

10 February 1998

COMMENT AND RESPONSE DOCUMENT FOR NPA 25B-238

FLAP GATES

Revision of Gate Requirements for High-Lift Device Controls

1. Introduction

Notice of Proposed Amendment 25B-238 was published for comment on 20 June 1997. The NPA and the corresponding FAA Notice of Proposed Rule-Making 97-9 were prepared following discussions in the Flight Test Harmonisation Working Group. The objective of the NPA and NPRM is to update the requirements governing flap gates and to ensure harmonised JAA and FAA requirements in this area.

2. Background

The principal requirements relating to flap gates are 25.697(a) and (b), 25.145 (b) and (c). In addition, JAR-1 gives a definition of a gate.

The positioning of flap gates has been discussed in the Flight Study Group, in the D&F Study Group and in the Flight Test Harmonisation Working Group. The concern was that the current JAR-25 requirements are not fully consistent with modern practice. Further, if these requirements were to be applied literally, this would result in too many gates in the quadrant which could cause confusion in a high workload environment.

3. Discussion of Comments

Responses were received from the following organisations:

CAA Monaco
CAA (UK)
Daimler Benz Aerospace
FAA
Short Brothers plc
Transport Canada

and a member of the JAA Requirements Advisory Panel.

Of these, four commentators accepted the NPA as proposed.

One commentator supported the technical intent of the proposals but expressed wider-ranging concerns about the current requirements that fell outside the scope of this NPA. These comments were as follows:

"(1) The location of the proposed requirements within JAR. Paragraph 25.145 is suitable for those parts of the requirement which deal with handling and performance, but consideration could be given to moving that part of the current requirement which deals with gate design to paragraph 25.697. Similar considerations may also be applied to the location of the advisory material in AC 25-7.

Furthermore, it may be worthwhile to consider what is the best location within the requirements for the definition of a “gate”.

- (2) The requirements of JAR 25.145(e) could be considered to be unnecessarily prescriptive in requiring that “A separate and distinct movement of the control” must be used to pass through the gated position. It is suggested that the current requirement may be retained as advisory material to indicate an acceptable means of compliance with a more objectively worded requirement.
- (3) The proposed JAR 25.145(e) requires features which prevent inadvertent movement of the control through the gated position, whereas JAR 25.697(b) requires that the control be designed and located to make inadvertent operation improbable. It is recognised that there is a distinction to be made between the specific movement through a gated position and the overall handling of the control, but it is possible for this difference of wording to be seen as a contradiction, which might lead to problems of interpretation."

The commentator recommends, as a longer term action, that the above comments be addressed by the JAA D&F and Flight Study Groups. This recommendation is supported.

One commentator suggests renumbering the proposed 25.145(e) as 145(d) to align with the amendments to FAR Part 25. Although the NPA proposals are harmonised technically with NPRM 97-9, this editorial difference is necessary as there is an existing JAR 25.145(d). This is a temporary solution, chosen initially for the purposes of consultation as current 25.145(d) was expected to have been deleted by NPA 25B-215. However, changes arising from NPA 25B-215 have not yet been adopted so the numbering is maintained until that time.

One commentator had several comments. Firstly, the commentator noted that JAR 25.145 uses both the terms “wing flaps” and “high lift devices” and it was suggested that “high lift devices” be used consistently throughout JAR 25.145. Whilst there is no objection in principle to this proposal, both these terms are used in many other places in JAR-25 and standardisation on a single term was not within the scope of the NPA. This comment is therefore not supported.

Secondly, the commentator notes that the JAR proposal differs from the NPRM in that the gate may be located at “a go-around position” instead of “the go-around position” as in the NPRM. This seems to be a misunderstanding as the NPRM proposal reads the same as the NPA.

Thirdly, the commentator notes that there is no reference to the relationship between the configuration for missed approach (JAR 25.101(g) and JAR 25.121(d)) and the configuration used for go-around (proposed JAR 25.145(e)). Since these configurations can be different, the commentator believes that the definitions and procedures should be clarified. However, this comment is outside the scope of the NPA and is thus not addressed.

Lastly, the commentator notes that there is no requirement to position a gate before retraction of the leading edge high lift devices. He believes this may lead to an inadvertent retraction of the high lift leading edge devices during a go-around which may be hazardous even though the “don’t sink” requirement of 25.145(c) can be met technically. Whilst this point was discussed during the development of the NPA and NPRM, it was felt to be too prescriptive. The effects of leading edge retraction may differ significantly between types and, in addition to the “don’t sink” requirement, there are more general requirements covering changes in configuration.

4. Discussion of Changes

Changes to current texts are indicated by italics.

- 4.1 Change: Delete ACJ 25.697(a) and the cross-reference in JAR 25.697(a).

Discussion: JAR 25.697(a), when read in conjunction with the associated ACJ, can clearly be interpreted as requiring gates at all positions used for take-off, en-route, approach and landing. It is considered that the requirement itself is adequate but that ACJ 25.697(a) should be deleted. It is not necessary for every flap position scheduled under 25.101(d) to be gated and, indeed, most current aeroplanes do not meet this.

4.2 Change: Add a reference in JAR 25.145(b) to ACJ 25.145(b)(1), (b)(2), (b)(3).

Change: Add a new ACJ 25.145(b)(1), (b)(2) and (b)(3) to read:

***"ACJ 25.145(b)(1), (b)(2) and (b)(3)
Longitudinal Control
See JAR 25.145(b)(1), (b)(2) and (b)(3)***

The presence of gated positions on the flap control does not affect the requirement to demonstrate full flap extensions and retractions without changing the trim control."

Discussion: JAR 25.145(b)(1) - (3) do not specifically refer to the use of flap gates in the demonstration of the pitch control forces encountered during complete flap extension or retraction. As a result, these requirements have been interpreted differently by Authorities in the past. The FAA has not allowed credit for re-trimming at gated wing flap positions whereas some JAA Authorities have. The FTHWG has agreed to harmonise on the FAA interpretation and a new ACJ 25.145(b)(1), (b)(2) and (b)(3) is adopted to record this agreement.

4.3 Change: Move the last paragraph of JAR 25.145(c) to a new JAR 25.145(e) and amend it to read:

"(e) See ACJ 25.145(e). If gated high-lift device control positions are provided, sub-paragraph (c) of this paragraph applies to retractions of the high-lift devices from any position from the maximum landing position to the first gated position, between gated positions, and from the last gated position to the fully retracted position. The requirements of sub-paragraph (c) of this paragraph also apply to retractions from each approved landing position to the control position(s) associated with the high-lift device configuration(s) used to establish the go-around procedure(s) from that landing position. In addition, the first gated control position from the maximum landing position must correspond with a configuration of the high-lift devices used to establish a go-around procedure from a landing configuration. Each gated control position must require a separate and distinct motion of the control to pass through the gated position and must have features to prevent inadvertent movement of the control through the gated position. It must only be possible to make this separate and distinct motion once the control has reached the gated position."

Change: Add a new ACJ 25.145(e) to read:

"If gates are provided, JAR 25.145(e) requires the first gate from the maximum landing position to be located at a position corresponding to a go-around configuration. If there are multiple go-around configurations, the following criteria should be considered when selecting the location of the gate:

- a The expected relative frequency of use of the available go-around configurations.*
- b The effects of selecting the incorrect high-lift device control position.*
- c The potential for the pilot to select the incorrect control position, considering the likely situations for use of the different go-around positions.*
- d The extent to which the gate(s) aid the pilot in quickly and accurately selecting the correct position of the high-lift devices."*

Discussion: Current JAR 25.145(c) provides a check that the acceleration capability of

the aeroplane and the rate of flap retraction are compatible. It also allows credit for gates when showing compliance with the requirements for handling during a go-around.

However, the penultimate sentence requires that "the first gated control position from the landing position must correspond with the high-lift devices configuration used to establish the go-around procedure from the landing configuration." This is too restrictive and largely unworkable when considering alternate landing flap settings. The complete last paragraph dealing with flap gates will be moved to a new JAR 25.145(e) and amended to reflect the agreement in the Flight Test Harmonisation Working Group that the first gate from the landing position should be located at *a* go-around position (not *the* go-around position as in the current 25.145(c)). This will give the flexibility to address the use of multiple landing/go-around flap combinations. A new ACJ 25.145(e) is adopted to give guidance on the location of the first gate.

The definition of a gate in the current JAR/FAR 25.145(c) has caused misunderstandings in the past. The present definition requires the separate and distinct motion of the control to be made at the gate in order to initiate movement beyond it, but this is not clearly stated. This clarification is made in the new JAR 25.145(e).

4.5 Change: Delete the definition of a gate contained in JAR-1.

Discussion: The definition of a gate in JAR 1 was most likely introduced because a gate is referred to in ACJ 25.697(a).

Since it is proposed to align with the FAR 25 practice of defining the gate solely in 25.145, the definition of a gate in JAR 1 is deleted.

5. Conclusion

Based on the review of the comments received, the NPA is adopted as written.