NOTICE OF PROPOSED AMENDMENT (NPA) NO 2008-18

DRAFT DECISION OF THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY

AMENDING
DECISION NO. 2003/2/RM OF THE EXECUTIVE DIRECTOR OF THE EUROPEAN AVIATION SAFETY AGENCY
of 17 October 2003 on
Certification Specifications including Airworthiness Code and Acceptable Means of Compliance, for large aeroplanes (« CS-25 »)

"Access through Bulkheads"

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A. EXPLANATORY NOTE

I. General

1. The purpose of this Notice of Proposed Amendment (NPA) is to consult stakeholders on the outcome of the rulemaking activity related to the rulemaking task 25.045 "Access through Bulkheads". The task originally envisaged amending Certification Specifications for Large Aeroplanes (CS-25) as adopted by Executive Director's Decision 2003/2/RM of 17 October 2003[1]. The scope of this rulemaking activity is outlined in Terms of Reference (ToR) 25.045 and is described in more detail below.

2. The Agency is directly involved in the rule-shaping process. It assists the Commission in its executive tasks by preparing draft regulations, and amendments thereof, for the implementation of the Basic Regulation[2] which are adopted as "Opinions" (Article 19(1)). It also adopts Certification Specifications, including Airworthiness Codes and Acceptable Means of Compliance and Guidance Material to be used in the certification process (Article 19(2)).

3. When developing rules, the Agency is bound to following a structured process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as "the Rulemaking Procedure"[3]. In the particular case of the rulemaking task 25.045 the Agency seeks opinions of the stakeholders on the conclusion, supported by Regulatory Impact Assessment (RIA), that the Agency should not produce a rule and terminate the rulemaking task 25.045. Before taking a final decision on the issue, the Agency wishes to consult stakeholders.

4. This rulemaking activity was included in the Agency's Advance Planning 2007. It implements the rulemaking task 25.045 "Access through Bulkheads". The scope of this rulemaking activity is outlined in ToR 25.045 and is described in more detail below.

5. The text of this NPA has been prepared by the Agency based on the draft text developed by the rulemaking group dedicated to the 25.045 task. It is submitted for consultation of all interested parties in accordance with Article 52 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.

II. Consultation

6. To achieve optimal consultation, the Agency is publishing the NPA on its internet site. Comments should be provided within 3 months from the date of publication in accordance with Article 6(4) of the EASA Rulemaking Procedure.

   Comments on this proposal should be submitted by one of the following methods:

   CRT: Send your comments using the Comment-Response Tool (CRT) available at **http://hub.easa.europa.eu/crt/**

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[1] Decision No 2003/2/RM of the Executive Director of the Agency of 17 October 2003 on Certification Specifications, Including Airworthiness Code and Acceptable Means of Compliance, for Large Aeroplanes (« CS-25 »), as last amended by Decision No 2007/020/R of the Executive Director of the European Aviation Safety Agency of 20 December 2007

[2] Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC *(OJ L 79, 19.03.2008, p.1).*

[3] Management Board Decision concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material (Rulemaking Procedure), EASA MB 08-2007 of 13.6.2007.

E-mail: Only in case the use of CRT is prevented by technical problems these should be reported to the CRT webmaster and comments sent by email to NPA@easa.europa.eu.

Correspondence: If you do not have access to internet or e-mail you can send your comment by mail to:
Process Support
Rulemaking Directorate
EASA
Postfach 10 12 53
D-50452 Cologne
Germany

Comments should be received by the Agency **before 13 September 2008**. If received after this deadline they might not be taken into account.

III. Comment response document

7. All comments received in time will be responded to and incorporated in a comment response document (CRD). The CRD will be available on the Agency's website and in the Comment-Response Tool (CRT).

IV. Report of the rulemaking group on the rulemaking task 25.045 completion

8. This summary report aims to reflect the work done and the decision finding process of the Rulemaking Group set up for the rulemaking task 25.045 (hereinafter referred to as "the Group") which after conducting of Regulatory Impact Assessment (RIA) lead the Group to the following conclusion:

The Agency should not continue with further rulemaking activity and terminate the 25.045 rulemaking task.

The Terms of Reference (ToR) for the 25.045 task requested from the Group the following:

a. To review Joint Aviation Authorities (JAA) ANPA 25D-224, including the comments received and the dispositions proposed in the draft CRD, and the preliminary Regulatory Impact Assessment (RIA);
b. To develop and present to the EASA Rulemaking Director and the JAA Cabin Safety Study Group (CSSG) a full RIA, with a cost/safety benefit analysis for both in the preliminary RIA preferred options to determine whether rulemaking is justified;
c. To draft and deliver to the EASA Rulemaking Director an NPA to CS-25 if found appropriate by RIA;
d. To include in the draft RIA considerations for a need of additional airworthiness requirements for Operators in JAR-26 if found appropriate by RIA.

9. Due to the fact that the original JAA ANPA was issued back in mid 90's the Group felt the need to take this in consideration and to review the following factors:

A. Accidents and Tests
- Accidents analysis for the period of time that elapsed since then, in terms of incidents and accidents by flight/hours
- Balance between: "Extremely remote risk" and "related costs"
- Evidences out of tests and supporting documentation to ensure an improvement in evacuation conditions

B. Technical evolution and continuous improvements introduced in the "state of the art" cabin designs and materials since 1985, such as:
- Seat fire blocking layers
- Floor proximity lighting/marking

- Enhanced Fuselage Burnthrough protection
- Reduced heat release of cabin interior materials
- Reduced smoke emission from cabin interior materials
- Improved access to Type III exits

C. Harmonisation

The focus is still to harmonise the regulations between the US Federal Aviation Administration (FAA) and the Agency wherever possible (specifically when differences in design requirements can cause unequal operation costs and unfair competition).

The FAA and Transport Canada (TCCA) have stated that, based on the information currently available, they have no regulatory activity planned in this area. If the Agency decided to proceed with rulemaking it would not be harmonised.

Conclusion:

Based on their investigation the Group is convinced that only an insignificant safety benefit would be introduced with new airworthiness requirements, whereas increase in aisle width, would lead to a reduced seating capacity/stowage room capacity with an associated economic impact. In addition, utilisation of the insignificant safety benefit would be restricted to the limited occurrences where this feature might be an impediment to evacuation.

10. Reference Documents considered by the Group[4]

MAIN DOCUMENTATION

Doc. No.	Title
25-045-002	Preliminary Regulatory Impact Assessment (RIA), Task No. 25.045 – Access through Bulkheads
25-045-004	JAA Cabin Safety Study Group – Summary Sheet # 17 – Access through Bulkheads
25-045-005	JAA ANPA 25D-224 Emergency Exit Access

SUPPORT DOCUMENTATION

Doc. No.	Title
25-045-010	AECMA/AEA Comments on the CRD to ANPA 25D-224
25-045-015	CAA Paper 89019 - Aircraft Evacuations: the effect of passenger motivation and cabin configuration adjacent to the exit (UK Civil Aviation Authority, 1989)
25-045-019	CAA Paper 2002/04 A Benefit Analysis for Cabin Water Spray Systems and Enhanced Fuselage Burnthrough Protection (UK Civil Aviation Authority, 2003)
25-045-022	IAPA (International Airline Passengers Association) Position Paper Issue 2 re. Type III Exits/Bulkheads

[4] Except the JAA ANPA 25D-224 these documents are not incorporated to this NPA for their size but can be provided to commenters on request.

Doc. No.	Title
25-045-023	IAPA Position Paper Issue 4 re. Type III Exits/Bulkheads (revised by Ronald Ashford)
25-045-025	DGAC-E (DGAC Spain) comments to Preliminary RIA 25.045
25-045-030	NTSB E-mail 2nd November 2006
25-045-031	FAA e-mail regarding NTSB response to queries
25-045-033	Example of a Canadian Regulatory Impact Assessment
25-045-034	Survey of MyTravel's A320, A321, A330-200 and B767 a/c, showing a layout drawing for each a/c type highlighting critical area plus a summary sheet indicating the impact on the MyTravel fleet (5 files)
25-045-040	An Analysis of past accidents in relation to Type III exit hatch disposal and Restricted Aisle Width at Monuments, 0950/R/000350/KK, Issue 1, R.G.W. Cherry & Associates Limited, October 2006

TEST & HARMONISATION DOCUMENTATION

Doc. No.	Title
25-040-002	ARAC (Aviation Rulemaking Advisory Committee) Cabin Safety Harmonisation Working Group - Tasking and Report
25-040-003	Drafting Group Tasking Form – EASA Terms of Reference - 25.040 Type III Exits (Access and Ease of Operation)
NPA 25D-270A 25-040-004	Proposed NPA 25D-270A Draft Improved Operation of and Access to Type III Exits
25-040-009	25.813 CSSG # 83 Letter to JAA re NPA 25D-270A
NPA 25D-270A 25-040-010	Appendix to NPA 25D-270A - Part 1
NPA 25D-270A 25-040-011	Appendix to NPA 25D-270A - Part 2
NPA 25D-270A 25-040-012	Appendix to NPA 25D-270A - Part 3
DOT/FAA/AM-89/14	The Influence of Adjacent Seating Configurations on Egress Through a Type III Emergency Exit (FAA Report 1989)
DOT/FAA/AM-92/27	Effects of Seating Configuration and Number of Type III Exits on Emergency Aircraft Evacuation (FAA Report 1992)
DOT/FAA/AM-95/22	Aircraft Evacuations Through Type-III Exits I: Effects of Seat Placement at the Exit (FAA Report 1995)
DOT/FAA/AM-95/25	Aircraft Evacuations Through Type-III Exits II: Effects of Individual Subject Differences (FAA Report 1995)
DOT/FAA/AM-01/2	Access-to-Egress: A Meta-Analysis of the Factors that Control Emergency Evacuation Through the Transport Airplane Type-III Overwing Exit (FAA Report 2001)
DOT/FAA/AM-02/16	Access-to-Egress I: Interactive Effects of Factors that Control

	the Emergency Evacuation of Naïve Passengers through the Transport Airplane Type-III Overwing Exit (FAA Report 2002)
DOT/FAA/AM-03/15	Access-to-Egress II: Subject Management and Injuries in a Study of Emergency Evacuation through the Type-III Exit (FAA Report 2003)
DOT/FAA/AM-04/2	Access-to-Egress III: Repeated Measurement of Factors that Control the Emergency Evacuation of Passengers through the Transport Airplane Type-III Overwing Exit (FAA Report 2004)

Working Methods

11. Based on experience the Group decided to accomplish their task by a combination of meetings supplemented by E-mail correspondence. This has shown to be the most efficient way. Five meetings were hold at the EASA Headquarter in Cologne:

    Meeting no: 1 held 30th March 2006
    Meeting no: 2 held 1st June 2006
    Meeting no: 3 held 7th September 2006
    Meeting no: 4 held 15th November 2006
    Meeting no: 5 held 25th January 2007

The Group Composition:

12. The composition was well balanced. Authorities, Operators, Manufacturers, F/A Unions and two observers (FAA; TCCA) participated.

    Members:

Enrique NIN	DGAC-E
Michael MARKUS	Austro Control (Chairman)
Carmela TRIPALDI	ENAC
Jan VAN DE MAAT	KLM Royal Dutch Airlines (AEA)
Jürgen FELDHAUS	Airbus Deutschland GmbH (AIRBUS)
Alfred AULETA	Futura o.b.o (IACA)
John MAYDEW	BAE Systems
Josef MAURER	ETF, CSA
Peter CHITTENDEN	EASA Certification Directorate
Jeff GARDLIN	FAA observer
Claude LEWIS	TCCA observer

    Secretary:

Ray CHERRY	external expert contracted by EASA

V. Regulatory Impact Assessment

13. Purpose and Intended Effect

a. Issue which the rulemaking activity is intended to address

This Regulatory Impact Assessment has been created to assess proposals, previously made by the JAA, to amend CS 25.813(a) and CS 25.815 to provide increased aisle width adjacent to monuments (rigid structures such as bulkheads, toilets, galleys or stowage units) for main aisles and cross aisles. The JAA proposal suggested that aisle width should be increased to 76 cm (30 inches), for aircraft with a passenger seating capacity of 110 or more.

In August 1985 a B737-200 at Manchester Airport UK, carrying 131 passengers and 6 crew, was destroyed with significant loss of life resulting from a fire fed by fuel from a ruptured fuel tank. About 36 seconds after the start of the take-off roll, as the airspeed passed 125 knots, the left engine suffered an uncontained engine failure, which punctured a wing fuel tank access panel. Fuel leaking from the wing ignited and burnt as a large plume trailing directly behind the engine. As the aircraft turned off, a wind of 7 knots from 250º carried the fire onto and around the rear fuselage. Subsequently fire developed within the cabin. Despite the prompt attendance of the airport fire service, the aircraft was destroyed and 55 persons on board lost their lives.

In the Conclusions, of the UK Air Accidents Investigation Branch (UK AAIB) accident report (see Reference 1), it states:

"Twin bulkheads in the forward cabin restricted evacuation flow to the forward exits after both were open".

In response to this recommendation, the UK CAA initiated research at Cranfield University to conduct evacuation trials to determine the effects of varying aisle sizes bounded by raised monuments (bulkheads). The results of these trials suggested that increasing the width of the aperture through the bulkhead would lead to an increase in the speed at which passengers can evacuate the aircraft in an emergency resulting in a recommendation from the University that consideration could be given to a minimum width of 30" for a passageway through a bulkhead. The current CS-25 requirements prescribe a minimum aisle width leading to a Type I exit to be 51 cm (20 inches) and the aisle width at the bulkhead on the Manchester B737 accident was 56 cm (22 inches).

b. Scale of the issue

1. The B737 Manchester Accident

The following is a Resumé of the text, from the UK AAIB Accident Report of the B737-200 accident at Manchester Airport, UK (Reference 1), which occurred in August 1985, giving an overview of the accident and an account of the issues surrounding the restriction to evacuation at the forward bulkhead:

i) Overview of the accident

"At 0612 hrs G-BGJL, carrying 131 passengers and 6 crew on a charter flight to Corfu, took off from Manchester with the co-pilot handling. About 36 seconds later, as the airspeed passed 125 knots, the left engine suffered an uncontained failure, which punctured a wing fuel tank access panel. Fuel leaking from the wing ignited and burnt as a large plume trailing directly behind the engine. The crew heard a 'thud', and believing that they had suffered a tyre-burst or bird-strike, abandoned the take-off immediately, intending to clear the runway to the right. They had no indication of fire until 9 seconds later, when the left engine fire warning occurred. After an exchange with ATC, during which the fire was confirmed, the commander warned his crew of an evacuation from the right side of the aircraft, by making a broadcast over the cabin PA system, and brought the aircraft to a halt in the entrance to link Delta. As the aircraft turned off, a wind of 7 knots from 250° carried the fire onto and around the rear fuselage. After the aircraft stopped the hull was penetrated rapidly and smoke, possibly with some flame transients, entered the cabin through the aft right door which was opened shortly before the aircraft came

to a halt. Subsequently fire developed within the cabin. Despite the prompt attendance of the airport fire service, the aircraft was destroyed and 55 persons on board lost their lives."

ii) Issues surrounding the restriction to evacuation at the forward bulkhead

"After the purser had confirmed the evacuation with the commander, he repeated the evacuation call a number of times over the PA system. Then, as the aircraft was coming to a halt, he went to the right front (R1) door to open it and release the inflatable escape slide. The door unlocked normally but as it was moving out through the aperture the slide container lid jammed on the doorframe preventing further movement of the door. After spending a short time trying to clear the restriction he postponed further effort and crossed to the L1 door. He cracked it open, ascertained that the forward spread of the fire was slow enough to allow evacuation from that door, opened it fully and confirmed the inflation of the slide manually. This was achieved about 25 seconds after the aircraft had stopped and coincident with the initiation of foam discharge from the first fire vehicle to arrive.

In the forward passenger cabin a pair of full height galley bulkheads were positioned just aft of the two doors, L1 and R1. The aisle aperture between the twin forward bulkheads in this configuration was 22 inches wide.

At the start of evacuation from the L1 door, the stewardess stated that passengers seemed to be jammed in the cabin aisle and entrance to the galley (i.e. between the twin forward bulkheads). She cleared the jam by pulling one young passenger forwards and the flow then started. Later she saw a young girl lying on the floor of the forward aisle. She pushed another youth back, pulled the girl forward by her collar and pushed her down the slide. As the passengers came forward through the bulkhead aperture the smoke built up in the forward galley area."

iii) UK AAIB Conclusions and UK CAA Response

Included in the Conclusions of the UK-AAIB accident report (Ref. AAIB 8/88) is the following:

AAIB Findings*: "Twin bulkheads in the forward cabin restricted evacuation flow to the forward exits after both were open."*

AAIB Recommendation No. 4.10: *"A review of the approval of the cabin configuration as it existed on G-BGJL should be conducted, with particular reference to the following features of that configuration:-*

….

ii) The forward aisle restriction created by the floor to ceiling forward galleys."

UK CAA Response:

"In respect of Recommendation 4.10(ii), the review showed that current requirements for minimum aisle widths are based upon extensive testing under orderly evacuation conditions. In considering any adverse effects induced by panic (competitive behaviour) as might exist in rapidly deteriorating environmental conditions, the Authority has initiated a comprehensive research programme to investigate these effects. A report on this work will be published shortly (Summer 1989) at which time revisions to current requirements will be considered.

2. Experimental Trials Results

In accord with their undertaking to the UK AAIB, the UK CAA commissioned a research programme to investigate *"the influence of increasing the width of the passageway through the floor to ceiling bulkhead leading to floor level Type I exits, on the time taken for passengers to evacuate the aircraft."* (see Reference 2)

Both competitive and non-competitive evacuation trials were carried out by Cranfield University, using a Trident aircraft. Incentive payments were used to simulate

competitive behaviour. The trials involved the evaluation of evacuation times with varying aisle widths at floor to ceiling bulkheads. It was concluded from the trials that:

"The results from the programme of evacuations involving competition between passengers suggested that increasing the width of the aperture through the bulkhead will lead to an increase in the speed at which passengers can evacuate the aircraft in an emergency. The fact that the evacuation times for the 20" 24" and 27" apertures were significantly slower than those for the 30" and 36" configurations, suggest that consideration could be given to a minimum width of 30" for a passageway through a bulkhead."

3. Subsequent Regulatory Activity

In the late 1980's the JAA CSSG considered the recommendations from the UK AAIB Accident Report for the B737 Manchester accident and the evacuation trials carried out by Cranfield University with a view to formulating new regulations for JAR 25. In 1996, an Advanced Notice of Proposed Amendment ANPA 25D-224 (see Reference 3 - reproduced in Appendix 1 of this NPA) was raised by the JAA CSSG. This JAA ANPA proposed regulatory change to JAR 25.813 Emergency Exit Access and JAR 25.815 Aisle Width to require that:

"For aeroplanes with a passenger seating capacity of 110 or more, the width of each main aisle, and cross aisle, including any passageway between individual passenger areas, bounded on both sides by rigid structure such as bulkheads, toilets, galleys or stowage units must be equal or exceed 30 inches at any point between these structures."

Following the transition of the design related responsibilities, including the rulemaking responsibility in the field of airworthiness to the Agency, a Rulemaking Group was set up in March 2006 to address the issue of "Access through Bulkheads". This Group comprised of members from European National Aviation Authorities and the Industry as well as observers from the US FAA and Transport Canada. The studies and discussions within this Group have culminated in the generation of this Regulatory Impact Assessment.

c. Brief statement of the objectives of this rulemaking activity

The objective of this rulemaking activity is to consider Amendments to CS-25 addressing the width of passageways that are bounded on both sides by rigid structures (monuments) such as bulkheads, toilets, galleys or stowage units to improve the Evacuation capability. The proposed change to the requirements would be restricted to aeroplanes with a passenger seating capacity of 110 or more. The passageway would be increased to 76 cm (30 inches) or more at any point between these structures.

14. Options

a. The options identified

Option 1: **Do nothing**

The Agency would not propose to change the existing regulations to provide increased aisle widths adjacent to monuments.

Option 2: Voluntary Implementation

The Agency would encourage airframe manufacturers to increase aisle widths adjacent to monuments voluntarily.

Option 3: Further Research/Analysis

Delay the decision on the way forward in order to conduct further research.

Option 4: Rulemaking Action

The Agency would take regulatory action to provide increased aisle widths adjacent to monuments.

The impacts associated with each option are described in Section 16 and evaluated in Section 17.a.

b. The preferred option selected

See section 17.c.

15. Sectors concerned

- airframe manufacturers and their design organisations
- aircraft modifiers
- operators

16. Impacts

a. All identified impacts

i. Safety

Following a survivable accident, rapid evacuation of the aircraft is paramount to the continued survival of the occupants in fire related accidents. Any cabin layout features that are likely to delay or restrict the efficient evacuation of the aircraft are therefore of immediate safety concern.

1. Accident Analysis

A study of past accidents, commissioned by Transport Canada, was carried out in October 2006, on western world fire-related accidents to passenger carrying transport aircraft that occurred over the period 1967 to 2002 (Reference 4). The objective of the study was to determine:

"Whether constricted aisle width at monuments has been cited as an impediment to evacuation in accidents other than in the Boeing 737 accident in Manchester, England, in 1985."

Eighty-six accidents were studied based on the official accident reports produced by the Accident Investigating Authorities. Additionally for ten of these accidents separate reports relating to survivor statements and evacuation issues were also studied. The conclusions of this study were:

"Although restricted aisle width at monuments was cited as an impediment to evacuation in the accident to the Boeing 737 in Manchester, England, in 1985, a review of 86 other accident reports and 10 reports addressing occupant survival issues did not reveal any other accidents where this was considered an issue."

This is in contrast with the assumption made in the JAA CSSG ANPA 25D-224 reproduced in Appendix 1 of this NPA. The ANPA 25D-224 states that:

"Further it is assumed that not more than 10% of the passengers per accident would die as a result of the narrow aisle width between monuments."

It was the view of the Group, that this assessment of the potential number of fatalities, associated with restricted aisles at monuments, is not supported by in-service accident data. To confirm this view the Group consulted with Accident Investigating Authorities.

2. Experience of Accident Investigating Authorities

To ensure that the conclusions with respect to effects of restricted aisles at monuments being limited to very few accidents are substantiated (i.e. only the Manchester accident identified), the NTSB and the UK AAIB were asked the following questions:

1. *Have there been any (Authority) recommendations regarding aisle width at bulkheads?*

2. *Have there been any accidents where aisle width at bulkheads was cited as an impediment to evacuation?*

3. *Have there been any other accidents where your colleagues recall aisle width being an impediment to evacuation?*

The response from the Accident Investigating Authorities confirmed that they had not issued recommendations regarding aisle width at bulkheads (other than that included in the Conclusions of the UK-AAIB accident report (Ref. AAIB 8/88) for the Manchester Boeing 737 accident.

Neither Authority could recall any accident where the aisle width at the bulkhead was cited as being an impediment to evacuation.

3. Other Improvements to Fire and Evacuation Regulations

Following the Manchester accident, regulatory action has been taken by many Airworthiness Authorities, for both new aircraft designs and introduced into existing aircraft by retroactive rules, resulting in significant cabin safety improvements. The fire and evacuation issues addressed include the following:

- "Seat fire blocking material" (CS-25/FAR Part 25, paragraph 25.853 and Appendix F, Part II - Flammability of Seat Cushions)
- "Floor proximity emergency escape path marking" (CS-25/FAR Part 25, paragraph 25.812)
- "Improved Heat Release Rate From Cabin Materials" (CS-25/FAR Part 25, paragraph 25.853 and Appendix F, Part IV - Test Method to Determine the Heat Release Rate From Cabin Materials Exposed to Radiant Heat)
- "Reduced smoke emission from cabin interior materials" (CS-25/FAR Part 25, paragraph 25.853 and Appendix F, Part V – Test Method to Determine the Smoke Emission Characteristics of Cabin Materials)
- "Improved access to Type III exits" (FAR Part 25, paragraph 25.813(c))

In service aircraft have been addressed for the above safety improvements by the Operational Requirements (JAR OPS-1, FAR 121).
In addition:

- Enhanced Fuselage Burnthrough protection from pool fires is an FAA regulation (FAR Part 25, paragraph 25.856 (b) and is proposed by the Agency for CS-25 (EASA NPA 2008-13).
- The Agency is currently reviewing the CS-25 with regard to Type III exits with respect to ease of access and operation (EASA NPA 2008-03).

The introduction of these cabin safety improvements will enhance the survivability of passengers such that the conditions experienced in the Manchester accident are unlikely to be repeated. Furthermore, the improvements will significantly enhance survivability in other fire-related accidents whereas utilisation of increasing aisle width at monuments would be restricted to the limited occurrences where this feature might be an impediment to evacuation.

4. Safety Impact - Conclusion

Based on past accident experience, and the improvements that have been afforded by changes to the fire and evacuation regulations, it is concluded that there is only an insignificant safety benefit to be gained by increasing the aisle width at monuments beyond that currently specified in the CS-25 Regulations.

Option 1. Do nothing:

Based on the rationale contained in this Section of the Regulatory Impact Assessment it is concluded that the "Do Nothing" option would not have any significant adverse effect on occupant safety.

Option 2. Voluntary Implementation:

This is effectively the status quo, since the regulations currently specify minimum dimension requirements for aisle width. A manufacturer or operator is free to provide additional space as they choose. Thus, the safety impact of voluntary implementation would likely be no different from that of Option 1 "Do Nothing".

Option 3. Further Research/Analysis:

There would be no immediate safety impact if further research or analysis were carried out. Should this option be adopted the two areas of potential research that might be considered are additional experimental research and additional data analysis.

A. Experimental Research

The Cranfield University research indicates that an increase in aisle width at monuments beyond that currently required by the CS-25 regulations could increase the speed at which passengers can evacuate the aircraft in certain accident scenarios. It is unlikely that further research in this area would yield significantly different results from those obtained from the Cranfield University Trials.

B. Data Analysis

Analysis of accident data and responses from Accident Investigating Authorities indicate that the scenario in which aisle width at monuments is an impediment to evacuation is a relatively rare occurrence. The Transport Canada study was reasonably conclusive in terms of the degree to which aisle widths at monuments presented an impediment to evacuation in accidents other than the Boeing 737 accident at Manchester and the conclusions from this study were supported by the UK AAIB and the NTSB experience of past accidents.

It is therefore concluded that further data analysis would not change the conclusions that have been made based on the research carried out to date.

On this basis it is considered, the research undertaken to date gives a reasonably clear indication of the safety impact of increasing the aisle width at monuments:

Option 4. Rulemaking Action:

Based on the rationale contained in this Section of the Regulatory Impact Assessment it is concluded that the "Rulemaking Action" option would not have any significant beneficial effect on occupant safety.

ii. Economic

There will be an economic impact for Operators of some aircraft as the implementation of this rule could result in a reduction in passenger seats, which in turn will reduce operating revenues. The economic impact of a regulatory change is likely to be greater on smaller aircraft (above 110 seats) than on large aircraft due to the restriction in flexibility of design solutions with limited cabin space. Whilst the magnitude of the economic impact is difficult to determine with accuracy, a study carried out by a major European airline concluded that increasing aisle width in accord with the JAA proposal would result in an annual loss of revenue on A330/A340 aircraft of approximately $US 1,215,000 per aircraft. The assessment for a Boeing 747-400 Combi aircraft was $US 1,750,000 per aircraft. An assessment carried out for narrow body aircraft with more than 110 seats, suggested that the annual revenue loss was in the region of $US 800,000 per aircraft. As with most cost estimates the revenue loss assessments cannot be made with a high degree of accuracy. However, it is evident that an increase in aisle width at monuments would have a relatively large economic impact on some aircraft designs.

Option 1. Do nothing:

This option has no adverse economic impact.

Option 2. Voluntary Implementation:

It is unlikely that voluntary compliance would be undertaken in instances where there is a significant economic impact.

This is effectively the status quo, since the regulations currently specify *minimum* dimension requirements for aisle width. A manufacturer or operator is free to provide additional space as they choose. Thus, the economic impact of voluntary implementation would likely be no different from that of Option 1 "Do Nothing".

Option 3. Further Research/Analysis:

Any economic impact from adopting this option is likely to be borne by the Airworthiness Authorities funding or conducting further research.

The assessments that have already been made of the economic impact are applicable to current in-service aircraft however, the magnitude of the cost estimates are likely to be the same on new aircraft designs, since the constraints on cabin space will be similar. Whilst further research into the economic impact of adopting the JAA proposal might result in more accurate cost predictions, it is considered unlikely that the magnitude of the predicted costs will be significantly different from those already carried out.

Option 4. Rulemaking Action:

1. Operators

The economic impact on Operators of the JAA proposal is described above.

2. Airframe Manufacturers & Aircraft Modifiers

It is considered unlikely that there will be a significant cost incurred by Airframe Manufacturers or Aircraft Modifiers since the JAA proposed regulatory change would simply change the design constraints on newly designed cabin configurations.

iii. Environmental

There is no, or negligible, environmental impact resulting from any of the options. Although, it is feasible that there will be a small increase in the number of flights should Option 4 - Rulemaking Action be adopted, the resultant environmental impact is considered to be negligible.

iv. Social

There is minimal social impact resulting from any of the options although it is feasible that there will be a small increase in ticket prices should Option 4 - Rulemaking Action be adopted.

v. Other aviation requirements outside EASA scope

There are no specific ICAO requirements that address aisle width at monuments.

If a regulatory change under CS-25 is adopted, the possible need for a JAR-26 requirement will require consideration.

b. Equity and fairness in terms of distribution of positive and negative impacts among concerned sectors

The only option that will result in an equity or fairness issue is Option 4 - Rulemaking Action. Regulatory action to increase aisle width at monuments is not currently under consideration by the FAA, Transport Canada or any other Regulatory Authority. Hence, regulation by the Agency would tend to affect adversely European

Operators by placing an economic burden upon them. This would reduce their capability to compete with other non-European Operators in the global market. Option 1 - Do nothing – would result in European and non-European operators being treated equally.

17. Summary and Final Assessment

a. Comparison of the positive and negative impacts for each option evaluated

Option 1 - Do nothing:

As discussed in Section 17.a. of this Regulatory Impact Assessment the Safety impact of Option 1 "Do Nothing" is assessed to have no significant adverse effect on occupant safety. This conclusion was based on an analysis of accidents supported by experience from two major Accident Investigating Authorities.

Furthermore, significant enhancements have been made to cabin safety by the introduction of regulations aimed at reducing the fire threat to occupants and improving evacuation capability. Additional regulatory changes are under consideration by the major Airworthiness Authorities aimed at further enhancing cabin safety. The implemented, and proposed, regulatory changes, pertinent to cabin safety, are considered to reduce the threat to occupants that was experienced in the 1985 Boeing 737 accident at Manchester. Additionally these cabin safety improvements will enhance occupant safety in post crash accident scenarios experienced more frequently than in the Manchester accident.

By contrast, the JAA proposal if implemented would place a relatively large economic burden on Operators of certain aircraft where aisle width is a critical feature of their cabin configuration. Option 1 "Do Nothing" would not result in any additional economic burden on Operators.

The FAA and Transport Canada have stated that, based on the information currently available, they have no regulatory activity planned to increase bulkhead width at Monuments. Hence, Option 1 "Do Nothing" would mean a common regulatory standard being applied to aircraft operating in Europe and North America with a consequential equity between European and North American Operators. This option has no adverse social or environmental impacts.

Option 2 - Voluntary Implementation:

Voluntary Implementation of the JAA proposal will effectively maintain the status quo. Hence, the safety and economic impacts will be similar to Option 1 "Do Nothing".

Option 3 - Further Research/Analysis:

Whilst it is recognised that further research might provide more accurate predictions of the economic impact of the JAA proposed regulatory change, it is considered that it would still be concluded that the economic burden placed on Operators would be substantial.

It is also concluded that further experimental research or data analysis into the safety impacts of the JAA proposed regulatory change would not alter the conclusions that have been made based on the studies carried out to date.

On this basis, it is considered that there is no benefit to be gained by adopting Option 3 - Further Research/Analysis.

Option 4 - Rulemaking Action:

The available data does not support the case for regulatory action. The existing experimental data indicates that an improved evacuation rate is likely to be achieved by increasing the aisle width at monuments. However, accident data analyses, and the experience from Accident Investigating Authorities, leads to the conclusion that there is only an insignificant safety benefit to be gained by

increasing the aisle width at monuments beyond that currently specified in the CS-25 Regulations. Furthermore, since the FAA and Transport Canada have no current plans to regulate in this area Option 4 - Rulemaking Action would result in un-harmonised requirements, which would put European Operators in a disadvantageous position in comparison with their North American counterparts.

b. A summary describing who would be affected by these impacts and analysing issues of equity and fairness

European Operators would be the Sector mostly affected by regulatory change. Since regulatory action to increase aisle width at monuments is not currently under consideration by Airworthiness Authorities other than EASA, the rule change would adversely affect European Operators and reduce their capability to compete with their North American counterparts in the global market.

c. Final assessment and recommendation of a preferred option

After due consideration the Rulemaking Group believes that Option 1 "Do Nothing" is to be preferred. This conclusion is reached on the basis that:

- Past accident experience, and the improvements that have been afforded by changes to the fire and evacuation regulations, leads to the conclusion that there is only an insignificant safety benefit to be gained by increasing the aisle width at monuments beyond that currently specified in the CS-25.
- The JAA proposal if implemented would place a relatively large economic burden on Operators of certain aircraft, where aisle width at monuments is a critical feature of their cabin configuration. Since the FAA and Transport Canada have stated that they have no regulatory activity planned in this area, this economic burden would be applied to European Operators only, hence placing them in a commercially disadvantageous position with respect to their North American competitors.

REFERENCES:

1. Accident Report No. 8/88, Boeing 737-236, G-BGJL, 22nd August 1985, at Manchester Airport, UK AAIB
2. Aircraft Evacuations: the effect of passenger motivation and cabin configuration to the exit, Paper 89019, UK CAA 1989
3. ANPA 25D-224 – *Emergency Exit Access*, JAA Cabin Safety Study Group, 1996 (See Appendix 1 of this NPA)
4. *An Analysis of past accidents in relation to Type III exit hatch disposal and Restricted Aisle Width at Monuments*, 0950/R/000350/KK, Issue 1, R.G.W. Cherry & Associates Limited, October 2006

B. RECOMMENDATION OF THE PREFERRED OPTION

The preferred option proposed by the Agency based on the recommendation by the 25.045 Rulemaking Group is as follows:

"The Agency should not continue with further rulemaking activity and terminate the 25.045 rulemaking task."

Opinions are sought from the stakeholders on the above conclusion.

C. APPENDICES

APPENDIX I : ORIGINAL JAA ANPA 25D-224

CAA CONSULTATIVE DRAFT

CIVIL AVIATION AUTHORITY JOINT AVIATION REQUIREMENTS

JAR-25 Large Aeroplanes	Origin JAA Cabin Safety Study Group	PAPER NO.25D-224 ISSUE 1 ~~30 October 1996~~ 1 November 1996

ANPA 25D-224 EMERGENCY EXIT ACCESS

INTRODUCTION

This ANPA has been prepared by the JAA Regulation Division following work with the JAA Cabin Safety Study Group, which adopted an earlier CAA proposal. (CAA Preliminary Draft Paper dated 24/1/90).

Amendments are proposed to JAR 25.813 and 25.815, dealing with the width of aisles leading to floor-level exits. The proposals will be considered for possible retroactive application in consultation with the JAR-26 Steering Group. If appropriate, this would be the subject of a future NPA 26-3.

There has been a debate within the Regulation Advisory Panel concerning the safety case and the implications for cost and practicality of the proposals, as well as the effect of lack of harmonisation. To enable the Paper to move forward, it is circulated as an ANPA.

It is intended that this ANPA gather more data on the design and cost implications of these proposals for JAR-25 and JAR-26; so that the CSSG and the RAP could develop an NPA for full consultation under the NPA scheme.

In particular, comments are specifically requested on the inclusion of cross aisles in the proposals. This is discussed in the paragraph of the Justification entitled "Proposed modification to JAA Requirements".

PROPOSALS

Please see attached NPA.

D41/74/1-7

CAA CONSULTATIVE DRAFT

ANPA 25D-224
EMERGENCY EXIT ACCESS

1. Paragraphs affected:

JAR 25.813 Emergency Exit Access
JAR 25.815 Aisle Width

2. Introduction

This change to JAR-25 proposes a widening of certain aisles and cross aisles on aircraft with a passenger seating capacity of 110 or more and results from accident experience and related research.

3. Proposals

a. Amend JAR 25.813 (a) as follows:

Change the third sentence to read:
"Passageways and cross aisles must be unobstructed."

Delete the fourth sentence of JAR 25.813(a)

b. Amend JAR 25.815 as follows:

Revise the title to read:
"Width of aisle, cross aisle and passageways"

Renumber the existing text as sub-paragraph "(a)" and add the following new paragraphs:

(b) Each passageway leading from a main aisle to a Type A emergency exit must be at least 36 inches (914.4 mm) wide. Each other passageway leading from a main aisle to a Type 1, or Type II emergency exit, each passageway between individual passenger areas and each cross aisle must be at least 20 inches (508 mm) wide.

(c) For aeroplanes with a passenger seating capacity of 110 or more, the width of each main aisle, and cross aisle, including any passageway between individual passenger areas, bounded on both sides by rigid structure such as bulkheads, toilets, galleys or stowage units must be equal or exceed 30 inches at any point between these structures.

D41/74/2-7

JUSTIFICATION FOR ANPA 25D-224 FOR 30" BULKHEADS

This ANPA deals with aisles width leading to floor level exits. Although primarily addressing JAR-25, and thus future products, it should be noted that the economic evaluation have been extended to include the SG's views on the inclusion of these requirements in JAR-26. Depending on the comments received to this ANPA consultation, the CSSG will prepare proposals, for formal consultation, on texts for JAR-25 and JAR-26. The latter will be done in co-ordination with the JAR-26 Steering Group.

The JAA is progressing another proposal, NPA 25D-270 et al, addressing the width of passageways leading to the overwing exits.

Background

The Manchester Accident

In August 1985, a B737-200 series aircraft operating out of Manchester Airport suffered an uncontained engine failure, resulting in a serious fire within the passenger cabin. Passengers died as a result of their inability to reach exits before conditions in the cabin became life threatening. Panic induced competitive behaviour caused blockage of the aisles and passageways leading to the available exits at the front of the aircraft and at the overwing exits.

During the emergency evacuation of the Manchester accident aircraft, the environmental conditions in the cabin quickly deteriorated. This was caused by the rapidly developing external fuel fire combined with an internal cabin materials fire which spread throughout the passenger compartment in the early stages of the evacuation.

The AAIB Manchester Accident Report

The British Aircraft Accident Investigation Branch (AAIB) concluded in their report of the Manchester accident that the relatively narrow width aisle ($\simeq$ 22½ inches) between monuments (toilets, galley, stowage compartments etc.), restricted the flow to the forward exits to a single-file.

Furthermore, in the AAIB accident report the forward stewardess is quoted as follows:

> "..passengers seemed to be jammed in the cabin aisle and entrance to the galley (*i.e.* between the twin forward bulkheads). She cleared the jam by pulling one young passenger forwards and then the flow started. Later she saw a young girl lying on the floor of the forward aisle. She pushed another youth back, pulled the girl forward by her collar and pushed her down the slide."

The conclusion drawn from these factors at the time was that this restriction in combination with panic induced competitive behaviour may have resulted in passengers dying in the cabin, who should otherwise have successfully reached the available exits.

AAIB Conclusions

The following Conclusions were made by the UK's AAIB in the accident report:

Conclusion 18

"The forward stewardess had to pull passengers free who had become wedged in the forward aisle at the galley restriction to start the flow of evacuees."

Conclusion 102

"Twin bulkheads in the forward cabin restricted evacuation flow to the forward exits after both were open."

Conclusion 103

"The present regulatory Evacuation Certification Requirements are inadequate in their evaluation of important potential egress restrictions...".

AAIB Recommendations

Consequently, AAIB Accident Report Recommendation 4.10 states that the Authority "...review the approval of the cabin configuration (on the accident aircraft) ... with particular reference to the following feature(s)...

(ii) The forward aisle restriction created by the floor to ceiling forward galleys."

The AAIB also recommended "a review .... of the adequacy of existing British Civil Airworthiness Requirements relating to unobstructed access to exits..' (Recommendation 4.11).

Both American and European requirements state that the width of the passageways leading to floor level type exits should be at least 20 inches.

Evacuation Research

The UK Civil Aviation Authority, in responding to the AAIB recommendations, commissioned the Applied Physiology Unit of the Cranfield Institute of Aeronautics (now Cranfield University) to conduct competitive type passenger evacuation trials to establish if the accident findings were valid and what, if any, changes to the current regulations were necessary.

The results of Cranfield trials are reported in CAA Paper reference 89019, which concludes that the width of aisles between rigid structure monuments, as opposed to between seats, should be increased from the existing minimum of 20 inches to a minimum of 30 inches.

The CAA Paper (Pages 16 and 17) states that:

"During these evacuations, there was a sudden rush towards the front of the cabin once the call to evacuate the aircraft had been made. This frequently lead to temporary blockages caused by people struggling to get through the gap in the bulkhead...".

"The smaller the aperture in the bulkhead, the more pronounced and more frequently the blockages seemed to occur. The blockages and people struggling against each other contributed to the slower evacuation times found in the results."

The research work at Cranfield confirmed that the blockages identified in the Manchester accident were likely to occur on aircraft with similar dimensions between bulkheads when an element of competitive behaviour was present. This is clearly identified in CAA Paper 89019, in the curve on page 9, and the plots on pages 30 to 35. In some tests the blockage between the bulkheads became so bad that the test had to be aborted.

It is understood that initial analysis of recent research into evacuations with a 28 inch dimension between bulkheads shows no improvement over the 27 inch dimension, and additionally shows a significant reduction in performance over the 30 inch bulkhead dimension.

Conclusion

The restriction of passenger flow to a 'single-file' is not the potentially most limiting factor. The worst case scenario is that passengers will actually become jammed between the two bulkheads and as a result completely stopping the flow of passengers to available floor level exits.

Timely and aggressive actions by the forward stewardess in the Manchester accident managed to resolve the problem but there was without doubt delay in this process. As a consequence passengers were exposed to toxic fumes in the cabin for a longer period than would have been necessary. This certainly contributed to the number of fatalities.

These factors are germane to the case that passenger egress in emergency evacuations is more essential to flight safety than, say, an additional 10 inches of stowage space that might accommodate cabin service facilities. In spite of this documented evidence and much CAA effort to reach a harmonised position, some 11 years after the Manchester accident the certification requirements in respect of minimum widths between bulkhead remain unchanged.

Year	Flights 10^6	Fatal Accs	Fat Accs with exit usage	Fat Accs with exit usage, 10^6
1993	13.9	31	5	0.36
1992	13.6	25	1	0
1991	12.7	25	2	0.16
1990	12.6	22	4	0.32
1989	12.3	27	2	0.16
1988	12.2	25	6	0.49
1987	11.8	24	2	0.17
1986	11.3	17	1	0.09
1985	10.9	22	1	0.09
1984	10.4	16	1	0.10

The columns indicate the following:

Column 1 - year
Column 2 - number of large, western built, commercial jet and turboprop flights
Column 3 - fatal accidents per year to the above class
Column 4 - accidents to jet passenger flights where following a survivable accident, emergency exits were, or could have been, used
Column 5 - a fatal accident rate for column 4, per million flights

It should be noted that the flights in Column 2 include turboprop aeroplanes, although there are no such aeroplanes certificated to carry 110 or more passengers. However, it should also be noted that the accident data includes a number of aeroplanes where not all of the fleets have greater than 110 passengers (e.g. some DC-9 and most BAe 146 aeroplanes).

The above data indicates an average of 2 fatal accidents per 10 million flights, or, 2×10^{-7}.

Competitive behaviour does not occur in all fatal accidents with exit usage. It is conservatively estimated that competitive conditions occur in about 1 in 10 fatal accidents with exit usage.

Further it is assumed that not more than 10% of the passengers per accident would die as a result of the narrow aisle width between monuments. This leads to an occurrence per departure of 2×10^{-8}.

Benefit

It is considered that the proposals would result in improved passenger evacuation flow along aisles and cross-aisles where these pass through monuments, thus minimising the risk of evacuation blockage and increasing the the overall rate of evacuation; maximising the chance of survival in life threatening cabin fire scenarios.

The proposals are considered by the CSSG to be fully effective in all probable cases.

Costs

Considering that the impact on aircraft in service today will differ from those future aircraft not yet designed, three cases are offered. Since it is considered easier to implement changes to aircraft not yet designed than to those in current service, the impact for the latter cases is the higher of the three. The following are the three different situations that exist, and need to be considered:-

JAR-25 - future products;
JAR-26 - newly manufactured only; and
JAR-26 - all fleets.

Costs associated with these proposals primarily relate to the costs for existing aircraft incurred as a result of space which must be created in order to obtain the unobstructed aisle/cross-aisle widths of 30 inches. This is an increase of up to 10 inches over the length of monuments such as lavatories, galleys, stowages, etc. which are normally located adjacent to aisles. The loss of space available for such monuments will eventually translate into loss of revenue. This is because either less seats can be installed for the same level of service (as provided in terms of galley capability etc.), or because a lower level of service can be maintained with the same number of seats, or a combination of the two.

For future aircraft, the only significant costs that are envisaged are the above, from the point of view of a manufacturer not being able to fit seats in an area where previously they were located. It is of course, not certain that this would be the case, and as the JAR-25 proposals refer to aircraft yet to be designed, the impact of this aspect will be considered at the design stage.

With this standard introduced into JAR-26, two situations can be distinguished:

application only for aeroplanes manufactured from a certain date onwards in the future (newly manufactured, but already Type Certificated),

or

application to both newly manufactured aeroplanes and aeroplanes already in service at the time of the implementation of this rule.

The former case may been more affected than that for the JAR-25 case, but it is considered that manufacturers will be able to comply with the requirements considering the texts that are envisaged for JAR-26.

The latter case, i.e. application to all current aircraft regardless of certification basis, is considered not to be cost-effective. This is from the point of view of both the modifications required to these older types, and the fact that more seats may be lost (the assumptions made for JAR-26 are that the manufacturers of more modern aircraft will be able to design modifications that will reduce the seat loss to an absolute minimum.

Conclusion - Economic Evaluation

The conclusion is that these proposals should be considered to be effective for newly manufactured and future aircraft, but not for the existing fleets. This would imply that both JAR-25 and JAR-26 texts would be proposed as NPAs, following this ANPA.

Comments are requested, however, from organisations that feel they are to be adversely affected by the proposals as drafted, or who feel that the assessment of the package as being effective, is incorrect. In order to better understand such comments, they should be fully substantiated.

Proposed modification to JAA Requirements

In JAR-25, requirements relating to aisle widths leading to floor level emergency exits, are currently contained in paragraphs 25.813 and 25.815 (JAR-25, Change 14). The ANPA also includes rationalisation of 25.813 and 815 to transfer all dimensions to paragraph 25.815.

It should be noted that the CSSG was not able to obtain consensus on the inclusion of cross-aisles in these proposals. As an ANPA, the texts are included, but readers should note that operator and manufacturer representatives of the CSSG felt that the cross-aisle case should be excluded on the basis that the research work has only studied narrow-bodied interior arrangements, and that if a cross-aisle is blocked then passengers can move across the aircraft via the seat rows. NAA and crew organisation members did not agree with the above opinion and considered that the competitive behaviour research was equally valid for passenger flow along cross-aisles between bulkheads (toilets etc.), and hence applicable to widebodied aircraft. This view is supported by the Cranfield researches.

Comments are specifically requested on the above.

Passenger Discriminant

This ANPA proposes a rule change that applies to aircraft with a seating capacity of 110 or more only, namely, large transport aircraft. (The accident aircraft, for example, had a maximum seating capacity of 130). The discriminant of 110 passengers was chosen after considerable debate within the JAA CSSG. A review of current aircraft showed that for aircraft with passenger capacities greater than 110, the exit width is generally at least 30 inch; thus it was judged appropriate to apply the proposed rule to this class of aircraft to ensure a consistent evacuation width from seat to exit.

Compliance with the Proposed Criteria

In large aircraft it is normally the size and number of emergency exits which limit the maximum number of passenger seats, whereas on small transport aircraft the maximum passenger seating capacity is limited by the size or volume of the cabin. Furthermore, the 109 pax above passenger seat limit is appropriate to economic terms since it is on large transport aircraft of this size that there is normally a greater amount of space available to accommodate a wider aisle between monuments; this can usually be achieved without serious economic and marketing penalty.

Since the late 1980's, some wide-bodied and narrow-bodied aircraft have been certificated with aisles approaching widths of 30 inches between floor to ceiling monuments. This is the case on both the Boeing 777 and Airbus A320 aircraft. On many aircraft there is no left side bulkhead between the cabin and the forward left floor level exit. On many A320 aircraft, this forward left configuration incorporates only a weather shield. It is therefore argued that whilst there may be some difficulties in meeting a 30 inch dimension, these difficulties can be overcome if there is a commitment by aircraft manufacturers and operators to address the case to provide an enhanced level of passenger evacuation.

Retroactive Application of the Proposals

The CSSG considered the need to extend these proposals from JAR-25 (i.e. for future aircraft) to JAR-26. The discussions below on the impact of such an action led the CSSG to recommend that JAR-26 should contain text making the JAR-25 requirements applicable to all aircraft manufactured after whatever date the JAR-26 requirement becomes effective (say 1 January 1998) at the opportunity of their first major cabin refurbishment after 1 January 2000.

Economic Evaluation

The Manchester accident indicated that width of aisle sections between monuments maybe an important factor in the rate at which evacuees can pass to downstream exits under conditions of competitive behaviour. Subsequent competitive behaviour research carried out by Cranfield University has indicated that all widths between monuments of up to, but not including, 30 inches severely restrict the rate of passage.

Accident Data

The CSSG had available, for aeroplanes certificated to carry 110 or more passengers, the following data on the number of flights, and the number of fatal accidents involving exit usage. This is in total 25 fatal accidents with exit usage, of which 1 in 10 had competitive behaviour.