EASA	COMMENT RESPONSE DOCUMENT
	Proposed Special Condition for Installation of Structure Mounted Airbag **Applicable to A380** **Issue 1**

Commenter 1 : Boeing (Operational Regulatory Affairs)

Comment # [1] – Statement of Issue

Text states : " … *Inflatable restraint system in front of passenger operating opposite to flight direction will be denoted as structure mounted airbag."*

Comment :

Limiting the definition to systems that are located in front of a passenger and deploy aftward may be too restrictive. There are scenarios where the inflatable restraint could deploy from the side and still position itself, when inflated, in front of the passenger (e.g., located to prevent a corner strike condition). The term *"structure mounted*" should refer to the installation and not to the location or orientation of the device.

Re-wording suggested :
"A structure mounted airbag is defined as an inflatable restraint system mounted on interior structure that does not move with the passenger and which deploys between the passenger and the structure."

EASA response:
EASA position: Agreement
EASA answer: The Statement of Issue for the proposed Special Condition D-52 is changed accordingly.

Comment # [2] – Special Condition – 2) Intermediate Pulse Shape

This Special Condition is not a stand-alone condition.

It is actually a sub-condition to Special Condition 1, or a qualifying statement for Special Condition 1.

Comment :
It is recommended to add/merge the wording of the paragraph 2 to the paragraph 1 -HIC Characteristic- of the Special Condition.

EASA response:

***EASA position: Noted*.**
EASA answer: The proposed change will not change the intent or requirements of the proposed Special Condition D-52. The existing structure was chosen to highlight EASA position related on "intermediate pulse shape". In addition the proposed Special Condition D-52 is based to a great extent on the commented and agreed Special Condition D-47 "Installation of inflatable Seatbelts". It is therefore preferred to keep the two Special Conditions as similar as possible when it will not improve safety. Therefore the Special Condition D-52 remains unchanged and harmonized with Special Condition D-47.

Comment # [3] – Special Condition – 3) Protection during Secondary Impact

No definition of "*secondary impact"* is contained within the regulations. Consequently, compliance with this Special Condition is subjective and cannot be quantified

Comment :
It is recommend making the following changes to Paragraph 3:

- Revise the title of this Special Condition to: "*Protection of Occupants"*
- Replace the proposed wording with the following text: *"Evidence must be provided that the post-deployment features of the installation shall not result in an unacceptable injury hazard. This must include consideration of the deflation characteristics in addition to physical effects. As a minimum, a qualitative assessment shall be provided. It must also be substantiated that the trigger point for airbag deployment has been chosen to ensure the probability of the protection being available when needed."*

EASA response:

***EASA position: Disagreement*.**
EASA answer*: *The proposed Special Condition D-52 is based to a great extent on the commented and agreed Special Condition D-47 "Installation of inflatable Seatbelts". It is therefore preferred to keep the two Special Conditions as similar as possible when it will not improve safety. Therefore the Special Condition D-52 remains unchanged and harmonized with Special Condition D-47.

Comment # [4] – Special Condition – 4) Protection of Occupants other than 50th Percentile

Text states : "*The existing policy is to consider other percentile occupants on a judgmental basis only i.e. not using direct testing of inquiry criteria but evidence from head paths etc. to determine likely areas of impact.*

Comment :
Re-word "*inquiry*" with the correct term "*injury*"

EASA response:
EASA position: Agreement.
EASA answer: Typo, the proposed Special Condition D-52 is changed accordingly.

Comment # [5] – Special Condition – 5) Airbag Deployment

text states: *"5) Airbag Deployment*

Evaluation of the deployment of the airbag must take into account the deflection or deformation of the installation during the crash pulse. If installed in a monument used for stowage, this should include the possible range of loading conditions. The effects of any loads imposed by the airbag deployment on the positioning of the airbag should also be included in the evaluation.
The HIC test may be performed with the airbag deploying from a rigid test fixture provided that the above factors and the occupant size considerations in paragraph 4) are taken into account. A rational analysis supported by static deployment tests would be acceptable."

Comment :
There is no requirement for aircraft interior components designed to meet the requirements of CS 25.561 to withstand any "*crash pulse*."

It is recommend that this entire paragraph be replaced with the following text:

"5) Airbag Deployment

Evaluation of the airbag deployment and the occupant impact with the airbag must be conducted using a rigid test fixture. Testing must consider occupant size (Condition #4) and position (Condition #6)."

EASA response:
EASA position: Disagreement.
EASA answer: The proposed change to the text of" 5) Airbag Deployment" is more prescriptive that the existing text and is not improving the level of safety. It is EASA position that Special Conditions must ensure the intended level of safety but not reduce flexibility of design or compliance

demonstration. Therefore the text remains unchanged.

Comment # [6] – Special Condition – 6) Occupants Adopting the Brace Position

This paragraph, as proposed, does not address “out of position” occupants.

Comment :
Unlike a pelvic restraint airbag, which deploys away from the occupant, a bulkhead mounted airbag deploys toward the occupant. This can be compared to the first generation of airbags installed in automobiles.
This paragraph should require that the airbag have a tailored deployment profile – deploy, fill, harden – to reduce the risk to out of position occupants.

It is recommend adding the following text to this paragraph:
“Structure mounted airbags must be designed to accommodate out of position occupants and must not themselves cause a hazard or generate a hazardous condition.”

EASA response:

EASA position: Disagreement.
EASA answer: Special Condition 6) Occupants Adopting the Brace Position is addressing “out of position” occupants as it also addresses intermediate positions. The proposed Special Condition D-52 is based to a great extent on the commented and agreed Special Condition D-47 “Installation of inflatable Seatbelts”. It is therefore preferred to keep the two Special Conditions as similar as possible when it will not improve safety. Therefore the Special Condition D-52 remains unchanged and harmonized with Special Condition D-47.

Comment # [7] – Special Condition – 6) Occupants Adopting the Brace Position

This appears to be an omission (when compared with other recent airbag Special Conditions that have been issued).

Comment :
It is recommended adding the following wording to this paragraph :

“The airbag must protect occupants with loosely fastened pelvic restraints.
[Loose is defined as being able to insert a 2.4” diameter bar between the ATD’s pelvis and the pelvic restraint system.]”

EASA response:

EASA position: Disagreement.
EASA answer: Other recent airbag Special Conditions that have been issued as mentioned in the comment to – Special Condition – 6) Occupants adopting the Brace Position, are related to seatbelt mounted airbag systems. The new proposed Special Condition D-52 is addressing structure mounted airbag installations. Such installations do not interfere with the seatbelt. Therefore the use of the seatbelt will be considered as for all other seat and seatbelt certifications that have to comply with the emergency landing dynamic conditions.

Comment # [8] – Special Condition – 15) & 18)

Both Special Conditions deal with flammability

Comment :
It is recommend locating these two paragraph adjacent to each other in the final document.

EASA response:
EASA position: Noted.
EASA answer: ***Proposed Special Condition D-52 remains unchanged as this is a nice to have comment and that some certification documents are already referring to the current CRI numbering.***

Comment # [9] – Special Condition – 19)

This paragraph specifies a specific manufacturer.
However, it should be general in order to avoid the perception of bias.

Comment :
It is recommend revising the text a follows:

*"19) If lithium-ion non-rechargeable batteries are used to power the ~~AMSAFE Aviation Inflatable Restraint (AAIR)~~ inflatable restraint, the batteries must be RTCA DO-227 and Underwriters Laboratory (UL) compliant. ~~However, if~~ **The use of** rechargeable lithium-ion batteries ~~are used~~, **may require** additional special conditions ~~may apply~~."*

EASA response:
EASA position: Agreement.
EASA answer: The proposed Special Condition D-52 is changed accordingly

Comment # [10] – Special Condition – 20)

The intent of this Special Condition is already covered in CS 25.601

Comment :
It is suggested deleting this Special Condition.

EASA response:
EASA position: Disagreement.
EASA answer: We do not have a lot of experience with structure mounted airbag installations. But someone may have the position that seatbelt airbag systems are similar and have demonstrated their reliability. Special Condition 20) was issued to highlight the issue.

Comment # [11] – Special Condition –

No mention is made of the effect that deflated airbags may have on escape path lighting after impact.

Comment :
It is recommend adding the following paragraph :

"The airbag, once deployed, must not adversely affect the emergency lighting system (i.e. block escape path lighting to the extent that the light(s) no longer meet their intended function)."

EASA response:
EASA position: Agreement.
EASA answer: The proposed Special Condition D-52 is changed accordingly

EASA Note :

Following the comments received, EASA has decided to modify and to re-issue the Special Condition on "installation of structure mounted airbag - Applicable to A380" – (Click here - hyperlink).
Most of the changes brought to the initial issue were editorial, therefore a new consultation has been judged not needed.