European Aviation Safety Agency *30 Nov 2009*

COMMENT RESPONSE DOCUMENT (CRD) TO NOTICE OF PROPOSED AMENDMENT (NPA) 2008-04

for amending the Executive Director Decision No. 2003/02/RM of 17 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for large aeroplanes (« CS-25 »)

"Type III emergency exit access and ease of operation"

Explanatory Note

I. General

1. The purpose of the Notice of Proposed Amendment (NPA) 2008-04, dated 10 April 2008 was to propose an amendment to Decision 2003/02/RM of the Executive Director of the European Aviation Safety Agency of 17 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for large aeroplanes CS-25 as last amended by Executive Director's Decision 2009/013/R of 14 October 2009 (CS-25 Amendment 7).

II. Consultation

2. The draft Executive Director Decision amending Decision N° 2003/02/RM/Opinion for amending Commission Regulation 216/2008 was published on the web site (http://www.easa.europa.eu) on 10 April 2008.

   By the closing date of 10 July 2008, the European Aviation Safety Agency ("the Agency") had received 41 comments from 16 National Aviation Authorities, professional organisations and private companies.

III. Publication of the CRD

3. All comments received have been acknowledged and incorporated into this Comment Response Document (CRD) with the responses of the Agency.

4. In responding to comments, a standard terminology has been applied to attest the Agency's acceptance of the comment. This terminology is as follows:

   - **Accepted** – The comment is agreed by the Agency and any proposed amendment is wholly transferred to the revised text.
   - **Partially Accepted** – Either the comment is only agreed in part by the Agency, or the comment is agreed by the Agency but any proposed amendment is partially transferred to the revised text.
   - **Noted** – The comment is acknowledged by the Agency but no change to the existing text is considered necessary.
   - **Not Accepted** - The comment or proposed amendment is not shared by the Agency.

   The resulting text highlights the changes as compared to the current rule.

5. The Executive Director Decision will be issued at least two months after the publication of this CRD to allow for any possible reactions of stakeholders regarding possible misunderstandings of the comments received and answers provided.

   Such reactions should be received by the Agency not later than 1 February 2010 and should be submitted using the Comment-Response Tool at http://hub.easa.europa.eu/crt.

IV. CRD table of comments, responses and resulting text

(General Comments)	-

comment	*4* comment by: *FAA* The FAA has reviewed NPA No. 2008-04 and has no comments.
response	*Noted*

comment	*15* comment by: *AEA* AEA members in general support any regulation activity for improvement of occupant survivability in survivable crash scenarios. With respect to the complex issues of evacuation through Type III exits, the current regulations could be improved as proposed by EASA. We would like to take this opportunity to mention that the safety aspects adressed in this NPA could be ensured by operational procedures, improved seat design and other further enhancements as previously discussed within the working groups (but without reaching consensus). In addition, an extended safety briefing for passengers seated adjacent to the type III exit is relevant, for this reason OPS 1.285 should also be reviewed.
response	*Noted* Operational approaches were discussed and considered, as explained in the NPA, to the extent possible in the context of supporting the revisions to aircraft construction requirements of CS-25. Revision of the operational code was not part of the group's remit. The Agency can see the potential benefit of an extended safety briefing to passengers and will investigate this in future rulemaking associated with the operational code.

comment	*16* comment by: *AEA* <u>Impact on comfort level.</u> The concerns from an operator's point of view are mainly related to the ability of providing a <u>consistent</u> level of comfort to all passengers within one class. Reductions in seat pitch and/or recline etc. have a major impact on the comfort level. Maintaining these levels while also meeting the proposed requirements regarding Type III exit access and operation will most probably affect the number of seat rows in an airplane cabin of certain, fixed dimensions.
response	*Noted* The commenter's concerns are understood and were duly considered. The balance between safety and economic/comfort impacts was debated at length, in particular the possible loss of a seat row. Disagreements on this issue within the

group led to the use of the Agency's Conflict Resolution procedure.

The comment does not bring new arguments to the issue and therefore the Agency sees no reason to reverse the decision taken.

comment

24 comment by: *ETF*

The European Transport Workers' Federation (ETF) has the following general comments:

While the NPA addresses new design on aircraft, accident investigations show that even the current design on type III exits may pose a risk during evacuations but that this risk is acceptable to the industry.

The NPA and suggested rule change is far from optimal as it demonstrates dissenting views. In particular how far modifications can encroach on the type III exit has been discussed over the years. In addition some of the suggested rules seem to contradict each other.

The study by Professor Helbing et al on the dynamic features of escape panic (2000) (*) describe by simulation how escape panic can build up fatal pressure. Despite the fact that this study was on the design of buildings and corridors the result may be of relevance. The studied aircraft accidents in the NPA with high fatality may indicate the same escape panic pattern in addition to inhalation of toxic smoke or fumes. One of the main findings in the Helbing study was the effect that "faster is slower" due to impatience and that this in turn could lead to panic and pushing. This result may also influence design solutions on how far the encroachment on deployable features such as legrests into the type III exits should be.
One of the simulations in the study was on an escape route with a wider area. Their conclusion was that the efficiency of evacuating a corridor drops by 20% if the corridor contains a widening. The relevance to this NPA is that the space adjacent to the type III exit under CS 25.813 (c) (ii) could develop into a bottleneck and lead to jamming. The conclusion corresponds with the note under AMC 25.813 (c) 4 second paragraph.

The ETF would for the above reasons suggest that further studies are needed to assess that the rule change will not lead to a lower level of safety of the occupants.

http://www.nature.com/nature/journal/v407/n6803/full/407487a0.html#B1

response

Noted

The Agency agrees that all possible efforts must be made to be confident that regulations will result in designs that will perform optimally in real emergency evacuation situations.

In regard to the "outboard seat removed" configuration, the Agency feels that sufficient experience and test evidence exists in order to be acceptably confident of its efficacy under real conditions. For a more detailed explanation, please see the response to comment No 28.

comment 28 comment by: *AIR SAFETY GROUP*

Air Safety Group comments on EASA NPA No 2008-04
'Type III Emergency Exit Access and Ease of Operation'

The Air Safety Group (ASG) welcomes this Notice and commends EASA for addressing the issues involved and the differences of opinion expressed, particularly those put forward during the FAA/JAA Cabin Safety Harmonisation process. This allows our response to be brief and in turn address only a limited number of these issues which we ask EASA to consider before finalising the amendments to section CS 25.813.

The following points broadly reflect the order of the Notice of Proposed Amendment (NPA) and are not in any order of priority.

The NPA addresses the issues of Exit Access and Ease of Operation. The equally important issue of the blocking of Type III exits, which is well documented in accident reports and research work, is not addressed. In the longer term, at least in the larger airliners, Type III hatches must be replaced in new designs by more adequate doors. New regulations on access and opening of these Type III exits should not be introduced for application on new designs without the 'blocking' problem being fully considered and resolved. The likely design changes to improve Access and Ease of Operation do not address this problem. Paragraph 8 below makes proposals which apply to new designs to aim to remove the 'blocking' problem.

1. Access to Type III exits in the early days of jet transport

One aspect not discussed that we believe to be relevant is that the early jets, certainly European ones such as the Comet 4, Trident, BAC 1-11 and VC-10, all showed a considerably greater seat pitch adjacent to Type III over-wing exits than elsewhere. Indeed the Trident used at Cranfield for the early evacuation trials sponsored by the CAA was delivered from British Airways with an 18 inch gap and this was found to be typical of the aircraft types mentioned above. These aircraft were designed to airworthiness requirements which avoided quoting actual dimensions but stated:
'Easy means of access to the exits shall be provided to facilitate use at all times, including darkness; exceptional agility shall not be required of persons using the exits.
Access shall be provided from the main aisle to Type III .... exits and such exits shall not be obstructed by seats, berths or other protrusions to an extent which would reduce the effectiveness of the exit.'
Having investigated the over-wing exit area, the exit hatch and the seating adjacent to the exit the AAIB, in its report on the B737 accident at Manchester in 1985, found it '*difficult to reconcile the certification of such a cabin configuration with the (above) requirements ...*'
It was this accident and the inadequate space between seats adjacent to these exits that led to a great deal of research and discussion and to the need to quote minimum dimensions in order to ensure that the spirit of the requirements would be met. However it is a great pity that those being considered fall well short of what the industry considered necessary before actual dimensions were first called

for.

2. Outboard seat removed

With reference to the 3rd complete paragraph of page 10, the staff member responsible for opening the Type III exit during many of the Cranfield trials is of the opinion that the 'outboard seat removed' configuration is unacceptable in that, even with practice, it was extremely difficult to open the hatch with passengers coming from two directions rather than one and that he recalls, contrary to the statement made, that several blockages did occur. He suggests that one of the few faults in an otherwise excellent report on the trials was that the effect of abandoned trials, which occurred with this configuration due to the exit becoming blocked due to two passengers trying to get through the 20 inch wide exit at the same time, and compounded by very narrow access gaps, was not easily seen in the summary of results. Had the abandoned trials been allowed to continue a little longer and/or had they cleared with the evacuation continuing, then the resulting very slow evacuations would have changed the average evacuation times significantly and, it is suggested, shown this configuration to be dangerously slow even with the hatch opened and thrown out very rapidly. As it was only the faster, successful trials with no major blocking were considered and the results consequently interpreted as satisfactory.

We therefore suggest that the EASA reconsider authorising this configuration unless it is considered that trials with an 'automatically disposable hatch', ADH, have demonstrated that with such a hatch the configuration is indeed acceptable. However we feel strongly that with a conventional removable hatch this configuration should not be authorised and that paragraph CS 25.813 (1) (ii) be removed or amended accordingly. In this we are in general agreement with the position of many organisations involved with the CSHWG report.

3. Ease of Operation Safety Impact

We strongly support the introduction of ADHs and recommend that new aircraft are so fitted (but see paragraph 8). However it should not be forgotten that FAA CAMI trials demonstrated that even a short but well presented briefing by a member of the cabin staff of the passenger seated by a conventional removable hatch considerably increased the chances of that passenger opening and disposing of the hatch rapidly and correctly. This was an important finding that is relevant to the many aircraft that have and, unless all aircraft are retro-fitted with ADHs, will continue for many years to have this type of hatch. We recommend that airline cabin staff be required to brief such passengers in an appropriate manner.

If the hatch is not rapidly thrown out onto the wing but is allowed to drop inside the cabin then the proposed gaps of 10 inches for double seats and 13 inches for triple seats are inadequate.

We regretfully concur with the view that it is extremely doubtful that cabin staff will ever be able to give an adequate briefing to those passengers required to open the hatches in an emergency. We therefore recommend that separate and different figures are quoted for aircraft with ADHs and without ADHs.

4. Access to the Type III exits

Having studied the results of both the Cranfield and the CAMI trials (the member of the Cranfield team referred to above also observed a number of the CAMI trials) we are not convinced that a 10 inch gap will ever be adequate because of the difficulty in stepping through the hole onto the wing from such a narrow and off-centre gap. We therefore agree with the position of the various organisations involved in the CSHWG report who recommended that 13 inches should be the minimum for all configurations. It should be noted that these same organisations supported the CSHWG report in saying that conventional removable hatches should not be allowed for aircraft with 20 or more seats. To reconcile this position with the fact that it is extremely unlikely that many existing aircraft will ever be retrofitted with ADHs, however much we would like this to occur, we propose that the figure of 13 inches is **only** applicable to aircraft fitted with ADHs. For existing aircraft with conventional removable hatches we propose that these dimensions should be 13 inches for double seats and 16 inches for triple seats to take into account the likelihood that the hatch will be dropped onto the floor during many emergency evacuations.

5. Placards

We support the spirit of paragraph 25.813 (4) and in particular sub-paragraph (ii), namely: *'Accurately state and illustrate the proper method of opening the exit,...'.* However we must point out that in many current aircraft the same placard is displayed on both sides of the aircraft. This means that 50% of them are back to front and do not '*accurately illustrate the proper method of opening'.* These we believe would almost certainly confuse any passenger trying to follow the instructions illustrated.

Rapid hatch opening is best achieved, with lap belt undone and when still seated, by moving the hand adjacent to the hatch to the bottom handle and the other hand to the top. This allows the hatch to swing down and rotate into the cabin above the passenger's lap and thus to be in the best position then to swing back outwards through the gap and onto the wing.

All placards must show this clearly and correctly since if the hands are reversed the hatch is almost certain to continue falling into the cabin out of the control of the passenger. Information about the need for two different versions of these placards should be included within paragraph (4) and in the relevant advisory material.

We accept that if a single unhanded placard is used then 50% will show the correct position but that if handed placards are introduced then it would be possible for none to show the correct position. To avoid such an absurd error the wording of the two versions must make absolutely clear which side of the aircraft each type of placard should be fitted.

6. Seat pitch

An issue that is relevant to evacuations in general, not only to the Type III discussion in particular, is the possibility of passengers being trapped as they stand up and at about the same time the person behind them pushes the seat

back right forward. With a small seat pitch and with certain seats the seat back can come down behind the knees of the passenger in front and make it virtually impossible for them to move. If an operator increases the seat pitch at the exit there will be pressure to still further reduce the pitch elsewhere, thereby increasing the likelihood of passengers becoming trapped. This issue should be considered by EASA when authorising specific seating configurations. It should be noted that a specific minimum seat pitch is not a good indicator of the space available as the thickness of the seat back cushions can vary quite largely and a 27 inch pitch seat with thin cushions can give more space (albeit less comfort) than a 29 inch seat pitch, with seat backs with more depth. The necessary space needs to be specified by minimum dimensions as in the UK CAA's Airworthiness Notice.

7. Foreign airlines

Since European passengers fly to and from Europe on foreign airlines we suggest that EASA considers ensuring that such airlines conform to European standards with respect to cabin safety and, in particular, to the latest version of paragraph 25.813.

8. Future new aircraft types

The original Type III emergency exit where the hatch has to be opened and disposed of by the passenger (i.e. not an ADH) has problems which may be summarised as follows:

1) The opening and disposal of these hatches is carried out by untrained people (passengers) and the experience has shown that they frequently take considerable time to achieve this, thus delaying evacuation.

2) There is a risk that passengers may open a hatch when a trained professional would not, e.g. when an external fire is relatively close. This can accelerate the fire process and result in more fatalities.

3) In actual accidents and evacuation trials, the hatch is frequently put on a seat rather than being thrown out on the wing, as intended. It is then likely to end up on the floor where it becomes a significant obstacle and delays evacuation.

4) Experience of evacuations in life-threatening situations ('competitive behaviour') shows that passengers trying to exit simultaneously quite frequently cause the exit to block preventing or delaying further evacuation.

The Air Safety Group considers that these problems make the manually-opened hatches unsatisfactory and unsuitable as a means of complying with the 25.813 evacuation requirements, especially the tendency to become blocked under some circumstances. At least on the larger airliners the requirements should be met by the use of larger doors with a floor-level sill. The Automatically Disposable Hatch (also referred to as an Automatic Opening Exit (AOE) by Boeing) has been shown to result in significant improvements - problems 1) and 3) above are alleviated or removed, but 2) and 4) are unchanged; problem 4 (blocking) can make the exit unusable.

A substantial number of participants in the JAA/FAA Cabin Safety Harmonisation Working Group supported the position that the Type III hatch should not be allowed on **new** aircraft types with passenger seating of 110 or more; the ASG agrees in principle but considers that the discriminate should be lower (60 or more seats) and that all exits should be a minimum of Type I doors, or approved new doors with floor-level sills and substantially larger than the Type III exit minima.

For **existing** aircraft types retrospective modification to fit larger doors is difficult and expensive. ADHs should, however, be required for Type III exits for **new variants** with passenger seating for 20 passengers or more. **Existing aircraft in service** and **new production of current variants** with Type III exits should not be required to be modified for the foreseeable future.

response

Partially accepted

The comments from the Air Safety Group are here below dealt with in turn;

1. Access to Type III exits in the early days of jet transport

Noted

The comments on the history of type III exit access dimensions are interesting. However, the Agency is still of the opinion that the minimum dimensions in the proposed new rule are appropriate.

Mention is made of the B737 accident at Manchester in 1985 and the fact that the investigating authority were surprised that the cabin had been found in compliance to the applicable requirements, which gave sensible but only qualitative guidance.

It should be noted that the layout on this aircraft (reference Appendix 3 fig. c of the AAIB report on this accident) was such that to be made compliant with the new proposed requirements, the seats immediately behind the access passageway would need to be moved about 10 inches rearwards.

2. Outboard seat removed

Not accepted
In addition to the evacuation trials performed by Cranfield Institute of Technology, and as explained in the NPA text, several phases of evacuation trials were also performed by the FAA's Civil Aeromedical Institute (CAMI). Two reports, issued in 1989 and 2002 (References 7 and 9 in the NPA), include data from trials involving the "Outboard Seat Removed" (OBR) configuration. The latter report included 48 evacuations with this configuration.

The commenter mentions two problems encountered in the Cranfield OBR trials: an initial difficulty to open and dispose of the hatch and blockages of the exit due to multiple escapees attempting to make simultaneous use of the exit. In two cases blockages were sufficiently severe that the test was abandoned.

The FAA trials did not encounter either of these effects. The results obtained from

these evacuation trials showed that the OBR configuration produced comparable overall results to the single passageway configurations. The "Exit Ready Time" compared favourably with that of other passageway configurations and no evacuation trial was halted because of exit blockage.

The Agency thus remains confident that the OBR configuration is a valid option in the new rule.

3. Ease of Operation Safety Impact

Not accepted

In regards to the suggestion that cabin staff be required to brief passengers seated adjacent to Type III Exits, as explained in the reply to a previous comment (No. 15 see above), this goes beyond the remit of the subject CS-25 revisions to Type III exit requirements.

The Agency is not in agreement in regards to the suggestion of wider minimum access requirements for "non ADH" Type III exits. With the new proposed revisions to CS-25, such a suggestion would only apply to aircraft with less than 41 passenger seats. These aircraft are required by CS 25.807 to have a relatively high total exit "rating" and due to their size are likely to be penalised more if increased access dimensions were to be specified.

Studies performed for this rulemaking activity confirmed this reduced criticality of Type III exits for these smaller aircraft and in any case the Agency does not agree that provision of increased minimum access dimensions will necessarily lead to reduced effects of misplacement of a removable hatch.

4. Access to the Type III exits

Not accepted

Extensive trials data were generated, both in Europe and the US, from which the proposed minimum access dimensions were derived. The Agency finds nothing in this comment to indicate that the proposed minimum dimensions have been chosen unwisely.

The comment relating to existing aircraft is outside of the scope of this rulemaking task, which is only related to new designs.

5. Placards

Accepted

It was certainly the intention that the subject placards be "handed" in order that the illustrations on both sides of the aircraft are correct. It is the Agency's experience that "handing" such placards is in fact the common practice where they have been installed due to regulations other than JAR/CS 25.

However, the point is taken and text will be added to AMC 25.813(c) making it clear that unhanded placards are unacceptable and that safeguards against the

incorrect installation of the placards should be taken.

The second point is also taken, i.e. that the best way to handle the hatch should be shown. This may vary somewhat between designs and so a general approach will be taken, i.e. that the technique shown on the placard must be substantiated.

AMC 25.813(c) will be amended. See resulting text at the end of the CRD.

6. Seat pitch
Not accepted

The point made is interesting but after consideration the Agency sees no need to make any further revisions to CS-25.

CS 25.813(c)(6) requires that seat backs bounding access passageways to Type III and IV exits be designed to prevent escaping passengers climbing over seat backs to bypass the intended evacuation route route (Note that due to the revised layout - see comment No. 2- 25.813 (c) (6) is now 25.813 (c) (7) (i)). This requirement is in the form of a limitation to the deflection of seat backs from the vertical under a defined load which will also have the result of preventing the passenger trapping concern raised by this comment.

The wider issue of the space provided for seated passengers (which, as the commenter explains, is only indirectly related to seat pitch) may be considered in future rulemaking.

7. Foreign airlines
Not accepted

The suggestion is beyond the scope of this NPA This rulemaking activity covers changes to CS-25, which is applicable to the applicants for new designs and not concerned with regulation of the design of third country aircraft operated by foreign airlines.

The issue may however be considered in the future rulemaking activity of the Agency related to regulation of third-country aircraft.

8. Future new aircraft types
Not accepted
The commenter makes two points under this heading, that Type III exits should not be allowed on aircraft with passenger seating layouts of more than 60, and that new "variants" of currently produced designs with passenger seating layouts of more than 20 should be required to have ADH Type III exits.

Taking the points in turn;

The efficacy of Type III exits in the context of various aircraft sizes was debated during the development of this NPA and no reason was found to suggest that as size increased their evacuation performance reduced.

The design requirements of this NPA are derived from extensive test data and the Agency is confident that they assure the risk of "blocking" as suggested by the

commenter is reduced to a level commensurate with the nominal passenger rating assigned to a Type III exit by CS 25.807.

In the vast majority of designs, Type III exits will be under passenger operation. It might therefore be argued that the risk of an exit being unwisely opened, such as when an external fire is close, will be higher than with cabin crew operated exits. However, service experience has not revealed this to be a significant problem.

The Agency thus remains confident that the Type III exit, as restricted in its design (and that of surrounding items) by the new provisions of this NPA, remains an acceptable contributor to evacuation performance on aircraft up to large size.

In regards to new variants of aircraft, the existing provisions in Part 21 provide mechanisms by which ADH may be mandated. The introduction of a pair of Type III Exits would need to be considered in the context of 21A.101.

comment	*32* comment by: *CAA-NL* CAA-NL:no comments on this NPA
response	*Noted*

comment	*33* comment by: *Luftfahrt-Bundesamt* The LBA has no comments on NPA 2008-04.
response	*Noted*

comment	*41* comment by: *UK CAA* Thank you for the opportunity to comment on NPA 2008-04, Type III Emergency Exit - Access and Ease of Operation. Please be advised that the UK CAA have no comments.
response	*Noted*

comment	*42* comment by: *Transport Canada Civil Aviation Standards Branch* Foremost, we wish to express our support for the subject proposed regulatory action, particularly in regard to the implementation of *automatically disposed hatches* (ADH). This notwithstanding, we submit the following comments (discussed previously): 1) Although we recognize that the benefits that are likely to accrue from the implementation of ADH on aeroplanes with a passenger capacity of 40 or less ('smaller' transport category aeroplanes) are relatively lower than those for higher-passenger-capacity aeroplanes (due to the lower number of passengers and to the better exit-capacity to passenger-number ratio of these aeroplanes), we submit that such benefits may very well be viable - and cost-effective -,

	particularly in consideration of the increasing 'value of human life' that we are seeing in recent times (at least here, in North America), and the existence of viable ADH designs already in service on some such aeroplanes. It is noted that the referenced analysis (Reference 3), which discusses the benefits likely to accrue from the implementation of ADH, has only considered accidents to low-wing aeroplanes; we are planning on developing data regarding high-wing aeroplanes in the near future. We previously provided EASA with data from evacuation tests conducted for us by Cranfield University (CU) in support of this activity, which indicated that the disposition of type III hatches inside 'smaller' transport category aeroplanes could significantly reduce passenger egress rates (we did not see this data referenced in the NPA). The results of this work, together with the results of further testing recently completed for us by CU, suggests that this egress rate reduction could be of the order of 12 to 29% (for the tested conditions and configuration: single aisle, 4 seats abreast, representative of a 'smaller' transport category aeroplane) - probably a higher factor than that for larger transport category aeroplanes (likely due to the more confined vertical space at type III exits on such aeroplanes). Another issue related to 'smaller' transport category aeroplanes is the potential for hatch disposition inside the aircraft to slow down evacuation by obstructing the aisle, particularly on the '1-seat' side of a three-seats-abreast configuration; we are planning on conducting work to assess this in the future. 2) Consideration should be given to ensuring that definitive and appropriate *exit jamming* criteria are applied to ADH, inasmuch as, as indicated in the referenced justification report (Reference 11), the anticipated benefits may not be realized (or could, in effect, become negative) if the exit jamming rate for ADH is more than a factor of approximately 2.85 over the relevant rate for conventional type III exits, and as ADH, potentially being more 'complex' exits, are probably more likely to be subject to jamming/failure. Reference (3) A Benefit Analysis for the Installation of Automatic Hatches at Type III Exits (0942/R/000308/KK) February, 2008, RGW Cherry and Associates. Reference (11) A Review of Issues Related to the Fitment of Automatically Disposable Hatches at Type III Exits with Regard to the Number of Certificated Passenger Seats (0982/R/000422/KK) February, 2008, RGW Cherry and Associates. We would be happy to discuss the above at your convenience. We wish to thank EASA for the opportunity to comment on the subject NPA.
response	*Partially accepted* These two comments are addressed in turn. Not Accepted 1) Passenger Number Discriminant Used for Requiring ADH Hatch

The commenter suggests that a requirement for Type III exits to be of the ADH type on aircraft with seating capacities of less than 41 seats may in fact provide economically justifiable safety benefits.

The commenter refers to the results of recent evacuation trials conducted in a smaller diameter cabin mock-up (double seats either side of the longitudinal aisle). These trials indicated that evacuation times from a Type III exit in such a cabin may be increased by up to 29% by unfavourable disposal of a removable hatch. The Agency has reviewed the reference test data. In the light of the conditions tested (hatch impediment placed either horizontally or vertically in the exit access passageway, compared to no hatch impediment) it is easy to see that such an adverse effect is possible. However, the Agency believes that the probability of a removable hatch being disposed in such a way and the relative contribution of a Type III exit to the overall evacuation capability of the aircraft size in question must also be considered. As the commenter concedes, the smaller the aircraft, the better the exit capacity to passenger number ratio. Taking these combined factors into account, the Agency remains confident with the analysis method used to determine the passenger number above which ADH exits are needed, namely 40 seats (Reference 3 in the NPA).
"The commenter notes that high wing aircraft accidents were not considered in the reference report. This was because the only data available regarding occupant egress rates came from trials of low wing aircraft configurations (CAMI testing). It is likely that egress rates for high wing aircraft are different from low wing aircraft. High wing aircraft of less than 41 passengers contribute a very small proportion to the worldwide passenger seat count and thus they represent a correspondingly small potential to save lives. The Agency does not believe that had their inclusion in the analysis been practicable, the overall conclusions would have been altered."

Partially Accepted

2) Exit Jamming

It is agreed that care must be taken to prevent the new ADH type exit designs introducing unacceptable jamming risks. However, it is the Agency's considered view that the current design processes employed in door design, as required by the certification process, will result in only a minimal increased risk, due to the inevitable increase in complexity. A significant safety benefit will therefore still be achieved by introduction of the requirement for ADH designs.

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comment	*27* comment by: *DGAC France* the French DGAC has no comment on this NPA 2008-04
response	*Noted*

A. Explanatory Note - IV. Content of the draft decision p. 4-6

comment	*8* comment by: *AIRBUS* The paragraph 10 should be modified as shown: *"10 [...] The intention of the ADH is that ~~it does not require manual intervention to ensure that~~ its final location after opening is in a position that does not present an impediment in the exit access path, in the exit opening itself, or outside the aircraft."* Justification: The intention is certainly to design a hatch that doesn't need to be carried after opening. But disposing the hatch in a position that doesn't create an impediment in the exit access path can be done manually. A person can pull the handle and push/pull the hatch till it has reached a position outside the exit access path inside or outside the cabin.
response	*Partially accepted* The wording "manual intervention" does not convey the meaning intended. It is agreed that many acceptable ADH designs under the proposed new rules of this NPA will require the operator to push/pull or otherwise manually bring the exit to its final open position. The intention of this paragraph in the Explanatory Note section of the NPA was to clarify that an ADH design is one in which mechanisms guide the exit blade/plug to its final open position and secure it in this position. Note: The comment is agreed in principle but the Explanatory note will not be published again.

A. Explanatory Note - V. RIA - 1. Purpose and Intended Effect - a. Issue which the NPA is intended to address p. 6-7

comment	*18* comment by: *AEA* <u>Performance of exits in relation to pax density.</u> As a result of the specified comfort level in First and Business Class, certain cabin configurations accommodate significantly less passenger seats than the maximum certified seat count for the subject airplane type. In those cases the relationship between the seat count/passenger density and the exit performance should be taken into account.
response	*Not accepted* The commenter appears to be suggesting that in the event that there are less seats installed than the maximum certificated number, exit performance might be allowed to be reduced also. Whilst there may be logical arguments to support such a proposal, this is outside the terms of reference of the task covered by this NPA.

A. Explanatory Note - V. RIA - 1. Purpose and Intended Effect - c. Brief statement of the objectives of the NPA p. 7

comment	*20* comment by: *European Regions Airline Association* ERA request that any new requirement be required only for aircraft seating 61 and above. Justification: • only minor improvements for aircraft seating between 41 and 61 • economic penalty is proportionally much higher for sub 60 seat aircraft • 40 seats is not an usual discriminant used, whereas 60 is already used for some considerations (such as reinforced cockpit doors)
response	*Not accepted* Discussions regarding the choice of discriminants for requiring the various Type III Exit design features were a significant part of the deliberations of the working group. The decisions taken, namely above 19 seats for requiring dimensioned minimum access and unobstructed projected opening, and above 40 seats for ADH exit design, are by their nature not definitive. However, if anything there is reason to justify lowering the descriminants, not increasing them. There is already a discriminant set at 40 seats in CS 25.807 associated with the number and type of exits required versus seating capacity. The step change in required exits at this point is one of the influences on the choice of 40 for the introduction of the ADH design (as is explained in the NPA).

A. Explanatory Note - V. RIA - 4. Impacts - a. All identified impacts - i. Safety p. 8-13

comment	*21* comment by: *European Regions Airline Association* ERA request that the new requirement be required only for aircraft seating 61 and above. Justification: • only minor improvements for aircraft seating between 41 and 61 • economic penalty is proportionally much higher for sub 60 seat aircraft • 40 seats is not an usual discriminant used, whereas 60 is already used for some considerations (such as reinforced cockpit doors)
response	*Not accepted* See reply to comment No. 20

A. Explanatory Note - V. RIA - 4. Impacts - a. All identified impacts - ii. Economic p. 13-15

comment	*14* comment by: *AEA*

Attachment #1

Ref: "**Ease of Access Economic Impact**" page 14

Comment: The Agency refers to improved FAA access requirements. We would like to make following remarks:
According to our understanding the improved FAA access requirements were introduced per Amendment 25-76 (and not Amendment 25-79).
Obviously U.S. operators have been impacted by these improved requirements. Therefore FAA has provided opportunities for Part121 operators to request a deviation from the requirements in case application would affect cabin layouts above a defined level, which involves seat pitch and total number of passenger seats.
We feel that making reference to the economic impact of the corresponding FAA requirements, without mentioning the "escape" provided for those operators having problems with the incorporation of the new requirements, does not adequately reflect the awareness of the negative economic impact.

The relevant parts of the corresponding FAA requirements are cited in the attached document.

response *Partially accepted*

The commenter is correct; the FAR 25 amendment quoted should have been 25-76.

However, the "escape" provided to Part 121 operators is only in regards to retrofit actions on existing aircraft. This NPA, and the FAA action introduced by Amendment 76, only affect applications for new type designs.

Thus the reference to the FAA's economic analysis is still considered by the Agency to be valid.

comment *17* comment by: *AEA*

Economic impact.
According to EASA the negative economic impact effects of the proposed requirements would be unlikely because these will apply to new airplane designs only. However, we feel the economic impact must be considered when comparing similar airplane designs with similar cabin dimensions (versus comparison with new designs with increased fuselage & cabin length). Larger airplanes for transportation of the same numbers of passengers require significantly higher operational costs.

response *Partially accepted*

The commenter is raising a point that was discussed at length in the working group and in fact led to the use of the dissenting positions procedure. This procedure concluded that any economic penalties from the prohibition of recline in flight into the required passageway were likely to be commensurate with the safety benefits (see Appendix III of the NPA). Further consideration in the light of this comment has not led the Agency to revise its opinion.

comment	*22* comment by: *European Regions Airline Association* ERA request that the new requirement be required only for aircraft seating 61 and above. Justification: • only minor improvements for aircraft seating between 41 and 61 • economic penalty is proportionally much higher for sub 60 seat aircraft • 40 seats is not an usual discriminant used, whereas 60 is already used for some considerations (such as reinforced cockpit doors)
response	*Not accepted* See reply to comment No. 20.

comment	*37* comment by: *ETF* The seat recline into a minimum exit passageway has been advocated by manufacturers and airline associations. As mentioned under point 4 in the position paper on design solution, the type III exit passageway is not the only place where recline is limited. The last seatrows in the cabin or in front of partition walls often have limited recline. Design solutions should follow CS 25.813 1) (c) (3). The seat loss should thus as of today remain minimal. Under "Ease of operation economic impact" it is suggested that placards illustrating the opening of the exit be placed at the exits in order that the passengers seated at the exit can familiarize themselves on how to open the exit. This is supported as passengers are expected to open the exits.
response	*Noted*

A. Explanatory Note - V. RIA - 5. Summary and Final Assessment - c. Final assessment and recommendation of a preferred option p. 18

comment	*5* comment by: *AIRBUS* The paragraph: *"A passenger operated exit needs to be both simple and easy to operate. Current removable hatch designs are neither. The physical effort required is appreciable and correct disposal of the separated hatch would be an uncertain action for even a trained person."* should be replaced by the following paragraph: *"A passenger operated exit needs to be both simple and easy to operate."* Justification: The two last sentences do not bring anything to the justification of the NPA. In addition, stating that even a trained person could not correctly operate the traditional hatch is highly questionable. Traditional hatches are relatively simple to operate: they open by pulling one handle and although it is understood that the proposed amendment provides improvement in ease of operation, significant

	design efforts have been made to minimize the weight of the hatch on Airbus single aisle family. Lastly, it has to be noticed that these traditional type III hatches are certified exits for the seat credit they deserve and equip today several thousands of in-service aircraft of various manufacturers without being considered unsafe.
response	*Partially accepted* It is agreed that the comments are excessively critical of the most common Type III exit designs to date. However, it should be noted that the text is located in a section of the NPA dealing with justification of the proposed new rulemaking actions. Note: The comment is agreed in principle but the Explanatory note will not be published again.

B. DRAFT DECISION p. 20

comment	*1* comment by: *Francis Fagegaltier Services* **Metric or US units** The conversion factor is not constant throughout the proposals: 20 inches are converted into either 50.8 cm in 25.813 (c)(1)(ii) and (c)(2) or 50.6 cm in 25.813 (c)(3)(i). Inches are not converted in AMC 25.813(c)
response	*Accepted* Conversions will be corrected/ added as appropriate. • - Concerning the conversion of the 20 inches: The correct conversion is 50.8 cm = 20 inches. Anyway, following comment No. 6 (reference to the 50.8 cm or 20 inches is removed), this correction becomes not applicable. - Concerning AMC 25.813 (c) and the missing conversion: This results in a change to paragraph 2 of AMC 25.813(c) where "10 or 13 inch" will be changed to "25.4 or 33 cm (10 or 13 inches)". See final resulting text at the end of CRD.

B. DRAFT DECISION - CS 25.813 p. 20-22

comment	*2* comment by: *Francis Fagegaltier Services*

25.813 (c) Format.
The first sentence of 25.813 (c)(1) is assumed to be also applicable to 25.813 (c)(2). Consequently, it would be logical to change the format to read as follows:

(c) The following must be provided for each Type III or Type IV exit
(1) There must be access from the nearest aisle to each exit.

(2) For each Type III exit in an aeroplane that has a passengerseating configuration of 20 or more and which has only seats installed immediately to the forward and aft of the access route(s)
(i) Except as provided in subparagraph (c)(2)(ii) of this paragraph, ……
(ii) In lieu of one 25.4 or 33 cm (10 or 13 inches) passageway, …….

(3) For each Type III exit which has an access route bounded by any item(s) other than only seats .....

Etc.Etc.

response *Accepted*

Paragraph (c) will be amended as suggested.

This comment prompted further review of the layout of the new rule.

For clarity and simplification it was also decided to change the layout of CS 25.813 (c) (6) to (10):
25.813 (c) (6), (c) (7) and (c) (10) are gathered in a new 25.813 (c) (7).
25.813 (c) (8) and (c) (9) are unchanged.

See final resulting text at the end of the CRD.

comment *3* comment by: *Francis Fagegaltier Services*

25.813 (c)(1)(ii)
It is assumed that the second sentence ("Adjacent exits must not share a common passageway ») is valid for all types of exits. It is then suggested moving it to (c)(1) to read as follows:

(c) The following must be provided for each Type III or Type IV exit
(1) There must be access from the nearest aisle to each exit. Adjacent exits must not share a common passageway.

response *Not accepted*

The commenter is suggesting that the text referred to should be made applicable to Type IV exits also. However, the intention of this text is to rule out the removal of two outboard seats on aircraft with adjacent Type III exits, thus creating three passageways. In such a case there would clearly be insufficient access to the two exits.

Adjacent Type IV exits are unlikely to be proposed. This exit type is only directly accepted by CS25.807(d) for installation on an a/c with less than 10 seats in which case only one pair is required. A proposal for adjacent Type IV exits,

presumably seeking additional passenger credit, would therefore need to use the provisions of CS25.807(d)(5) and the proposed access passageway(s) would be specifically substantiated.

comment 6 comment by: *AIRBUS*

The proposed paragraph 25.813(c)(1)(ii) should be modified with the following proposal:
"(ii) [...] The unobstructed space adjacent to the exit must extend vertically from the floor to the ceiling (or to the bottom of upper side wall stowage bins), inboard from the exit for a distance not less than the width of the narrowest passenger seat installed on the aeroplane ~~(or 50.8cm (20 inches) whichever is the greatest)~~, and from the forward edge of the forward passageway to the aft edge of the aft passageway. The exit opening must be totally within the fore and aft bounds of the unobstructed space. [...]"

Justification:
The basic objective, which is to prevent expanded (over sized) double seats to be installed at this location, will be met, even without the introduction of a lower limit for the seat width to be taken into account.

response *Accepted*

Following further consideration of the review group the Agency is in agreement with this comment. The objective is to prevent the reduction in available space by the installation of, for instance, a double seat assembly with each seat place wider than the other seats installed on the aircraft. The Agency agrees that the wording *"not less than the width of the narrowest passenger seat installed on the aeroplane"* achieves this intent and that the inclusion of a dimensional minimum is not required.

See final resulting text in 25.813 (c) (2) (ii) at the end of CRD.

Due to the revised layout (See comment No. 2) 25.813 (c) (1) (ii) is now 25.813 (c) (2) (ii).

comment 9 comment by: *AIRBUS*

Page 21:
Paragraph (9):
"(9) The latch design of deployable features (such as tables, video monitors, telephones, leg/foot rest) mounted on seats or bulkheads/partitions bordering and facing a passageway to a Type III or Type IV exit, must be such that inadvertent release by evacuating
passengers will not occur. The latch design of deployable features must also be such that cabin crew can easily check that the items are fully latched in the stowed position. Placards indicating that each such item must be stowed for taxi, take-off and landing must be installed in the normal field of view of, and be readable by each person seated in each seat bordering and facing a passageway to a Type III or Type IV exit. (See AMC 25.813(c))."

Comment:

	Economy class seats backrest tables should be exempted from this requirement. Justification: One large placard will be attached to each backrest table with a detailed description to open the Type III exit. In addition, the bilingual wording "fasten seat belt while seated" and "Life vest under your seat" is located on the backrest table. With an additional bilingual placard, "Stow table during taxi, take-off and landing", the table will show too many information with consequences in terms of loss of clarity, and some table designs do not have enough space.
response	*Not accepted* The Agency cannot agree to safety information for economy passengers being reduced to below that for other passengers. Economy class seats backrest tables can easily be designed to provide sufficient space for installation of all the placarding mentioned. It can be noted that the placarding for stowage of a meal table need only be visible when the table is deployed. This provides for greater flexibility in the placement of the various placards mentioned by the commenter.

comment	*10* comment by: *Boeing* Boeing suggests removing the phrase "(or 50.8cm (20 inches) whichever is the greatest)" from paragraph 25.813 (c)(1)(ii). Inclusion of this requirement would cause existing passenger seats less than 20 inches at this location to be non-compliant. No justification has been provided for this restriction. With the removal of this portion, the regulation would be harmonized with the FAA for this section of the rule. JUSTIFICATION: It is Boeing's position that the intent of this paragraph is to prevent expanded (over-sized) double seats from being installed at this location. The paragraph without the restriction of "(or 50.8cm (20 inches) whichever is the greatest)" is satisfactory to prevent the use of larger double passenger seats in front of the exit.
response	*Accepted* See above comment No. 6 on the same subject.

comment	*12* comment by: *AEA* Required width of passageways. Ref: **CS25.813(c)(2)** page 21 Relevant text: "*For each Type III exit which has an access route bounded by any item(s) other than only seats (e.g. bulkhead/wall, class divider, curtain) to its forward and/or aft side, must be provided with an unobstructed passageway that is at least 50.8 cm (20 inches) in width*". Comment: It is understood that the performance of Type III exits in these kind of

	configurations may be different from those in the more "conventional" lay-outs with a seat in front and a seat aft of the exit, but requiring a 50.8 cm wide passageway for configurations with either a seat in front and a bulkhead aft, a bulkhead in front and a seat aft or a bulkhead in front and a bulkhead aft of the exit does not seem a logic value compared to the 25.4/33 cm requirement for a lay-out with only seats as a boundary of the access route. To our knowledge the mentioned configurations have not been tested and therefor we think there is no justification for this part of the proposed requirement.
response	*Not accepted* The commenter is correct to point out that the configurations covered by this paragraph have not been tested and therein lays the problem. To the Agency's knowledge, these configurations cannot be considered rare and so it would seem necessary to include them in the rule. The case of a bulkhead/wall or other similar feature to the forward and aft side of the passageway is akin to the "other passageways" in CS 25.813(a) and the minimum width dimension of 50.8cm (20 inches) was thus deemed appropriate. Furthermore a Type III exit is a minimum of 50.8 cm wide so for at least the distance from the exit equal to the narrowest seat installed on the aircraft the passageway must be of at least this width anyway. Note that due to the revised layout (See comment No. 2) 25.813 (c) (2) is now 25.813 (c) (3).

comment	*13* comment by: *AEA* <u>Prevention of evacuees climbing over seats during an evacuation</u> Ref: **CS25.813(c)(6)** page 21 Comment:We assume the Agency refers to features (in current 16g seat designs) which prevent the seat backs from folding forward. Our understanding is that the current seat designs, certified to meet the 16g dynamic test requirements, already have seat backs which are designed to stay upright during impact of a passenger seated behind. Is the Agency of the opinion that such a design meets the proposed requirement? If not, there should be more guidance to explain the exact intent of the Agency.
response	*Noted* As stated in the proposed AMC, the intent is to prevent escapees bypassing the intended exit access passageway by climbing over the features positioned either to the front or rear of an exit passageway. Seats designed to meet CS 25.562 may directly comply with the criteria specified in the AMC. However it cannot be assumed that this will be the case. All seat designs will deflect to some extent under the loads that a passenger is capable of applying to a seat back and it was considered useful to provide an acceptable means of compliance in the form of quantified deflection limits under a specified load. Because seat backs must lean rearward for ergonomic reasons, the AMC limits allow a greater rearwards lean under the specified load than for the forward

limit.

Note that due to the revised layout (See comment No. 2) 25.813 (c) (6) is now 25.813 (c) (7) (i)

comment

25 comment by: *ETF*

CS 25.813 (c) (1) (ii) It is noted that the CAMI tests show that the evacuation rate is "acceptable" with two passageways leading to an unobstructed space at the exit. As explained in the general comment the size of the unobstructed space adjacent to the exit is essential. The space should not allow crowding. A maximum dimension of the space should also be described.

25.813 (c) (4) Detailed placards illustrating the opening and use of the type III exits are supported as passengers are expected to open the exits themselves

response

Partially accepted

The proposed AMC 25.813(c) text includes a warning against providing an excessively large unobstructed space and points out that additional substantiation may be required in such a case.

In the absence of data to set a quantified upper limit, the Agency is of the opinion that this should be sufficient to avoid the risk highlighted by this comment.

The comment regarding placards is noted.

comment

29 comment by: *ICCAIA Cabin Safety Working Group*

Comment to c(1):
c(1) states passenger-seating configuration of 20 or more. This discriminant is considerably different from 14 CFR 25.813 Amdt 25-116, which uses 60. The industry would prefer to have harmonization. What is the technical justification for the capacity chosen?

Comment to c(1)(ii) and c(3)(i):
The adoption of the following statement is problematic:
"...the width of the narrowest seat installed on the aeroplane (or 50.8 cm (20 inches) whichever is the greatest)..."
The width of seats in commuter and/or regional aeroplanes may be smaller then 20 inches. The text as is, may end up leading to elimination of two seats or alternatively requiring the desing of a new "unique" seat width to accommodate this requirement.
It is preferable that the text refers to the width of the narrowest seat installed, without specification of dimensions.

Comment to c(2):
Please add clarification, in the rule or AMC, about a situation were the exit is bounded by a seat plus underbin class divider curtain hanging over the backrest to its forward or aft side.

Comment to c(8):

	Please add in the AMC guidance similar to CAA-UK AN79: Any gap of greater than one inch into which a hand or foot may enter is considered unacceptable. Comment to c(10): Please add clarification in the AMC to address the following points: a) Are baggage bars, as described in AC 25-17, section 25.787, 102.b.(2).(i).(G), still acceptable, or the intent of the rule is to require complete enclosure? b) If the intention is to require complete enclosure, how to address the conflict with 25.787, where it is stated that under seat compartments are excluded? c) If baggage bars are still acceptable, does this require an aft baggage bar for a seat forward of the exit?
response	*Partially accepted* The comments from the ICCAIA are here below dealt with in turn; Comment to c(1) (note that due to the revised layout (See comment No. 2) 25.813 (c) (1) is now 25.813 (c) (2)): *Noted* As explained in the NPA, this rulemaking activity was based on the JAA NPA 25D-270A as developed from international work prior to EASA's creation. The discriminant of passenger seating configuration for the various dimensional constraints for exit access, operation etc. was set at 20 during this work and was not considered a parameter needing further reconsideration. The Agency notes that the JAA NPA as presented to the Regulation Director on 28th February, 2003 included a paper titled "Unified Submission of the Dissenting Position of the Members Representing AEA, AECMA, AIA, Airbus, ATA, The Boeing Company and GAMA". In this paper it was stated; "The industry members support harmonization to existing FAR Part 25.813 requirements, as modified by NPRM 95-1 (13 inch exit access for a seat row which contains three seats and 10 inch exit access for a seat row which contains no more than two seats), with the addition of the Type III exit access requirements extended to include the 20 passenger and above configurations." Comment to c(1)(ii) and c(3)(i) (Note that due to the revised layout (See comment No. 2), 25.813 (c)(1) (ii) and 25.813 (c)(3) (i) are now respectively 25.813 (c)(2) (ii) and 25.813 (c)(4) (i)): *Accepted* See above comment (No. 6) on this same subject and proposed changes. Comment to c(2) *Not Accepted* CS 25.813(c)(2) (now 25.813 (c) (3)) already covers this issue. Any item other

than or in addition to a seat at the boundary of a Type III exit access route will require that a 50.8 cm passageway is provided.

The Agency sees no reason to prohibit the installation of a curtain or panel (e.g. a class divider) over the seat backs of seats bounding an access route to an exit.

Comment to c(8):

Accepted

It is agreed that this clarification is useful. The AMC text will be added in AMC 25 813(c) paragraph 8 "Entrapment". See final resulting text at the end of the CRD.

Comment to c(10):

Partially accepted

The intention of the text in the AMC para. (10) is to require the baggage stowage (be it under seat or otherwise) to restrain the contents, including under the rearwards inertia load of CS 25.561(b)(3), namely 1.5 g. This is in order to remove the risk of baggage moving into the passageway during a crash, which might impart rearwards forces to unrestrained baggage. This implies that a rear baggage bar, or other device, is needed.

However, this comment has led to further review of this rule. After due consideration the Agency is of the opinion that traditional baggage bar designs are acceptable for seats bounding the forward side of an exit passageway. Consequently, the text will be added to CS25.813(c)(10). Note that due to the revised layout (see comment No. 2), the text will be found in CS 25.813 (c) (7) (ii). See final resulting text at the end of the CRD.

comment

31 comment by: *ICCAIA Cabin Safety Working Group*

Attachment #2

response

Noted

comment

34 comment by: *Austro Control GmbH*

CS 25.813(c)(1)(i), (c)(1)(ii) & (c)(2):

Add: The unobstructed passageway must extend vertically from the floor to the ceiling (or bottom of sidewall stowage bins).

Justification:
The vertical dimension is missing.

response

Not accepted

AMC to 25.807 and 25.813 already exist and covers this point.

Although prior to this proposed amendment the term "unobstructed" was only used in CS25.813(a) and (b), the clarification provided in this AMC remains applicable to its new use in CS25.813(c).

This AMC interprets the upper extent as being the prescribed minimum height of the exit. Although in the case of a Type III exit this may be slightly lower than the underside of the sidewall stowage bins, the Agency considers that this covers the concern raised.

comment *36* comment by: *Austro Control GmbH*

CS 25.813(c):

Add item CS 25.813(c)(11):

"Moveable, quick-change, class dividers must not be installed at positions such that the dividers would form the boundary of a passageway leading to a Type III or Type IV exit."

Justification:
Class dividers have not been adressed at all. The curtains on those dividers can lead to interference on escape routes. Visual recognition of exits is affected.

response *Not accepted*

See also the reply to comment 29 above.

The Agency does not agree that moveable, quick change class dividers need to be prohibited from forming the boundary of an exit access passageway.

However, class dividers (be they moveable, quick change or otherwise) at an exit row will invalidate the use of a 25.4/33cm (10/13 inches) passageway. In the case of the typical moveable, quick change type this is due to the reduction in ability to place hand/arms over and/or grip the seat backs. This is covered by CS 25.813(c)(2) (in the new revised layout -see comment no. 2-, please refer to CS 25.813 (c) (3)).

The point made about visual recognition of exits is not agreed. For instance, a bulkhead could be placed immediately forward or aft of an exit access passageway, so why not a class divider?

comment *38* comment by: *Dassault Aviation*

§ CS
25.813(c)(2)

NPA 2008-04 Text

For each Type III exit which has an access route bounded by any item(s) other than only seats (e.g. bulkhead/wall, class divider, curtain) to its forward and/or aft side, must be provided with an unobstructed passageway that is at least 50.8 cm (20 inches) in width. The width of the passageway must be measured with any adjacent seats, or other movable features, adjusted to their most adverse positions.

Dassault Aviation Comments (worked out by R. Niedojadlo)

This paragraph is valid for airplane that have a passenger seating configuration of 19 or fewer.
Business jet seats are very different than airliners seats in order to meet our customers requirements : the seats can track on the floor, they can rotate 180° on their base, the backrest can be tilted horizontally for berthing configuration, etc...
As a result, the width of the passageway will never meet this new regulation if the seats located forward and aft of the type III emergency exit adjusted in their most adverse positions.
All Business Jet manufacturers (Bombardier, Embraer, Dassault, etc..) use placards and pictograms which request the passengers to place the seats in a specific Taxi, Take Off and Landing position during those flight phases.
Dassault Aviation kindly request the EASA to split this paragraph in 2 categories :
* airplane that have a passenger seating configuration of 20 or more with seats adjusted to their most adverse positions.
* airplane that have a passenger seating configuration of 19 or less with seats adjusted to their Taxi, Take Off and Landing position.
Dassault Aviation arguments are the following :
1) In the previous regulation, there has always been a clear distinction between the requirements for cabins which have capacities for more than 19 passengers and those for 19 or less passengers. This lower passenger density results in significant safety advantages with respect to evacuation and therefore all previous guidance and policy has permitted various interior configurations provided the exit can be opened in those configurations. There has been maintained in regulation and policy a clear distinction between the requirement for large airplanes (unobstructed access to utilize the exit) and that of small airplanes (access to open the exit). Obviously the exit must be usable in smaller aircraft as well however as a result of much lower passenger densities, the same degree of overall safety can still be attained even with a lesser degree of accessibility (this concept is well documented in the regulatory background).
2) Dassault Aviation considers that placards and pictograms which request the passengers to place the seats in a specific Taxi, Take Off and Landing position are acceptable on Business Jets because :
a)In addition to very low passenger densities compared the relative number of exits, appropriate takeoff and landing configuration has been utilized by the FAA and the EASA as a compensating factor. There have been numerous equivalent levels of safety (ELOS) to §25.813(e) granted which allow the use of sliding doors for lavatories which can be occupied during takeoff and landing. These ELOS require an instructional placard to secure the door in the open position during takeoff and landing as well as an annunciator notification of door configuration. There are also many examples of the use of a placard alone

for less obtrusive features such as swivel seats and berths.
b) Safety instructions to the passengers, whether in verbal or placard form, assure that the passengers themselves have the information necessary to utilize those features provided on the aircraft in the safest manner.
While the final responsibility for compliance to these instructions falls upon the pilot in command (§91.3), the passengers also maintain a great degree of responsibility to follow the safety requirements. There are infinite examples where the safety of the passengers is reliant upon their following safety instructions (seat belt use, baggage location, no smoking, carriage of materials, use of portable electronic devices, seated during takeoff and landing, etc.).
It would be inappropriate for the EASA to propose to dismiss the passengers responsibilities at the expense of those features and amenities which add to comfort can be used completely safely when used as clearly instructed.

§
CS 25.813(c)(3)(ii)

NPA2008-04 Text

For aeroplanes that have a passenger seating configuration, of 19 or fewer, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the exit.

Dassault Aviation Comments

Since a new amendment of CS 25.813(c) is proposed, it would be a good thing to add a paragraph in AMC to explain which "compensating factors" are found acceptable, for example :
"The limited available cabin space in smaller transport category airplanes significantly reduces the designer's options for providing the amenities expected in this type airplane while at the same time always maintaining access to Type III and IV emergency exits. The reduced number of passengers inherently provides a significant benefit in egress time. In addition to very low passenger densities compared the relative number of exits, appropriate takeoff and landing configuration placards or pictograms can be utilized as a compensating factor".

These facts have been previously acknowledged by FAA and EASA regulation, policy and past practice.

CS 25.813(c)(6)

The design of each seat, or other feature, bounding the passageway leading to each Type III or Type IV exit must be such that evacuees are prevented from climbing over in the course of evacuating. (See AMC 25.813(c)).

On Business Jets, the fuselage diameter is much smaller than on airliners.
As a result, the space available above the seat backrest does not allow a passenger to climb over.
This paragraph will be automatically fulfilled on airplane that have a passenger seating configuration of 19 or less, so it is not an issue for Dassault Aviation to have this new rule.

However, on Business Jets it is very common to install a low height cabinet below the type III exit. This cabinet is less than 20 inches high in order to meet the requirements of §25.807(a)(3).
So, it would be preferable to precise in this paragraph that "It is acceptable that evacuees step over a feature that is less than 20 inches high as allowed by §25.807(a)(3)"

response *Partially accepted*

CS 25.813(c)(2) :
Partially Accepted.

It was not the intention to make CS 25.813(c)(2) applicable to all aircraft. The proposed wording was an error. This paragraph will be revised (see final resulting text in 25.813 (c) (3) due to revised layout).

CS 25.813(c)(3)(ii) (now 25.813 (c) (4) (ii)): :
Partially Accepted

The commenter asks for additional information about "compensating factors" that can be found acceptable by the Agency. The Agency agrees with the commenter to the fact that more details could be given about the cabin configuration of Business Jet or private VIP airplanes. After a long review, it was finally decided that this subject should be dealt in the context of another rulemaking task about Business Jet and VIP cabin arrangements, and not only in the frame of Exit type III.
AMC 25.813 (c) will not be developed to cover the minor obstructions and associated compensating factors.

CS 25.813(c)(6) (now 25.813 (c) (7) (i)):
Partially Accepted
This paragraph is only intended to cover the case where an escaping passenger tries to enter the access passageway to the exit by climbing over a seat back, or other feature bounding the passageway. It is understood that the example described by the commenter (low height cabinet below the type III exit) is commonly found in business jet interiors. CS 25.813(c)(6) does not apply to such an installation.

B. DRAFT DECISION - new AMC 25.813(c) p. 22-24

comment *7* comment by: *AIRBUS*

Page 23:

A new paragraph 4 should be added after the paragraph 3, Automatic Disposal of Hatch/Door:

"4 Alternative Design: Automatic Opening Exit (AOE)
An Automatic Opening Exit (AOE) may be used as an alternative design. An AOE is a hinged door or hatch equipped with a fully automatic opening means. This type of exit potentially provides a significantly improved opening time in comparison to an ADH. Provided adequate substantiation, installation of an AOE may allow the airplane manufacturer to claim for additional seat credit."

Adding this paragraph on AOE would reflect discussions that took place within the Drafting Group with regard to the definition of an ADH versus an OAE. This would as well highlight that the main purpose of an ADH is to ensure that the hatch comes to a position outside the exit access path after its opening whereas an AOE provides significant design improvements allowing justification of increased credit.

response *Not accepted*

It is true that discussions did take place in regards to an "AOE" exit design (i.e. an ADH design with a stored energy device to swiftly open the exit once the operating handle has been actuated) that would perhaps lead to additional "seat credit".

However, the Agency believes that CS 25.807(d)(5) already covers such a case and so additional AMC material would serve no purpose.

comment *11* comment by: *Boeing*

[Ref. also Page 21, CS 25.813(c)(9)]

The guidance proposed in AMC 25.813(c)(2)(b) specifies that the acceptable latch design for deployable features in this area has a feature that must be pushed for several seconds before the latch is released.

It is Boeing's position that mechanical latch designs that are guarded or are positioned so that inadvertent operation is prevented should also be acceptable in the Type III exit passageway, as long as the requirements of CS 25.561 and CS 25.562 are met. The proposed material should state this.

JUSTIFICATION: Latches that are guarded or are positioned so that inadvertent operation is prevented are equivalent to those that require a time delay release. Both prevent inadvertent deployment by the passenger.

response *Not accepted*

The commenter has misinterpreted the intent of this paragraph. It was intended to cover deliberate as well as inadvertent actions.

Upon further review of this paragraph and the associated rule, the Agency came to the conclusion that the text was ill-advised and it will thus be deleted and paragraph 2a incorporated with the lead in sentence. (see also comments 26 and 30).
See final resulting text at the end of the CRD.

The Agency considers that in the event designs with problems of direct compliance along the lines outlined in subparagraph b are desired, the better approach is to utilise the Special Condition provision of 21A.16B to derive an acceptable solution.

comment

19 comment by: *AEA*

Ref: **AMC 25.813(c), item 2a - Deployable Features** on page 22

Comment: AEA is of the opinion that operational procedures in combination with appropriate technical features (e.g. a hidden seat recline lock-out device, operated by cabin crew only) will result in an acceptable level of safety, provided the required procedure is adequately incorporated into the relevant crew training.

As it is acceptable that the stowage of deployable features (such as tables, video monitors, telephones, leg/foot rest) mounted on seats or bulkheads/partitions bordering and facing a passageway to a Type III or Type IV exit is checked by the cabin crew applying the same procedures to certain devices which should prevent the seat back from recline into the minimum required passageway during TTL, should be acceptable likewise.

In addition, the design of the seat back recline mechanism should be such that the seat back can be easily pushed forward to clear the required passageway (also in case of electrically operated seats). This would create a kind of "fail safe" design for those scenarios where the crew's attention might become distracted in case of a (prepared) emergency landing.
Especially for outboard opening hatches (e.g. like the AOE on 737NG airplanes) in-flight recline into the minimum required passageway should be accepted as this would never compromise the operation of the exit (as mentioned under AMC 25.813(c), item 2b - Deployable Features on page 22).

response

Not accepted

This aspect was discussed at length by the working group and agreement could not be reached between all members. As is explained in Appendices II and III of the NPA, this failure to reach agreement resulted in the EASA Conflict Resolution process being used.

It was concluded that designs such as "hidden seat recline lock-out devices" were not acceptable means to comply with the requirements for an "unobstructed passageway".

The commenter makes a comparison between items that are described as acceptable in the AMC to deploy into the exit passageway (e.g. handsets, tray tables, in armrest video monitors) and seat back recline. The Agency sees a significant difference in regards to seat recline. It is known that escaping passengers are likely to attempt to find an escape route directly from the seat rows in front and behind of the intended access passageway to the exit. Such attempts will impose significant loads onto the seat backs, towards the access passageway. Thus it cannot be assumed that seat backs reclined into the exit access passageway can be negated by escaping passengers pushing them aside.

comment	*26* comment by: *ETF* AMC 25.813 (c) 2 is a problem. The below paragraphs should either be strengthened considerably or deleted. 2 a While most of the items described may have good design solutions for stowing them away, even smaller items such as handsets may fail to retract. This could result in a loop that could become a trap risk during evacuations. A design solution must guarantee that it will function at all times. 2 b Is difficult. Electrically controlled chairs are very heavy and usually have no manual back up solution. These chairs are still unreliable and sometimes airlines land with one or more chair(s) stuck in the down position. Consequently the crew must have replaced the passenger to another seat during landing. A legrest extending across the minimum passageway may become a trap if passengers must climb over the seat or parts of it and will slow the evacuation considerably. This is unacceptable. A design solution must guarantee that the chair always and even during power failure of the chair retract out of the passageway to the exit during critical phases of flight. The paragraph should be strengthened taking the above power failure and critical phases of flight into account or deleted. 3 The paragraph on Automatic Disposal of hatch is supported.
response	*Partially accepted* This comment covers two paragraphs; AMC 25.813(c) Para. 2a (now paragraph 2.) The AMC text makes it clear that it is accepted that some items may deploy into the required exit access passageway (with an attendant risk that this could happen inadvertently during an evacuation) as long as they can be easily moved out of the way again. The AMC text also makes it clear that the latching means must be designed such that inadvertent release will be unlikely in the first place. The Agency is of the opinion that the proposed text is sufficient to convey the pertinent points. *AMC 25.813(c) Para. 2b* Electrically actuated seats are required to have manual override mechanisms to cover cases such as electrical/electronic failures in the seat and loss of electrical power supply from the aircraft to the seat. It is not understood why the commenter knows of situations where a failed seat was left in the deployed position for landing. Perhaps a spare seat was available in which case a seat not in an evacuation path might safely be left deployed. Alternatively, perhaps the operator's cabin crew training on this procedure was less than would be desired. However, it has been decided to delete this paragraph (see comment 11 above).

comment	*30* comment by: *ICCAIA Cabin Safety Working Group*

Comment to 2.b:
Please clarify the acceptability of mechanically actuated foot rests?

Comment to 4:
Based on the testing performed to substantiate the requirement is it possible to add to the AMC the width of the larger passageway beyond which additional substantiation is required?

response

Not accepted

The comments from the ICCAIA are here below dealt with in turn;

Comment to 2.b:
It has been decided to delete paragraph 2.b (see comment 11 above).

The revised text of paragraph 2 of the AMC does not allow a feature such as a mechanically actuated footrest that deploys into an exit access passageway.

Comment to 4:

The proposed AMC 25.813(c) text includes a warning against providing an excessively large unobstructed space and points out that additional substantiation may be required in such a case.

In the absence of data to set a quantified upper limit, the Agency is of the opinion that this should be sufficient.

comment *35* comment by: *Austro Control GmbH*

AMC 25.813(c)(2)(b):

The sentence on page 23, third break does not provide a clear intention of what is meant.
Please provide a more detailed/clear explaination on the subject.

response

Accepted

This sentence will be revised (in the revised layout, please refer to AMC 25.813 (c) (2), 4th paragraph). See final resulting text at the end of the CRD about the "Lock out device".

comment *39* comment by: *Dassault Aviation*

§
AMC 25.813(c)(2)(b)

NPA2008-04 Text

They can only be released by permanently pushing a button/control for several

seconds. This may include, for instance, a situation such as a business/first class seat with an electrically actuated legrest/ footrest extending across the minimum required passageway. Although at first sight this seems to be in direct contradiction to the text of CS 25.813(c)(1)(i), it is accepted that such a deliberate, flagrant and obvious action on the part of a passenger is unlikely.
However, in such a case, the requirements of CS 25.813(c)(3) must still be met in full, i.e. the operation of the exit may not be compromised by the seat in any position.

Dassault Aviation Comments (worked out by R. Niedojadlo)

On Business jets, even with the seat in the most adverse position, if the legrest is extended across the minimum passageway, this does not compromise the operation of the type III exit.
The reason is that there is always only one row of seat in front of type III exit, so it is possible to knee on the seat and legrest in order to open the exit and evacuate.

If this interpretation is not correct, it would be good to make some clarification in this AMC paragraph.

§
AMC 25.813(c)(2)(b)
continued

NPA2008-04 Text

<u>It is not accepted that Cabin Crew actions prior to taxi, takeoff and landing are employed as the means to prevent later passenger actions to deploy features into the minimum required passageway.</u>

Features (e.g. seat recline, footrests, video screens, tables) may still be unsafe, even if they do not deploy into a defined minimum 10 or 13 inch passageway (as applicable). Deployable items may create snagging/tripping hazards and in the case where a wider passageway than the minimum is provided, it cannot be assumed that escaping passengers will constrain themselves to passing along one side or the centre. Features which deploy into the actual passageway provided (in vertical projection from floor level to the upper ceiling/over head bin constraint) must be assessed in the same way as if they deployed into the minimum passageway, i.e. they must be accepted on one of the bases in 2 a. or 2 b. above.

Dassault Aviation Comments

It should be précised if "later passenger actions to deploy features" are inadvertent actions or deliberate actions.

In order to prevent inadvertent actions, the Business Jet seats controls are placed in recesses.
This prevents passenger contact on those controls that could occur during evacuation.

But we consider deliberate actions from passengers should not be considered on Business Jets because :
Safety instructions to the passengers, whether in verbal or placard form, assure that the passengers themselves have the information necessary to utilize those features provided on the aircraft in the safest manner.
While the final responsibility for compliance to these instructions falls upon the pilot in command (§91.3), the passengers also maintain a great degree of responsibility to follow the safety requirements. There are infinite examples where the safety of the passengers is reliant upon their following safety instructions (seat belt use, baggage location, no smoking, carriage of materials, use of portable electronic devices, seated during takeoff and landing, etc.).
It would be inappropriate for the EASA to propose to dismiss the passengers responsibilities at the expense of those features and amenities which add to comfort can be used completely safely when used as clearly instructed.

response *Noted*

This comment covers two areas;

The dimensional requirements for an unobstructed passageway do not apply to aircraft with passenger seating capacities of less then 20. For aircraft of seating capacities of 19 or less the rule text only requires "access" and in regards to being able to operate the exit "minor obstructions" are acceptable. The situation described by the commenter would appear to meet these requirements.

The sentence regarding later passenger actions is intended to cover both deliberate and inadvertent actions. This sentence has been revised following another comment on its clarity (see comment 35 above).

As explained in Comment 35, this sentence is only referring to deployment of items into the minimum dimensioned passageways specified for aircraft with seating capacities of 20 and above.

From other comments from this same commenter it appears that only aircraft of 19 seats or less were being referred to. Thus it is assumed that the above responses answer the concerns raised.

C. APPENDICES - Appendix I: Original JAA NPA Justification p. 25-28

comment *23* comment by: *European Regions Airline Association*

ERA request that the new requirement be required only for aircraft seating 61 and above.

Justification:

- only minor improvements for aircraft seating between 41 and 61
- economic penalty is proportionally much higher for sub 60 seat aircraft
- 40 seats is not an usual discriminant used, whereas 60 is already used for some considerations (such as reinforced cockpit doors)

response

Not accepted

See reply to comment No. 20.

resulting text

Book 1
SUBPART D - DESIGN AND CONSTRUCTION
....
CS 25.813
Emergency exit access and ease of operation
(See AMC to 25.807 and 25.813 and AMC 25.813(c))

....
(c) ~~There must be access from each aisle to each Type III or Type IV exit, and~~

The following must be provided for each Type III or Type IV exit -

(1) There must be access from the nearest aisle to each exit.

(2) In addition, for each Type III exit in an aeroplane that has a passenger-seating configuration of 20 or more and which has only seats installed immediately to the forward and aft of the access route(s) -

(i) Except as provided in sub-paragraph (c)(2)(ii) of this paragraph, the access must be provided by an unobstructed passageway that is at least 25.4 cm (10 inches) in width for interior arrangements in which the adjacent seat rows on the exit side of the aisle contain two seats, or 33 cm (13 inches) in width for interior arrangements in which those rows contain three seats. The width of the passageway must be measured with adjacent seats adjusted to their most adverse positions. At least 25.4 cm (10 inches) of the required passageway width must be within the required projected opening width of the exit.

(ii) In lieu of one 25.4 or 33 cm (10 or 13 inches) passageway, there may be two unobstructed passageways, that must be at least 15.2 cm (6 inches) in width and lead to an unobstructed space adjacent to each exit. Adjacent exits must not share a common passageway. The width of the passageways must be measured with adjacent seats adjusted to their most adverse positions. The unobstructed space adjacent to the exit must extend vertically from the floor to the ceiling (or to the bottom of upper side wall stowage bins), inboard from the exit for a distance not less than the width of the narrowest passenger seat installed on the aeroplane and from the forward edge of the forward passageway to the aft edge of the aft passageway. The exit opening must be totally within the fore and aft bounds of the unobstructed space.

(3) Each Type III exit in an aeroplane that has a passenger seating

configuration of 20 or more and which has an access route bounded by any item(s) other than only seats (e.g. bulkhead/wall, class divider, curtain) to its forward and/or aft side, must be provided with an unobstructed passageway that is at least 50.8 cm (20 inches) in width. The width of the passageway must be measured with any adjacent seats, or other movable features, adjusted to their most adverse positions.

(4) In addition to the access -

(i) For aeroplanes that have a passenger seating configuration~~, excluding pilot's seats,~~ of 20 or more, the projected opening of the exit provided must be unobstructed and there must be no interference in opening the exit by seats, berths, or other protrusions (including ~~seatbacks in any position~~ adjacent seats adjusted to their most adverse positions) for a distance from that exit not less than the width of the narrowest passenger seat installed on the aeroplane.

(ii) For aeroplanes that have a passenger-seating configuration~~, excluding pilot's seats,~~ of 19 or fewer, there may be minor obstructions in this region, if there are compensating factors to maintain the effectiveness of the exit.

(5) For each Type III and Type IV exit there must be placards that –

(i) Are readable by each person seated adjacent to and facing a passageway to the exit, one in their normal field of view; and one adjacent to or on the exit;

(ii) Accurately state or illustrate the proper method of opening the exit, including the correct use of controls, handles, handholds etc.;

(iii) If the exit is a removable hatch, state the weight of the hatch and indicate an appropriate location to place the hatch after removal.

(6) For aeroplanes with a passenger seating configuration of 41 or more, each Type III exit must be designed such that when operated to the fully open position, the hatch/door is automatically disposed so that it can neither reduce the size of the exit opening, the passageway(s) leading to the exit, nor the unobstructed space specified in sub-paragraph (c)(2)(ii) of this paragraph, to below the required minimum dimensions. In the fully open position it must also not obstruct egress from the exit via the escape route specified in CS 25.810(c).

(7) The design of each seat, bulkheads/partition or other feature, bounding the passageway leading to each Type III or Type IV exit must be such that -

(i) evacuees are prevented from climbing over in the course of evacuating.

(ii) any baggage stowage provisions (such as under seat stowage) would prevent baggage items entering the passageway under the inertia forces of CS 25.561(b)(3) unless placards are installed to indicate that no baggage shall be stowed under the seats bounding the passageway.

(iii) no protrusions (such as coat hooks) could impede evacuation.

(8) The design and arrangement of all seats bordering and facing a passageway to each Type III or Type IV exit, both with and without the bottom cushion in place, must be free from any gap, which might entrap a foot or other part of a person standing or kneeling on a seat or moving on or along the seat row.

(9) The latch design of deployable features (such as tables, video monitors, telephones, leg/foot rest) mounted on seats or bulkheads/partitions bordering and facing a passageway to a Type III or Type IV exit, must be such that inadvertent release by evacuating passengers will not occur. The latch design of deployable features must also be such that cabin crew can easily check that the items are fully latched in the stowed position. Placards indicating that each such item must be stowed for taxi, take-off and landing must be installed in the normal field of view of, and be readable by each person seated in each seat bordering and facing a passageway to a Type III or Type IV exit.

(d) ….

Proposal 2: Introduce a new **AMC 25.813 (c)** as follows:

BOOK 2
AMC – SUBPART D

….

AMC 25.813(c)

Emergency Exit Access and Ease of Operation

1 Post Crash Seat Deformation

The requirement for an "unobstructed" passageway is not intended to preclude some deformation of seat structure into the required minimum passageway dimension due to emergency landing dynamic loading.

Seat permanent deformation of up to 3 inches (as recorded in the tests required by CS 25.562) into the minimum passageway dimensions defined in CS 25.813(c) is acceptable, provided no part of the seat intrudes into the minimum required projected opening of the exit and provided the exit operating characteristics are not compromised. Relevant parts of FAA Advisory Circular 25.562-1B provide further details.

2 Deployable Features

Features mounted on seats, bulkheads or other cabin features, under passenger control and which deploy into the required minimum passageway, may be accepted as not contravening the "unobstructed passageway" requirements of CS 25.813(c) provided they are easily and instinctively pushed out of the passageway by escapees in the event that they remain deployed prior to, or become deployed during, an evacuation. This may include, but not be limited to, items such as handsets, tray tables, in-armrest video monitors. Items such as footrests which would not be within

easy reach of escapees' hands and/or not easily visible during an evacuation will not be accepted as being easily and instinctively re-stowed.

Such designs will be assessed on their individual merits.

It must be noted that none of the above reduces the requirement to design latching means that will prevent inadvertent release by evacuating passengers.
A "Lock out device" will not be acceptable as part of a means of compliance to the minimum unobstructed passageway dimensions. "Lock out device" means a mechanism actuated by a cabin crewmember to prevent passengers deploying items into an access passageway during taxi, take-off and landing.

Features (e.g. seat recline, footrests, video screens, tables) may still be unsafe, even if they do not deploy into a defined minimum 15.2, 25.4 or 33 cm (6, 10 or 13 inches) passageway (as applicable). Deployable items may create snagging/tripping hazards and in the case where a wider passageway than the minimum is provided, it cannot be assumed that escaping passengers will constrain themselves to passing along one side or the centre. Features which deploy into the actual passageway provided (in vertical projection from floor level to the upper ceiling/over head bin constraint) will be assessed in the same way as if they deployed into the minimum passageway, i.e. they can be accepted if they can be easily and instinctively pushed out of the passageway as described above.

3 Automatic Disposal of Hatch/Door

The intent, in CS 25.813(c)(6), of requiring "automatic" disposal of a Type III hatch/door on aeroplanes with passenger seating configurations of 41 or more is to remove the risk of passenger confusion, difficulty or error once the opening handle movement has been initiated.

In this context, "automatic" is intended to convey the requirement that this type of Type III exit should be by its design as simple, instinctive and easy to operate as any other type of exit.

Markings, controls and kinematics of the design should be so that with minimal instruction (i.e. from a study of the placards required by CS 25.813(c)(5) a naïve subject, with the ranges of size and strength found in the 5th percentile female to the 95th percentile male, would be expected to be able to swiftly and correctly operate the exit to its fully open and secured position.

In this regard, the exit hatch/door should move from its closed to fully open position in one simple and continuous operator motion, e.g. avoiding discontinuities in required force/direction on the handle(s). The traditional practice of providing a removable hatch will not be accepted as meeting the requirements of CS 25.813(c)(6).

It is to be noted that the requirements of CS 25.809, which defines emergency exit operating characteristics, testing requirements etc. are applicable to all exit types, including Type III and IV.

4 Very Large Exit Access Provision

In most cases it is expected that the cabin arrangement adjacent to a Type III or IV

exit will be such that access provision and unobstructed space for operation will be towards the minimum dimensions required. However, this might not always be the case.

Some of the testing performed to substantiate the required dimensions has revealed that competition between escaping passengers can reduce a Type III exit's evacuation performance in cases where a large unobstructed passageway or adjacent area is provided.

Dependent on the details of a specific cabin layout, additional substantiation may therefore be necessary for a design providing a substantially larger passageway and/or clear area adjacent to the exit than the minimum required. This will also apply to Type IV exits.

5 "De-Rated" and "Oversized" Exits

Two cases can be identified where some additional considerations may be needed when considering the provisions of CS 25.813(c)(4)(i), namely;

a. A larger exit type (e.g. Type II, I) which is declared as a Type III in order to, for instance, place a seat partially overlapping the exit opening (i.e. "de-rating" the exit).
b. The exit opening provided by the design is larger than the minimum required (i.e. an "oversize exit").

In such cases it may be acceptable that the exit opening provided is partially obstructed, at all times or perhaps when certain features are deployed, if the remaining exit aperture still provides the intended egress performance.

Each such case will be assessed on its own individual merits and if accepted would be so on the basis of Equivalent Safety.

6 Provisions to Prevent Escapees Bypassing the Intended Evacuation Route

CS 25.813(c)(7) (i) is intended to prevent cabin installations which would permit escaping passengers bypassing the intended evacuation route to the exit by climbing over seat backs or any other feature that may bound the required access passageway.

In the case of seat backs, the surface over which an escapee may attempt to climb should remain essentially upright, i.e. not exceeding 20 degrees rearward and 10 degrees forward relative to a plane normal to the cabin floor, when a load of up to 668 N (150 lbf) is applied horizontally in a fore/aft direction at the structurally most critical point.

In the case of features other than seat backs, the obstacle to climbing over should be assessed with the aim that it be comparable to the seat back example above, i.e. the angle and height of the item/surface in question.

7 Placards

The placards required by CS 25.813(c)(5) must accurately illustrate the proper method of opening the exit. This will require different "handed" placards for installation on the

left and right sides of the cabin. Precautions should be taken to minimise the risk of a placard being installed on the incorrect side of the cabin.

The particular method illustrated on a placard, e.g. placement of body, hands etc. should be substantiated as being that most likely to result in successful operation.

8. Entrapment

The seat design should free of any gaps into which it would be possible to place a foot, hand or arm in such a way as to delay or hamper free movement of passengers to the exit. Any opening/gap that is assessed as being positioned such that it poses a risk and which is more than 2.54cm (one inch) in width will need to be the subject of particular scrutiny before being found acceptable.

Appendix A - Attachments

AEA_NPA200804_FAAReferences.pdf
Attachment #1 to comment #14

ICCAIA.AC.022.pdf
Attachment #2 to comment #31