EASA	CERTIFICATION MEMORANDUM
	EASA CM No.: EASA CM – S – 002 Issue: 01 **Issue Date: 14th of January 2014** **Issued by: Structures section** **Approved by: Head of Certification Experts Department** **Regulatory Requirement(s): CS 25.561 (c)(2)**

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Subject

Application of CS 25.561 (c)(2) 1·33 'Wear and Tear' Factor – Frequent Removal of Interior Structures

Log of Issues

Issue	Issue date	Change description
01	14.01.2014	First issue.

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1. INTRODUCTION

1.1. PURPOSE AND SCOPE

This Certification Memorandum provides guidance on the application of the 1·33 'Wear and Tear' factor applied to inertia forces for interior structure/item of mass attachment fittings (including seat rails), as required by CS 25.561 (c)(2), including attachment of large items of mass, e.g. galleys, closets, lavatories, class dividers, etc. which may be frequently moved and which, if they became loose, could directly, or indirectly, threaten occupant safety.

This Certification Memorandum does not attempt to address other structural items which may attract the use of such a factor, e.g. engine mounts, or latches, or attachments of seats, berths, and safety belts as referenced in CS 25.785, 25.787, 25.789.

1.2. REFERENCES

It is intended that the following reference materials be used in conjunction with this Certification Memorandum:

Reference	Title	Code	Issue	Date
CS 25.561 (c)(2)	Emergency Landing Conditions	CS-25	---	---

1.3. ABBREVIATIONS

The following abbreviations are used in this Certification Memorandum:

Abbreviation	Meaning
AMC	**A**cceptable **M**eans of **C**ompliance
CS	**C**ertification **S**pecification
EASA	**E**uropean **A**viation **S**afety **A**gency
FAR	**F**ederal **A**viation **R**egulation
g	**g**ram
lb	**p**ound
PBE	**P**rotective **B**reathing **E**quipment
STC	**S**upplemental **T**ype **C**ertificate
TC	**T**ype **C**ertificate

1.4. DEFINITIONS

The following definitions are used in this Certification Memorandum:

Definition	Meaning
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2. BACKGROUND

Recent Certification/Validation projects have indicated a need for further guidance and harmonisation regarding the application of the 1·33 'Wear and Tear' factor to interior structure/item of mass attachment fittings subjected to frequent removal. Increasing numbers of fuselage interiors are being designed to ease the tasks of completing cabin re-fits and configuration changes and removal of interior structure for maintenance access to other parts of the aircraft, e.g. zoned/modularised/flexible/adaptable areas. There has also been concern relating to the lack of standardisation of compliance with CS 25.561(c)(2), in particular for STCs.

Designing to simplify cabin changes and removals may also result in more frequent removal taking place than first envisaged and an increased potential for wear and tear or more significant damage.

Although the definition of 'frequent', in this context, and correlation between ease of change, frequency of change, and occurrence of wear (and its significance) may be difficult to establish and may require 'engineering judgement', EASA considers increased occurrence of damage to be a reasonable expectation in such situations. Until convincing evidence is provided to the contrary, EASA considers that it is necessary to address this potential increase in wear and associated damage by ensuring appropriate and more consistent application of the 1·33 factor.

Frequent changes, particularly in an operating environment, are likely to be associated with tight timescales, limited inspection equipment availability, and limited opportunities to access and thoroughly inspect the attachments.

The number of changes, i.e. the number of times a specific item is removed/replaced, and also the accumulation of design changes during an aircraft life may be difficult to track for regulatory purposes and may well occur without original manufacturer involvement.

CS 25.561 (c)(2) provides 'quick change' interiors as an example of when attachment fittings would attract the 1·33 'Wear and Tear' factor. This is perhaps one of the more obvious examples of the designs requiring the 1·33 factor and was added to specifically address some modifications that allowed frequent daily changes between cargo and passenger configurations by using palletised rows of seats. It does not address the full scope of the intended application of the 1·33 factor, e.g. as indicated in existing AMC 25.561 (b)(3), which supports a much broader application, referring also to 'commercial accommodation equipment'.

The above concerns relating to evolving design philosophy, the subsequent potential for more frequent changes, and the associated increased potential for damage, in addition to inconsistent application of the factor to STCs, have driven the need for further guidance to support and clarify existing requirements regarding the applicability of the 1·33 'Wear and Tear' factor to frequently changed interior structure/item of mass attachment fittings.

2.1. EXISTING REQUIREMENTS AND AMC

2.1.1. CS 25.561 (c)(2)

Existing requirement **CS 25.561 (c)(2)**, and related AMC, identifies the need for the 1·33 factor to be applied to interior structure attachments likely to be subject to 'severe wear and tear'.

> *"**CS 25.561 (c)** For equipment, cargo in the passenger compartments and any other large masses, the following apply:…*
>
> (1) *These items must be positioned so that if they break loose they will be unlikely to:*
>
> (i) *Cause direct injury to occupants;*
>
> (ii) *Penetrate fuel tanks or lines or cause fire or explosion hazard by damage to adjacent systems; or*

(iii) *Nullify any of the escape facilities provided for use after an emergency landing.*

(2) *When such positioning is not practical (e.g. fuselage mounted engines or auxiliary power units) each such item of mass must be restrained under all loads up to those specified in subparagraph (b)(3) of this paragraph.* ***The local attachments for these items should be designed to withstand 1·33 times the specified loads if these items are subject to severe wear and tear through frequent removal (e.g., quick change interior items).***"

2.1.2. AMC 25.561 (b)(3) Commercial Accommodation Equipment

"Commercial accommodation equipment complying only with FAR 25.561 pre-Amendment 25-91 need additional substantiation by analysis, tests or combination thereof to cover the 1·33 factor for their attachments as specified in ***CS 25.561 (c).***"

3. EASA CERTIFICATION POLICY

3.1. EASA POLICY

The 1·33 'Wear and Tear' factor, as identified in CS 25.561 (c)(2) and supporting AMC, is intended to be applied to interior structure/item of mass attachment fittings including, but not limited to, structure (including seat tracks):

- designed for 'quick change' (per the original example provided in the requirements), which makes possible rapid changes, e.g., frequent overnight changes, seasonal changes, etc., between cargo and passenger configurations using palletised seats, cargo nets, etc. This consideration is specific to interior designs that were provided to enable the operator quick in-service relocation or reconfiguration of specific equipment, or quick access through equipment removal, and which may not be identified by fitting type alone. Such changes are of particular concern in the post TC modification market for existing airframes when the factor has not been applied by the STC holder and the original manufacturer has not provisioned for such frequent removal.
- which is zoned/modularised/flexible/adaptable (probably more recent TC designs) and designed by the manufacturer to include quick access/quick release features such that change is possible during minor inputs. TC holders and modification services should specify which equipment items, and airframe locations, are intended by design for in-service relocation/reconfiguration and which are not, including identification of any factors used, e.g. in a Component Maintenance Manual, Interior Reconfiguration Guide, SRM etc.
- intended for available quick relocation or reconfiguration at a frequency equal to, or greater than the frequency of typical local seat changes/movements, e.g., dividers and partitions moved to allow regular change between business and economy configurations when in service and the seating attachment configuration remains unchanged;
- designed to allow frequent access to other parts of the aircraft for inspection and maintenance;
- likely to be removed locally on an 'ad hoc' basis, e.g., overhead bins with quick release pins. This is particularly important if such removal is likely to occur uncontrolled/unrecorded due to ease of removal providing an attractive practical alternative solution to an approved access route. Although prediction of such situations may be difficult for any new configurations, this bullet point is intended to encourage review and transfer of practical experience from previous similar configurations.

- for attachments not subject to frequent removal: An item that is removed less than once per year is not regarded as frequent removal. However, note that although an item may not typically be removed at a frequency greater than once a year, e.g. galleys and toilets, the 1.33 may remain appropriate because local impact associated with the movement of larger masses is potentially more likely to damage structure or structure protection, e.g. damage corrosion protection local to a lavatory or galley structure, than smaller masses.

All interior structure and item of mass removals should be supported by thorough inspection, as appropriate to the design philosophy, of the attachments. This should include appropriate guidance, e.g., allowable damage limits etc., in supporting maintenance documentation. Particular attention should be paid when using existing fittings and seat track for a new interior.

EASA acknowledges that the above examples are not all inclusive and that some 'engineering judgement' is still required regarding the extent of application. If in doubt, the applicant should discuss the matter with the Agency early in the design process.

Note 1: The 1·33 factor is considered appropriate for all attachments of interior items of mass > 0,45 kg (1lb) (or > 0,15 kg (1/3lb) if attached to a seat, ref. AC 25.562-1B) likely to experience frequent removal. The 1.33 factor also applies to all safety equipment mountings (PBE, Fire Extinguishers, Oxygen Bottles, etc.).

Note 2: This CM does not require multiple applications of the 1.33 factor to the same attachment. Therefore, it is the applicants responsibility to understand any Equipment/System suppliers use of 'wear and tear' factors within its specifications and consider them as, and when, appropriate to this CM, e.g. as applicable to the airframe attachment etc.

3.2. WHO THIS CERTIFICATION MEMORANDUM AFFECTS

This Certification Memorandum affects applicants who need to show compliance with CS-25 Emergency Landing Conditions.

4. REMARKS

1. Suggestions for amendment(s) to this EASA Certification Memorandum should be referred to the Certification Policy and Planning Department, Certification Directorate, EASA. E-mail CM@easa.europa.eu or fax +49 (0)221 89990 4459.
2. For any question concerning the technical content of this EASA Certification Memorandum, please contact:

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