COMMENT AND RESPONSE DOCUMENT

NPA 22B-49 - SPONSOR CAA UK

THE PROPOSAL

The proposal of NPA 22B-49 was sponsored by CAA and was circulated as a Consultative Draft on 21 July 1999. The CAA part of the proposal is as follows:

Add JAR 22.151(c)(3)

> (3) In conditions associated with the early stages of the aerotow, any significant pitching tendency of the sailplane must be immediately controllable, without exceptional piloting skill, under any combinations of allowable towing conditions.

Add IEM 22.151(c)(3)

> In demonstrating compliance with this requirement, in addition to the requirements of JAR 22.21(a) and (b), the effects of at least the following should be investigated:
>
> Variations of tow cable length
> Variations of pitch trim settings
> Maximum expected acceleration along the longitudinal axis of the sailplane
> Snatch loads on tow
> Wind gradient due to ground boundary layer effects.

Amend JAR 22.713(a)(2) as follows;

> (2) Installed to minimise the possibility of dangerous upsets during aerotowing ....of not more than 25°.

Add new JAR 22.1585(g) and renumber (g), (h), (i) and (j), as (h), (i), (j) and (k) respectively

> (g) any special procedures or advice to the pilot that may be necessary for aerotowing, wire or bungee launching.

THE COMMENTS AND RESPONSES

Comments were received from ENAC, LBA and CAA UK:

1. ENAC

1.1 ENAC comment was:

A different text is proposed for the new JAR 22.151(c)(3) as follows:

(3) ~~In conditions associated with the early stages of the aerotow, any~~ Any significant pitching tendency of the sailplane which could result in an upset condition must be immediately controllable, without exceptional piloting skill, under any combinations of allowable towing conditions."

Reason for proposed text/comment was:

ENAC agrees with the proposal of addressing the problem of upset. Nevertheless, it has been considered that, although the early stage of the towing represents one of the most probable conditions for the upset, this is not the only critical (one). Aerotowing performed close to the mountains in (the) presence of wind conditions or thermal activity is another example of (a) situation where a towing upset is a cause of a potentially catastrophic accident.

It is therefore suggested to remove from 22.151(c)(3) the reference to the early stage of the aerotow in order to address the manufacturer's investigation of the problem in a more general way. A more clear reference to the upset (see underlined text)has also been suggested to highlight the intent of the rule to the reader.

1.2 CAA Response to ENAC Comment

The ENAC suggestion might be acceptable if the concern about the early stage of take off was put into IEM material but the Study Group supported the original wording, because if a design can cope with a tow upset in the early stages of an aerotow, it can cope with the other less critical cases by default. There was also the danger that by changing the requirement in the way suggested, the intention of the NPA to address the critical case of aerotowing upsets close to the ground (immediately after take-off) might be lost. The comment was therefore not accepted by the Study Group or the proposer.

2. LBA

LBA made 5 comments, one of which was a general comment relating to snatch loads. The 4 remaining comments are covered under paragraphs 2.1 to 2.4 respectively:

2.1

2.1.1 Comment

"*Comment on 22.151(c)(3)*

In conditions associated with the early stages of the aerotow any ~~significant~~ pitching....."

The reason for this comment was that if the situation becomes worse due to a significant pitching tendency, the dynamic effort accelerates the movements and the situation cannot be controlled by normal control inputs any more. The only action is to release the tow rope at once.

2.1.2 Response

This comment was accepted by the Study Group and the proposer.

2.2

2.2.1 Comment

"*Comment on IEM 22.151(c)(3)*

~~Maximum expected~~ ~~a~~Acceleration along the longitudinal axis of the sailplane.

The reason for the comment was that measurements have been made in trials in Germany; the acceleration during normal operations is relatively low (+/- 0.2g) and thus does not cause any difficulties. During a simulated upset, g levels reached a maximum of 1g. It is not only the acceleration itself, but the gradient of the acceleration which makes the situation uncontrollable beyond a certain amount, and the only way to control the situation is to release the tow rope. So it is not necessary to measure the exact values of the accelerations. Certain accelerations produce different behaviour of the sailplane which the pilot can clearly identify. LBA therefore believes that it is not the exact value of the acceleration that is important, but the resulting behaviour of the sailplane.

2.2.2 Response

This comment was accepted by the Study Group and the proposer.

2.3

2.3.1 Comment

Comment on IEM 22.151(c)(3)

" Qualitative tests to investigate the effects of w ~~W~~ind gradient due to ground boundary layer effects.

The reason for the proposed addition were that it is difficult to investigate in exact numbers, therefore it must be made clear that only qualitative tests have to be performed to investigate these effects. The ground boundary layer will also be investigated during computer simulation in the near future."

2.3.2 Response

This comment was not accepted, because the requirement is implied and relates only to IEM material, not a requirement. It was agreed by the Study Group that it is self-evident that qualitative tests are acceptable.

2.4

2.4.1 Comment

Comment on IEM 22.151(c)(3):

Add two dynamic tow manoeuvres. [The JAA Form 200 then listed two manoeuvres in great detail, equivalent to a Flight Test Proposal; too lengthy

to add here.]

2.4.2 Response

The comment was not accepted for the following reasons:

(a) It was felt that establishing such manoeuvres was too prescriptive, and that the Airworthiness Requirements were an inappropriate place for, essentially, part of a Flight Test Proposal.

(b) It is not clear what the pass/fail criteria are.

(c) The comment offers a different philosophy from the NPA; the NPA requires the sailplane to regain a normal position, whereas this comment does the reverse.

(d) Dynamic loads are already covered in 22.151(c)(3).

3 CAA UK

CAA UK made 2 comments, one of which was a general comment suggesting that JAR 23 should be amended to include similar towing requirements. The remaining comment was as follows:

3.1 Comment

"Why stipulate 'early stages' of an aerotow? While the risk is obviously increased if there is less height to recover the situation, exceptional flying skill should not be required at any time. It would be better to delete the qualification of 'early stages' and reference to exceptional piloting skill in the proposed regulatory paragraph 22.151(c)(3) and the following rewording is proposed:

(3) ~~In conditions associated with the early stages of the aerotow, a~~Any significant pitching tendency of the sailplane must be immediately controllable, ~~without exceptional piloting skill,~~ by pilots of average skill under any combinations of allowable towing conditions.

3.2 Response

This is similar to the ENAC comment in 1.1 above. The CAA suggestion might be acceptable if the concern about the early stage of take off was put into IEM material but the Study Group supported the original wording, because if a design can cope with a tow upset in the early stages of an aerotow, it can cope with the other less critical cases by default. There was also the danger that by changing the requirement in the way suggested, the intention of the NPA to address the critical case of aerotowing upsets close to the ground (immediately after take-off) might be lost.

The new comment, suggesting the replacement of *'without exceptional*

piloting skill' by *'pilots of average skill'* was felt to be unnecessary, because the former wording is generally used in requirements, and the two are effectively synonymous. The comments were therefore not accepted by the Study Group.

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