Noise Certification Workshop

Session 3: Aircraft Noise Re-Certification

“Modified” Aircraft

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Recertification to CH4 Modified aircraft

- The previous speaker dealt with cases in which there was no change made to the aircraft:
  - Twelve questions OK

    And
  - Noise levels below CH4

Recertification to CH4 Modified aircraft

- Now we consider the case that the aircraft needs modifications to meet Chapter 4:
  - 12 Questions **not** OK

    or
  - Noise levels do **not** meet CH4

Recertification to CH4 Modified aircraft

- Appendix 8 of the ICAO ETM contains recertification guidelines for modified aircraft.
- ETM guidelines currently address operational limitations: flap deflection, propeller speed, maximum take-off and landing mass, and take-off thrust derate (interim), and demonstration methods.

Re-certification to CH4 Operational Limitations

- Operational limitations: a restriction on
  - the configuration or
  - the manner in which an aircraft may be flown
  - which is applied in such a way that it is dependent on the will of the pilot, and may otherwise be breached.

Operational Limitations
Flap Deflection

- **Only the most critical flap deflection (highest noise level) shall be certified.**
- Noise levels for other flap deflections may be approved only as supplementary information.
- Supplementary information clearly marked.

Operational Limitations
Flap Deflection

- **Certification at less than maximum flap deflection:**
  - **flap deflection must be limited by means of a physical limit which, for prudence, may be frangible.**

Operational Limitations Flap Deflection

- Breaking operational limitation:
- In Emergency section of the AFM only
- “Emergency situation”
  - Unforeseen
  - Situation endangers safety
  - Necessitates violation

Operational Limitations
Flap Deflection

- After breaking frangible device:
- Replace before next flight
- Maintenance item.
- Record in Aircraft log.

Operational Limitations Flap Deflection

- Take all effects of changed reference flight profile into account.
- Propeller driven aeroplane most noise critical flap configuration may not be associated with the maximum flap.

Operational Limitations Propeller speed

- Approach: Noisiest configuration.
- For propeller driven airplanes:

Highest RPM

Operational Limitations
Take-off & Landing Mass

- It may be possible to lower the noise certification levels of an aeroplane by lowering its maximum take-off and/or landing mass.
- An individual aircraft shall be certificated at only one pair of maximum take-off and landing masses at any one time.
- Noise levels for other masses may be approved only as supplementary information.

Operational Limitations Takeoff Thrust De-rate

- Full take-off thrust is required in determining lateral noise level.
- Take-off thrust de-rate is sometimes necessary in order to meet the lateral noise level limit.
- In this case, the derated take-off thrust becomes an operational limitation.

Operational Limitations Takeoff Thrust De-rate

- ICAO/CAEP has not yet reached full agreement on methods for implementing and controlling take-off thrust derate.
- Issue being addressed by CAEP/WG1.
- Interim guidance included in ETM.

Operational Limitations Takeoff Thrust De-rate

- ETM interim guidance:
  - A method for control of de-rated take-off thrust is required.
  - At discretion of the certification authority, method could include a physical or electronic control, engine re-designation, and flight manual limitation.

Operational Limitations Takeoff Thrust De-rate

- ETM interim guidance: (continued)
  - Derated take-off thrust defined for noise purposes must be equal to the take-off operating thrust limit for normal operation and may be exceeded in an emergency situation.
  - Flight manual limitations and performance sections must be consistent.

Demonstration Methods

- General principle: Evidence as satisfactory as the evidence expected for new type.
- Lateral noise data taken at a lateral offset of 650m must be corrected to an offset of 450m by means of the “integrated” method of adjustment.

Demonstration Methods

- Centre of gravity position:
  - Approach: Most critical (i.e. noisiest) configuration.
  - Takeoff: within the normal certified range.


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