



Noise Certification Workshop

(Montreal, 20 to 21 October 2004)

NCW – BIP3/3
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SESSION 3: AIRCRAFT NOISE RE-CERTIFICATION

ASSESSMENT CRITERIA

A. CHAPTER 3/5 TO CHAPTER 4

B. CHAPTER 2 TO CHAPTER 4

C. FAR PART 36, STAGE 3 TO CHAPTER 4

(Presented by J. Böttcher)

“MODIFIED” AIRCRAFT

(Presented by J. Skalecky)

WORKED EXAMPLE OF APPLYING ASSESSMENT CRITERIA

(Presented by G. Readman)

SUMMARY

This paper provides information on the assessment criteria for re-certification of subsonic jet aeroplanes and large propeller-driven aeroplanes from ICAO Annex 16, Volume I, Chapters 3 or 5, from Chapter 2 and from United States FAR Part 36, Stage 3 to the Standard of Chapter 4.

It presents some aspects of a re-certification for modified aircraft, and two examples of applying the “reassessment” criteria.

1. INTRODUCTION

1.1 Re-certification is the “certification of an aircraft with or without a revision to its certification noise levels, to a Standard different to that to which it was originally certified”. This paper provides information on the assessment criteria for re-certification of subsonic jet aeroplanes and large propeller-driven aeroplanes. The requirements for re-certification from Chapters 3 or 5, from Chapter 2 and from FAR Part 36, Stage 3 to the Standard of Chapter 4 in ICAO Annex 16, Volume I are considered.

2. ASSESSMENT CRITERIA FOR RE-CERTIFICATION FROM CHAPTERS 3 OR 5 TO CHAPTER 4

2.1 Noise levels already approved to Chapters 3 or 5 and submitted in support of applications for re-certification of existing aircraft should be assessed against criteria described in this section. These criteria have been developed to ensure satisfactory compliance with the new Standard. The criteria consist of a list of twelve questions concerning the manner in which the original Chapter 3 or Chapter 5 data was obtained and subsequently processed. The twelve questions are the result of a comparison of the various amendments and revisions to Annex 16 and to the ICAO Environmental Technical Manual (ETM) to which an aircraft's existing Chapter 3 and Chapter 5 noise levels may have been approved.

2.2 For aeroplanes which were approved in accordance with Amendment 5 or higher of Annex 16, Volume I, a reassessment is not required. The aeroplane's existing approved Chapter 3 or Chapter 5 noise levels should be used to determine compliance with the new Standard.

2.3 For aeroplanes which were approved in accordance with Amendment 4 or lower of Annex 16, Volume I, the applicant should be required to show that the existing approved Chapter 3 or Chapter 5 noise levels are equivalent to those approved to Amendment 5 by answering the twelve questions. Five of these questions have to be applied to all aeroplanes (subsonic jet and large propeller-driven), four have to be applied to subsonic jet aeroplanes only and three have to be applied to large propeller-driven aeroplanes only. The twelve questions themselves are laid down in Appendix 8 of the ETM.

3. RE-CERTIFICATION FROM CHAPTER 2 TO CHAPTER 4

3.1 For a Chapter 2 aeroplane not already re-certificated to Chapter 3, noise data originally developed to demonstrate compliance with the requirements of Chapter 2 should first be corrected in an approved manner to the requirements of Chapter 3 of Annex 16, Volume I, before the data are assessed against the requirements of Chapter 4, as proposed by CAEP/6.

4. RE-CERTIFICATION FROM UNITED STATES FAR PART 36, STAGE 3 TO CHAPTER 4 AS PROPOSED BY CAEP/6

4.1 For Stage 3 aeroplanes which were approved in accordance with United States FAR Part 36, Amendment 24 (effective date 7 August 2002) or higher, only one assessment criterion for subsonic jet aeroplanes (one of the twelve questions concerned with engine bypass ratio) has to be considered. Aside from consideration of this criterion, the existing approved Stage 3 noise levels of the aeroplane should be used to determine compliance with Chapter 4.

4.2 For Stage 3 aeroplanes which were approved in accordance with Amendments 7 through 23 of FAR Part 36, in addition to the twelve questions mentioned in Section 2, two additional assessment criteria (two additional questions) have to be considered. The two additional questions are laid down in Appendix 8 of the ETM.

5. "MODIFIED" AIRCRAFT

5.1. An existing aeroplane may have been approved with Chapter 3 or Chapter 5 noise certification levels that are higher than the maximum levels required by Chapter 4. For such an aeroplane to be considered for re-certification to Chapter 4 it will be necessary to “modify” the aircraft in order to lower its noise levels below the limits required by Chapter 4. In order that certifying authorities evaluate applications for re-certification of “modified” aeroplanes in a consistent manner, the guidelines described in Appendix 8 (section 3) of the ICAO Environmental Technical Manual (ETM) should be followed.

5.2 The Appendix 8 (section 3) guidelines on “modified” aeroplanes currently address operational limitations on flap deflection, propeller speed, and maximum authorised take-off and landing mass. These guidelines also address noise certification demonstration methods concerning lateral noise measurement distance and aircraft center of gravity. Interim guidance on take-off thrust de-rate is also included. ICAO CAEP Working Group 1 continues to work on the issue of take-off thrust de-rate.

6. WORKED EXAMPLE OF APPLYING ASSESSMENT CRITERIA

6.1 Two examples of applying the “re-assessment” criteria described in Appendix 8 of the Environmental Technical Manual are presented. The examples are intended to show how to navigate through the re-certification “roadmap” and apply the “12 question” assessment criteria.

6.2 The first example concerns an application to have “Aircraft A” re-certificated to Chapter 4. This aircraft was originally certified to Chapter 3 in accordance with an early amendment of Annex 16, Volume I. The Chapter 3 noise certification levels fulfil the Chapter 4 cumulative margin requirements. The aircraft passes each of the relevant re-assessment criteria (the so called “12 questions”).

6.3 The second example concerns an application to have “Aircraft B” re-certificated to Chapter 4. This aircraft, like “Aircraft A”, was originally certified to Chapter 3 in accordance with an early amendment of Annex 16, Volume I. Again, like “Aircraft A”, Aircraft B’s Chapter 3 noise certification levels fulfil the Chapter 4 cumulative margin requirements. However, “Aircraft B” fails one of the re-assessment criteria. The presentation shows how this situation is resolved and the consequential change in the existing Chapter 3 noise levels to the new Chapter 4 noise levels.