MacLeod, Air Carrier/General Aviation Maintenance Issues
James L. Crook, Air Traffic Issues
William H. Schultz, Aircraft Certification Procedures Issues
Ian Redhead, Airport Certification Issues

Billy Glover, Occupant Safety Issues
John Tigue, General Aviation Certification and Operations Issues
David Hilton, Noise Certification Issues
John Swihart, Rotorcraft Issues
Roland B. Liddell, Training and Qualification Issues
Craig Bolt, Transport Airplane and Engine Issues

ARAC Projects that will be handled by Alternative Actions rather than Rulemaking

(Beta) Reverse Thrust and propeller Pitch Setting below the Flight Regime (25.1155)
Fire Protection (33.17)
Rotor Integrity--Overspeed (33.27)
Safety Analysis (33.75)
Rotor Integrity – Over-torque (33.84)
2 Minute/30 Second One Engine Inoperative (OEI) (33.XX)
Bird Strike (25.775, 25.571, 25.631)
Casting Factors (25.621)
Certification of New Propulsion Technologies on Part 23 Airplanes
Electrical and Electronic Engine Control Systems (33.28)
Fast Track Harmonization Project: Engine and APU Loads Conditions (25.361, 25.362)
Fire Protection of Engine Cowling (25.1193(e)(3))
Flight Loads Validation (25.301)
Fuel Vent System Fire Protection (Part 25 and Retrofit Rule for Part 121, 125, and 135)
Ground Gust Conditions (25.415)
Harmonization of Airworthiness Standards Flight Rules, Static Lateral-Directional Stability, and Speed Increase and Recovery Characteristics (25.107(e)(1)(iv), 25.177©, 25.253(a)(3)(4)(50)). Note: 25.107(a)(b)(d) were enveloping tasks also included in this project—They will be included in the enveloping NPRM)
Harmonization of Part 1 Definitions Fireproof and Fire Resistant (25.1)
Jet and High Performance Part 23 Airplanes
Load and Dynamics (Continuous Turbulence Loads) (25.302, 25.305, 25.341 (b), etc.)
Restart Capability (25.903(e))

Standardization of Improved Small Airplane Normal Category Stall Characteristics Requirements (23.777, 23.781, 23.1141, 23.1309, 23.1337, 25.1305)

ATTC (25.904/App I)
Cargo Compartment Fire Extinguishing or Suppression Systems (25.851(b), 25.855, 25.857)
Proof of Structure (25.307)
High Altitude Flight (25.365(d))
Fatigue and Damage Tolerance (25.571)
Material Prosperities (25.604)

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*).

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid Office of Management and Budget (OMB) control number.

VI. Plain Writing

The Plain Writing Act of 2010 (Pub. L. 111–274) requires Federal agencies to write documents in a clear, concise, and well-organized manner. The NRC has written this document to be consistent with the Plain Writing Act as well as the Presidential Memorandum, ''Plain Language in Government Writing,'' published June 10, 1998 (63 FR 31883).

VII. Backfitting and Issue Finality

The NRC has determined that the amendments in this final rule do not constitute backfitting and are not inconsistent with any of the issue finality provisions in 10 CFR part 52. The amendments are non-substantive in nature, and include adding three inadvertently omitted addenda to Section XI of the ASME B&PV Code to the list of documents approved for incorporation by reference and correcting a footnote number. They impose no new requirements and make no substantive changes to the regulations. The amendments do not involve any provisions that would impose backfits as defined in 10 CFR part 50, or would be inconsistent with the issue finality provisions in 10 CFR part 52. For these reasons, the issuance of the rule in final form would not constitute backfitting or represent an inconsistency with any of the issue finality provisions in 10 CFR part 52. Therefore, the NRC has not prepared any additional documentation for this final rule addressing backfitting or issue finality.

VIII. Congressional Review Act

In accordance with the Congressional Review Act of 1996 (5 U.S.C. 801–808), the NRC has determined that this action is not a major rule and has verified this determination with the Office of Information and Regulatory Affairs, Office of Management and Budget.

List of Subjects in 10 CFR Part 50

Antitrust, Classified information, Criminal penalties, Fire protection, Incorporation by reference, Intergovernmental relations, Nuclear power plants and reactors, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 552 and 553, the NRC is adopting the following amendments to 10 CFR part 50.

PART 50—DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

■ 1. The authority citation for part 50 continues to read as follows:

Authority: Atomic Energy Act secs. 102, 103, 104, 105, 147, 149, 161, 181, 182, 183, 186, 189, 223, 234 (42 U.S.C. 2132, 2133, 2134, 2135, 2167, 2169, 2201, 2231, 2232, 2233, 2236, 2239, 2273, 2282); Energy Reorganization Act secs. 201, 202, 206 (42 U.S.C. 5841, 5842, 5846); Nuclear Waste Policy Act sec. 306 (42 U.S.C. 10226); Government Paperwork Elimination Act sec. 1704 (44 U.S.C. 3504 note); Energy Policy Act of 2005, Pub. L. 109–58, 119 Stat. 194 (2005). Section 50.7 also issued under Pub. L. 95–601, sec. 10, as amended by Pub. L. 102–486, sec. 2902 (42 U.S.C. 5851). Section 50.10 also issued under Atomic Energy Act secs. 101, 185 (42 U.S.C. 2131, 2235); National Environmental Protection Act sec. 102 (42 U.S.C. 4332). Sections 50.13, 50.54(d), and 50.103 also issued under Atomic Energy Act sec. 108 (42 U.S.C. 2138). Sections 50.23, 50.35, 50.55, and 50.56 also issued under Atomic Energy Act sec. 185 (42 U.S.C. 2235). Appendix Q also issued under National Environmental Protection Act sec. 102 (42 U.S.C. 4332). Sections 50.34 and 50.54 also issued under sec. 204 (42 U.S.C. 5844). Sections 50.58, 50.91, and 50.92 also issued under Pub. L. 97–415 (42 U.S.C. 2239). Section 50.78 also issued under Atomic Energy Act sec. 122 (42 U.S.C. 2152). Sections 50.80–50.81 also issued under Atomic Energy Act sec. 184 (42 U.S.C. 2234).

■ 2. In § 50.55a, add paragraphs (a)(1)(ii)(B)(*5*) through (*7*) to read as follows:

§ 50.55a Codes and standards.

(a) * * *

(1) * * *

(ii) * * *

(B) * * *

(*5*) 1975 Winter Addenda,

(*6*) 1976 Summer Addenda, and

(*7*) 1976 Winter Addenda.

* * * * *

§ 50.55a [Amended]

■ 3. In § 50.55a, paragraph (e)(1), in the second sentence, remove footnote ''9'' and add, in its place, footnote ''7''.

Dated at Rockville, Maryland, this 8th day of December 2014.

For the Nuclear Regulatory Commission.

Cindy Bladey,

Chief, Rules, Announcements, and Directives Branch, Division of Administrative Services, Office of Administration.

[FR Doc. 2014–29037 Filed 12–10–14; 8:45 am]

BILLING CODE 7590–01–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No.: FAA–2013–0142; Amdt. No. 25–141]

RIN 2120–AK12

Harmonization of Airworthiness Standards—Gust and Maneuver Load Requirements

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This final rule amends certain airworthiness regulations for transport category airplanes, based on recommendations from the FAA-sponsored Aviation Rulemaking Advisory Committee (ARAC). This amendment eliminates regulatory differences between the airworthiness standards of the FAA and European Aviation Safety Agency (EASA). It does not add new requirements beyond what manufacturers currently meet for EASA certification and does not affect current industry design practices. This final rule revises the pitch maneuver design loads criteria; revises the gust and turbulence design loads criteria; revises the application of gust loads to engine mounts, high lift devices, and other control surfaces; adds a ''round-the-clock'' discrete gust criterion and a multi-axis discrete gust criterion for airplanes equipped with wing-mounted engines; revises the engine torque loads criteria; adds an engine failure dynamic load condition; revises the ground gust design loads criteria; revises the criteria used to establish the rough air design speed; and requires the establishment of a rough air Mach number.

DATES: Effective February 9, 2015.

ADDRESSES: For information on where to obtain copies of rulemaking documents and other information related to this final rule, see ''How To Obtain Additional Information'' in the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: For technical questions concerning this action, contact Todd Martin, Airframe and Cabin Safety Branch, ANM–115,

Transport Airplane Directorate, Aircraft Certification Service, Federal Aviation Administration, 1601 Lind Avenue SW., Renton, WA 98057–3356; telephone (425) 227–1178; facsimile (425) 227–1232; email *Todd.Martin@faa.gov.*

For legal questions concerning this action, contact Sean Howe, Office of the Regional Counsel, ANM–7, Federal Aviation Administration, 1601 Lind Avenue SW., Renton, Washington 98057–3356; telephone (425) 227–2591; facsimile (425) 227–1007; email *Sean.Howe@faa.gov.*

SUPPLEMENTARY INFORMATION:

Authority for This Rulemaking

The FAA's authority to issue rules on aviation safety is found in Title 49 of the United States Code. Subtitle I, Section 106 describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the agency's authority.

This rulemaking is promulgated under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, ''General Requirements.'' Under that section, the FAA is charged with promoting safe flight of civil aircraft in air commerce by prescribing regulations and minimum standards for the design and performance of aircraft that the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority. It prescribes new safety standards for the design and operation of transport category airplanes.

I. Overview of Final Rule

The FAA is amending Title 14, Code of Federal Regulations (14 CFR) Part 25 as described below. This action harmonizes part 25 requirements with the corresponding requirements in Book 1 of the EASA Certification Specifications and Acceptable Means of Compliance for Large Aeroplanes (CS–25). As such, this action—

1. Revises § 25.331, ''Symmetric maneuvering conditions,'' to prescribe both positive and negative checked pitch maneuver loads that take into account the size of the airplane and any effects of the flight control system. The introductory paragraph, § 25.331(c), is revised by moving some criteria to § 25.331(c)(2) where those criteria apply.

2. Removes appendix G to part 25, ''Continuous Gust Design Criteria,'' and § 25.341(b) now clearly sets forth the continuous turbulence requirement.

3. Revises § 25.341, ''Gust and turbulence loads,'' to—

• Remove the optional mission analysis method currently specified in appendix G in favor of the design envelope analysis method.

• Update the turbulence intensity criteria in § 25.341(b) to take into account in-service measurements of derived gust intensities.

• Update § 25.341(a) to require evaluation of discrete gust conditions at airplane speeds from design speed for maximum gust intensity, V_B, to design cruising speed, V_C, (previously required only at V_C) and to specify reference gust velocities up to 60,000 feet, rather than the previously specified 50,000 feet.

• Add a new paragraph § 25.341(c) that specifies a ''round-the-clock'' discrete gust criterion and a multi-axis discrete gust criterion for airplanes equipped with wing-mounted engines.

4. Revises § 25.343, ''Design fuel and oil loads,'' § 25.345, ''High lift devices,'' § 25.371, ''Gyroscopic loads,'' § 25.373, ''Speed control devices,'' and § 25.391, ''Control surface loads: General,'' by adding to each of these regulations a requirement to evaluate the continuous turbulence loads criteria in § 25.341(b).

5. Revises § 25.361, ''Engine and auxiliary power unit torque,'' to—

• Remove the requirement to assess engine torque loads due to engine structural failures (this requirement is re-established in the new § 25.362, outlined below).

• Provide specific engine torque load criteria for auxiliary power unit installations.

• Remove the requirements that apply to reciprocating engines.

• Change the title of § 25.361 from ''Engine torque'' to ''Engine and auxiliary power unit torque.''

6. Adds new § 25.362, ''Engine failure loads,'' to require engine mounts and supporting airframe structure be designed for 1g flight loads combined with the most critical transient dynamic loads and vibrations resulting from failure of a blade, shaft, bearing or bearing support, or bird strike event.

7. Revises § 25.391, ''Control surface loads: General,'' and § 25.395, ''Control system,'' to remove references to the ground gust requirements in § 25.415.

8. Revises § 25.415, ''Ground gust conditions'' to—

• Reorganize and clarify the design conditions to be considered.

• Identify the components and parts of the control system to which each of the conditions apply.

• Make it stand alone in regard to the required multiplying factors and to provide an additional multiplying factor to account for dynamic amplification.

9. Revises § 25.1517, ''Rough air speed, V_{RA}'' to remove the reference to VB in the definition of rough air speed and to require that a rough air Mach number, MRA, be established in addition to rough air speed. Also, this action removes the reference to § 25.1585, ''Operating procedures,'' because it is no longer applicable since that regulation was modified.

II. Background

A. Statement of the Problem

Part 25 prescribes airworthiness standards for type certification of transport category airplanes for products certified in the United States. EASA CS–25 Book 1 prescribes the corresponding airworthiness standards for products certified in Europe. While part 25 and CS–25 Book 1 are similar, they differ in several respects.

The FAA tasked ARAC through the Loads and Dynamics Harmonization Working Group (LDHWG) to review existing structures regulations and recommend changes that would eliminate differences between the U.S. and European airworthiness standards. The LDHWG developed recommendations, which EASA has incorporated into CS–25 with some changes. The FAA agrees with the ARAC recommendations as adopted by EASA, and this final rule amends part 25 accordingly.

B. Summary of the NPRM

On May 6, 2013, the FAA issued a Notice of Proposed Rulemaking (NPRM), Notice No. 25–139,[1] Docket No. FAA–2013–0142, to amend §§ 25.331, 25.341, 25.343, 25.345, 25.361, 25.371, 25.373, 25.391, 25.395, 25.415, and 25.1517; to add § 25.362; and to remove appendix G of 14 CFR part 25. That NPRM was published in the **Federal Register** on May 28, 2013 (78 FR 31851). In the NPRM, the FAA proposed to (1) revise the pitch maneuver design loads criteria; (2) revise the gust and turbulence design loads criteria; (3) revise the application of gust loads to engine mounts, high lift devices, and other control surfaces; (4) add a ''round-the-clock'' discrete gust criterion and a multi-axis discrete gust criterion for airplanes equipped with wing-mounted engines; (5) revise the engine torque loads criteria and add an engine failure dynamic load condition; (6) revise the ground gust design loads criteria; (7) revise the criteria used to establish the rough air design speed; and (8) require the establishment of a rough air Mach number.

[1] On April 16, 2014, the **Federal Register** published a correction (79 FR 21413) changing the Notice No. to ''13–04'' for the NPRM that published May 28, 2013 (78 FR 31851) and for subsequent NPRM corrections that published June 24, 2013 (78 FR 37722) and July 16, 2013 (78 FR 42480).

The FAA proposed these changes to eliminate regulatory differences between the airworthiness standards of the FAA and EASA. The NPRM comment period closed on August 26, 2013.

On June 24, 2013, the **Federal Register** published a correction to the NPRM to correct three equations in the proposed amendments to § 25.341 (78 FR 37722). On July 16, 2013, the **Federal Register** published a second correction to one equation in the proposed amendments to § 25.341 (78 FR 42480). The equations in this final rule have not changed from those in the corrected NPRM.

C. General Overview of Comments

The FAA received two comments. One commenter supported the NPRM and the ongoing international harmonization of certification requirements. The other comment addressed § 25.341 and is discussed below.

III. Discussion of Public Comments and Final Rule

A. Section 25.341, ''Gust and Turbulence Loads''

Section 25.341(a)(6) uses the term Z_{mo}, which is the maximum operating altitude, in feet, specifically defined in § 25.1527. A commenter noted that the units for the term Z_{mo} are not provided in the current rule. While § 25.341(a)(6) was not being revised as part of this rulemaking, the commenter recommended that this paragraph be revised to include the appropriate units for Z_{mo} (feet) for ease of reference. We agree, and revise the rule as recommended.

B. Section 25.415, ''Ground Gust Conditions''

After further FAA review of what we proposed by NPRM, we now specify that control system gust locks are to be taken into account only when the airplane is so equipped. As proposed, § 25.415 would have required that the airplane be evaluated while taxiing with the controls locked and unlocked, and while parked with the controls locked. However, many transport category airplanes with powered flight controls do not have control system gust locks. As noted in the NPRM, these airplanes rely on their hydraulic actuators to provide protection from ground gusts. We, therefore, now revise § 25.415 to clarify that, for all airplanes, the ground gust conditions apply when the airplane is taxiing and while parked. For airplanes that include control system gust locks, the taxiing condition must be evaluated with the controls locked and unlocked, and the parked condition must be evaluated with the controls locked. Airplanes not equipped with gust locks are to be evaluated in their normal configuration while taxiing and while parked. With these changes to § 25.415, the rule wording will no longer be exactly the same as CS 25.415; however, the intent of the two rules is the same in how airplanes with and without gust locks are evaluated.

C. Advisory Material

On May 31, 2013, the FAA published and solicited public comments on three proposed ACs that describe acceptable means for showing compliance with the NPRM's proposed regulations. The comment period for the proposed ACs closed on September 26, 2013. The FAA did not receive any comments on the proposed ACs. Concurrently with this final rule, the FAA is issuing the following final ACs to provide guidance material for the new regulations adopted by this amendment:

- AC 25.341–1, ''Dynamic Gust Loads.''
- AC 25.362–1, ''Engine Failure Loads.''
- AC 25.415–1, ''Ground Gust Conditions.''

IV. Regulatory Notices and Analyses

A. Regulatory Evaluation

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 and Executive Order 13563 direct 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 (Public Law 96–354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Pub. L. 96–39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, the Trade Act requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation with base year of 1995). This portion of the preamble summarizes the FAA's analysis of the economic impacts of this final rule.

Department of Transportation Order DOT 2100.5 prescribes policies and procedures for simplification, analysis, and review of regulations. If the expected cost impact is so minimal that a proposed or final rule does not warrant a full evaluation, this order permits that a statement to that effect and the basis for it be included in the preamble if a full regulatory evaluation of the cost and benefits is not prepared. Such a determination has been made for this final rule. The reasoning for this determination follows.

The FAA is amending certain airworthiness standards for transport category airplanes. Adopting this final rule will eliminate regulatory differences between the airworthiness standards of the FAA and EASA. This final rule does not add new requirements beyond what manufacturers currently meet for EASA certification and does not affect current industry design practices. Meeting two sets of certification requirements raises the cost of developing new transport category airplanes with little to no increase in safety. In the interest of fostering international trade, lowering the cost of manufacturing new transport category airplanes, and making the certification process more efficient, the FAA, EASA, and several industry working groups came together to create, to the maximum extent possible, a single set of certification requirements that would be accepted in both the United States and Europe. Therefore, as a result of these harmonization efforts, the FAA is amending the airworthiness regulations described in section I of this final rule, ''Overview of Final Rule.'' This action harmonizes part 25 requirements with the corresponding requirements in EASA CS–25 Book 1.

Currently, all manufacturers of transport category airplanes, certificated under part 25 are expected to continue their current practice of compliance with the EASA certification requirements in CS–25 Book 1. Since future certificated transport airplanes are expected to meet CS–25 Book 1, and this rule simply adopts EASA requirements, manufacturers will incur minimal or no additional cost resulting from this final rule. The FAA made this same determination in the NPRM and received no comments.

The FAA has, therefore, determined that this final rule is not a ''significant regulatory action'' as defined in section 3(f) of Executive Order 12866, and is not ''significant'' as defined in DOT's Regulatory Policies and Procedures.

B. Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (Public Law 96–354) (RFA) establishes ''as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration.'' The RFA covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a rule will have a significant economic impact on a substantial number of small entities. If the agency determines that it will, the agency must prepare a regulatory flexibility analysis as described in the RFA.

However, if an agency determines that a rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the RFA provides that the head of the agency may so certify, and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

In the NPRM, the FAA determined that this rule would not impose more than minimal cost.

The FAA believes that this final rule does not have a significant economic impact on a substantial number of small entities for the following reasons. We did not receive any comments from small entities. All United States transport category airplane manufacturers exceed the Small Business Administration small-entity criteria of 1,500 employees. Therefore, as provided in section 605(b), the head of the FAA certifies that this rulemaking will not result in a significant economic impact on a substantial number of small entities.

C. International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465), prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such the protection of safety, and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. The FAA has assessed the potential effect of this final rule and determined that it is in accord with the Trade Agreements Act as the rule furthers the legitimate domestic objectives of safety, creates no unnecessary obstacles to foreign commerce, does not exclude imports, and uses European standards as the basis for United States regulation.

D. Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (Public Law 104–4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of $100 million or more (in 1995 dollars) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a ''significant regulatory action.'' The FAA currently uses an inflation-adjusted value of $151 million in lieu of $100 million. This final rule does not contain such a mandate; therefore, the requirements of Title II of the Act do not apply.

E. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. The FAA has determined that there is no new requirement for information collection associated with this final rule.

F. International Compatibility and Cooperation

(1) In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified no differences with these regulations.

(2) Executive Order (EO) 13609, Promoting International Regulatory Cooperation (77 FR 26413, May 4, 2012), promotes international regulatory cooperation to meet shared challenges involving health, safety, labor, security, environmental, and other issues and reduce, eliminate, or prevent unnecessary differences in regulatory requirements. The FAA has analyzed this action under the policy and agency responsibilities of Executive Order 13609, Promoting International Regulatory Cooperation. The agency has determined that this action would eliminate differences between U.S. aviation standards and those of other civil aviation authorities by creating a single set of certification requirements for transport category airplanes that would be acceptable in both the United States and Europe.

G. Environmental Analysis

FAA Order 1050.1E identifies FAA actions that are categorically excluded from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 312f of Order 1050.1E and involves no extraordinary circumstances.

V. Executive Order Determinations

A. Executive Order 13132, Federalism

The FAA has analyzed this final rule under the principles and criteria of Executive Order 13132, Federalism. The agency determined that this action will not have a substantial direct effect on the States, or the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, does not have Federalism implications.

B. Executive Order 13211, Regulations That Significantly Affect Energy Supply, Distribution, or Use

The FAA analyzed this final rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). The agency has determined that it is not a ''significant energy action'' under the executive order and it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

VI. How To Obtain Additional Information

A. Rulemaking Documents

An electronic copy of a rulemaking document may be obtained by using the Internet—

1. Search the Federal eRulemaking Portal (*http://www.regulations.gov*),

2. Visit the FAA's Regulations and Policies Web page at *http://www.faa.gov/regulations_policies/*, or

3. Access the Government Printing Office's Web page at *http://www.gpo.gov/fdsys/*.

Copies may also be obtained by sending a request (identified by notice, amendment, or docket number of this rulemaking) to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Avenue SW., Washington, DC 20591; or by calling (202) 267–9680.

B. Comments Submitted to the Docket

Comments received may be viewed by going to *http://www.regulations.gov* and following the online instructions to search the docket number for this action. Anyone is able to search the electronic form of all comments received into any of the FAA's dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.).

C. Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires the FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. A small entity with questions regarding this document, may contact its local FAA official, or the person listed under the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. To find out more about SBREFA on the Internet, visit *http://www.faa.gov/regulations_policies/rulemaking/sbre_act/*.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends part 25 of title 14, Code of Federal Regulations as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

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

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

■ 2. Amend § 25.331 by revising paragraph (c) introductory text and paragraph (c)(2) to read as follows:

§ 25.331 Symmetric maneuvering conditions.

* * * * *

(c) *Maneuvering pitching conditions.* The following conditions must be investigated:

* * * * *

(2) *Checked maneuver between V_A and V_D.* Nose-up checked pitching maneuvers must be analyzed in which the positive limit load factor prescribed in § 25.337 is achieved. As a separate condition, nose-down checked pitching maneuvers must be analyzed in which a limit load factor of 0g is achieved. In defining the airplane loads, the flight deck pitch control motions described in paragraphs (c)(2)(i) through (iv) of this section must be used:

(i) The airplane is assumed to be flying in steady level flight at any speed between V_A and V_D and the flight deck pitch control is moved in accordance with the following formula:

$\delta(t) = \delta_1 \sin(\omega t)$ for $0 \leq t \leq t_{max}$

Where—

δ_1 = the maximum available displacement of the flight deck pitch control in the initial direction, as limited by the control system stops, control surface stops, or by pilot effort in accordance with § 25.397(b);

$\delta(t)$ = the displacement of the flight deck pitch control as a function of time. In the initial direction, $\delta(t)$ is limited to δ_1. In the reverse direction, $\delta(t)$ may be truncated at the maximum available displacement of the flight deck pitch control as limited by the control system stops, control surface stops, or by pilot effort in accordance with 25.397(b);

$t_{max} = 3\pi/2\omega$;

ω = the circular frequency (radians/second) of the control deflection taken equal to the undamped natural frequency of the short period rigid mode of the airplane, with active control system effects included where appropriate; but not less than:

$$\omega = \frac{\pi V}{2V_A} \text{ radians per second;}$$

Where

V = the speed of the airplane at entry to the maneuver.

V_A = the design maneuvering speed prescribed in § 25.335(c).

(ii) For nose-up pitching maneuvers, the complete flight deck pitch control displacement history may be scaled down in amplitude to the extent necessary to ensure that the positive limit load factor prescribed in § 25.337 is not exceeded. For nose-down pitching maneuvers, the complete flight deck control displacement history may be scaled down in amplitude to the extent necessary to ensure that the normal acceleration at the center of gravity does not go below 0g.

(iii) In addition, for cases where the airplane response to the specified flight deck pitch control motion does not achieve the prescribed limit load factors, then the following flight deck pitch control motion must be used:

$\delta(t) = \delta_1 \sin(\omega t)$ for $0 \leq t \leq t_1$

$\delta(t) = \delta_1$ for $t_1 \leq t \leq t_2$

$\delta(t) = \delta_1 \sin(\omega[t + t_1 - t_2])$ for $t_2 \leq t \leq t_{max}$

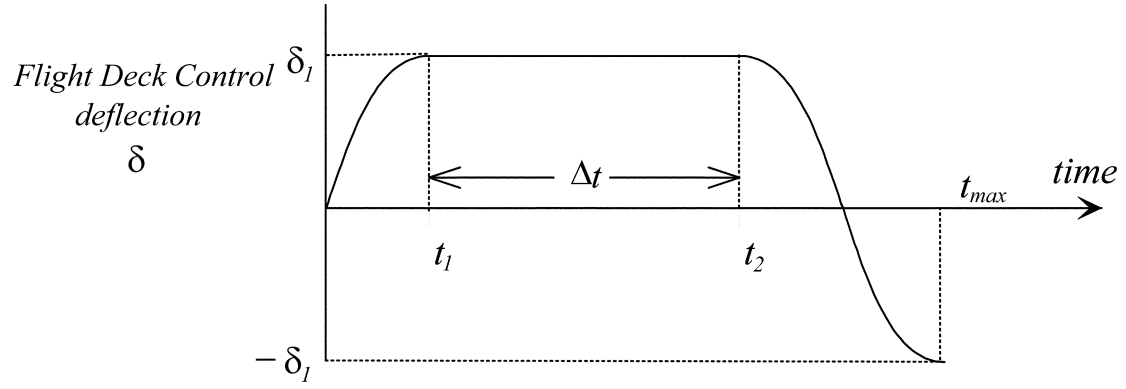
Where—

$t_1 = \pi/2\omega$

$t_2 = t_1 + \Delta t$

$t_{max} = t_2 + \pi/\omega$;

Δt = the minimum period of time necessary to allow the prescribed limit load factor to be achieved in the initial direction, but it need not exceed five seconds (see figure below).



(iv) In cases where the flight deck pitch control motion may be affected by inputs from systems (for example, by a stick pusher that can operate at high load factor as well as at 1g), then the effects of those systems shall be taken into account.

(v) Airplane loads that occur beyond the following times need not be considered:

(A) For the nose-up pitching maneuver, the time at which the normal acceleration at the center of gravity goes below 0g;

(B) For the nose-down pitching maneuver, the time at which the normal acceleration at the center of gravity goes above the positive limit load factor prescribed in § 25.337;

(C) $t_{max.}$.

■ 3. Amend § 25.341 by revising paragraphs (a)(5)(i), (a)(6), and (b), and by adding paragraph (c) to read as follows:

§ 25.341 Gust and turbulence loads.

(a) * * *

* * * * *

(5) * * *

(i) At airplane speeds between V_B and V_C: Positive and negative gusts with reference gust velocities of 56.0 ft/sec EAS must be considered at sea level. The reference gust velocity may be reduced linearly from 56.0 ft/sec EAS at sea level to 44.0 ft/sec EAS at 15,000 feet. The reference gust velocity may be further reduced linearly from 44.0 ft/sec EAS at 15,000 feet to 20.86 ft/sec EAS at 60,000 feet.

* * * * *

(6) * * *

Z_{mo} = Maximum operating altitude defined in § 25.1527 (feet).

* * * * *

(b) *Continuous turbulence design criteria.* The dynamic response of the airplane to vertical and lateral continuous turbulence must be taken into account. The dynamic analysis must take into account unsteady aerodynamic characteristics and all significant structural degrees of freedom including rigid body motions. The limit loads must be determined for all critical altitudes, weights, and weight distributions as specified in § 25.321(b), and all critical speeds within the ranges indicated in § 25.341(b)(3).

(1) Except as provided in paragraphs (b)(4) and (5) of this section, the following equation must be used:

$P_L = P_{L-1g} \pm U_\sigma \overline{A}$

Where—

P_L = limit load;

P_{L-1g} = steady 1g load for the condition;

$\overline{A}$ = ratio of root-mean-square incremental load for the condition to root-mean-square turbulence velocity; and

U_σ = limit turbulence intensity in true airspeed, specified in paragraph (b)(3) of this section.

(2) Values of $\overline{A}$ must be determined according to the following formula:

$$\overline{A} = \sqrt{\int_0^\infty |H(\Omega)|^2 \Phi(\Omega) d\Omega}$$

Where—

$H(\Omega)$ = the frequency response function, determined by dynamic analysis, that relates the loads in the aircraft structure to the atmospheric turbulence; and

$\Phi(\Omega)$ = normalized power spectral density of atmospheric turbulence given by—

$$\Phi(\Omega) = \frac{L}{\pi} \frac{1 + \frac{8}{3}(1.339\Omega L)^2}{\left[1 + (1.339\Omega L)^2\right]^{11/6}}$$

Where—

Ω = reduced frequency, radians per foot; and

L = scale of turbulence = 2,500 ft.

(3) The limit turbulence intensities, U_σ, in feet per second true airspeed required for compliance with this paragraph are—

(i) At airplane speeds between V_B and V_C: $U_\sigma = U_{\sigma\rho\varepsilon\phi} F_g$

Where—

$U_{\sigma\rho\varepsilon\phi}$ is the reference turbulence intensity that varies linearly with altitude from 90 fps (TAS) at sea level to 79 fps (TAS) at 24,000 feet and is then constant at 79 fps (TAS) up to the altitude of 60,000 feet.

F_g is the flight profile alleviation factor defined in paragraph (a)(6) of this section;

(ii) At speed V_D: U_σ is equal to ½ the values obtained under paragraph (b)(3)(i) of this section.

(iii) At speeds between V_C and V_D: U_σ is equal to a value obtained by linear interpolation.

(iv) At all speeds, both positive and negative incremental loads due to continuous turbulence must be considered.

(4) When an automatic system affecting the dynamic response of the airplane is included in the analysis, the effects of system non-linearities on loads at the limit load level must be taken into account in a realistic or conservative manner.

(5) If necessary for the assessment of loads on airplanes with significant non-linearities, it must be assumed that the turbulence field has a root-mean-square velocity equal to 40 percent of the U_σ values specified in paragraph (b)(3) of this section. The value of limit load is that load with the same probability of exceedance in the turbulence field as $\overline{A}U_\sigma$ of the same load quantity in a linear approximated model.

(c) *Supplementary gust conditions for wing-mounted engines.* For airplanes equipped with wing-mounted engines, the engine mounts, pylons, and wing supporting structure must be designed for the maximum response at the nacelle center of gravity derived from the following dynamic gust conditions applied to the airplane:

(1) A discrete gust determined in accordance with § 25.341(a) at each angle normal to the flight path, and separately,

(2) A pair of discrete gusts, one vertical and one lateral. The length of each of these gusts must be independently tuned to the maximum response in accordance with § 25.341(a). The penetration of the airplane in the combined gust field and the phasing of

the vertical and lateral component gusts must be established to develop the maximum response to the gust pair. In the absence of a more rational analysis, the following formula must be used for each of the maximum engine loads in all six degrees of freedom:

$$P_L = P_{L-1g} \pm 0.85\sqrt{L_V^2 + L_L^2}$$

Where—

P_L = limit load;

$P_{L\text{-}1g}$ = steady 1g load for the condition;

L_V = peak incremental response load due to a vertical gust according to § 25.341(a); and

L_L = peak incremental response load due to a lateral gust according to § 25.341(a).

■ 4. Amend § 25.343 by revising paragraph (b)(1)(ii) to read as follows:

§ 25.343 Design fuel and oil loads.

* * * * *

(b) * * *

(1) * * *

(ii) The gust and turbulence conditions of § 25.341(a) and (b), but assuming 85% of the gust velocities prescribed in § 25.341(a)(4) and 85% of the turbulence intensities prescribed in § 25.341(b)(3).

* * * * *

■ 5. Amend § 25.345 by revising paragraph (c)(2) to read as follows:

§ 25.345 High lift devices.

* * * * *

(c) * * *

(2) The vertical gust and turbulence conditions prescribed in § 25.341(a) and (b).

* * * * *

■ 6. Revise § 25.361 to read as follows:

§ 25.361 Engine and auxiliary power unit torque.

(a) For engine installations—

(1) Each engine mount, pylon, and adjacent supporting airframe structures must be designed for the effects of—

(i) A limit engine torque corresponding to takeoff power/thrust and, if applicable, corresponding propeller speed, acting simultaneously with 75% of the limit loads from flight condition A of § 25.333(b);

(ii) A limit engine torque corresponding to the maximum continuous power/thrust and, if applicable, corresponding propeller speed, acting simultaneously with the limit loads from flight condition A of § 25.333(b); and

(iii) For turbopropeller installations only, in addition to the conditions specified in paragraphs (a)(1)(i) and (ii) of this section, a limit engine torque corresponding to takeoff power and propeller speed, multiplied by a factor accounting for propeller control system malfunction, including quick feathering, acting simultaneously with 1g level flight loads. In the absence of a rational analysis, a factor of 1.6 must be used.

(2) The limit engine torque to be considered under paragraph (a)(1) of this section must be obtained by—

(i) For turbopropeller installations, multiplying mean engine torque for the specified power/thrust and speed by a factor of 1.25;

(ii) For other turbine engines, the limit engine torque must be equal to the maximum accelerating torque for the case considered.

(3) The engine mounts, pylons, and adjacent supporting airframe structure must be designed to withstand 1g level flight loads acting simultaneously with the limit engine torque loads imposed by each of the following conditions to be considered separately:

(i) Sudden maximum engine deceleration due to malfunction or abnormal condition; and

(ii) The maximum acceleration of engine.

(b) For auxiliary power unit installations, the power unit mounts and adjacent supporting airframe structure must be designed to withstand 1g level flight loads acting simultaneously with the limit torque loads imposed by each of the following conditions to be considered separately:

(1) Sudden maximum auxiliary power unit deceleration due to malfunction, abnormal condition, or structural failure; and

(2) The maximum acceleration of the auxiliary power unit.

■ 7. Add § 25.362 to read as follows:

§ 25.362 Engine failure loads.

(a) For engine mounts, pylons, and adjacent supporting airframe structure, an ultimate loading condition must be considered that combines 1g flight loads with the most critical transient dynamic loads and vibrations, as determined by dynamic analysis, resulting from failure of a blade, shaft, bearing or bearing support, or bird strike event. Any permanent deformation from these ultimate load conditions must not prevent continued safe flight and landing.

(b) The ultimate loads developed from the conditions specified in paragraph (a) of this section are to be—

(1) Multiplied by a factor of 1.0 when applied to engine mounts and pylons; and

(2) Multiplied by a factor of 1.25 when applied to adjacent supporting airframe structure.

■ 8. Revise § 25.371 to read as follows:

§ 25.371 Gyroscopic loads.

The structure supporting any engine or auxiliary power unit must be designed for the loads, including gyroscopic loads, arising from the conditions specified in §§ 25.331, 25.341, 25.349, 25.351, 25.473, 25.479, and 25.481, with the engine or auxiliary power unit at the maximum rotating speed appropriate to the condition. For the purposes of compliance with this paragraph, the pitch maneuver in § 25.331(c)(1) must be carried out until the positive limit maneuvering load factor (point A_2 in § 25.333(b)) is reached.

■ 9. Amend § 25.373 by revising paragraph (a) to read as follows:

§ 25.373 Speed control devices.

* * * * *

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

* * * * *

■ 10. Amend § 25.391 by revising the introductory text to read as follows:

§ 25.391 Control surface loads: General.

The control surfaces must be designed for the limit loads resulting from the flight conditions in §§ 25.331, 25.341(a) and (b), 25.349, and 25.351, considering the requirements for—

* * * * *

■ 11. Amend § 25.395 by revising paragraph (b) to read as follows:

§ 25.395 Control system.

* * * * *

(b) The system limit loads of paragraph (a) of this section need not exceed the loads that can be produced by the pilot (or pilots) and by automatic or power devices operating the controls.

* * * * *

■ 12. Revise § 25.415 to read as follows:

§ 25.415 Ground gust conditions.

(a) The flight control systems and surfaces must be designed for the limit loads generated when the airplane is subjected to a horizontal 65-knot ground gust from any direction while taxiing and while parked. For airplanes equipped with control system gust locks, the taxiing condition must be evaluated with the controls locked and unlocked, and the parked condition must be evaluated with the controls locked.

(b) The control system and surface loads due to ground gust may be

assumed to be static loads, and the hinge moments H must be computed from the formula:

$H = K (1/2) \rho_o V^2 c S$

Where—

K = hinge moment factor for ground gusts derived in paragraph (c) of this section;
ρ_o = density of air at sea level;
V = 65 knots relative to the aircraft;
S = area of the control surface aft of the hinge line;
c = mean aerodynamic chord of the control surface aft of the hinge line.

(c) The hinge moment factor K for ground gusts must be taken from the following table:

Surface	K	Position of controls
(1) Aileron	0.75	Control column locked or lashed in mid-position.
(2) Aileron	*±0.50	Ailerons at full throw.
(3) Elevator	*±0.75	Elevator full down.
(4) Elevator	*±0.75	Elevator full up.
(5) Rudder	0.75	Rudder in neutral.
(6) Rudder	0.75	Rudder at full throw.

*A positive value of K indicates a moment tending to depress the surface, while a negative value of K indicates a moment tending to raise the surface.

(d) The computed hinge moment of paragraph (b) of this section must be used to determine the limit loads due to ground gust conditions for the control surface. A 1.25 factor on the computed hinge moments must be used in calculating limit control system loads.

(e) Where control system flexibility is such that the rate of load application in the ground gust conditions might produce transient stresses appreciably higher than those corresponding to static loads, in the absence of a rational analysis substantiating a different dynamic factor, an additional factor of 1.6 must be applied to the control system loads of paragraph (d) of this section to obtain limit loads. If a rational analysis is used, the additional factor must not be less than 1.2.

(f) For the condition of the control locks engaged, the control surfaces, the control system locks, and the parts of any control systems between the surfaces and the locks must be designed to the resultant limit loads. Where control locks are not provided, then the control surfaces, the control system stops nearest the surfaces, and the parts of any control systems between the surfaces and the stops must be designed to the resultant limit loads. If the control system design is such as to allow any part of the control system to impact with the stops due to flexibility, then the resultant impact loads must be taken into account in deriving the limit loads due to ground gust.

(g) For the condition of taxiing with the control locks disengaged, or where control locks are not provided, the following apply:

(1) The control surfaces, the control system stops nearest the surfaces, and the parts of any control systems between the surfaces and the stops must be designed to the resultant limit loads.

(2) The parts of the control systems between the stops nearest the surfaces and the flight deck controls must be designed to the resultant limit loads, except that the parts of the control system where loads are eventually reacted by the pilot need not exceed:

(i) The loads corresponding to the maximum pilot loads in § 25.397(c) for each pilot alone; or

(ii) 0.75 times these maximum loads for each pilot when the pilot forces are applied in the same direction.

■ 13. Revise 25.1517 to read as follows:

§ 25.1517 Rough air speed, V_{RA}.

(a) A rough air speed, V_{RA}, for use as the recommended turbulence penetration airspeed, and a rough air Mach number, M_{RA}, for use as the recommended turbulence penetration Mach number, must be established. V_{RA}/M_{RA} must be sufficiently less than V_{MO}/M_{MO} to ensure that likely speed variation during rough air encounters will not cause the overspeed warning to operate too frequently.

(b) At altitudes where V_{MO} is not limited by Mach number, in the absence of a rational investigation substantiating the use of other values, V_{RA} must be less than V_{MO}—35 KTAS.

(c) At altitudes where V_{MO} is limited by Mach number, M_{RA} may be chosen to provide an optimum margin between low and high speed buffet boundaries.

Appendix G to Part 25 [Removed and Reserved]

■ 14. Remove and reserve appendix G to part 25.

Issued under authority provided by 49 U.S.C. 106(f) and 44701(a) in Washington, DC, on November 14, 2014.

Michael P. Huerta,

Administrator.

[FR Doc. 2014–28938 Filed 12–10–14; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA–2014–0668; Special Conditions No. 25–572–SC]

Special Conditions: AAR Engineering Services, Boeing 757–200 Series Airplane; Seats With Non-Traditional, Large, Non-Metallic Panels

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special condition; request for comments.

SUMMARY: These special conditions are issued for the Boeing 757–200 series airplane. This airplane, as modified by AAR Engineering Services, will have novel or unusual design features when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature includes seats with non-traditional, large, non-metallic panels on Boeing 757–200 series airplanes. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: This action is effective on AAR Engineering Services on December 11, 2014. We must receive your comments by January 26, 2015.

ADDRESSES: Send comments identified by docket number FAA–2014–0668 using any of the following methods:

- *Federal eRegulations Portal:* Go to *http://www.regulations.gov/* and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M–30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue SE., Room W12–140, West Building Ground Floor, Washington, DC 20590–0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12–140 of the West Building Ground Floor at 1200 New Jersey Avenue SE., Washington, DC, between 8 a.m. and 5 p.m., Monday through Friday, except federal holidays.
- *Fax:* Fax comments to Docket Operations at 202–493–2251.

Privacy: The FAA will post all comments it receives, without change, to *http://www.regulations.gov/,* including any personal information the commenter provides. Using the search