



NOTICE OF PROPOSED AMENDMENT (NPA) No 2010-11

DRAFT DECISION OF THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY

**amending Decision No 2003/2/RM of the Executive Director of the European
Aviation Safety Agency of 17 October 2003 on**

**Certification Specifications, including Airworthiness Codes and Acceptable
Means of Compliance, for Large Aeroplanes («CS-25»)**

***‘Passenger emergency exits, emergency features and escape routes —
Harmonisation with FAA’***

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A. Explanatory Note

I. General

1. The purpose of this Notice of Proposed Amendment (NPA) is to envisage amending Certification Specifications for large Aeroplanes (CS-25) as originally issued by the Executive Director's Decision 2003/2/RM of 17 October 2003¹ and last amended by Executive Director's Decision 2010/005/R of 5 August 2010² (CS-25 Amendment 9). The scope of this rulemaking activity is outlined in the Terms of Reference (ToR) 25.039 and is described in more detail below.
2. The European Aviation Safety Agency (hereinafter referred to as the 'Agency') is directly involved in the ruleshaping process. It assists the Commission in its executive tasks by preparing draft regulations, and amendments thereof, for the implementation of the Basic Regulation³ which are adopted as 'Opinions' (Article 19(1)). It also adopts Certification Specifications, including Airworthiness Codes and Acceptable Means of Compliance and Guidance Material to be used in the certification process (Article 19(2)).
3. When developing rules, the Agency is bound to follow a structured process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as 'The Rulemaking Procedure'⁴.
4. This rulemaking activity is included in the Agency's 4-year Rulemaking Programme for 2011. It implements the rulemaking task 25.039 for harmonisation with FAA concerning Passenger emergency exits, emergency features and escape routes.
5. The text of this NPA has been developed by the Agency. It is submitted for consultation of all interested parties in accordance with Article 52 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.
6. The proposed rule has taken into account the development of European Union and International law (ICAO), and the harmonisation with the rules of other authorities of the European Union main partners as set out in the objectives of Article 2 of the Basic Regulation. The proposed rule;
 - a. complies with ICAO Standards and Recommended Practices (see paragraph A V 21 a. vi for details);
 - b. is harmonised with FAA rules. There are 4 editorial differences listed in appendix 3. There is only one significant difference (see appendix 3 and detailed explanations in paragraph A V 19). FAA agreed in principle with the proposed technical content and confirmed their intention to harmonise.

II. Consultation

7. To achieve optimal consultation, the Agency is publishing the draft decision of the Executive Director on its website. Comments should be provided within 3 months in accordance with Article 6(4) of the Rulemaking Procedure. Comments on this proposal should be submitted by one of the following methods:

¹ Decision No 2003/2/RM of the Executive Director of the Agency of 17 October 2003 on Certification Specifications, including Airworthiness Code and Acceptable Means of Compliance, for Large Aeroplanes («CS-25»).

² Decision No 2010/005/R of the Executive Director of the Agency of 5 August 2010.

³ Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1).

⁴ Management Board decision concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material (Rulemaking Procedure), EASA MB 08-2007, 13.6.2007.

- CRT:** Send your comments using the Comment-Response Tool (CRT) available at <http://hub.easa.europa.eu/crt/>
- E-mail:** In case the use of CRT is prevented by technical problems, these should be reported to the [CRT_webmaster](mailto:CRT_webmaster@easa.europa.eu) and comments sent by email to NPA@easa.europa.eu.
- Correspondence:** If you do not have access to the Internet or e-mail, you can send your comment by mail to:
 Process Support
 Rulemaking Directorate
 EASA
 Postfach 10 12 53
 D-50452 Cologne
 Germany

Comments should be submitted by **8 December 2010**. If received after this deadline they might not be taken into account.

III. Comment response document

8. All comments received in time will be responded to and incorporated in a comment response document (CRD). The CRD will be available on the Agency's website and in the Comment-Response Tool (CRT).

IV. Content of the draft opinion/decision

Background: FAA rulemaking

9. The FAA have issued FAR Part 25 amendments: 25-76 in 1992, 25-88 in 1996, 25-94 in 1998 and 25-116 in 2004), related to Emergency Exits and escape routes. A summary of the contents of each of these Amendments is given below.

Except for part of amendment 25-76, none of those Amendments were proposed to be included in European standards. In order to harmonise with FAA, the Airworthiness Codes need to be upgraded to reflect the FAA status as well as the result of the JAA Working Group concerning Amendment 88.

10. FAR Amendment 25-76 deals with improvement of Type III exit. This Amendment was aimed at taking into account the results coming from FAA's Civil Aeromedical Institute (CAMI) in order to improve the evacuation of occupants under emergency evacuation.

Note: Most of the Amendment is already covered or superseded by NPA 2008-04 and included in CS-25 Amendment 9. The only proposed change to be considered in this proposal concerns cross-aisles to be provided for all exit types in multi-aisle aeroplanes.

11. FAR amendment 25-88 defines two new types of passenger emergency exits (Type B and Type C), and provides more consistent standards with respect to the passenger seating allowed for each exit type, and the type and number of exits required depending on passenger seating configurations. The amendment also requires reduced maximum inflation time of escape slides.

The changes allow more flexibility in the design of emergency exits and reflect improvements in escape slide technology. They should enable more cost-effective emergency exit arrangements and, in the case of escape slides, enable more rapid egress of passengers under emergency conditions.

Note: This activity was initiated prior to the creation of EASA by JAA and the Cabin Safety Steering Group (CSSG), which resulted in the issuance of JAA NPA 25D-298 on 31 July 1999.

12. FAR Amendment 25-94 only aims at correcting mistakes originated from Amendment 88.

13. FAR Amendment 25-116 relates to cabin crew assist spaces and handles, door hold-open features, outside viewing means, interior compartment doors and portable oxygen equipment. This FAA Amendment aims at taking advantage of the state-of-the-art, as well as common practice.

Subject of the proposed amendment

14. The aim of this NPA is to propose an enhancement to the cabin safety standards of CS-25 to reflect the state-of-the-art. The changes proposed will reduce differences with FAR Part 25 and incorporate results of the previous JAA Working Group concerning FAR Part 25 Amendment 88.
15. A detailed description of the proposed CS-25 changes is given in Appendix 1.
16. A cross-reference table to illustrate how the proposed changes will impact the existing CS-25 paragraph numbering is given in Appendix 2.
17. A table listing the remaining differences between EASA and FAA standards in relation with emergency exits and escape routes is given in Appendix 3.

V. Regulatory Impact Assessment

18. Purpose and intended effect

- a. Issue which the NPA is intended to address

The primary purpose of this NPA is to enhance the cabin safety standards incorporated in CS-25 based on previously adopted standards in FAR Part 25. As such, the changes will benefit as follows:

- take advantage of FAA research into Type III exits, as well as proposed new Type B and C exits in order to improve safety;
- learn from service experience (for instance about assist space, passenger rating, etc.);
- incorporate the safety recommendation given by the National Transportation Safety Board (NTSB) regarding oxygen mask connections;
- give more flexibility to the designer in terms of emergency exit arrangement and remove inconsistencies in the current regulation;
- reflect the state-of-the-art in cabin safety design (escape slides, door hold-open features, assist handle);
- enhance harmonisation with FAR Part 25 to avoid unnecessary certification differences.

- b. Scale of the issue

This proposed amendment concerns emergency exits and escape routes for large aeroplanes and as such, will impact new TC and STC for Large Aeroplanes and amended TC and STC as applicable under Part 21A.101. This NPA does not contain any retroactive requirement.

- c. Brief statement of the objectives of the NPA

The purpose of this NPA is to amend CS-25 to enhance cabin safety standards based on previously adopted FAR amendments 25-76, 25-88, 25-94 and 25-116.

FAR amendments deal with emergency exits, emergency features and escape routes and update the following FAR Part 25 paragraphs: 25.785, 25.807, 25.810, 25.811, 25.812, 25.813.

19. Options

a. The options identified

Following options can be considered:

Option 1. Do nothing.

Option 2. Full adoption of FAA Amendments 25-88, 25-94 and 25-116. Partial adoption of Amendment 25-76 (only the part concerning cross-aisles in CS 25.813(a)).

For details, please refer to FAA final rules references 1, 2, 3 and 4.

Option 3. Regulate to partly adopt FAA Amendments into CS-25: Same provisions as in option 2 except concerning the adoption of amendment 25-116 for the viewing means.

Following some difficulties encountered in implementing the viewing means as required in FAR 25-116 requirements in on-going certifications in the US and in Europe, some adaptations are proposed for:

- viewing means in all lighting conditions;
- viewing means for flight crew with the exit closed in all lighting conditions.

In addition, following recommendation was issued in a very recent cabin safety research publication (reference 5):

'Recommendation 13 – Amending CS-25 to address external viewing means

The Regulatory Impact Assessment addressed the implications of amending CS-25 to require outside viewing means at emergency exits and to specify their minimum performance standards. However, the required level of illumination implied by FAR 25.809(a) needs further deliberation. Additionally, the requirement should not be limited to viewing windows at, or adjacent to, the exits, but should be open to the possibility of using other technologies such as external cameras. The use of external cameras may also improve flight crew awareness of external conditions for safe evacuation. It is therefore concluded that further research is needed prior to any regulatory action being taken by EASA.'

- The alleviated provisions, proposed hereafter, were coordinated and agreed with FAA, even though they are not yet included in FAR Part 25.
- The conditions for viewing of the conditions outside the exit are the same as in option 2: exit closed, all ambient lighting conditions, all landing gear conditions.
- The requirement for viewing the likely areas of evacuee ground contact is not applicable for Flight Crew Compartment emergency exit.
- The requirement for viewing the likely areas of evacuee ground contact is not applicable to the passenger compartment exits in all ambient lighting conditions when landing gears are collapsed (the requirement is only applicable, in all ambient lighting conditions, when all landing gears are extended).
- The requirement for viewing the likely areas of evacuee ground contact is adapted for over-wing exit where it was experienced that the evacuee ground contact cannot always be seen from the aircraft with the door closed.

b. The preferred option selected (if possible)

Option 3 is the preferred option.

20. Sectors concerned

Those affected by this proposal are:

- Airframe Manufacturers/Designers of Large Aeroplanes,
- Operators of Large Aeroplanes,
- Authorities/Regulators.

21. Impacts

a. All identified impacts

i. Safety

Option 1. Option 1 would maintain the existing safety level in terms of emergency evacuation. The existing standard would therefore not reflect the state-of-the-art as required by Article 19 of the Basic Regulation. In particular, the following existing voluntary practices which are deemed to enhance safety will not be reflected in the CS:

- assist space specifications,
- handles at assist space,
- doors hold-open features,
- outside viewing means,
- portable oxygen bottles connected to the mask.

In addition, without this rule, voluntary practices could be relaxed at any time.

Option 2. Adopting option 2 would improve the level of safety in terms of emergency evacuation:

- New exit configuration standards (part of FAR amendment 25-88):

The new exit configuration requirements as described in proposed CS 25.807(g) propose a simpler and more consistent set of standards that either retain an equivalent level of safety (compared to today's CS 25.807(d)) or increase the level of safety.

For the following cases, the level of safety is increased:

- Under existing regulations, the increase in allowable passenger seats ranges from 45 to 70 for each additional Type I exit pair depending on the aeroplane exit configuration and the total passenger capacity. The new rule proposes to standardise the passenger rating of a Type I exit at 45 (in this context, the passenger rating refers to the maximum number of passenger seats that may be installed for each exit pair as per proposed CS 25.807(g)). Limiting a Type I exit to 45 passengers will improve safety. Speed in an evacuation can lead to the saving of lives such as in conditions of fire or a water environment. An aeroplane having two pairs of Type I exits and two pairs of Type III exits, under current regulations, can have 179 passengers. The proposed regulations would limit this to 155 or 160 passengers (depending on whether the Type III exits are adjacent), a reduction of 11–13 % which would likely reduce the evacuation time also by approximately 11–13 % (FAA NPRM 90-4, reference 6). However, a manufacturer who would like to design an aeroplane with 179 passengers could do so with a configuration of two Type C and two Type III exit pairs (instead of two Type I and two Type III exit pairs as they could have done with the previous standard). The evacuation of such an aeroplane would be more expeditious, as the Type C exit is six inches wider than the Type I exit.

- After evacuation demonstrations, FAA has come to the conclusion that two adjacent Type III exits consistently fail to provide a rate of egress that is double that of a single Type III exit. Typically, some evacuees must bypass one exit in order to be there a steady flow through the other exit. The combined passenger rating of adjacent Type III exits is therefore reduced in this proposal from a total of 70 to 65.

While it is difficult to estimate the number of fatalities or injuries that might be avoided by the proposed rule, FAA Amendment No 25-88 (reference 1) refers to three studies that can help:

- The first one (ref 'Study of FAR Sec. 25.807(c) Emergency Exits' FAA Aeronautical Center, May 1975, Project Report No 70-597-120A) shows that exit flow rates are proportional to exit widths within the 61 cm to 107 cm range (24 to 42 inches).
- The second study ('Study of FAR Sec. 25.807(c) Emergency Exits', FAA Aeronautical Center, May 1975, Project Report No 70-597-120A) shows that the evacuation rate is increased by one occupant every 12 seconds for each six inch increase in exit width.
- In another study ('Decision Analysis Model for Passenger-Aircraft Fire Safety with Application to Fire Blocking of Seats', National Bureau of Standards, March 1984, NBSTR 84-2817, DOT/FAA/CT/84-8), the National Bureau of Standards NSB (since renamed the National Institute for Standards and Technology), analysed accidents involving fire and fatalities that occurred between 1965 and 1982 and estimated the number of fatalities that could have been avoided if passengers had additional time to escape as a result of reduced seat cushion flammability. NBS estimated that of 712 fire fatalities during the period analysed, 109 could have been avoided if there had been 20 additional seconds of evacuation time (a rate of 3 lives saved per 100 million passenger enplanements).

— Amended escape slide erection times (part of FAR amendment 25-88)

The reduced time allowed for escape slide erection will provide faster emergency evacuation and so potentially prevent some fatalities or injuries that otherwise might be sustained. It is to be noted that the level of safety will not be highly increased as the requirement reflects today's state-of-the-art, which means that most of the slides used already comply with the specified times.

— Assist space (part of FAR amendment 25-116)

Assist spaces are defined areas adjacent to an exit that allow cabin crew to control and assist an evacuation without reducing the unobstructed width of the passageway leading to the exit. Assist spaces have been demonstrated to improve the level of safety by reducing the evacuation time.

The proposed requirement on assist space will reflect current industry best practice and be dependent on the type of exits used, the number of passengers carried and whether an assisting mean is required at the exit. The level of safety will therefore not be significantly increased.

Nevertheless, the minimum size proposed in regulation would provide a standardised approach and allow an additional margin of safety under adverse conditions.

— Assist handle (part of FAR amendment 25-116)

Assist handles as a mean to enable cabin crew to steady themselves while assisting passengers in evacuating is crucial for the efficiency of evacuation. So this requirement is very important from a safety standpoint to improve the emergency evacuation.

The FAR requirement reflects current industry practices as assist handles are already incorporated in most, if not all installations. The level of safety will not be significantly increased under this option but will ensure that it is maintained.

— Portable O₂ bottle (part of FAR amendment 25-116)

The proposed requirement comes from a National Transportation Safety Board (NTSB) safety recommendation following United Airlines Flight 811 accident in February 1989: it was determined that cabin crew had difficulties in using the portable O₂ bottles because they were not connected to the mask. Additional action was needed by the cabin crew to be able to use them. The recommendation to connect the mask or hose assembly to the supply source is already part of AMC 25.1447(c)(4) and most of the configurations already include this standard. The proposal to include this provision within the Airworthiness Code will ensure it forms part of the minimum standard and therefore cannot be relaxed.

By updating CS-25 to require the connection, it minimises the time and dexterity necessary for cabin crew to don and use portable O₂ and thereby enhance their ability to assist in the survivability of occupants.

— Viewing means (part of FAR amendment 25-116)

Emergency evacuations are sometimes combined with a hazard, such as a fire, outside the aeroplane. As the hazard may pose an immediate threat to the occupants of the aeroplane, it is often necessary to avoid opening certain otherwise useable emergency exits in order to prevent injury to the evacuees. In this context, a viewing window or other means of assessing the outside conditions and determining whether an exit should be opened is extremely valuable. This means should provide visibility taking into account all conditions of landing gear collapse and all outside illumination conditions.

Viewing means are currently part of most aircraft designs, so the safety benefits are limited. At least, the rule will ensure that the safety standards are not relaxed at any time.

Some improvements are expected in case of poor visibility conditions. Since evacuations can take place at night, a better visibility of outside conditions could help the cabin crew before opening the door in assessing potential hazards that could pose a threat to the occupants.

In addition, the applicability of the requirement for viewing means to flight crew emergency exit might render safer the evacuation of pilots. In case of evacuation, it could be of help for pilots to have a view where they will be contacting the ground. Current designs are such that the pilots are able to view the ground from the window when closed (which is the typical Flight Crew emergency exit), but cannot view the ground contact area which is immediately below the flight deck window.

— Exit hold-open feature (part of FAR amendment 25-116)

The capability of an exit to remain open during an evacuation without threat of premature closing is very important from a safety standpoint

during any emergency evacuation. Adverse attitude, wind or contact by evacuating passengers could cause an unsecured door to close and jeopardise the safety of subsequent passengers.

This standard is mostly part of current designs so no significant safety improvement is expected.

— Interior doors (part of FAR amendment 25-116)

Following accidents in the 1960's, an amendment to regulations prohibited the installation of doors 'between passenger compartments'. This is today covered by CS 25.813(e).

At that time, it was common practice to divide the first class and tourist class cabins with a solid door. It was determined in the course of accident investigations that this door could be detrimental in evacuation of passengers, who tended not to recognise that there was an exit beyond the door, even if it was the closest available. However, the regulation was worded such that doors may be installed between passengers and exits provided there are no passengers on both sides of the door (e.g., for door across the main passenger aisle at the end of the cabin).

The proposed rule aims at clarifying the rule in order to ensure that no door between any passenger compartment and exits can be installed. Should such a door become jammed, persons could be prevented or delayed in evacuating which could result in fatalities or injuries that would not have occurred otherwise. So the proposed rule will improve safety ensuring that evacuation is facilitated. Anyhow, the safety improvement is relative due to the fact that current design standards do not include interior doors for commercial air transportation. Only few cases exist, for example for private use and where the number of passengers is much smaller.

— Type III cross-aisle (part of FAR amendment 25-76)

Cross-aisles are currently required for Type A, Type I, and Type II exits as per CS 25.813(a). Proposed rule will require that cross-aisles be provided for all exit pairs in multi-aisle aeroplanes. This will certainly increase the level of safety by improving the evacuation time. For example, if one exit cannot be used, passengers could more easily use the opposite exit.

Option 3. Adopting option 3 would improve the level of safety in terms of emergency evacuation at the same level as option 2 except for the viewing means where the provisions are slightly different: they are alleviated compared to the ones in FAR amendment 25-116.

The Agency is of the opinion that the provisions proposed for option 3 regarding the viewing means will improve the level of safety because they provide sufficient view to identify hazards that could endanger evacuation of passengers and crew.

ii. Economic

Option 1. There would not be any economic impact.

Option 2. Economic impacts are described below:

— New exit configuration standards (part of FAR amendment 25-88)

In general, we can estimate very low cost impacts coming from this rule.

Firstly, exit configurations on aeroplanes certified with CS-25 are very rarely at the maximum limit in terms of passengers per exit.

Secondly, if there is some increase in costs, it would be far outweighed by the benefits of enhanced design flexibility given by the two new exit types, as well as with the new consistent standard and improved evacuation capabilities.

The addition of Type B and Type C exits will provide manufacturers with increased design flexibility.

As an example for flexibility and cost reduction, we can think of the exemptions that were granted for McDonnell Douglas DC-10 or B757 type-certifications with exits similar to proposed Type B with associated rating of 80 or 75 passengers. With the new Type B exits proposed, no exemption would be needed.

Configurations with Type B and C exits will likely cost no more than configurations without these exits since manufacturers will most likely not utilise them unless it is cost-effective to do so.

The main cost increase could arise from the new limitation relating to Type I exits: the current standards allow an increase in passenger seating configuration ranging from 45 to 70 for each additional Type I exit pair, depending on aeroplane exit configuration and total passenger seating capacity. The revised rule will limit the allowed increase for Type I exit pairs to 45 passengers for all exit configurations and seating capacities. Should a manufacturer desire to keep the same capacity, it is possible under the revised standards to install Type I exits instead of Type C exits. Despite the increased width of a Type C exit of 6 inches relative to a Type I exit, significant additional costs are not expected. According to FAA NPRM 90-4 (reference 6), manufacturers often make their Type I exits the size of the proposed Type C exit, or larger for reasons such as providing easier access for passengers and service equipment. This is the case of popular aeroplanes for which exits are qualified Type I with dimensions such as 30×65 inches, 30×72 inches, 33×72 inches or 34×72 inches. These exits would qualify, in size, as Type C exits.

Finally, it has to be highlighted that this proposed rule is only applicable to future type-certificated aeroplanes, so no re-design costs will be expected.

— Amended escape slide erection times (part of FAR amendment 25-88)

The technology of escape slides to meet the revised standard is available and will not add to the cost of slides. The rule changes basically update slide requirements to current technology.

— Assist space and handle, Portable O₂ bottle, Exit hold-open feature and Interior doors (part of FAR amendment 25-116)

Costs are considered to be negligible as the proposed rule codifies practices that are already being adopted by the entire industry and no retrofit is requested.

— Viewing means (part of FAR amendment 25-116)

Costs are again considered to be negligible as the proposed rule codifies practices that are already being adopted by the entire industry and no retrofit is requested.

Exception concerns the following requirements where additional costs are expected:

- Viewing means for tail cone emergency exits: considerable engineering design would be needed in order to meet the requirement should a manufacturer wish to design a new aeroplane with tail cone emergency exit. It is conceivable that, since the rule applies only to aeroplanes for which an application for type-certification is made after the effective date, and no retrofit is included, most future aeroplanes will not be equipped with a tail cone exit. So costs seem again limited.
- Viewing means of the likely areas of evacuee ground contact for flight crew emergency exit: significant engineering design may be needed in order to meet any proposed requirement.
- Viewing means of the likely areas of evacuee ground contact in all lighting conditions with the landing gears collapsed: in those conditions, complex and powerful lighting equipment would be needed in order to fulfil the proposed requirement.

— Type III cross-aisle (part of FAR amendment 25-76)

Minimum costs are expected following this new requirement about cross-aisles at Type III exits: in most cases, manufacturers can originally design the interior configuration of aeroplanes that will receive future type-certificate so that there will be no less number of seats as a result of these improved access requirement.

Option 3. Economic impacts are the same as option 2 concerning:

- new exit configuration standards,
- amended escape slide erection times,
- assist space and handle, portable O₂ bottle, exit hold-open feature and interior doors.

Economic impacts are lower than option 2 concerning viewing means because the two requirements having the highest cost impacts are not part of this option:

- viewing means of the likely areas of evacuee ground contact in all lighting conditions with landing gears collapsed;
- viewing means of the likely areas of evacuee ground contact for flight crew compartment emergency exits.

iii. Environmental

No environmental impact identified.

iv. Social

No social impact identified.

v. Other aviation requirements outside EASA scope

FAA

FAR Part 25 already include those requirements, as described in paragraphs A.IV 9-10-11-12-13.

vi. ICAO Standards And Recommended Practices

Proposed requirements comply with Annex 8 to the Convention on International Civil Aviation signed at Chicago on 7 December 1944:

- Concerning the part D.6 'DESIGN AND CONSTRUCTION: Emergency landing provisions'.
D.6.2, D.6.3 and D.6.4 require aeroplanes to be designed to facilitate rapid evacuation and ditching.
- Concerning the part I 'CRASHWORTHINESS AND CABIN SAFETY'.
I.4 and I.5 specify cabin layout and exit requirements for evacuation as well as lighting and markings conditions.

- b. Equity and fairness in terms of distribution of positive and negative impacts among concerned sectors.

No equity and fairness issues have been identified.

22. Summary and final assessment

- a. Comparison of the positive and negative impacts for each option evaluated.

Both options 2 and 3 improve the overall level of safety:

- by requiring current practices to be continued in the future;
- by mandating changes following National Transportation Safety Board recommendation;
- by improving evacuation time at exits, and particularly at Type III exits.

Option 2 proposes two additional requirements concerning viewing means of the likely areas of evacuee ground contact that may improve the level of safety in case of evacuation. The Agency is not convinced that option 2 offers much higher level of safety than option 3. Option 3 indeed achieves the objective of the rule by providing means, during an emergency evacuation, to assess external hazards that could pose a threat to evacuees if the exit is opened.

In addition, the engineering and design costs of option 2 are much higher than option 3.

- b. A summary describing who would be affected by these impacts and analysing issues of equity and fairness.

The main actors economically impacted are the manufacturers of large aeroplanes due to the efforts in design development. Operators and passengers are expected to benefit from the safety increase.

Nevertheless, we can estimate time and money savings due to the harmonisation with FAA rules: harmonised rules will facilitate acceptance of compliance statements generated during certification in subsequent Type validation programmes, which will save time and cost both for the Industry and the Agency.

No equity and fairness issues have been identified.

- c. Final assessment and recommendation of a preferred option.

The preferred option is option 3 due to the enhanced level of safety with low economic impact.

B. Draft Decision

The text of the amendment is arranged to show deleted text, new text or new paragraph as shown below:

1. deleted text is shown with a strike through: ~~deleted~~
2. new text is highlighted with grey shading: **new**
3. ... indicates that remaining text is unchanged in front of or following the reflected amendment.

I Draft Decision CS-25

Book 1

SUBPART D DESIGN AND CONSTRUCTION

CS 25.785 Seats, berths, safety belts and harnesses

...

(h) Each seat located in the passenger compartment and designated for use during take-off and landing by a cabin crew member required by the Operating Rules must be -

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

(2) ...

...

CS-25.807 Emergency exits

(See AMC to 25.807 ~~and 25.813 and AMC 25.807~~)

(a) *Type*. For the purpose of this CS-25, the types of exits are defined as follows:

(1) *Type I*. This type is a floor-level exit with a rectangular opening of not less than 61 cm (24 inches) wide by 1.22 m (48 inches) high, with corner radii not greater than ~~one-third the width of the exit~~ **20,3 cm (8 inches)**.

(2) *Type II*. This type is a rectangular opening of not less than 51 cm (20 inches) wide by 1.12 m (44 inches) high, with corner radii not greater than ~~one-third the width of the exit~~ **17,8 cm (7 inches)**. Type II exits must be floor-level exits unless located over the wing, in which case they ~~may~~ **must** not have a step-up inside the aeroplane of more than 25 cm (10 inches) nor a step-down outside the aeroplane of more than 43 cm (17 inches).

(3) *Type III*. This type is a rectangular opening of not less than 51 cm (20 inches) wide by 91 cm (36 inches) high with corner radii not greater than ~~one-third the width of the exit~~ **17,8 cm (7 inches)**, and with a step-up inside the aeroplane of not more than 51 cm (20 inches). If the exit is located over the wing, the step-down outside the aeroplane may not exceed 69 cm (27 inches).

(4) *Type IV*. This type is a rectangular opening of not less than 48 cm (19 inches) wide by 66 cm (26 inches) high, with corner radii not greater than ~~one-third the width of the~~

~~exit~~ 16 cm (6.3 inches), located over the wing, with a step-up inside the aeroplane of not more than 74 cm (29 inches) and a step-down outside the aeroplane of not more than 91 cm (36 inches).

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

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

(7) *Type A*. This type is a floor-level exit with a rectangular opening of not less than 1.07 m (42 inches) wide by 1.83 m (72 inches) high, with corner radii not greater than ~~one-sixth of the width of the exit~~ 17,8 cm (7 inches).

(8) *Type B*. This type is a floor-level exit with a rectangular opening of not less than 81,3 cm (32 inches) wide by 182,9 cm (72 inches) high, with corner radii not greater than 15 cm (6 inches).

(9) *Type C*. This type is a floor-level exit with a rectangular opening of not less than 76,2 cm (30 inches) wide by 121,9 cm (48 inches) high, with corner radii not greater than 25,4 cm (10 inches).

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

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

(d) *Asymmetry*. Exits of an exit pair need not be diametrically opposite each other nor of the same size; however, the number of passenger seats permitted under sub-paragraph (g) of this paragraph is based on the smaller of the two exits.

~~Passenger emergency exits. (See AMC 25.807 (d). Except as provided in subparagraphs (d)(3) to (7) of this paragraph, the minimum number and type of passenger emergency exits is as follows:-~~

~~(1) For passenger seating configurations of 1 to 299 seats—~~

Passenger seating configuration (crew member seats not included)	Emergency exits for each side of the fuselage			
	Type I	Type II	Type III	Type IV
1 to 9				4
10 to 19			4	
20 to 39		4	4	
40 to 79	4		4	

80 to 109	4		2	
110 to 139	2		4	
140 to 179	2		2	

Additional exits are required for ~~passenger~~ seating

configurations greater than 179 seats in accordance with the following table:

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

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

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

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

(ii) For a tail cone exit incorporating a floor level opening of not less than 51 cm (20 inches) wide by 1.52 m (60 inches) high, with corner radii not greater than one third the width of the exit, in the pressure shell and incorporating an approved assist means in accordance with CS 25.810(a), 25 additional passenger seats.

(iii) For a tail cone exit incorporating an opening in the pressure shell which is at least equivalent to a Type III emergency exit with respect to dimensions, step-up and step-down distance, and with the top of the opening not less than 1.42 m (56 inches) from the passenger compartment floor, 15 additional passenger seats.

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

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

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

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

(ii) Any other floor level door or exit that is accessible from the passenger compartment and is as large or larger than a Type II exit, but less than 1.17 m (46 inches) wide.

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

(7) For an aeroplane that is required to have more than one passenger emergency exit for each side of the fuselage, no passenger emergency exit must be more than 18.3 m (60 feet) from any adjacent passenger emergency exit on the same side of the same deck of the

fuselage, as measured parallel to the aeroplane's longitudinal axis between the nearest exit edges.

(e) *Uniformity.* Exits must be distributed as uniformly as practical, taking into account passenger seat distribution.

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

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

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

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

(f) *Location.*

(1) Each required passenger emergency exit must be accessible to the passengers and located where it will afford the most effective means of passenger evacuation.

(2) If only one floor-level exit per side is prescribed, and the aeroplane does not have a tail cone or ventral emergency exit, the floor-level exits must be in the rearward part of the passenger compartment unless another location affords a more effective means of passenger evacuation.

(3) If more than one floor-level exit per side is prescribed, and the aeroplane does not have a combination cargo and passenger configuration, at least one floor-level exit must be located in each side near each end of the cabin.

(4) For an aeroplane that is required to have more than one passenger emergency exits for each side of the fuselage, no passenger emergency exit shall be more than 18.3 metres (60 feet) from any adjacent passenger emergency exit on the same side of the same deck of the fuselage, as measured parallel to the aeroplane's longitudinal axis between the nearest edges.

~~Flight crew emergency exits. For aeroplanes in which the proximity of passenger emergency exits to the flight crew area does not offer a convenient and readily accessible means of evacuation of the flight crew, and for all aeroplanes having a passenger seating capacity greater than 20, flight crew exits must be located in the flight crew area. Such exits must be of sufficient size and so located as to permit rapid evacuation by the crew. One exit must be provided on each side of the aeroplane; or, alternatively, a top hatch must be provided. Each exit must encompass an unobstructed rectangular opening of at least 48 by 51 cm (19 by 20 inches) unless satisfactory exit utility can be demonstrated by a typical crewmember.~~

(g) ~~reserved~~ Type and number required. The maximum number of passenger seats permitted depends on the type and number of exits installed in each side of the fuselage. Except as further restricted in subparagraphs (g)(1) through (g)(9) of this paragraph, the maximum

number of passenger seats permitted for each exit of a specific type installed in each side of the fuselage is as follows:

Type A	110
Type B	75
Type C	55
Type I	45
Type II	40
Type III	35
Type IV	9

(1) For a passenger seating configuration of 1 to 9 seats, there must be at least one Type IV or larger over-wing exit in each side of the fuselage or, if over-wing exits are not provided, at least one exit in each side that meets the minimum dimensions of a Type III exit.

(2) For a passenger seating configuration of more than 9 seats, each exit must be a Type III or larger exit.

(3) For a passenger seating configuration of 10 to 19 seats, there must be at least one Type III or larger exit in each side of the fuselage.

(4) For a passenger seating configuration of 20 to 40 seats, there must be at least two exits, one of which must be a Type II or larger exit, in each side of the fuselage.

(5) For a passenger seating configuration of 41 to 110 seats, there must be at least two exits, one of which must be a Type I or larger exit, in each side of the fuselage.

(6) For a passenger seating configuration of more than 110 seats, the emergency exits in each side of the fuselage must include at least two Type I or larger exits.

(7) The combined maximum number of passenger seats permitted for all Type III exits is 70, and the combined maximum number of passenger seats permitted for two Type III exits in each side of the fuselage that are separated by fewer than three passenger seat rows is 65.

(8) If a Type A, Type B, or Type C exit is installed, there must be at least two Type C or larger exits in each side of the fuselage.

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

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

(ii) For a tail cone exit incorporating a floor-level opening of not less than 51 cm (20 inches) wide by 1.52 m (60 inches) high, with corner radii not greater than ~~one third the width of the exit~~ 18 cm (7 inches), in the pressure shell and incorporating an approved assisting means in accordance with CS 25.810(a), 25 additional passenger seats.

(iii) For a tail cone exit incorporating an opening in the pressure shell which is at least equivalent to a Type III emergency exit with respect to dimensions, step-up and step-down distance, and with the top of the opening not less than 1.42 m (56 inches) from the passenger compartment floor, 15 additional passenger seats.

(h) Other exits. The following exits must also meet the applicable emergency exit requirements of CS 25.809 through 25.812, and must be readily accessible:

- (1) Each emergency exit in the passenger compartment in excess of the minimum number of required emergency exits.
- (2) Any other floor-level door or exit that is accessible from the passenger compartment and is as large or larger than a Type II exit, but less than 1.17 m (46 inches) wide.
- (3) Any other ventral or tail cone passenger exit.

(i) ~~Reserved~~ *Ditching emergency exits for passengers.* Whether or not ditching certification is requested, ditching emergency exits must be provided in accordance with the following conditions, unless the emergency exits required by subparagraph (g) of this paragraph already meet them:

- (1) For aeroplanes that have a passenger seating configuration of nine seats or less, excluding pilot seats, one exit above the waterline in each side of the aeroplane, meeting at least the dimensions of a Type IV exit.
- (2) For aeroplanes that have a passenger seating configuration of 10 seats or more, excluding pilot seats, one exit above the waterline in a side of the aeroplane, meeting at least the dimensions of a Type III exit for each unit (or part of a unit) of 35 passenger seats, but no less than two such exits in the passenger cabin, with one on each side of the aeroplane. The passenger seat/exit ratio may be increased through the use of larger exits, or other means, provided it is shown that the evacuation capability during ditching has been improved accordingly.
- (3) If it is impractical to locate side exits above the waterline, the side exits must be replaced by an equal number of readily accessible overhead hatches of not less than the dimensions of a Type III exit, except that for aeroplanes with a passenger configuration of 35 seats or less, excluding pilot seats, the two required Type III side exits need to be replaced by only one overhead hatch.

(j) ~~Reserved~~ Flight crew emergency exits. For aeroplanes in which the proximity of passenger emergency exits to the flight crew area does not offer a convenient and readily accessible means of evacuation of the flight crew, and for all aeroplanes having a passenger seating capacity greater than 20, flight crew exits must be located in the flight crew area. Such exits must be of sufficient size and so located as to permit rapid evacuation by the crew. One exit must be provided on each side of the aeroplane; or, alternatively, a top hatch must be provided. Each exit must encompass an unobstructed rectangular opening of at least 48,3 cm by 50,8 cm (19 by 20 inches) unless satisfactory exit utility can be demonstrated by a typical crew member.

~~(k) Each passenger entry door in the side of the fuselage must qualify as a Type A, Type I, or Type II~~

CS-25.809 Emergency exit arrangement

(See AMC 25.809 (a))

(a) (1) Each emergency exit, including a flight crew emergency exit, must be a movable door or hatch in the external walls of the fuselage, allowing unobstructed opening to the outside.

(2) Each emergency exit, including a flight crew emergency exit, must have means to permit viewing of the conditions outside the exit when the exit is closed, in all ambient lighting conditions with the landing gears extended or in any condition of collapse. The viewing means may be on or adjacent to the exit provided no obstructions exist between the exit and the viewing means.

(3) Except as provided in subparagraph (4), for passenger emergency exits, a means must also be provided to permit viewing of the likely areas of evacuee ground contact when the exit is closed with the landing gears extended or in any condition of collapse. Furthermore, the likely areas of evacuee ground contact must be viewable with the exit closed during all ambient lighting conditions when all landing gears are extended.

(4) Passenger exits over the wing need not meet the requirements of subparagraph (3) of this paragraph provided the likely areas of evacuee ground contact are viewable from the escape route required by CS 25.810(c) under all ambient lighting conditions and with the landing gear extended or in any condition of collapse.

(b) ...

(h) Reserved

(i) Each emergency exit must have a means to retain the exit in the open position, once the exit is opened in an emergency. The means must not require separate action to engage when the exit is opened, and must require positive action to disengage.

CS-25.810 Emergency egress assisting means and escape routes

(See AMC 25.810(c)(2))

(a) Each non-over-wing Type A, Type B or Type C exit, and any other non-over-wing landplane emergency exit more than 1.8 m (6 feet) from the ground with the aeroplane on the ground and the landing gear extended, must have an approved means to assist the occupants in descending to the ground.

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

- (i) It must be automatically deployed and deployment must begin during the interval between the time the exit opening means is actuated from inside the aeroplane and the time the exit is fully opened. However, each passenger emergency exit which is also a passenger entrance door or a service door must be provided with means to prevent deployment of the assisting means when it is opened from either the inside or the outside under non-emergency conditions for normal use.
- (ii) Except for assisting means installed at Type C exits, it must be automatically erected within 40 6 seconds after deployment ishas begun. Assisting means installed at Type C exits must be automatically erected within 10 seconds from the time the opening means of the exit is actuated.
- (iii) It must be of such length after full deployment that the lower end is self-supporting on the ground and provides safe evacuation of occupants to the ground after collapse of one or more legs of the landing gear
- (iv) It must have the capability, in 46 km/hr (25-knot) winds directed from the most critical angle, to deploy and, with the assistance of only one person, to remain usable after full deployment to evacuate occupants safely to the ground.
- (v) For each system installation (mock-up or aeroplane installed), five consecutive deployment and inflation tests must be conducted (per exit) without failure, and at least three tests of each such five-test series must be conducted using a single representative sample of the device. The sample devices must be deployed and inflated by the system's primary means after being subjected to the inertia forces specified in CS 25.561(b). If any part of the system fails or does not function properly during the required tests, the cause of the failure or malfunction must be corrected by positive means and

after that, the full series of five consecutive deployment and inflation tests must be conducted without failure.

- (2) The assisting means for flight crew emergency exits may be a rope or any other means demonstrated to be suitable for the purpose. If the assisting means is a rope, or an unapproved device equivalent to a rope, it must be:
 - (i) Attached to the fuselage structure at or above the top of the emergency exit opening, or, for a device at a pilot's emergency exit window, at another approved location if the stowed device, or its attachment, would reduce the pilot's view in flight;
 - (ii) Able (with its attachment) to withstand a 1779 N (400-lbf) static load.
- (b) Assisting means from the cabin to the wing are required for each Type A or Type B exit located above the wing and having a step-down unless the exit without an assisting means can be shown to have a rate of passenger egress at least equal to that of the same type of non-over-wing exit. If an assisting means is required, it must be automatically deployed and automatically erected concurrent with the opening of the exit ~~and self-supporting within 10 seconds.~~ In the case of assisting means installed at Type C exits, it must be self-supporting within 10 seconds from the time the opening means of the exits is actuated. For all other exit types, it must be self-supporting 6 seconds after deployment has begun.
- (c) An escape route must be established from each over-wing emergency exit, and (except for flap surfaces suitable as slides) covered with a slip resistant surface. Except where a means for channelling the flow of evacuees is provided:
 - (1) the escape route from each Type A or Type B emergency exit, or any common escape route from two Type III emergency exits, must be at least 1.07 m (42 inches) wide ~~at type A passenger emergency exits; that from any other passenger emergency exit must be at least 61 cm (24 inches) wide at all other passenger emergency exits; and~~
 - (2) the escape route surface must have a reflectance of at least 80 %, and must be defined by markings with a surface-to-marking contrast ratio of at least 5:1 ~~(see AMC 25.810 (e) (2)).~~
- (d) Assisting means must be provided to enable evacuees to reach the ground for all Type C exits located over the wing and, if the place on the aeroplane structure at which the escape route required in subparagraph (c) of this paragraph terminates is more than 1.8 m (6 feet) from the ground with the aeroplane on the ground and the landing gear extended ~~means to reach the ground must be provided to assist evacuees who have used the escape route, for all other exit types.~~
 - (1) If the escape route is over the flap, the height of the terminal edge must be measured with the flap in the take-off or landing position, whichever is higher from the ground.
 - (2) The assisting means must be usable and self-supporting with one or more landing gear legs collapsed and under a 46 km/hr (25-knot) wind directed from the most critical angle.
 - (3) The assisting means provided for each escape route leading from a Type A or B emergency exit must be capable of carrying simultaneously two parallel lines of evacuees; ~~and, the assisting means leading from any other exit type~~ For other than Type A exits, the assist means must be capable of carrying as many parallel lines of evacuees as there are required escape routes.
 - (4) The assisting means provided for each escape route leading from a Type C exit must be automatically erected within 10 seconds from the time the opening means of the exit is actuated, and that provided for the escape route leading from any other exit type must be automatically erected within 10 seconds after actuation of the erection system.

- (e) If an integral stair is installed in a passenger entry door that is qualified as a passenger emergency exit, the stair must be designed so that, under the following conditions, the effectiveness of passenger emergency egress will not be impaired:
- (1) the door, integral stair, and operating mechanism have been subjected to the inertia forces specified in CS 25.561(b)(3), acting separately relative to the surrounding structure;
 - (2) the aeroplane is in the normal ground attitude and in each of the attitudes corresponding to collapse of one or more legs of the landing gear.

CS-25.812

[...]

(f) Except for subsystems provided in accordance with subparagraph (h) of this paragraph that serve no more than one assisting means, are independent [...]

(g) [...]

(1) [...]

(ii) Not less than 0.5 lux (0.05 foot-candle) (measured normal to the direction of the incident light) for a minimum width of 1.07 m (42 inches) for a Type A over-wing exit and 61 cm (2 feet) for all other over-wing emergency exits along the 30 % of the slip-resistant portion of the escape route required in CS 25.810(c) that is farthest from the exit for the minimum required width of the escape route; and [...]

(2) At each non-over-wing emergency exit not required by CS 25.810(a) to have descent assisting means the illumination must be not less than 0.3 lux (0.03 foot candle) (measured normal to the direction of the incident light) on the ground surface with the landing gear extended where an evacuee is likely to make his first contact with the ground outside the cabin.

(h) The means required in CS 25.810 (a) (1) and (d) to assist the occupants in descending to the ground must be illuminated so that the erected assisting means is visible from the aeroplane. In addition:

(1) If the assisting means is illuminated by exterior emergency lighting, it must provide illumination of not less than 0.3 lux (0.03 foot candle) (measured normal to the direction of the incident light) at the ground end of the erected assisting means where an evacuee using the established escape route would normally make first contact with the ground, with the aeroplane in each of the attitudes corresponding to the collapse of one or more legs of the landing gear.

(2) If the emergency lighting illuminating the assisting means serves no other assisting means, is independent of the aeroplane's main emergency lighting system, and is automatically activated when the assisting means is erected, the lighting provisions:

(i) may not be adversely affected by stowage; and

(ii) must provide illumination of not less than 0.3 lux (0.03 foot candle) (measured normal to the direction of the incident light) at the ground end of the erected assisting means where an evacuee would normally make first contact with the ground, with the aeroplane in each of the attitudes corresponding to the collapse of one or more legs of the landing gear.

CS-25.813 Emergency exit access

(See AMC to 25.807 and 25.813)

~~Each required emergency exit must be accessible to the passengers and located where it will afford an effective means of evacuation. Emergency exit distribution must be as uniform as practical, taking passenger distribution into account; however, the size and location of exits on~~

~~both sides of the cabin need not be symmetrical. If only one floor level exit per side is prescribed, and the aeroplane does not have a tail cone or ventral emergency exit, the floor level exit must be in the rearward part of the passenger compartment, unless another location affords a more effective means of passenger evacuation. Where more than one floor level exit per side is prescribed, at least one floor level exit per side must be located near each end of the cabin, except that this provision does not apply to combination cargo/passenger configuration.~~

(a) There must be a passageway leading from each the nearest main aisle to each Type A, Type B, Type C, Type I, or Type II emergency exit and between individual passenger areas. Each passageway leading to a Type A or type B exit must be unobstructed and at least 91 cm (36 inches) wide. ~~Other Passageways and cross-aisles between individual passenger areas and those leading to Type I, Type II, or Type C emergency exits must be unobstructed and at least 51 cm (20 inches) wide. Unless there are two or more main aisles, each Type A or B exit must be located so that there is passenger flow along the main aisle to that exit from both the forward and aft directions. If two or more main aisles are provided, there must be a~~ unobstructed cross-aisles at least 51 cm (20 inches) wide ~~leading directly to each passageway between main aisles. the exit and the nearest main aisle. There must be:~~

- (1) A cross-aisle which leads directly to each passageway between the nearest main aisle and a Type A or B exit; and
- (2) A cross-aisle which leads to the immediate vicinity of each passageway between the nearest main aisle and a Type C, Type I, Type II, or Type III exit; except that when two Type III exits are located within three passenger rows of each other, a single cross-aisle may be used if it leads to the vicinity between the passageways from the nearest main aisle to each exit.

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

- (1) Each assist space must be a rectangle on the floor, of sufficient size to enable a crew member, standing erect, to effectively assist evacuees. The assist space must not reduce the unobstructed width of the passageway below that required for the exit.
- (2) For each Type A or Type B exit, assist space must be provided at each side of the exit regardless of whether an assisting means is required by ~~the exit is covered by~~ CS 25.810(a).
- (3) ~~For any other type exit that is covered by CS 25.810(a), space must at least be provided at one side of the passageway.~~ For each Type C, I or II exit installed in an aeroplane with seating for more than 80 passengers, an assist space must be provided at one side of the passageway regardless of whether an assisting means is required by CS 25.810(a).
- (4) For each Type C, I or II exit, an assist space must be provided at one side of the passageway if an assisting means is required by CS 25.810(a).
- (5) For any tail cone exit that qualifies for 25 additional passenger seats under the provisions of CS 25.807 (g) (9) (ii), an assist space must be provided, if an assisting means is required by CS 25.810(a).
- (6) There must be a handle, or handles, at each assist space, located to enable the crew member to steady himself or herself:
 - (i) While manually activating the assisting means (where applicable) and,
 - (ii) While assisting passengers during an evacuation.

(c) There must be access from each aisle to each Type III or Type IV exit, and:

- (1) For aeroplanes that have a passenger seating configuration, excluding pilot's seats, of 20 or more, the projected opening of the exit provided may not be obstructed and there must be no interference in opening the exit by seats, berths, or other protrusions

(including seatbacks in any position) for a distance from that exit not less than the width of the narrowest passenger seat installed on the aeroplane;

(2) For aeroplanes that have a passenger seating configuration, excluding pilot's seats, of 19 or less, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the exit.

(d) If it is necessary to pass through a passageway between passenger compartments to reach any required emergency exit from any seat in the passenger cabin, the passageway must be unobstructed. However, curtains may be used if they allow free entry through the passageway.

(e) No door may be installed in any partition between any passenger compartments seat that is occupiable for take-off and landing and any passenger emergency exit, such that the door crosses any egress path (including aisles, cross-aisles and passageways).

(f) If it is necessary to pass through a doorway separating any crew member seat (except those seats on the flight deck), occupiable for take-off and landing, the passenger cabin from other areas to reach any required emergency exit from any passenger seat, the door must have a means to latch it in the open position. The latching means must be able to withstand the loads imposed upon it when the door is subjected to the ultimate inertia forces, relative to the surrounding structure, listed in CS 25.561 (b).

CS-25.853(f)

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

CS-25.855 Cargo or baggage compartments (See AMC to CS 25.855 and 25.857)

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

SUBPART F EQUIPMENT

CS-25.1447 (c) (4)

(4) Portable oxygen equipment must be immediately available for each cabin crew member. The portable oxygen equipment must have the oxygen dispensing unit connected to the portable oxygen supply.

(See AMC 25.1447 (c)(4).)

II Draft Decision AMC

Book 2

AMC – SUBPART D

AMC to 25.807 and 25.813

Emergency Exits

The term 'unobstructed' should be interpreted as referring to the space between the adjacent wall(s) and/or seat(s), the seatback(s) being in the most adverse position, in vertical projection from floor-level to at least the prescribed minimum height of the exit.

Relevant part of the FAA Advisory Circular 25-17A Transport Airplane Cabin Interiors Crashworthiness Handbook, dated 15/7/94 05/18/09 is accepted by the Agency as providing acceptable means of compliance with CS 25.807.

Note: 'relevant parts' means 'the part of the AC 25-17A that addresses the applicable FAR/CS-25 paragraph'.

FAA Advisory Circular 25.807-1 'Uniform Distribution of Exits', dated 8/13/90 is accepted by the Agency as providing acceptable means of compliance with CS 25.807 (e).

[...]

AMC 25.809

Emergency exit arrangement

The requirement to provide a view of the outside in all ambient lighting conditions suggests the use of externally mounted lighting (although other means may be acceptable). In the landing gear collapsed cases, the rolling and pitching effects on the fuselage may redirect a fixed lamp's beam away from the area illuminated in the all landing gears extended condition. Furthermore, in the case of inflatable escape slides the toe end ground contact point will probably move in the opposite direction to that of the lamp beam.

In recognition of these effects, and in order to maintain reasonable demands on the complexity and power of external lighting equipment, the rule does not require the entire viewable area to be visible in all ambient lighting conditions. The only specific illumination requirement is for the likely areas of evacuee ground contact, with all landing gears extended, for passenger exits.

However, it is recommended that as large a field of view as is practicable should be provided, taking into account aspects such as fuselage curvature and door/window/hatch location, in order to provide the best chance to identify external evacuation hazards before exits are opened.

AMC 25.813

Emergency Exit Access

The term 'unobstructed' should be interpreted as referring to the space between the adjacent wall(s) and/or seat(s), the seatback(s) being in the most adverse position, in vertical projection from floor-level to at least the prescribed minimum height of the exit.

For Assist Spaces, relevant part of the FAA Advisory Circular 25-17A Transport Airplane Cabin Interiors Crashworthiness Handbook, dated 05/18/09 is accepted by the Agency as providing acceptable means of compliance with CS 25.813 (b).

Note: 'relevant parts' means 'the part of the AC 25-17A that addresses the applicable FAR/CS-25 paragraph'.

C. References

- Reference 1: FAA Docket No 26140; Amendment No 25-88; FAA final rule RIN 2120-AC43 'Type and number of passenger emergency Exits required in Transport Category Airplanes'.
- Reference 2: FAA Docket No 26530; Amendment Nos 25-76, 121-228, 135-43; FAA final rule RIN 2120-AC46 'Improved access to type III exits'.
- Reference 3: FAA Docket No 29147; Amendment No 25-94 Transport Category Airplanes, Technical Amendments and Other Miscellaneous Corrections.
- Reference 4: FAA Docket No FAA-2004-19412; Amendments Nos 25-116, 121-306 RIN 2120-AF77 FAA final rule 'Miscellaneous Cabin Safety Changes'.
- Reference 5: Study on CS-25 Cabin Safety Requirements (EASA 2008.C18) reference 4208/R/000454/KK issue 5 dated October 2009, RGW Cherry and associated, Aeronautical and safety engineers.
- Reference 6: FAA Docket No 26140; Notice No 90-4; Notice of Proposed Rulemaking RIN 2120-AC43 'Type and number of passenger emergency Exits required in Transport Category Airplanes'.

All FAA references can be found on the FAA website:
[http://www.airweb.faa.gov/Regulatory and Guidance Library/rgWebcomponents.nsf/FrameSet?OpenPage](http://www.airweb.faa.gov/Regulatory%20and%20Guidance%20Library/rgWebcomponents.nsf/FrameSet?OpenPage)

D. Appendix 1: Detailed description of the proposed CS-25 changes

1. CS 25.785 is updated to refer to new Type B emergency exit in addition to the existing reference to Type A emergency exit. This is in line with FAR 25 Amendment 88.
2. CS 25.807(a) is updated to express the maximum corner radii in absolute dimensions in lieu of proportions based on the actual width. This change aims at removing possible misinterpretation: the corner radii are to be based on the minimum required width rather than the actual width of the exit.

In addition, Type B and C emergency exit references are added together with their respective definition.

Those changes are in line with FAR amendment 25-88.

3. CS 25.807(d) regarding type and number of exits versus the passenger seating configuration is updated and transferred into CS 25.807(g) and is replaced with a new paragraph dealing with asymmetry of exit pairs. This is in line with FAR Amendment 25-88.
4. CS 25.807(e) on ditching is transferred into CS 25.807(i) and is replaced by new paragraph concerning uniformity of exits. This is in line with FAR amendment 25-88.
5. CS 25.807(f) is transferred into CS 25.807(j). The new CS 25.807(f) comes from CS 25.813: accessibility and distribution of the emergency exits. CS 25.807(f)(4) is transferred from CS 25.807(d)(7). These changes are in line with FAR Amendments 25-88 and 25-94.
6. CS 25.807(g) is updated with the new specifications for the type and number of exits in respect with the maximum number of passengers and with requirements coming from the existing CS 25.807(d)(1), (3), (4). This is in line with FAR Amendment 25-88.

It is to be noted that the current CS 25.807(d)(2) about the limitation on door types for passenger seating configurations greater than 299 passengers is proposed to be cancelled. Instead, and for harmonisation purposes with FAA, new paragraph CS 25.807(g)(7) is proposed: this paragraph does not give an overall passenger limitation in case of Type III door installed but a maximum credit in the number of passengers whatever the number of Type III is: the credit is of 70 passengers for 2 or more Type III exits, 65 if the exits are adjacent to each others. The result of this new rule is that contrary to the JAA proposal, Type III exits can be installed for aeroplanes with passenger capacity greater than 299 but the credit for Type III exit is limited, which consequently limits the number of Type III.

As described by the FAA, main justifications are the following (see reference 1):

- The requirement asking for each exit to be a Type A or Type 1 exit for passenger seating capacities over 299 was introduced at JAR 25 change 3 in 1976 following FAR 25 amendment 25-15 when the first wide body aeroplanes were proposed to be certified. Even though there was no operational experience at that time, it was considered that they should not have a large number of small exits. This requirement was to discourage interior layouts with numerous Type III and fewer large exits. Proposed new paragraph CS 25.807(g)(7) still discourages this.
- Later on, some wide body aeroplanes were certified with Type III exits (such as B767, A310 or A340-600) and experience gathered (evacuation demonstrations or actual evacuations under emergency conditions) have shown that a limited number of Type III exits can be effective for twin aisles aeroplanes. Therefore, new paragraph 25.807(d)(5) was adopted with FAR 25-72 followed by JAR 25 change 14 in order to permit any alternate

emergency exit configuration (including Type III exits for aeroplane configurations over 299 passengers) provided the overall evacuation capability is shown to be equal or greater than that specified. As a result, this paragraph which finally opened the door to Type III is no longer justified.

On this subject, comments from stakeholders are particularly requested.

7. CS 25.807(i) contains the requirements from former CS 25.807(e)(1)(2)(3). This is in line with FAR amendment 25-88.
8. CS 25.807(j) contains the requirements from former CS 25.807(f). This is in line with FAR amendments 25-88 and 25-94.
9. CS 25.807(k) is deleted. The current requirement gives a minimum size to the entry door. This is not safety related but linked to passengers and crew comfort and for servicing purpose. This paragraph currently constitutes a regulatory difference between CS-25 and FAR 25 and this difference is proposed to be cancelled.
10. CS 25.809(a) is adapted from FAR amendment 25-116.
 - 25.809(a)(1) is identical to former CS 25.809(a) and is applicable to all emergency exits.
 - 25.809(a)(2) is also applicable to all emergency exits. This paragraph gives the same provisions as in FAR 25.809(a) for the general viewing of the conditions outside the exit when the exit is closed (this paragraph does not cover the viewing of the evacuee ground contact).
 - 25.809(a)(3) contains the provisions on the viewing of the areas of evacuee ground contact. The requirements are less stringent than FAR 25.809(a) because they exclude Flight crew compartment exit. Furthermore, the provisions do not apply if the landing gears are collapsed.
 - 25.809(a)(4) contains specific alleviated provisions for exits over the wing.
11. CS 25.809(i) is added to require for means to retain the exit in the open position once the exit is open. This is in line with FAR amendment 25-116.

Note that CS 25.809 does not contain the provision found under FAR 25.809(h) (prevention of opening of ventral or tail cone exits during flight). The Agency does not plan to include such a paragraph. But in order to have better readability between FAA and EASA rules, the Agency proposes to reserve paragraph CS 25.809(h).

12. CS 25.810 is updated to add reference to Type B and C for all requirements.

For non-over-wing exits, the erection time is changed from 10 seconds to 6 seconds for Type A exits, which is the actual state-of-the-art. And same evacuation time is required for Type B exits. The time is set at 10 seconds for Type C exits, from the time the exit is starting to be opened to the time the assisting mean is fully erected.

For over-wing exits:

- the erection time is set at 10 seconds from the time the opening means of the exit is actuated for Type C exits;
- for any other exit types, the erection time is unchanged: 10 seconds after actuation of the erection system.

Note: The additional requirement given in CS 25.811 amendment 9 about the cover removal instructions is kept. This sentence was removed erroneously from FAR in amendment 25-88.

13. CS 25.812 is updated to improve and clarify the wording used and get aligned with the one used in FAR 25-88.

In addition, and to get aligned with FAR Amendment 25-116, the over-wing exterior emergency lighting specifications are updated.

Note: The reference to CS-25.810(a)(1) and (d) is kept. FAA erroneously removed the reference to (1). This was corrected in FAR Amendment 25-128.

14. First part of CS 25.813 (general part) is deleted and transferred into CS 25.807(f). As a result, 25.807 will only focus on exits whereas 25.813 will only focus on access.
15. CS 25.813(a) is updated in accordance with FAR amendments 25-76 and 25-88. The proposed paragraph contains some rewordings, new reference to Type B and C exits as well as new specifications concerning:
 - passageways between individual passenger areas and passageways leading to Type I and II emergency exits;
 - passenger flow along the main aisle leading to Type A for aeroplanes with only one main aisle;
 - cross-aisles leading directly to each passageway between the nearest main aisle and Type A or B exits;
 - cross-aisles leading to the immediate vicinity of each passageway between nearest main aisle and Type C, I, II or III exits;
 - cross-aisles when two Type III exits are located within three rows.

Note: compared to FAR 25.813(a)(2), CS 25.813(a)(2) requires also cross-aisles for type C exits. This difference is not to be considered as a 'Regulatory difference' as FAA's intention is to add this missed exit type in FAR 25.813 (a) (2).

16. CS 25.813(b) is updated in accordance with FAR amendments 25-88 and 25-116. The proposed paragraph:
 - modifies the general size and specification of assist space requirements;
 - adds a requirement concerning assist space (at one side) for Type C, I and II exits and for configurations with more than 80 passengers;
 - adds specifications for tail cone exits;
 - adds requirements on handles at assist space;
 - updates all references with new Type B and C exits.
17. CS 25.813 (e) and (f) are proposed to clarify the regulation about internal doors between emergency exits and crew member seat or passenger seat, occupiable during take-off and landing. Those changes are in line with FAR amendment 25-116.
18. CS 25.853 and CS 25.855 are updated (reworded) in order to remove any confusion. CS 25.1447 is also updated in order to contain the requirement already part of AMC. This is to be aligned with FAR amendment 25-116.
19. Following paragraphs are not updated following FAA Amendment:
 - CS 25.807(h) as already in line with FAR 25.807(h) Amendment 114.
 - CS 25.811(e): FAR 25.811(e)(2) refers to Type A, B, C or I exit doors, excluding thereof other emergency exits, whereas it was not their intention. CS 25.811(e)(2) will still refer to passenger emergency exit in order to cover all exit types.
 - CS 25.813(c) is not to be aligned with any of FAR 25 Amendments as rulemaking task 25.040 has been processed recently and will result in amended CS 25.813(c) at latest standard (see CS-25 at Amendment 9). It is the intention of FAA to work on the harmonisation with this EASA paragraph.

20. For consistency reasons, 'assisting means' is proposed to be used when referring to the means to assist occupants in descending from the aeroplane to the ground.
21. In order to facilitate the comprehension, AMC to 25.807 and 25.813 are split and duplicated into two AMCs: AMC to 25.807 and AMC to 25.813. There is no change in content. Reference to AC is added in AMC 25.813.

E. Appendix 2: Cross-reference table

Existing CS-25	New CS-25 Content of existing CS-25 can now be found in:	Description of the change
25.785(h)(1)	CS 25.785(h)(1)	Updated
25.807(a)(1)	25.807(a)(1)	Updated
25.807(a)(2)	25.807(a)(2)	Updated
25.807(a)(3)	25.807(a)(3)	Updated
25.807(a)(4)	25.807(a)(4)	No change
25.807(a)(5)	25.807(a)(5)	No change
25.807(a)(6)	25.807(a)(6)	No change
25.807(a)(7)	25.807(a)(7)	Updated
	25.807(a)(8)	New
	25.807(a)(9)	New
25.807(b)	25.807(b)	No change
25.807(c)	25.807(c)	No change
25.807(d)	25.807(g)	The existing content of 25.807(d) can be found in 25.807(g) with modified configuration requirements. 25.807(d) now contains requirement on asymmetry of exit pairs.
25.807(e)	25.807(i)	The existing content about ditching can be found in 25.807(i) with a slight rephrasing, without modification of the content. 25.807(e) now contains requirement on uniformity of exits coming from 25.813.
25.807(f)(1), (2), (3), (4)	25.807(j)	The existing content of 25.807(f) about flight crew emergency exit can be now found in CS 25.807(j) without any change. The new proposed 25.807(f)(1), (2), (3) now contains former requirements contained in 25.813 (accessibility and distribution of the emergency exit). The new proposed CS 25.807(f)(4) contains requirements coming from CS 25.807(d)(7) with no change.
	25.807(g)	New paragraph (was formerly reserved). This new paragraph contains new requirements on type and number of exits.
25.807(h)	25.807(h)	No change.
	25.807(i)	New paragraph (was formerly reserved). This new paragraph contains requirements transferred from existing 25.807(e)(1), (2), (3) with no change in content.
	25.807(j)	New paragraph (was formerly reserved). This new paragraph contains requirements transferred from existing 25.807(f) with no change in content.
25.807(k)		Deleted (previously regulatory difference between CS-25 and FAR 25 proposed to be deleted)
25.809(a)	25.809(a)	Updated. Adapted from FAR 25.809(a)
25.809(b)	25.809(b)	No change
25.809(c)	25.809(c)	No change

Existing CS-25	New CS-25 Content of existing CS-25 can now be found in:	Description of the change
25.809(d)	25.809(d)	No change
25.809(e)	25.809(e)	No change
25.809(f)	25.809(f)	No change
25.809(g)	25.809(g)	No change
	25.809(h)	New but kept 'reserved'.
25.810	25.810	Updated
25.811	25.811	Updated
25.812	25.812	Updated
25.813	25.807(f)	General part deleted from CS 25.813 and transferred in CS 25.807(f).
25.813(a)	25.813(a)	Updated
25.813(b)	25.813(b)	Updated
25.813(c)	25.813(c)	No change
25.813(d)	25.813(d)	No change
25.813(e)	25.813(e)	Updated
25.813(f)	25.813(f)	Updated
25.853(f)	25.853(f)	Updated
25.855	25.855	Updated
25.1447(c)(4)	25.1447(c)(4)	Updated
AMC to CS 25.807 and 25.813	AMC 25.807 and AMC 25.813	AMC split and duplicated in two AMC. AMC 25.813 up-dated.
	AMC 25.809	New

F. Appendix 3: Differences between CS-25 and FAR Part 25

This table summarises the differences between both standards in relation with emergency exits and escape routes.

Only the paragraphs targeted by this NPA are mentioned (paragraphs impacted by FAR 25-88, 25-94, 25-116 and part of 25-76).

The differences are explained with more details in the NPA in the paragraph mentioned in the fourth column.

CS-25 paragraph	FAA Part 25 paragraph	Difference	Details can be found in NPA
25.807; 25.810; 25.812; 25.813	25.807; 25.810; 25.812; 25.813	Assist <u>ing</u> means is used in CS. Assist means is used in FAR.	Appendix 1 Paragraph 20
25.807(d), (e), (f)	25.807(d), (e), (f) and 25.813 introductory part	The introductory part of CS 25.813 is deleted as it is a duplication of already existing provisions of CS 25.807(d), (e), (f). Proposed CS 25.807 now only contains provisions on location of exits and CS 25.813 on access to exits.	Appendix 1 Paragraph 14
25.811(e)(2)	25.811(e)(2)	CS 25.811(e)(2) includes the cover removal instructions. CS 25.811(e)(2) covers all passenger emergency exits, and not only types A, B, C and I.	Appendix 1 Paragraph 12 Appendix 1 Paragraph 19
25.809(a)(1), (2), (3), (4)	25.809	Viewing means. Differences concern the flight crew compartment exit as well as the lighting conditions and landing gear conditions.	Paragraph A V 19
CS 25.813(a)(2)	FAR 25.813(a)(2)	CS 25.813(a)(2) covers type C exits.	Appendix 1 Paragraph 15