Overview of Part 36 Aircraft Noise Certification Stages

“Everything you ever wanted to know about Part 36 ‘stage’ classification but were afraid to ask.”

Presentation to:

LAX / Community Noise Roundtable

April 8, 2009

Presentation by:

Ted Baldwin

HARRIS MILLER MILLER & HANSON INC.
Picking up where Gene Reindel left off in March…

Cum Noise Margin Relative to Chapter 3 (EPNdB)

Certification Data (Large Transports)

Data Compiled by Lord, 2004
Airplanes must meet Part 36 standards to receive new or revised "type" or "airworthiness" certificates to operate in the U.S.

Noise standards for most aircraft are defined in terms of “stages.”

Standards vary with “design” criteria, including (but not limited to):

- Subsonic versus supersonic speed capabilities
- Type of propulsion (e.g. turbojet- or propeller-driven)
- Weight (e.g., “small” aircraft under 12,500 pounds, and “large” aircraft
- Rotary-winged versus fixed-wing aircraft
- Operating category (e.g., “acrobatic,” “agricultural,” “commuter,” “normal,” “restricted,” “transport,” and “utility”)”
- Use (e.g., “fire fighting” or “carrying external loads”)
- Date of initial flight or of application for type certificate

The meaning of stage terms; (e.g., Stage 1” or “2”) varies with these criteria, so references to specific stages should be made with care.
Why should we care about “stage” terminology?

- Understanding the applicability of existing regulations
- Anticipating the effect of new regulations
- Reviewing and commenting on proposed regulations
  - and other reasons…
- A short quiz should help demonstrate why we care…
Pop Quiz!

- How is a jet classified as Stage 1?
  - By failing testing to meet Stage 2, 3, or 4 standards
  - Or … by never having been tested!

- The FAA phased out Stage 1 jets in the mid-1980s. Wouldn’t a phase out of Stage 1 small propeller aircraft be an equitable thing to do for people living close in to small general aviation airports?
  - No, it would be meaningless, because there is no such thing as a “Stage 1” small propeller aircraft!

- The Airport Noise and Capacity Act of 1990 (“ANCA”) directed FAA to phase out Stage 2 aircraft by 2000. How significant was the effect on general aviation jets?
  - Nearly non-existent, because the phase out only applied to aircraft over 75,000 pounds.
Pop Quiz, continued…

- What is the minimum stage for a DC-9 in the U.S.?
  - *Stage 1, because some DC-9s are under 75,000 pounds!*

- What would you think about the reasonableness of a national ban on Stage 1 and 2 helicopters?
  - *It would be unreasonable, because Stage 2 helicopters meet the highest applicable noise standards!*

- How did stages become so ambiguous?
  - Because Part 36 — and the term “stage” — evolved and became more complex over time.

- **A word or two of caution:**
  - Because of the complexity of Part 36, this presentation is only a high-level summary and ignores many details, special cases, etc.
1969: Established initial Part 36 standards
- Only applied to jets and transport-category large props
- Aircraft were certificated or uncertificated – no stages
- Set EPNdB limits for takeoff, sideline, and approach

1974: Extended Part 36 to propeller-driven small aircraft
- “Certificated” or “uncertificated” – stages hadn’t been invented
- Set dBA limits for maximum-power level flyover at 1,000’

1977: Increased stringency of limits for jets and transport-category large aircraft and introduced stages
- “Stage 1” aircraft have never been shown to meet any noise standards (in one of two ways …)
- “Stage 2” aircraft meet original noise limits, set in 1969
- “Stage 3” aircraft meet more stringent limits, established in 1977
Evolution of Stage Terminology – 1978 to today

- **1978: Extended Part 36 to civil supersonic aircraft**
  - Same standards as civil subsonic jets
  - Concorde with flight time before 1980 (16) exempted

- **1988: Introduced helicopter certification**
  - Two classes, like small props, but termed Stage 1 and 2 (rather than uncertificated and certificated)
  - Stage 2 helicopters are “quiet” helicopters!
  - EPNdB limits for takeoff, approach, like jets and large transport-category aircraft (but not sideline), and flyover, like small props

- **2005: Added of Stage 4 (effective 1/1/2006)**
  - Cumulative 10 EPNdB less than Stage 3 limits
  - Subsonic jet and transport-category large airplanes
  - Not a Stage 3 phase out!
Some Upcoming Issues May Involve Stages

- Phase out of Stage 1 and 2 corporate jets in House version of the FAA reauthorization
- Burbank, LAX, VNY, and other (?) Part 161 studies
- Likely pressure over time for a phase out of Stage 3 jets
- Introduction of new engine technology, such as geared turbofan (Stage 5?)
Remember: Many existing airliners are Stage 4!

Certification Data (Large Transports)

Chapter 2

Chapter 3

ICAQ O Rule

Chapter 4

Data Compiled by Lord, 2004
Any questions?