European Aviation Safety Agency
Rulemaking Directorate

EXPLANATORY NOTE

CS-25 Amendment 3

General

Executive Director Decision 2007/010/R amends Executive Director Decision No. 2003/02/RM of 17 October 2003 (CS-25 Initial Issue) as last amended by Executive Director Decision 2006/05/R of 25 September 2006 (CS-25 Amendment 2).

This Amendment 3 of CS-25: Large Aeroplanes, incorporates the output from the following EASA rulemaking tasks:

Rulemaking Task No.	TITLE	NPA No.
25.002	Fuel Tank Structural Integrity / Fuel Tank Access Covers	21/2005
25.005	Flight Crew Error/ Flight Crew Performance Considerations in the Flight Deck Certification Process	15/2004[1]
25.008(a)	Flight in Icing Conditions	16/2004
25.059	Symbolic Exit Signs And Revised Standards for Cargo Compartments (D To C)	04/2006

Each Notice of Proposed Amendment (NPA) has been subject to consultation in accordance with Article 43 of the Basic Regulation[2] and Article 15 of the rulemaking procedure established by the Management Board[3]. For detailed information on the proposed changes and their justification please consult the above NPAs which are available on the Agency's website.

The Agency has addressed and responded to the comments received on each of the NPAs. The responses are contained in a comment-response document (CRD) which has been produced for each NPA and which are also available on the Agency's website. On the following pages of this Explanatory Note you can find additional information, not available elsewhere, to reflect possible post-CRD developments. This includes the comments, if any, on the published CRDs and the corresponding reactions by the Agency.

[1] NPA 15/2004 was issued under the title “Human Factors”.

[2] Regulation (EC) No 1592/2002 of the European Parliament and of the Council of 15 July 2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, *OJ L 240, 7.9.2002, p.1.* Regulation as last amended by Regulation (EC) No 334/2007 *(OJ L 88, 29.3.2007, p. 39)*.

[3] Decision MB/08/2007 of the Management Board of 13 June 2007 amending and replacing Decision MB/07/2003 concerning the Procedure to be applied by the Agency for the issuing of Opinions, Certification Specifications and Guidance Material (“Rulemaking Procedure”).

Apart from the changes that came out of the above NPAs, this Amendment 3 of CS-25 also incorporates several changes aiming to remove certain editorial errors and inconsistencies identified. Their description/justification can be found at the end of this Editorial Note.

A complete list of the paragraphs affected by Amendment 3 can be found in the Preamble section of CS-25.

The Agency publishes amendments to Certification Specifications as consolidated documents. Therefore, except for a note under the amended paragraph the detailed amendments in the text of the consolidated version are not visible. To allow readers to see all the detailed amendments a Change Information document has been created and is published on the Agency's website as part of the Amendment package.

Rulemaking Task No.: 25.002

Title: Fuel Tank Structural Integrity/Fuel Tank Access Covers

NPA No.: NPA 21/2005

CRD No.: CRD 21/2005

CS 25.721 (b)(1)

An internal comment was made after the NPA was published on website that the wording describing the aircraft landing gear configurations in wheels-up landing was not clear enough and could potential admit an ambiguous interpretation. This was agreed and consequently the wording was improved. For clarity, the two separate aircraft configuration conditions to be considered both for the impact and sliding landing conditions were separated into two separate sub-paragraphs ((i) and (ii)).

Rulemaking Task No.: 25.005

Title: Flight Crew Error/Flight Crew Performance Considerations in the Flight Deck Certification Process

NPA No.: NPA 15/2004

CRD No.: CRD 15/2004

REACTION TO CRD 15-2004 AND EASA RESPONSE

1. Comment No. 35

Honeywell International

It is unclear whether the original comment was properly interpreted. We believe that better examples need to be provided to aid the end-user of this document. We suggest using real-world program examples, perhaps those that spawned this Rule and AMC in the first place. A discussion of certification artifacts and an example of a compliance matrix would be helpful.

We did appreciate the in-text method of compliance hints in section 5, e.g., 5.4.3 "Analysis as a sole means of compliance is not sufficient…" 5.5.3, "If done by analysis, the completeness of the analysis may be established…" 5.6.3, "To establish the adequacy of controls and indications that facilitate error recovery, a statement of similarity or design description of the system and crew interface may be sufficient" and suggest this approach be used throughout Section 5 wherever possible to clarify necessity/sufficiency and appropriate usage of methods of compliance. Please review comment #35 again.

Justification**:**

Examples are the way that judgment, experience, and history are passed on to illustrate the intent in this Rule/AMC and express the Agency's expectations.

EASA RESPONSE: **Noted**

The AMC has been developed to include examples from recent certification experience. These are deliberately kept relatively simple, as the choice of an appropriate means of compliance or combination of several different means will be project specific and dependent on the level of novelty, complexity and integration of the design.

Guidance relating to the choice of Means of Compliance is provided in Section 5. This is based on existing certification experience and may be updated at a future date when further certification experience has been gained.

2. Comment No. 38

Honeywell International

Whilst the overall AMC 25.1302 is in the best format that we have seen to date, Section 6 is, in our opinion, the weakest section of the AMC, when it should be

the strongest; or alternatively at least as strong as the other sections. Applicants will need clear guidance on how to use the methods of compliance together – i.e., which are necessary, when do we have the right methods to reach sufficiency, for a spectrum of design problems. Practical examples called for in the original comment are not included in the new text. Also, see comment 35.

No text is provided for the new Section 6.3.5. This would be beneficial for end-user and consistent with modified text.

Justification:

The original comment is not fully addressed. Most applicants are reading this AMC for an important purpose, to discover how to comply with the rule, so the methods of compliance and their appropriate usage is critical.

EASA RESPONSE: **Partially Accepted**

The selection of the appropriate means of compliance or combination of several different means will be dependent on the level of scrutiny required as a result of the novelty, complexity and integration of the design. While Section 6.1 gives some general guidance on the benefits and limitations of previously accepted means of compliance, further guidance will only become available following detailed application of the new rule and means of compliance. This may be the subject of a future rulemaking task. The applicant may propose other means of compliance.

Section 6.3.5 “demonstration” was removed late in the NPAs development. This reflected the view that a demonstration and an evaluation are in fact the same means of compliance, the only difference being the participation or not of the Agency. As Agency participation can be decided very late in the certification process, the criterion was withdrawn as a means of compliance. Reference to demonstrations in Section 6.1 has been removed and the numbering changed accordingly.

3. Comment No. 50--52

Honeywell International

“Resulting Text “comments make reference to new Section 5.5.5. Section 5.5.5 could not be located in the document.

Justification:

Unclear where the “Resulting Text” is located for original comments 50-52.

EASA RESPONSE: **Accepted**

Typographical error. Reference should be to new Section 5.5.**3**.

4. Comment No. 66

Honeywell International

The descriptions for integration, complexity, and novelty are substantially improved. We suggest that the first (and perhaps second) sentence following the heading (Section 4.1), is a succinct definition that would read "Integration is…" or "Complexity is." The material as it exists, however, should also remain – again, it is a substantial improvement. The glossary should also provide definition of these important terms.

Justification:

A clarification of the meaning of important terminology is still required for the user of the document.

EASA RESPONSE: **Not Accepted**

Terms used are considered to be sufficiently understood or are elaborated on within the NPA in the context in which they are used.

EASA is aware of on-going research activities that will support compliance to the rule and facilitate implementation.

5. Comment No. 69

Honeywell International

The proposed Section 5.1 adds some detail, but there is still no definition for "resolution" and "precision". Consider adding definitions for "precision" and "resolution" in the Definitions section.

Justification:

A clarification of the meaning of the text is still required for the user of the document. Please review comment No. 69 again.

EASA RESPONSE: **Not Accepted**

These terms take the dictionary definitions. No quantitative values are given for such terms as it should be understood that compliance with CS 25.1302 will only be established if displays/controls have resolution/precision appropriate to accomplishing the associated tasks.

6. General

Airbus

After a thorough review of the Comment and Response Document, Airbus is still very much concerned about early introduction of this NPA upgrading CS 25 certification standards for Human Factors aspects concerning installed systems and equipment for use by flight crews, whereas there is still no clear visibility on the FAA intention. Whereas EASA answered that they are ensuring harmonisation with the FAA and that FAA have committed to "envelop" the final EASA text,

Airbus noticed that there are many comments provided by FAA showing that the AMC is not yet fully mature. For instance the section related to the methodical approach defining the scope and the section related to acceptable means of compliance were significantly commented by FAA. It appears that most of the FAA's comments have only been partially accepted and that the formal FAA process has even not started yet. As a result, in these conditions, Airbus still fears that the final AMC text will not be harmonised with the FAA final AC text.

It should be reminded that a disharmonised rule can lead to significant differences between the field of application and the required means of compliance resulting in additional costs. Therefore, the equity and fairness between European and US aircraft manufacturers, flight deck equipment suppliers and design organizations are still questioned knowing that experience shows that Human Factors demonstrations are usually heavy and costly.

Airbus would also like to highlight that the proposed new CS 25.1302 provides high-level requirements and therefore AMC 25.1302 is essential to allow the applicants and end-users to fully understand the requirement and to propose adequate compliance demonstrations with CS 25.1302. Therefore the proposed AMC must be clear and unambiguous. Airbus noticed that several comments reported in the CRD show that the proposed AMC is not fully clear for all end-users.

Airbus still considers that there is no urgency and the issuance of this NPA must be closely coordinated with the formal FAA process that seems to be on the verge of starting. The benefit will be the improvement of the quality of the final text and the insurance for harmonisation. Finally, this will also ensure equity and fairness between European and US applicants by ensuring that the same rule applies at the same time on both sides.

Airbus emphasises once again that this position is fully justified by the fact that in the meantime there still exists the JAA Interim Policy 25/14 that has already proven to require comprehensive additional demonstrations for aircraft manufacturers thus increasing the safety level. Even if the JAA Interim Policy 25/14 does not have any legal standing within EASA, Airbus would like to highlight that the formal need for Special Condition arises from IR 21A.16B and then the Special Condition proposed in the interim policy 25/14 can still be used as a basis by the EASA team and manufacturers.

Justification:

Need for harmonised rules and adoption dates, for fairness and equity reasons.

Need for AMC fine-tuning in co-operation with FAA.

Possibility to use JAA Interim Policy 25/14 as a special condition until concurrent issuance of EASA and FAA harmonised rule and AMC/AC.

EASA RESPONSE: **Noted**

The FAA has been an active member in both the EASA rulemaking group and review group that developed these proposals. Following publication of the CRD, the FAA undertook a further review of these proposals and has advised that they

have no further comment. It can therefore be assumed that they are in full agreement with the final draft text as written.

Publication by EASA will form the catalyst for FAA action and will enable a streamlined FAA adoption process to be initiated.

While every possible care has been taken to ensure harmonised requirements were developed, formal adoption within the FAA system demands further review, including economic and legal review, and public consultation. While we expect these reviews to proceed smoothly, no guarantee can be given, and unforeseen changes remain a possibility.

Flight-crew related human factors is established as a key safety enhancement area. CS 25.1302 and associated AMC is an enhancement to the JAA interim policy and is expected to lead to further safety benefits.

Rulemaking Task No.: 25.008a

Title: Flight in icing conditions

NPA No.: NPA 16/2004

CRD No.: CRD 16/2004

CRD 16/2004 Supplement

REACTION TO CRD 16-2004 SUPPLEMENT AND EASA RESPONSE

A summary of issues raised by reactions received to the CRD 16-2004 Supplement are addressed with reference to the affected sub-paragraph below.

CS 25.21(g)

Following the publication of the CRD 16-2004 Supplement that contained the proposed resulting text, editorial changes were introduced in the FAA final rule. These differences were reviewed and have no influence on the intent of this sub-paragraph. EASA has therefore decided to change the text in this decision in order to harmonise with the FAA final rule.

CS 25.125(a)(2)

A reaction was received from Boeing highlighting that the intent of this requirement could be bypassed if V_{REF} near the Maximum Landing Weight for non-icing would be artificially increased by an applicant. It was suggested that the threshold of 5 knots should be made applicable to all weights up to the maximum landing weight in order to prevent this.

The intent of this requirement is however considered to be clear as written, and an artificially increase V_{REF} at the maximum landing weight to avoid establishing landing distances in icing conditions, would not be accepted. CS 25.125(a)(2) is therefore unchanged and consistent with the FAA final rule.

CS 25.125(b)(2)(ii)(B)

Following the publication of the CRD 16-2004 Supplement that contained the proposed resulting text, editorial changes were introduced in the FAA final rule. These differences were reviewed and have no influence on the intent of this sub-paragraph. EASA has therefore decided to change the text in this decision in order to harmonise with the FAA final rule.

CS 25.143(i)(2)

Following the publication of the CRD 16-2004 Supplement that contained the proposed resulting text, editorial changes were introduced in the FAA final rule. These differences were reviewed and have no influence on the intent of this sub-paragraph. EASA has therefore decided to change the text in this decision in order to harmonise with the FAA final rule.

CS 25.207(g)

For consistency reasons within CS 25, the wording “Flight Manual” has been changed to read “Aeroplane Flight Manual”.

CS 25.1419

Following the publication of the CRD 16-2004 Supplement that contained the proposed resulting text, editorial changes were introduced in the FAA final rule. These differences were reviewed and have no influence on the intent of this sub-paragraph. EASA has therefore decided to change the text in this decision in order to harmonise with the FAA final rule.

Appendix C, part II(d) and (e)

Following the publication of the CRD 16-2004 Supplement that contained the proposed resulting text, editorial changes were introduced in the FAA final rule. These differences were reviewed and have no influence on the intent of these sub-paragraphs. EASA has therefore decided to change the text in order to harmonise with the FAA final rule.

AMC 25.21(g) paragraph 6.1.3

Boeing reacted to the CRD 16-2004 Supplement that the ice accretion in AMC 25.21(g) paragraph 6.9.3(b) should be the “landing ice accretion” instead of the “holding ice accretion” since the ice accretion should be consistent with the aeroplane configuration.

Although the assumption to use the ice accretion consistent with the aeroplane configuration in principle is correct, the AMC paragraph 6 provides an acceptable flight test programme where flight testing is selected by the applicant and agreed by the Authority as being the primary means for showing compliance. Paragraph 6.1.3. stresses however that this test programme is based on the assumption that the applicant will choose to use the holding Ice accretion for the majority of the testing assuming that it is the most conservative ice accretion. It is for that reason that “holding ice accretion” is mentioned in paragraph 6.9.3(b). The text of paragraph 6.1.3. is therefore changed to make this presumption more obvious. The FAA intends to change the AC 25.21-1X consistent with this AMC.

Rulemaking Task No.: 25.059

Title: Symbolic Exit Signs And Revised Standards for Cargo Compartments (D To C)

NPA No.: NPA 04/2006

CRD No.: CRD 04/2006

REACTION TO CRD 04-2006 AND EASA RESPONSE

In response to CRD 04/2006, EASA received the following response from the FAA:

The FAA and EASA have a different standard for 'equivalency', based on the inherent language differences between the United States and Europe. As such, EASA is able to accept a level of symbol recognition that the FAA does not believe would demonstrate equivalency for the English speaking population of the United States. Thus, there will likely be a difference between the two certification standards until such time as symbol recognition is improved sufficiently to be considered equivalent. With respect to a combination symbol/text sign, we note that the EASA NPA could permit this, but that EASA does not want to promote such signs since the goal of the NPA was to have a single symbol, and avoid 'dual language' signs. As long as such signs (i.e., "exit" plus symbol) are permissible, there should be an avenue for approval for both the FAA and EASA.

EASA RESPONSE:

EASA notes the FAA comments and confirms that combined symbol/text signs are not ruled out by this amendment.

EDITORIAL CORRECTIONS IN AMENDMENT 3

1. CS 25.405(b)

The formula for miscellaneous limit pilot forces

$$\left(\frac{1+R}{3}\right) \text{ x } 222 \text{ N}$$

is corrected to read

$$\left(\frac{25.4+R}{76.2}\right) \text{ x } 222 \text{ N}$$

where R = radius in mm.

Justification:

The original requirement, copied to JAR-25 from FAR Part 25, was originally derived from MIL A8865, which states the limit pilot force as

$$\left(\frac{1+R}{3}\right) \text{ x } 50 \text{ lbf}$$

where R is the radius in inches.

When making conversions from imperial to SI units, this formula was incorrectly converted, since the conversion did not consider the need to convert radius from inches to mm.

2. CS 25.901(b)(1)(ii)

Cross-reference to AMC 25.901(b)(1)(ii)) is corrected to read AMC 20-1

Justification:

AMC 25.901(b)(1)(ii) does not exists. In the JAR-25 the cross-reference was to ACJ 20X-1 which was transposed to EASA AMC 20-1.

3. CS 25.905(b)

Cross-reference to CS-P 80 is corrected to read CS P 50.

Justification:

CS-P 80 does not exist. The operational limits for certification of the propeller are in CS- P 50.

4. CS 25.905(c)

Cross-reference to CS-P 200 is corrected to read CS P 420.

Justification:

CS-P 200 does not exist. The specifications for certification of components of the propeller control system are contained in CS-P 420.

5. CS 25.907

Cross-reference in the heading to CS-P 190 is corrected to read CS P 530 and CS-P 550.

Justification:

CS-P 190 does not exists (original JAR-P 190 was revoked by adoption of new JAR-P by the NPA P-3). The certification specifications relative to propeller vibrations are contained in CS P 530 and CS-P 550.

6. AMC 25.1360(a)

The title is corrected from “Protection Against Injury” to read “Precaution Against Injury”.

Justification:

To remove inconsistency with the wording used in the title of CS 25.1360.

7. AMC 25.1360(b)

The title is corrected from “Protection Against Injury” to read “Precaution Against Injury”.

Justification:

To remove inconsistency with the wording used in the title of CS 25.1360.