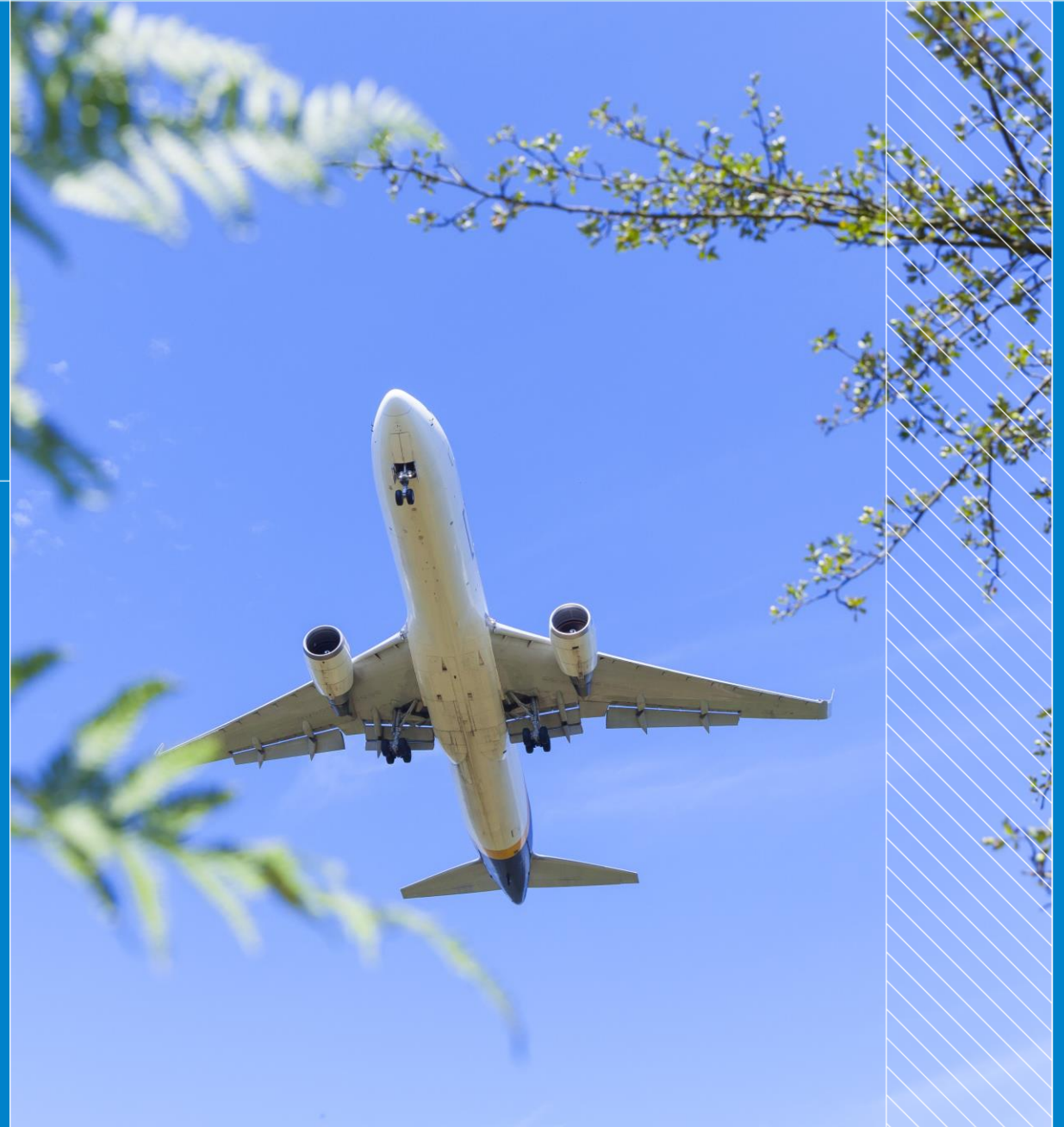


# Classification of design changes to cabin interiors of Large Aeroplanes

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# Background



EASA CM No.: CM-21.A-CS-001 Issue 02

## Certification Memorandum

### Classification of design changes to cabin interiors of Large Aeroplanes

EASA CM No.: CM-21.A-CS-001 Issue 02 dated 30 April 2021

Regulatory requirement(s): **Point** 21.A.91 of Annex I to Regulation (EU) No 748/2012 – Classification of changes to a type-certificate

# Background

- The CM provides a list of types of design changes to the cabin interior of Large Aeroplanes which should be classified as major based on GM 21.A.91.
- The CM is an effort of the EASA Cabin Safety team, with the support of the DOA Department.
- The CM has been conceived as a living document, to be periodically updated to include further guidance and examples.

# Background

→ The CM takes into account:

- The principle that classification is based on impact on airworthiness.
- The recent evolution of the regulatory framework (e.g. LOI, new DOA privileges).
- the content of the Excel file developed by the Ad Hoc WG formed by EASA in 2013.

# Past practice

- Past practice for classification of design changes in the Cabin Safety domain has not been fully in line with the requirements of Point 21.A.91 of Annex I (Part 21) to Regulation (EU) No 748/2012:

*‘Changes to a type-certificate are classified as minor and major. A ‘minor change’ is one that has no appreciable effect on the mass, balance, structural strength, reliability, operational characteristics, noise, fuel venting, exhaust emission, operational suitability data or other characteristics affecting the airworthiness of the product. Without prejudice to point 21.A.19, all other changes are ‘major changes’ under this Subpart. Major and minor changes shall be approved in accordance with points 21.A.95 or 21.A.97 as appropriate, and shall be adequately identified.*

# Past practice

- Classification was driven not only by the impact of the design change on the airworthiness of the affected aircraft but also by other factors:
  - Availability of compliance data
  - DOA past experience with similar design changes
  - Expected level of involvement of the EASA Cabin Safety specialists in the certification project
- The result was a very inconsistent framework in which the same type of design change could be classified in a different manner by different Design Organizations.

# The 2013 Ad Hoc WG

- An Ad Hoc working group was set up in 2013 by EASA to address the requests coming from DOAs to improve the guidance on the classification of design changes in the cabin safety domain.
- The objective of the working group was to develop a list of examples of design changes and to provide for each one of them a rationale in support of the expected outcome of the classification process.
- EASA would then transfer the content of the list into a Certification Memorandum and, eventually, use it as a basis for a revision of GM 21.A.91.



# The 2013 Ad Hoc WG

→ The 2013 Ad Hoc WG Excel file:

Item No.	Subject	Cabin Safety Change Classification Guidance.				
Major		Subject	Classification	Restriction/Assumption	Guidance Material	Notes
1	Seat installation	Change of overall cabin layout (LOPA) which results in the creation of new seating class transition locations that require new substantiation of issues such as direct view.	Major	Change of seating layout from e.g. single to dual class, dual to triple class, triple to dual class, installation of large monument, (e.g. galley, bar or other passenger amenity area), .....	FAA AC 25-17A	May be classified as 'Minor' if, for a similar design change, all necessary compliance documents are available to the DOA because already issued for a previously approved design change on the subject aircraft type.
2	Seat installation	Seat installation on an aircraft type with XX.562 in type certification basis.	Major	Seat type/model not previously installed by DOA on subject aircraft type before.	FAA AC 25-17A, FAA AC 25.562-1B	May be classified as 'Minor' if seat type can be verified as being ETSO C127a approved and all necessary compliance documents are available to the DOA because already issued for a previously approved design change on the subject aircraft type.
3	Seat installation	Installation of or change to a seat requiring generation of new dynamic seat test data.	Major	In the case of a change to the seat, this would be an aircraft level change.	FAA AC 25-17A, FAA AC 25.562-1B	

# The objectives of the CM

- Past practice for classification of design changes in the Cabin Safety domain needed to be reconsidered: classification cannot depend on competence, experience and level of performance of the DOA that designs the change.
- Based on the recent development of Part 21, DOAs may be granted the privilege to approve certain types of major changes.
- Competence, experience and the level of performance of the DOA must be taken into account to determine the LOI that EASA will have in the compliance verification activities related to a major design change.

# The objectives of the CM

- The latest Part 21 evolution (LOI, new DOA privileges) allows to switch to a more stringent approach for classification while maintaining the current level of workload for EASA.
- Expected short-term effects of the publication of the CM on CT.1 workload:
  - The share of design changes classified as major will increase
  - The workload for the EASA cabin safety specialists will not increase (low LOI).
  - The administrative workload for EASA PCMs will increase (additional major changes with zero EASA LOI).
- DOAs are expected to obtain the privilege to approve certain major changes: this should compensate the effects of the more stringent classification approach.

# Public Consultation Outcome

- Comment period start: 18<sup>th</sup> December 2019
- Comment period end: 31<sup>st</sup> January 2020
- A six weeks comment period was requested by the Cabin Safety team to allow stakeholders to contribute as much as possible.
- EASA received 61 comments from 10 commenters

# Public Consultation Outcome

## → Main controversial items:

- Additional (administrative, economic, technical) burden for DOAs
- EASA PCMs/ Cabin Safety specialists workload
- installation/relocation/modification of seats installed on aeroplanes required to comply with 25.562
- Installation of Halon-free handheld fire extinguishers
- Installation of interior components other than dynamic seats

→ The CM has been modified to address some of the received comments, mainly to improve the level of clarity of the definition of the scope of certain items in section 3 of the CM.

# The Final CM

Item #	Scope of the design change	Relevant guidance in GM 21.A.91	Justification for the classification as major
1	Installation/relocation of passenger seats on an aircraft required to comply with CS 25.562.	3.4 (d); 3.4 (g); App. A 2.(i)	Any reduction in the level of performance of passenger seats below the level of safety established by CS 25.562 may result in multiple fatalities in an emergency landing.
2	Modification/installation of seat components (features in the occupant head strike: monitors, tray tables, latches, etc.; occupant restraint systems; bottom and backrest cushions; etc.) that affect the performance in dynamic test conditions of a seat installed on an aeroplane having CS 25.562 in its certification basis.	3.4 (d); 3.4 (g); App. A 2.(i)	<p>Any reduction in the level of performance of passenger seats below the level of safety established by CS 25.562 may result in multiple fatalities in an emergency landing.</p> <p>A modification to a seat compliant with CS 25.562 may affect its structural performance (due to an excessive weight increase or adverse impact on the level of performance of the components in the primary load path from the occupant to the seat tracks), the level of protection offered to the occupant (e.g. by increasing HIC above 1 000), or compromise occupant egress (due to excessive permanent deformation).</p>

# The Final CM

Item #	Scope of the design change	Relevant guidance in GM 21.A.91	Justification for the classification as major
3	Installation of one or more of the following types of interior components: seats, galleys, toilets, wardrobes, etc.	3.4 (d); App. A 2.(i)	The effort needed to generate new substantiation data necessary to comply with the applicable certification requirements is considerable.
4	Installation/relocation of interior components (seats, galleys, lavatories) affecting the location, or reducing the width of aisles, cross aisles, passageways leading to the emergency exits.	3.4 (d); 3.4 (g); App. A 2.(i)	The location and dimensions of aisles, cross aisles, passageways leading to the emergency exits is essential to ensure safe and rapid evacuation of passengers and crew from the aircraft.
5	Installation/replacement of emergency egress assisting means (e.g. escape slides, inertia reels, ropes, etc.).	3.4 (d); 3.4 (g); App. A 2.(i)	The design and installation of emergency egress assisting means is essential to ensure safe and rapid evacuation of passengers and crew from the aircraft.
6	Deactivation of an emergency exit.	3.4 (d); 3.4 (g); App. A 2.(i)	The deactivation of an emergency exit affects the evacuation of passengers and crew from the aircraft.
7	Derating of emergency exits.	3.4 (d); 3.4 (g); App. A 2.(i)	The derating of an emergency exit has an impact on evacuation and at the same time requires a reassessment of the distribution of passenger seats in the cabin.

# The Final CM

Item #	Scope of the design change	Relevant guidance in GM 21.A.91	Justification for the classification as major
8	Installation/relocation of seats designated for use during take-off and landing by a cabin crew member required by the Operating Rules.	3.4 (d); 3.4 (g); App. A 2.(i)	The design and installation of seats occupied by cabin crew members during take-off and landing has a significant influence on the contribution that crew members may provide to achieve rapid evacuation of the cabin.
9	Installation of means (mirrors, camera systems) to enhance direct view of the cabin area for which the cabin crew member is responsible.	3.4 (c)	The use of mirrors or camera systems to monitor the cabin area that a crew member is responsible for requires an assessment of considerable complexity.
10	Installation of a crew rest compartment.	3.4 (d); 3.4 (g); App. A 2.(i)	Crew rest compartments are usually installed in remote areas, are isolated by means of a door from the passenger cabin and are accessible to crew members only. EASA has issued special conditions to address the safety issues (accessibility, evacuation, fire protection) associated with the installation of crew rest compartments, taking into account the function of such compartments and the complexity of the limitations/procedures associated to their use.



# The Final CM

Item #	Scope of the design change	Relevant guidance in GM 21.A.91	Justification for the classification as major
11	Installation of thermal/acoustic insulation materials on aircraft required to comply with CS 25.856(b). This item covers also design changes that introduce a new method of installation of already certified materials.	3.4 (g)	The intent of CS 25.856(b) is to extend the time available to cabin occupants for evacuation before an external fire can burn through the fuselage and reach the cabin. The time to burn through is critical because, in survivable aircraft accidents, the heat and smoke released by burning cabin materials ignited by an external fuel fire may incapacitate passengers before they are able to escape.
12	Installation of stretchers.	3.4 (d); 3.4 (g); App. A 2.(i)	Procedures must be developed to ensure that the installation of stretchers should not hinder or delay the rapid evacuation.
13	Introduction of an Incomplete Passenger Cabin (as defined in CM-CS-010-001 Issue 1).	3.4 (g)	See CM-CS-010-001 Issue 1.

# The Final CM

Item #	Scope of the design change	Relevant guidance in GM 21.A.91	Justification for the classification as major
14	Installation of a new type of floor proximity emergency escape path marking system.	3.4 (d); App. A 2.(i)	The installation of floor proximity emergency escape path marking ensures that evacuation of the cabin can occur in critical visibility conditions. The effort needed to generate new substantiation data necessary to comply with the applicable certification requirements is considerable.
15	Installation of large glass items (ref. AMC 25.603(a)) or large display panels (ref. AMC 25.788(b)) in the cabin.	3.4 (d)	The failure of large glass items or large display panels in an emergency landing and or following cabin depressurisation, may result in the release of fragments and in the exposure of sharp edges that may injure cabin occupants.
16	Installation of seat cargo bags.	3.4 (g)	See CM-CS-003 Issue 1.
17	Modifications that affect the ballistics or intrusion resistance of flight deck protection systems compliant with CS 25.795 and required by the applicable Operating Rules.	3.4(d); 3.4(g)	The effort needed to generate the substantiation data necessary to certify the installation or the modification of flight deck protection systems is considerable.

# The Final CM

Item #	Scope of the design change	Relevant guidance in GM 21.A.91	Justification for the classification as major
18	Installation of a PED charging station /stowage compartment.	3.4 (g)	The introduction of facilities designed to stow PEDs during their battery recharge process may increase the risk of having a thermal runaway event that may involve multiple PEDs. The propagation of a PED fire to other PEDs may result in a fire event that may have catastrophic consequences. The installation of In-Seat Power Supply Systems (ISPSS) is not addressed by this item, provided that they are not installed in fully enclosed compartments.
19	Installation of safety-related symbolic placards other than those described by AMC 25.1541.	3.4 (d)	Safety marking is essential to provide instructions/information to cabin occupants in emergency scenarios.  The design of symbolic placards should be evaluated through comprehension testing conducted with naïve subjects. The effort needed to generate the necessary substantiation data is considerable.

# The Final CM

Item #	Scope of the design change	Relevant guidance in GM 21.A.91	Justification for the classification as major
20	Installation of handheld fire extinguishers and related agents not listed in the FAA Advisory Circular AC 20-42D.	3.4(b); 3.4(d); 3.4(g)	<p>The handheld fire extinguishers required by CS 25.851(a) are essential to ensure that fires developing in occupied areas can be effectively controlled so that they do not have catastrophic consequences.</p> <p>The demonstration of adequate performance of a new extinguishing agent involves the need to generate a considerable amount of test evidence and substantiation data. If the new extinguishing agent is not listed in FAA AC 20-42D EASA has to establish a Means of Compliance alternative to AMC 25.851(a).</p>

# Conclusions

- The CM provides a list of types of design changes to the cabin interior of Large Aeroplanes whose classification is not controversial.
- The CM has been conceived as a living document, to be periodically updated to include further guidance and examples.
- Focal point for the technical content of the CM:  
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# THANK YOU

