



Explanatory Note to Decision 2013/010/R

CS-25 AMENDMENT 13

RELATED NPA/CRD 2011-09 AND NPA/CRD 2011-17

EXECUTIVE SUMMARY

This Decision addresses the need of updating CS-25 to reflect generic certification review items (CRIs) and a safety issue related to volcanic eruptions, as further explained below.

1. RMT.0067 on Incorporation of generic SC and AMC CRIs in CS-25

RMT.0067 upgrades CS-25 by introducing generic Certification Review Items (CRIs) containing Special Conditions and/or Guidance Material, and Acceptable Means of Compliance.

The intent is to reflect the current certification practices and facilitate future certification projects. Various CS-25 subparts and items are affected by this task.

Following the review of the 82 comments received, the Agency made some improvements and corrections to the CS-25 amendment proposal as explained in detail in the CRD to NPA 2011-09.

Further to these changes, the final resulting text for CS-25 amendment addresses the following items: stalling speeds for structural design; design manoeuvre requirements; design dive speed; side stick controls; towbarless towing; steep approach and landing; protection of essential systems and equipment in Class E cargo compartments; removal of need for berths intended only for the carriage of medical patients to comply with CS 25.562; inclusion of engines at ground idle when assessing escape slide performance in wind; oxygen outlets in the galley work areas; fireproofness of engine cowlings; flight envelope protection; reduced and derated take-off thrust; and go-around performance.

Reactions were received after the publication of the CRD to NPA 2011-09 and some of them, addressed in the table below, led to improving the CS-25 amendment text.

2. RMT.0364 on Volcanic Ash

RMT.0364 is an integral part of the Agency's overall strategy, which aims at maintaining continued safe flight while minimising disruption to normal flight operations in any future volcanic events.

The Essential Requirements for airworthiness of Regulation (EC) No 216/2008 (hereinafter referred to as the Basic Regulation) contain an obligation to provide operators with limitations and other information necessary to ensure that no unsafe condition will occur from exposure to environmental hazards. The Agency's proposals will benefit industry by providing additional guidance to ensure that this obligation is fully met in respect of volcanic hazards.

The scope of NPA 2011-17 impacted on many airworthiness Certification Specifications, including CS-23,

Applicability		Process map	
Affected regulations and decisions:	CS-25	Concept Paper:	No
Affected stakeholders:	type-certificate holders, restricted type-certificate holders, supplemental type-certificate holders and ETSO authorisation holders	Rulemaking group:	No
Driver/origin:	Safety	RIA type:	Light
Reference:	N/A	Technical consultation during NPA drafting:	Yes workshop+ICAO IVATF)
		Publication date of the NPA:	2011/Q2 and 2011/Q3
		Duration of NPA consultation:	3 months
		Review group:	No
		Focussed consultation:	No
		Publication date of the Opinion:	N/A
		Publication date of the Decision:	2013/Q2

CS-25, CS-27, CS-29, CS-APU, CS-E, and CS-P. It aimed at creating new rules and Acceptable Means of Compliance (AMC) to ensure that, if required by an operating rule, the susceptibility of product features to the effects of volcanic cloud hazards are established at type-certification and limitations and information are made available to operators. The availability of this data to operators is a prerequisite to ensure that the safety risk assessment undertaken by operators is robust, based on informed judgement and reflects a product's susceptibility to volcanic cloud hazards. The operators' use of this data in performing a safety risk assessment as part of their management system is currently the subject of a separate Agency Opinion to change Part-ORO/ORA and Part-ARO/ARA¹.

In response to the NPA, 119 comments were received from 32 commentators. Some of these were constructive and led to changes in the proposals. However, many misunderstood the intent of the proposals and its limited applicability. Following publication of the CRD, a dedicated volcanic ash workshop was held in Cologne on 4 December 2012, where further explanation of the proposals was given. The reaction period to the CRD was also extended until the end of the year to allow post-workshop written reactions to be received.

Reactions were received from Airbus, ICCAIA (Boeing, Rolls-Royce), and Hawker Beechcraft. Each of them has been answered individually in this Explanatory Note to the Decision.

The main concern raised was the possible delay in providing data to operators during a new volcanic event caused by the lead-time necessary to update manuals. The Agency's view is that, in the first instance, data should be communicated directly and in a timely manner with operators to ensure the safety of operations. It is not the aim of the Agency to interfere with the efficient flow of information, which has been shown to be effective during previous volcanic events. However, to ensure that new information and/or limitations are captured and retained, manuals should subsequently be updated through the normal change procedures in compliance with the obligations of Part 21.

Another concern raised related to the need to define in detail the nature of volcanic threats. While scientific work is still ongoing, it should be noted that ICAO has already published preliminary recommendations defining ash criteria.

The specific objective is to mitigate the risks linked to volcanic clouds hazards, and to amend CS-25 to reflect certification practices for a number of items that are treated under generic CRIs.

This Decision proposes new and amended rules and advisory materials as detailed above.

The proposed changes are expected to increase safety, reduce the administrative burden of managing generic CRIs, ensure compliance with ICAO recommendations (International Volcanic Ash Task Force (IVATF)) .

¹ Part-ORO and Part-ARO, Annexes II and III to Commission Regulation (EU) No 965/2012 of 05/10/2012 laying down technical requirements and administrative procedures related to air operations; Part-ORA and Part-ARA, Annexes VI and VII to Commission Regulation (EU) No 290/2012 of 30 March 2012 amending Regulation (EU) No 1178/2011 laying down technical requirements and administrative procedures related to civil aviation aircrew.

CS-25 Amendment 13

1. GENERAL

Executive Director Decision 2013/XXX/R amends Decision 2003/002/RM of 17 October 2003 (CS-25 Initial Issue) as last amended by Executive Director Decision 2012/008/R of 06 July 2012 (CS-25 Amendment 12). It represents Amendment 13 of CS-25 and incorporates the output from the following EASA rulemaking tasks, and editorial changes:

Rulemaking Task No	TITLE	NPA No
RMT.0067 (25.070)	Incorporation of generic SC and AMC CRIs in CS-25	2011-09
RMT.0364 (MDM.089)	Volcanic Ash	2011-17

The above-mentioned Notices of Proposed Amendment (NPA) have been subject to consultation in accordance with Article 52 of the Basic Regulation² and Article 6 of the Rulemaking Procedure established by the Management Board³. 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 the NPAs. The responses are contained in a Comment-Response Document (CRD) which has been produced for each NPA. The CRDs are available on the Agency's website.

² 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, 19.03.2008, p. 1). Regulation as last amended by Commission Regulation (EU) No 6/2013 of 8 January 2013 (OJ L 4, 9.1.2013, p. 34)

³ Management Board Decision MB 01/2012, amending and replacing Decision 08/2007, concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material ('Rulemaking Procedure').

2. CRD REACTIONS

2.1 In response to CRD 2011-09 on 'Incorporation of generic SC and AMC CRIs in CS-25', the Agency received the following substantive reactions, which are reproduced below together with the Agency's responses:

Reaction reference	From	Reaction	EASA Response
1) CS 25.349(a)(5)	Airbus	<p>In response to comment No. 66 by Embraer, CS 25.349(a)(5) is amended to indicate that "The conditions specified in this subparagraph must be investigated with yaw control held steady, and, as a separate condition, with corrective yaw control action to reduce sideslip as far as possible". This was never required in any of the Airbus SC"s. Practically it is impossible to meet this requirement in the normal case, as during the rolling manoeuvre the Electronic Flight Control System corrects automatically with a certain side slip target. Therefore Airbus proposes that either the system behaviour is specifically addressed in the CS 25.349(a)(5) wording, or the traditional Airbus SC text is incorporated.</p>	<p>Partially accepted.</p> <p>The Agency verified that previous CRIs (e.g. A340, A340-500/-600) used the same wording as the one proposed.</p> <p>Nevertheless, the Agency accepts to further improve the text to bring some clarification.</p> <p>The CS 25.349(a)(5) (last paragraph) text is modified as follows compared to the CRD resulting text:</p> <p>'The conditions specified in this subparagraph must be investigated with yaw control held steady without any corrective yaw control action (pilot or system induced) to maximise side slip, and, as a separate condition, with corrective yaw control action (pilot or system induced) to reduce sideslip as far as possible. The first condition (without any corrective yaw control action) may be considered as a failure condition under CS 25.302.'</p>
2) AMC 25.335(b)(1)(ii)	Airbus	<p>In response to comment No. 65 by Embraer, paragraph (a) in this AMC sets the condition, for the alternative demonstration, that "Any failure of the high speed protection system that would affect the design dive speed determination is shown to be remote".</p> <p>The Airbus A350 and A380 issue</p>	<p>Partially accepted.</p> <p>The Agency can confirm that the proposed text is consistent with previous Issue Papers, therefore, it is maintained.</p> <p>As part of the usual certification process, Airbus may propose an alternative means of compliance for a</p>

		<p>papers do not refer to the remote probability. This would impose much more stringent reliability targets to the Airbus high speed protection system, than for today's Airbus models. Therefore, Airbus proposes to change paragraph (a) in AMC 25.335(b)(1)(ii), to keep the existing Airbus IP conditions: (a) Any failure of the high speed protection system that would affect the design dive speed determination is shown to be Remote, <u>or less than 10⁻³ if detected loss of the High speed Protection system is shown as minor.</u></p>	<p>given project.</p>
<p>3) AMC 25.1193(e)</p>	<p>Rolls-Royce</p>	<p>The actual ability of say a steel cowl skin is such that it has the ability to withstand fire for long periods, well in excess of the required Fireproof standard. However the requirement is to be Fireproof. Seals will never have the same ability to withstand fire as steel but will meet a Fireproof requirement. Hence the requirement to meet the same Fire integrity standard (as defined in CS Definitions) as the surrounding cowling/skin.</p> <p>Was (5) Seals : Where seals are used part of the external engine nacelle/cowling or APU compartment boundaries, they should at least have the same ability to withstand fire as the surrounding cowling/skin.</p> <p>Should be (5) Seals : Where seals are used part of the external engine nacelle/cowling or APU compartment boundaries, they should at least have the same fire integrity standard as the surrounding cowling/skin.</p>	<p>Accepted.</p> <p>The Agency agrees with this comment.</p> <p>The text is updated as follows:</p> <p>'(5) Seals : Where seals are used part of the external engine nacelle/cowling or APU compartment boundaries, they should at least have the same ability to withstand fire comply with the same fire integrity standard as the surrounding cowling/skin.'</p>

2.2 In response to CRD 2011-17 on 'Volcanic Ash', the Agency received the following substantive reactions, which are reproduced below together with the Agency's responses:

Reaction reference	From	Reaction	EASA response
1) AMC 25.1593 Exposure to volcanic cloud hazards	Airbus	<p>The text of the proposed AMC 25.1593, Exposure to volcanic cloud hazards, has been changed from:</p> <p>"Information necessary for safe operation should be contained in the unapproved part of the flight manual" to:</p> <p>"Information necessary for safe operation should be contained in the unapproved part of the flight manual, or other appropriate manual, [...]".</p> <p>Although the proposed text now properly recognises that the flight manual is not the appropriate repository document for some of the provided data, Airbus is still concerned about the impact of the suggested means of compliance on the flexibility and adaptability expected from the manufacturers in terms of communication and answers to questions raised by the particularities of the situation.</p> <p>The lead-time necessary to update a manual, whatever it is approved or not, is not compatible with the need to be reactive and to permanently provide updated data during a crisis.</p> <p>Since the data subject to the paragraph 25.1593 will be required to obtain a Type Certificate, the manufacturers will have to comply with the requirement while preserving their ability to react and quickly communicate updated data to the operators.</p>	<p>Noted.</p> <p>The aim of the new CS 25.1593 and associated AMC is to ensure that a basic assessment of the product against volcanic hazards has been undertaken at type-certification. Any susceptibilities identified that could constitute a safety risk must be investigated and information and/or limitations must be established to mitigate the risks. This information is then promulgated to operators in order for them to perform a safety risk assessment ahead of any future volcanic encounter occurring.</p> <p>As individual volcanic events are unique in nature, the volcanic hazards to be assessed at initial type-certification may not be fully defined and will be generic in nature. It will, therefore, be necessary for the design organisation to re-assess their product and update information following new in-service volcanic events to reflect any new understanding.</p> <p>In the first instance, data should be communicated directly and in a timely manner with operators to ensure the safety of operations. It is not the aim of the Agency to interfere with the efficient flow of information, which has been shown to be effective during previous volcanic events. However, to ensure that new information and/or limitations are captured and retained, manuals should subsequently be updated through the normal change procedures in compliance with the obligations of Part 21.</p>

2) General comment	UK CAA	<p>A proportion of the previous feedback from industry and NAA's highlighted the lack of a regulatory definition of volcanic ash particle density, size and material composition. This it was argued, made manufacturer assessment of susceptibility of equipment in volcanic ash environments extremely difficult.</p> <p>UK CAA would like to highlight that some scientific work has begun in this area, resulting in the definition of some standardised ash criteria provided in the final version of ICAO International Volcanic Ash Task Force 2 (IVATF/2) working group, within Appendix 2B, titled preliminary recommendations for volcanic ash material for use in jet engine testing.</p> <p>Justification:</p> <p>The sample volcanic ash material definition as defined in the final version of ICAO IVATF/2, may not have been available earlier in the NPA 2011-17 evolution process, and interested parties may not be aware of the studies carried out so far on this subject.</p> <p>Proposed Text:</p> <p>Not intended for inclusion in the proposed CS.23, 25, 27, 29, E, P, or APU text. Reference could instead be made in the executive summary or explanatory note of the NPA.</p>	Noted.
3) General comment	Vereinigung Cockpit e.V.	<p>For the CS-23 / CS-25 / CS-27 / CS29 acc. the General Chapter (b)</p> <p>We fully agree on this aspect!</p> <p>For CS-E / CS-P / CS-APU we want to address beside the</p>	<p>Partially Accepted.</p> <p>Cracking of blade coatings is not a safety concern in itself, unless it leads to accelerated corrosion. The text is, therefore, not necessary.</p> <p>Reference is already made to 'pre-flight procedures', which</p>

		<p>"corrosion of metallic part"</p> <p>also</p> <p>"cracking of blade coating"</p> <p>For the CS-23 / CS-25 / CS-27 / CS29 CS-E / CS-P / CS-APU acc. the item "related pre-flight" we want to address the following:</p> <p>If volcanic ash is found on a parked airplane the procedures of ash removal should be clearly defined!</p>	<p>is intended to cover ash removal. The proposed text is accepted as aiding understanding.</p>
<p>4) Response to Comment n°17</p>	<p>Airbus</p>	<p>Quote</p> <p><i>"It is not possible at present to be more specific on the composition of ash, due to the lack of an accepted volcanic ash/cloud specification. Manufacturers already have a liability under the Essential Requirements of the Basic Regulation (EC 216/2008) to provide operators with limitations and other information necessary to ensure that no unsafe condition will occur from exposure to environmental hazards; these proposals have not created any additional liability. Manufacturers would have to demonstrate that they have gained sufficient knowledge of the risks posed by volcanic clouds through a combination of experience, studies, analysis and/or tests. The level of manufacturers' data supplied in support of existing SRA may be satisfactory".</i></p> <p>Unquote</p> <p>Airbus acknowledges that it is effectively the manufacturer's responsibility to assess robustness and/or limitation to known environmental conditions that could be encountered by the aircraft. This</p>	<p>Noted.</p> <p>While scientific work is still ongoing, it should be noted that ICAO has already published preliminary recommendations defining ash criteria. (See reaction from UK-CAA above).</p> <p>There is no intent to require products to demonstrate design robustness for extended operation in volcanic clouds. However, design organisations will need to consider exposure to volcanic cloud hazards if the operator is to be approved for operations in forecast contaminated airspace, and, in any case, against possible inadvertent encounters.</p> <p>If a design organisation establishes that operation in a known ash environment is acceptable, then it would be necessary to demonstrate the aircraft is capable to operate within this environment, subject to any limitations imposed.</p>

		<p>is what is currently achieved for volcanic ash by requesting avoiding flights in visible ash. To go further and to demonstrate/certify design robustness against volcanic ash, manufacturers should know the nature of the threat to be considered in terms of composition, concentration or other parameters as it is done for other environmental threats (ice ingestion, bird strike, contaminated runway, lighting strike...). Guidance from EASA would be requested to define the basis of the requirement. It is Airbus understanding that it is not the intent of the NPA to require manufacturers to demonstrate the design robustness against the hazards resulting from flights into volcanic clouds.</p>	
<p>5) Comment number: #72</p>	<p>ICCAIA (Boeing Commercial Airplanes)</p>	<p>Boeing requests that EASA provide a more comprehensive response to ICCAIA's item 2 in comment #72. Specifically, we ask that EASA address the situation where operators involved in a volcanic event must work with an airplane manufacturer in order to obtain new or changed data in a timely manner to make an expedited change to their volcanic ash Safety Risk Assessment, -- but the manufacturer's State of Design is not an EASA member country. This will not be an uncommon situation, and we consider it essential that EASA provide details in how it should play out in order to be in compliance with the proposed certification standards (CS).</p> <p>JUSTIFICATION: As ICCAIA pointed out, if the new CS are adopted, then any changes to manufacturers' data after the original type design approval of the airplane will, procedurally, also need to comply</p>	<p>(See our response to reaction 1) above)</p>

		<p>with the new CS. The concern is that this process of demonstrating compliance with the new CS may unintentionally impede the process of timely exchange of new or changed data between airline and manufacturers during a volcanic event -- with "potentially unacceptable consequences." As ICCAIA rightfully states: "Forcing information already provided by most manufacturers into a regulation will undoubtedly decrease the operational flexibility needed during a volcanic eruption."</p> <p>In response to ICCAIA, EASA indicates that the new CS will allow the manufacturer's data to be placed in the unapproved section of the flight manual where changes can be readily incorporated by an appropriately approved (EASA) DOA. While this may be an expeditious method for manufacturers holding an EASA-approved DOA, it will not be expeditious for those manufacturers whose State of Design is not an EASA member country and who do not hold an EASA-approved DOA.</p> <p>For those manufacturers, any changes to their data (i.e., the data provided to the operator) will need to be certified to the CS via their EASA-approved Post Type Validation Procedures. These procedures normally entail first submitting a certification plan to EASA for review and approval, followed by submittal of specific compliance data to the CS. This process typically requires months to complete.</p> <p>To avoid such an untenable situation, we recommend that EASA consider, at the least, either:</p>	
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		<ul style="list-style-type: none"> · (1) specific Post Type Validation Procedures between EASA and the manufacturer’s State of Design to ensure that there is an expeditious process to approve changes to the manufacturer’s data for use by operators in their volcanic ash Safety Risk Assessment; or · (2) delegation arrangements made ahead of time between EASA and non-European regulatory authorities of the manufacturer’s State of Design. 	
<p>6) Comment number: #72 and #24</p>	<p>ICCAIA (Rolls-Royce plc)</p>	<p>With regard to item 2 in comment #72 and the response to comment #24, it is recognised that the new CS will now allow manufacturers data to be placed in the unapproved section of the flight manual where changes can be ‘readily’ incorporated. The proposed CS-1050 (b) states that information is to be provided in the ‘relevant’ documentation and the response to comment #103 states that this term has been used to allow flexibility. We remained concerned, however, that the timescales required to update such documents whatever their approval requirements may, as stated in the original ICCAIA comments, impede the process of timely exchange of new or changed data between airline and manufacturers with the flexibility required during a rapidly changing volcanic event.</p> <p>In particular we feel that whilst the situation for EASA DOA holders is partly addressed in the EASA response, further consideration is required for manufacturers who do not hold an EASA DOA and who would need to approve changes to their data through Post Type</p>	<p>(See our response to reaction 1) above)</p>

		Validation Procedures.	
7) General comment	Hawker Beechcraft Corporation	<p>Hawker Beechcraft Corporation (HBC) believes a conflict of "requirement level" exists between the proposed certification standards and the corresponding AMCs.</p> <p>The standards state that "the susceptibility of aeroplane features to the effects of volcanic cloud contamination must be established." The AMCs say that "Information necessary for safe operation should be contained in the unapproved part of the flight manual." This appears to result in an uneven level of burden between an OEM and an operator: it seems that the OEM would have to spend significant resources to establish the effects of volcanic ashes on airplane features (such as, for example, actual levels of ash concentration and the exposure time that the airplane can tolerate), only to see this reflected in information that the operator or the aircraft would have the option to follow or not (because it is not in the approved pages of the AFM).</p> <p>Furthermore, the content of the associated AMCs is only partly actionable: for example, it does not provide agency-acceptable methods to determine the braking effectiveness of an airplane operating on a wet ash-contaminated runway. This is in direct contrast with EASA's AMC 25.1591 for operation on runways contaminated with standing water, slush, snow, or ice in support of CS 25.1591.</p> <p>In light of the above, it is recommended that HBC's response be as follows --</p>	<p>Not Accepted.</p> <p>It is expected that design organisations will support operators who elect to obtain an operational approval to fly in forecast volcanic ash contaminated airspace. Where no demand exists, it is possible that a design organisation can minimise the level of investigation performed by declaring a zero volcanic cloud tolerance for their product.</p> <p>There is no intent here to create an airworthiness standard for operation in volcanic clouds. The scientific knowledge, means of compliance and regulatory impact analysis have not developed to a level where this is currently a viable option. Any data provided will not have complied with a specific standard and cannot, therefore, be considered as approved data. The intent here is limited in scope and aims at facilitating operational flexibility by mitigating the risks associated with operating in airspace forecast to be contaminated with volcanic clouds and at aerodromes known to be contaminated.</p>

		<p>1. For airplanes approved to operate in volcanic ash environments, appropriate operating limitations and information should be established and included in the agency-approved portion of the AFM.</p> <p>2. EASA should develop sufficiently detailed AMCs to provide OEMs with actionable, EASA-approved method for showing compliance with the requirements of the new CSs.</p>	
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3. EDITORIAL CHANGES

Apart from the changes that resulted from the above NPAs, this Amendment 13 of CS-25 also incorporates a change to correct an editorial error:

Book 1

CS 25.951(c): Correct an error made in the units conversion when amending CS 25.951(c) at CS-25 Amendment 12:

(c) Each fuel system must be capable of sustained operation throughout its flow and pressure range with fuel initially saturated with water at 26.7°C (80°F) and having 0.20 cm³ (~~0.75 cc~~) of free water per 3.8 litres (0.75 cm³ per US gallon) added and cooled to the most critical condition for icing likely to be encountered in operation.
 ...'