*European Aviation Safety Agency*

# Explanatory Note to Decision 2013/033/R

## CS-25 Amendment 14

RELATED NPA/CRD 2013-02 — RMT.0048 (25.028) — 19.12.2013


**EXECUTIVE SUMMARY**

This Decision addresses a safety issue related to damages caused to large aeroplanes by debris impacts. Among the variety of debris and objects encountered, debris originating from tyre and wheel failure, engine failure (low energy and small fragments) and runway debris are of particular concern, as they have been factors in a number of accidents and serious incidents. In the past, the JAA Safety Strategy Initiative (JSSI) had identified the issue of protection from tyre/wheel debris impact as a significant safety issue, and this item was confirmed as part of the European Aviation Safety Plan (EASp) (item AER4.1).

CS-25 is upgraded for better protection of large aeroplanes against some categories of threats: tyre and wheel failure (debris, burst pressure effect), small engine debris, and runway debris. This includes a new CS 25.734 specification and its related Acceptable Means of Compliance (AMC) 25.734, providing a tyre and wheel failure model that is applicable to protection of structures and systems. The applicability of the existing CS 25.963(e) specification is expanded from fuel tank access covers to aircraft fuel tanks and the applicable threats now include wheel fragments and APU small fragments; the related AMC 25.963(e) has been updated accordingly, and its small engine debris model has been confirmed for fuel tanks, along with pass-fail criteria.

The proposed changes are expected to increase safety and reduce certification burden.


| **Applicability** | |
|---|---|
| Affected regulations and decisions: | ED Decision 2003/002/RM of 17 October 2003 (CS-25) |
| Affected stakeholders: | Large aeroplane manufacturers |
| Driver/origin: | Safety |
| Reference: | JSSI, EASp 2013–2016 (item AER4.1) |

| **Process map** | |
|---|---|
| Concept Paper: | No |
| Terms of Reference | 9.2.2009 |
| Rulemaking group: | Yes |
| RIA type: | Light |
| Technical consultation during NPA drafting: | No |
| Publication date of the NPA: | 22.1.2013 |
| Duration of NPA consultation: | 3 months |
| Review group: | Yes |
| Focussed consultation: | No |
| Publication date of the Opinion: | N/A |
| Publication date of the Decision: | 2013/Q4 |

# Table of contents

# 1. Procedural information

## *1.1. The rule development procedure*

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed ED Decision 2013/033/R in line with Regulation (EC) No 216/2008[1] (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the Agency's Rulemaking Programme for 2013–2016 under RMT.0048 (25.028)[3]. The scope and timescale of the task were defined in the related Terms of Reference (see process map on the title page).

The draft text of this Decision has been developed by the Agency based on the input of the Rulemaking Group RMT.0048 (25.028). All interested parties were consulted through NPA 2013-02[4]. 83 comments were received from interested parties, including industry and national aviation authorities.

The Agency has reviewed the comments received on the NPA. The comments received and the Agency's responses are presented in the Comment-Response Document (CRD) 2013-02[5].

The final text of this Decision with the Certification Specifications (CS)/Acceptable Means of Compliance (AMC) has been developed by the Agency based on the input of the Review Group RMT.0048 (25.028) (the same group which drafted the NPA proposal).

The process map on the title page summarises the major milestones of this rulemaking activity.

Additionally, some editorial changes are made as described in Chapter 2.6 below.

## *1.2. Structure of the related documents*

Chapter 1 contains the procedural information related to this task. Chapter 2 explains the core technical content. The text of the CS/AMC is annexed to the ED Decision.

---

1 Regulation (EC) No 216/2008 of the European Parliament and 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), as last amended by Commission Regulation (EU) No 6/2013 of 8 January 2013 (OJ L 4, 9.1.2013, p. 34).

2 The Agency is bound to follow a structured rulemaking 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'. See 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 Decision No 01-2012 of 13 March 2012.

3 http://easa.europa.eu/rulemaking/annual-programme-and-planning.php

4 In accordance with Article 52 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.

5 http://easa.europa.eu/rulemaking/comment-response-documents-CRDs-and-review-groups.php

# 2. Explanatory Note

## *2.1. Overview of the issues to be addressed*

Large aeroplanes are subject to damage by various objects or debris impacts while in service. Among this variety of debris and objects encountered, debris originating from tyre and wheel failure, engine failure (low energy and small fragments) and runway debris are of particular concern, as they have been factors in a number of accidents and serious incidents.

## *2.2. Objectives*

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Chapter 2.1. The specific objective of this proposal is, therefore, to improve safety by upgrading CS-25 provisions related to protection against some categories of threats: tyre and wheel failure (debris, burst pressure effect), small engine debris, and runway debris.

## *2.3. Outcome of the consultation*

Based on the comments and responses received, the proposed CS-25 Amendment 14 text was updated. Some adjustments were made to the models provided in AMC 25.734 for protection against tyre and wheel failure and in AMC 25.963(e) for fuel tank protection. Various clarifications and corrections were also made (Certification Specifications and Acceptable Means of Compliance). Nevertheless, the objectives and the substance of the proposed amendment are unchanged. Chapter 2 of CRD 2013-02 provides an overview of the main comments received and the Agency's responses thereto.

## *2.4. Summary of the Regulatory Impact Assessment (RIA)*

The proposal will improve safety without creating unacceptable costs for applicants. A slight increase of certification costs may be induced for some manufacturers who did not apply all the elements of the introduced threat models in the past. An economic benefit is also anticipated from the simplification of the certification process (decrease of the number of Certification Review Items (CRIs)).

## *2.5. Overview of the amendments*

CS 25.963(e) and AMC 25.963(e) are amended for protection of fuel tanks against the risk of hazardous fuel leakage. The applicability of the amended CS 25.963(e) is therefore not anymore limited to fuel tank access covers.

In CS 25.963(e)(1) the threats to be considered now include wheel debris and APU small fragments.

AMC 25.963(e) is amended. The consideration of wheel debris and APU small fragments is reflected and a link is made with a new AMC 25.734 which provides a wheel and tyre failure model along with pass-fail criteria. AMC 25.963(e) also defines a small engine debris threat model (9.5 mm (3/8 inch) steel cube at 213.4 m/s (700 ft/s)) which was already available in the current AMC for the evaluation of fuel tanks access covers. Its applicability includes the ± 15-degree area of the engine for which a normal impact to the skin is to be considered. It further adds the need to consider trajectories in the area

between – 15 and – 45 degrees (aft part of the engine), allowing credit for impact incidence angle, in response to the data review and reference recommendations.

A new paragraph CS 25.734 'Protection against Wheel and Tyre failures' is created and a corresponding AMC 25.734 introduces a tyre and wheel failure model.

CS 25.729(f) is deleted. The first two bullets of this subparagraph required protection of essential equipment installed on the landing gears and in the wheel wells against the effect of tyre burst and loose tyre tread. This is now encompassed in CS 25.734. The third bullet required protection against the effect of wheel brake temperature. This specification is moved to CS 25.735 'Brakes and braking systems' as a new subparagraph (l) 'Wheel brake temperature'.

Consistently, paragraph 4.d of AMC 25.729 is deleted and its content is moved to AMC 25.735 as a new paragraph 4.l (linked to the new CS 25.735(l)).

## *2.6. Editorial changes*

In addition to the outcome of the above-mentioned rulemaking task, the following editorial changes are made.

Book 1:

A typo is corrected in CS 25.809.

Book 2:

Some paragraph references inside AMC 25.1309 needed to be corrected as a consequence of the changes made to CS-25 Amendment 12. Indeed, paragraphs 3a and 3b were revised at Amendment 12 so that the previous references to 3b(2) should now be 3a(3), previous references to 3b(3) should now be 3b(2), and previous references to 3b(4) should now be 3b(3). This was not changed at Amendment 12 and is now corrected.

# 3. References

## *3.1. Related regulations*

N/A

## *3.2. Affected decisions*

ED Decision 2003/002/RM of 17 October 2003 as last amended by ED Decision 2013/010/R of 14 June 2013 (CS-25 Amendment 13).

## *3.3. Reference documents*

Refer to Explanatory Notes of NPA 2013-02 and CRD 2013-02.