

# Part 150 and Part 161: Purpose, Elements, and Process



Presentation to:  
**Noise Compatibility Committee**  
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Ted Baldwin



**HARRIS MILLER MILLER & HANSON INC.**

# Part 150, “Airport Noise Compatibility Planning”

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- **FAA created in response to Aviation Safety and Noise Abatement Act of 1979 (“ASNA”)**
  - U.S.C. Title 49 – Transportation, Subtitle VII - Aviation Programs, Part B - Airport Development and Noise, Chapter 475 – Noise
- **Part 150 purposes**
  - **Address overall ASNA purpose:**
    - Provide assistance to airport operators to prepare and carry out noise compatibility programs
  - **Address specific ASNA requirements:**
    - Describing noise, determining exposure, and identifying compatible land uses
    - Preparation and submission of noise exposure maps
    - Preparation and submission of noise compatibility programs
    - Airport noise compatibility planning grants for conducting studies
    - Limitations on recovering damages for noise
    - Nonadmissibility of noise exposure map and related information as evidence

# ASNA requirements related to describing noise

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*Establish a single system of measuring noise, for which there is a highly reliable relationship between projected noise exposure and surveyed reactions of people to noise, to be uniformly applied in measuring the noise at airports and areas surrounding such airports*

- **Part 150 A.150.3: “Noise descriptors”**
  - **A-Weighted Sound Level (dBA) must be employed to measure single event noise**
    - Maximum dBA (Lmax) and sound exposure level (SEL) as appropriate
    - A.150.5 specifies measurement procedures and equipment
  - **Yearly day-night average sound level (DNL or Ldn) must be employed for characterization of the cumulative exposure of individuals to noise around airports**
    - FAA accepts CNEL in California, to respect state law

# ASNA requirements related to determining exposure

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*Establish a single system for determining the exposure of individuals to noise which results from the operations of an airport and which includes, but is not limited to:*

- Noise intensity, duration, frequency of occurrence, time of occurrence
- **A150.1 requires the use of the FAA's Integrated Noise Model (INM) or an FAA-approved equivalent**
  - Noise and performance data for over 100 aircraft types
  - Strict FAA guidelines for obtaining approvals for any non-standard aircraft noise or performance inputs, or calculations
  - USAF "Noisemap" acceptable for modeling military operations
  - A150.101 requires preparation of 65, 70, and 75 Ldn contours
- **Starting in May 2015, FAA will require use of Aviation Environmental Design Tool (AEDT)**
  - Largely the same noise database and algorithms as INM
  - Integrates fuel burn, emissions, and noise analyses

# ASNA requirements related to land use compatibility

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*Identify land uses normally compatible with various exposures of individuals to noise*

- **A150.101: All land uses are considered compatible with noise levels less than Ldn 65 dB**
  - Local needs or values may dictate further delineation
- **Part 150 Appendix A, Table 1 “Land Use Compatibility with Yearly Day-Night Average Sound Level”**
  - Provides guidelines within 65 Ldn and higher contours
  - Note 1 reiterates supremacy of local determinations
- **City and County have adopted standards out to 60 Ldn**
  - Not permitted: single and multi-family residential, correctional institutions, nursing homes, assisted living facilities, and schools
  - Conditional permission: transient lodging, church, library, and hospital uses, based on sound attenuation and other factors
  - All other uses are permitted and compatible under Part 150

# ASNA requirements related to noise exposure maps

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*An airport operator may submit a noise exposure map showing noncompatible uses on the submission date and for a forecast year*

- In §150.21, FAA specifies at least a five-year forecast period
- **The map shall**
  - Be prepared in consultation with public agencies and planning authorities in the area surrounding the airport
  - Comply with prescribed systems for describing noise exposure and identifying non-compatible land use
- **If a change in airport operation will establish a substantial new noncompatible use the operator shall submit a revised map**
  - §150.21 defines substantial change as a 1.5 dB or greater increase in Ldn in a compatible area that is made noncompatible, or in a noncompatible area whose noncompatibility is significantly increased
  - ***All else being equal, a 1.5 dB increase in Ldn requires a 41% increase in operations***

# ASNA requirements related to compatibility programs

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***An airport operator that submitted a noise exposure map ... may submit a noise compatibility program ... after:***

- Consulting with public agencies and planning authorities in areas surrounding the airport, US officials having local responsibility for the airport, and air carriers using the airport
- Providing notice and an opportunity for a public hearing

***A Noise Compatibility Program shall state the measures the operator has taken or proposes to take to:***

- Reduce existing noncompatible uses
- Prevent introducing additional noncompatible uses

# ASNA requirements related to compatibility measures

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- **As suggested by ASNA, B150.7 requires consideration of:**
  - Acquisition of land and interests therein, including, but not limited to air rights, easements, and development rights
  - Barriers, acoustical shielding, and soundproofing
  - Preferential runway system (if mandatory\*)
  - Flight procedures (including the modifications of flight tracks)
  - Restrictions based on aircraft noise characteristics\*
  - Noise abatement takeoff or approach procedures approved as safe by the FAA (if mandatory\*)
  - Landing fees based on noise emission levels or time of arrival\*
  - Partial or complete curfews (if mandatory\*)
  - Other beneficial actions
  - Other actions FAA recommends for analysis at the airport

\* These measures almost always will trigger a Part 161 study

# Many noise compatibility program requirements require a noise exposure map update

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- §150.23(e) “Each noise compatibility program submitted to the FAA must consist of at least the following” [abbreviated]
  1. A copy of the noise exposure map and its supporting documentation as found in compliance with the applicable requirements by the FAA, per §150.21(c)
  2. A description and analysis of the alternative measures considered...
  3. Program measures proposed to reduce or eliminate present and future noncompatible land uses and ... the relative contribution of each ... to the overall effectiveness of the program. (*Analysis requires noise exposure map*)
  4. A description of public participation and the consultation ...
  5. ... effect of the program on reducing noise exposure to individuals and noncompatible land uses and preventing ... additional noncompatible uses within ... the noise exposure map.
  6. ... how the proposed actions may change ... [the existing program]
  7. ... summary of the comments at any public hearing ...
  8. [*Various schedule, funding, and implementation related details*]
  9. Provision for revising the program if made necessary by revision of the noise exposure map

## Other Part 150 related sections of ASNA

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- **47505. Airport noise compatibility planning grants**
  - FAA may provide Airport Improvement Program grants for studies
  - AIP defines criteria for funding of compatibility measures
- **47506. Limitations on recovering damages for noise**
  - Bars recovery of damages inside contours if notice of the Map is provided, unless damages are due to substantial changes at airport
    - §150.21 defines notice as three newspaper advertisements prior to acquisition or furnishing copy of map at time of acquisition
- **47507. Nonadmissibility of noise exposure map and related information as evidence**
  - May not be used in any suit or action seeking damages or other relief from noise that results from the airport's operation
- **ASNA also addressed aircraft noise technology and research**
  - Elements are unrelated to Part 150

# Overall Part 150 Summary

- **Part 150 submissions have two formal elements:**
  - Noise exposure map - FAA “accepts”
  - Noise compatibility program - FAA approves individual measures
    - *FAA approvals require demonstration that measures will reduce exposure to individuals and noncompatible land uses and prevent introduction of additional noncompatible uses within the noise exposure map*
- **Part 150 sets extensive standards for every step of NEM and NCP development, documentation, submission, consultation, and FAA review and determinations**
- **Public involvement is important**
  - NEMs and NCPs require consultation with state, local, and federal agencies with jurisdiction over land use within the Ldn 65 (Ldn 60 at Naples), FAA regional officials, and regular aeronautical users
  - Opportunity for all interested parties to review and comment, with all comments provided to the FAA
  - NCPs require offering the opportunity for a public hearing

# Airport Noise and Capacity Act of 1990, ANCA

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- *Required FAA to establish regulations regarding analysis, notice, and approval of airport noise and access restrictions*
  - *FAA implemented through Part 161 (1991)*

## *Other noise-related elements:*

- **Required FAA to establish phase-out of Stage 2 aircraft over 75,000 pounds**
  - *FAA promulgated Part 91 amendment (1991)*
- **Required FAA to develop “national aviation noise policy” by July 1, 1991**
  - *FAA published draft Aviation Noise Abatement Policy 2000, 7/14/2000*

# Part 161, “Notice and Approval of Airport Noise and Access Restrictions” – Overview

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- Establishes the federal program for reviewing noise and access restrictions on the use of Stage 2 and 3 aircraft
- Requires extensive benefit-cost analyses
  - Must follow Part 150 noise and land use analysis procedures
- Requires extensive notice process
  - May follow Part 150 notice procedures
- Requires different level of analysis for Stage 2 and 3 rules
  - Stage 3 restriction benefits must exceed costs
- Requires separate analysis of effects on aircraft less than 75,000 pounds
- Encourages voluntary agreements
- FAA has never been asked to rule on applicability to Stage 4
  - Likely to apply, since Stage 4 are quieter than Stage 2 or 3
  - Restricting Stage 4 but not Stage 2 or 3 would be “unreasonable”

# Part 161, “Notice and Approval of Airport Noise and Access Restrictions” – “Lessons Learned”

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- **Opportunity to enact a meaningful new Stage 1 or 2 restrictions has passed**
  - On 1/1/2016, Stage 1 and 2 jet operations will be banned in the US
  - Trivial exceptions for logistical reasons
  - Irrelevant at Naples because of existing bans
- **Many potential roadblocks**
  - No guidance for benefit/cost analysis
  - FAA has made its opposition clear
- **Study of last resort**
  - Very few airports have pursued
  - FAA approved extensions of some “sunsetting” restrictions, based on airport easing the restrictions
  - Only two new approved restrictions were Naples Stage 2 ban and Van Nuys accelerated Stage 2 phase out

# Naples Noise Program History – Part 150s to Part 161

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- **1985-1987 – First Part 150 Study**
- **1995-1997 – First Part 150 Update**
  - FAA accepts 1996 and 2001 noise exposure maps, which identified 60 DNL as the local compatibility standard
  - FAA approves updated noise compatibility program, including Stage 1 jet ban at night (10 p.m. – 7 a.m.)
- **1998 – Third Part 150, NEM and NCP Update**
  - FAA approves 24-hour Stage 1 jet ban
    - Required NAA to conduct same Part 161 analyses as for Stage 2 or 3 restrictions, and to receive FAA approval as for Stage 3 restriction, in order to comply with grant assurances
- **2000 – Fourth Part 150, NEM Update**
  - Provided background for pursuit of Stage 2 ban
  - Required follow-on Part 161 study, application, and approval

# Noise Program History – *Part 161 Process*

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- **January 2000 – NAA initiates Part 161 process**
  - June – NAA submits Part 161 to FAA for 24-hour Stage 2 jet ban
  - August – NAA submits supplement addressing FAA comments
- **October 2001 – FAA finds NAA in compliance with Part 161**
  - Alleges ban violates grant assurances and begins Part 16 investigation
- **March 2002 – NAA begins enforcement of Stage 2 ban**
  - NAA defends 3<sup>rd</sup> party challenges in federal and state courts
- **March 2003 – FAA finds ban "unreasonable, unjustly discriminatory, and preempted by federal law"**
  - FAA suspends NAA's eligibility for federal grants (and PFCs)
  - Several rounds of appeals, hearings, and decisions
- **September 2003 – NAA appeals to U.S. Court of Appeals**
  - June 2005 – Court rules in Naples' favor, grant eligibility restored
  - Community benefits from reduced noise exposure

# Naples provides insight into FAA views on Part 161

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- **ANCA is not a “safe harbor” from grant assurances**
  - ANCA and Part 161 are largely procedural
- **Grant assurances provide FAA with “right” to approve Stage 2 restrictions as well as Stage 3**
  - Also to require Part 161-like analyses and approvals for bans on other “stages,” as in 1998 noise compatibility program for Stage 1 ban
- **65 dB DNL is a “standard” without demonstrating:**
  - Unique local conditions
  - Local government prohibition of residential uses
  - Identifiable liability concerns
- **At Naples must show benefits within 60 Ldn will exceed costs**
- **Airports must follow a “balanced approach”**
  - Exhaust non-restrictive noise abatement and land use options
- **The national implications of a restriction are a valid basis for determining its reasonableness**

# Resources

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- FAA “Airport Noise” page provides links to ANCA, ASNA, Part 150, Part 161, program statistics, guidance, policies, etc.:  
[http://www.faa.gov/airports/environmental/airport\\_noise/](http://www.faa.gov/airports/environmental/airport_noise/)
- NoiseQuest website provides extensive educational material on aviation noise, including tools, research, case studies, etc.: <http://www.noisequest.psu.edu/aboutairports.html>
- Airport Cooperative Research Board (ACRP) website includes numerous reports on aviation noise and continuing research:  
<http://www.trb.org/ACRP/ACRP.aspx>, for example:
  - “Compilation of Noise Programs in Areas Outside DNL 65”  
[http://onlinepubs.trb.org/onlinepubs/acrp/acrp\\_syn\\_016.pdf](http://onlinepubs.trb.org/onlinepubs/acrp/acrp_syn_016.pdf)
- NAA website: <http://www.flynaples.com>
  - Especially noise abatement: <http://www.flynaples.com/noise-abatement>

## Discussion

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- Other questions, concerns, etc.?
- Thank you for your attention!



# FAA-Accepted 2015 Noise Exposure Map

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**Figure 44**  
2015 Five-Year Forecast Conditions  
Noise Exposure Map

- 2015 Five-Year Forecast Conditions DNL Contour
- Existing Runways
- Airport Property
- City of Naples / Collier County Jurisdictional Boundary
- Single Family Residential (See note 1)
- Multi Family Residential (See note 1)
- Condo/ Home Owners Assoc. (See note 1)
- Mobile Home (See note 1)
- Transient Lodging (See note 1)
- Commercial / Industrial
- Place of Worship
- Hospital / Nursing Home
- School
- Open Space / Recreation / Golf
- Agricultural / Non Agricultural / Wetland
- Government / Transportation / Other Public Use
- Water

Note 1: These five residential land uses are noncompatible inside the 60 dB DNL and higher contours. All other land uses shown on this figure inside the 60 dB DNL contour are compatible with the level of noise exposure.

Data Source: Collier County GIS, United States Department of Agriculture (USDA) Geospatial Data gateway, Environmental Systems Research Institute (ESRI)



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FIGURE 44: 2015 FIVE-YEAR FORECAST CONDITIONS NOISE EXPOSURE MAP. PREPARED BY HMMH FOR THE CITY OF NAPLES AND COLLIER COUNTY. DATE: 10/2014.

# 2015 NEM contours are larger than those with Runway 5/23 modifications, so provide “buffer”

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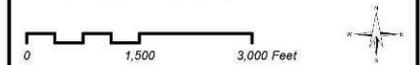


**Figure DNL-2**  
**2015 Day-Night Average Sound Level (DNL) Contours, for Runway 5/23 Displaced Landing Threshold Alternative, Compared to 2015 Noise Exposure Map 60 and 65 DNL Contours**

- 2015 Runway 5/23 Displaced Landing Threshold Alternative
- 2015 Noise Exposure Map 60 and 65 DNL Contour
- Runway Extension
- Existing Runways
- Airport Property
- City of Naples / Collier County Jurisdictional Boundary
- Single Family Residential (See note 1)
- Multi Family Residential (See note 1)
- Condo/ Home Owners Assoc. (See note 1)
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The population within 60 DNL contour is reduced by approximately 50% in 2015 (from 198 to 99)

510' Extension for Runway 5 Departures Only

800' Extension for Runway 23 Departures Only

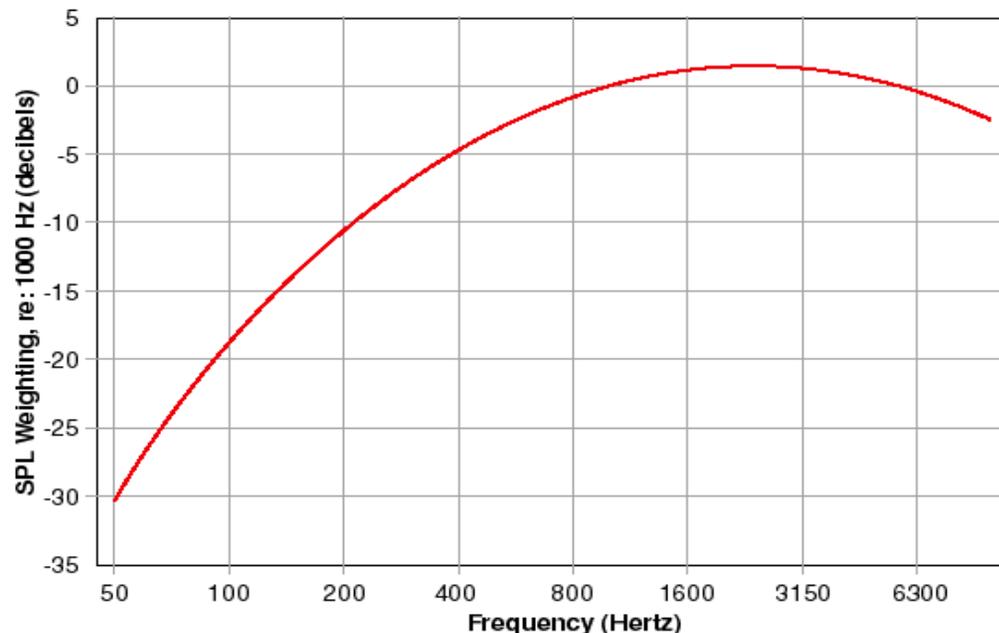
The benefit is to residents in the highest noise exposure area.

I:\GIS\USA\F1302460\_APF\_Fig.DNL2\_2015\_RwyDisp\_2015\_NEM\_Compairson.mxd

# What is the A-Weighted Sound Level (dBA)?

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- The human auditory system is not equally sensitive to all frequencies
- To be a useful environmental analysis tool we need a way to measure sound the way the ear “hears” it
- The A-weighted level achieves this goal

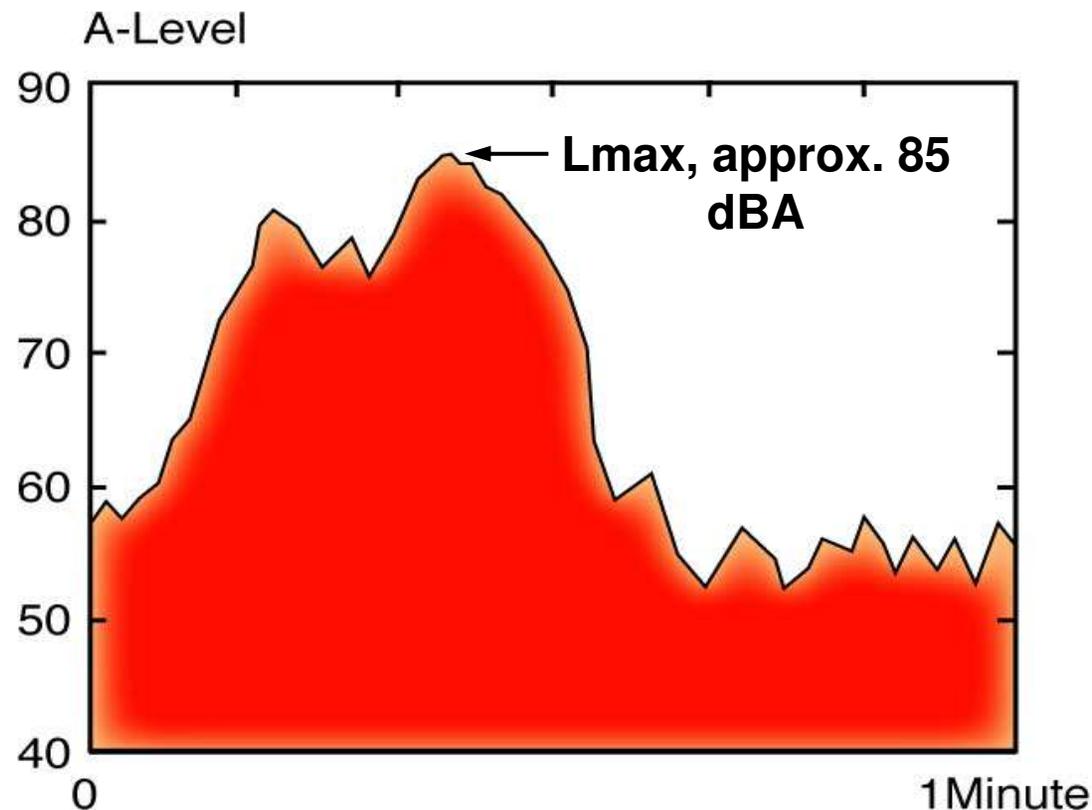


*Consistent with EPA's recommendation in the 1974 "Levels Document," federal, state, and local agencies use the A-weighted level for environmental noise analyses.*

## What is the Maximum Sound Level (Lmax)

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- The simplest way to describe a discrete noise “event” is its maximum sound level, Lmax
- Accounts only for sound amplitude (dBA)

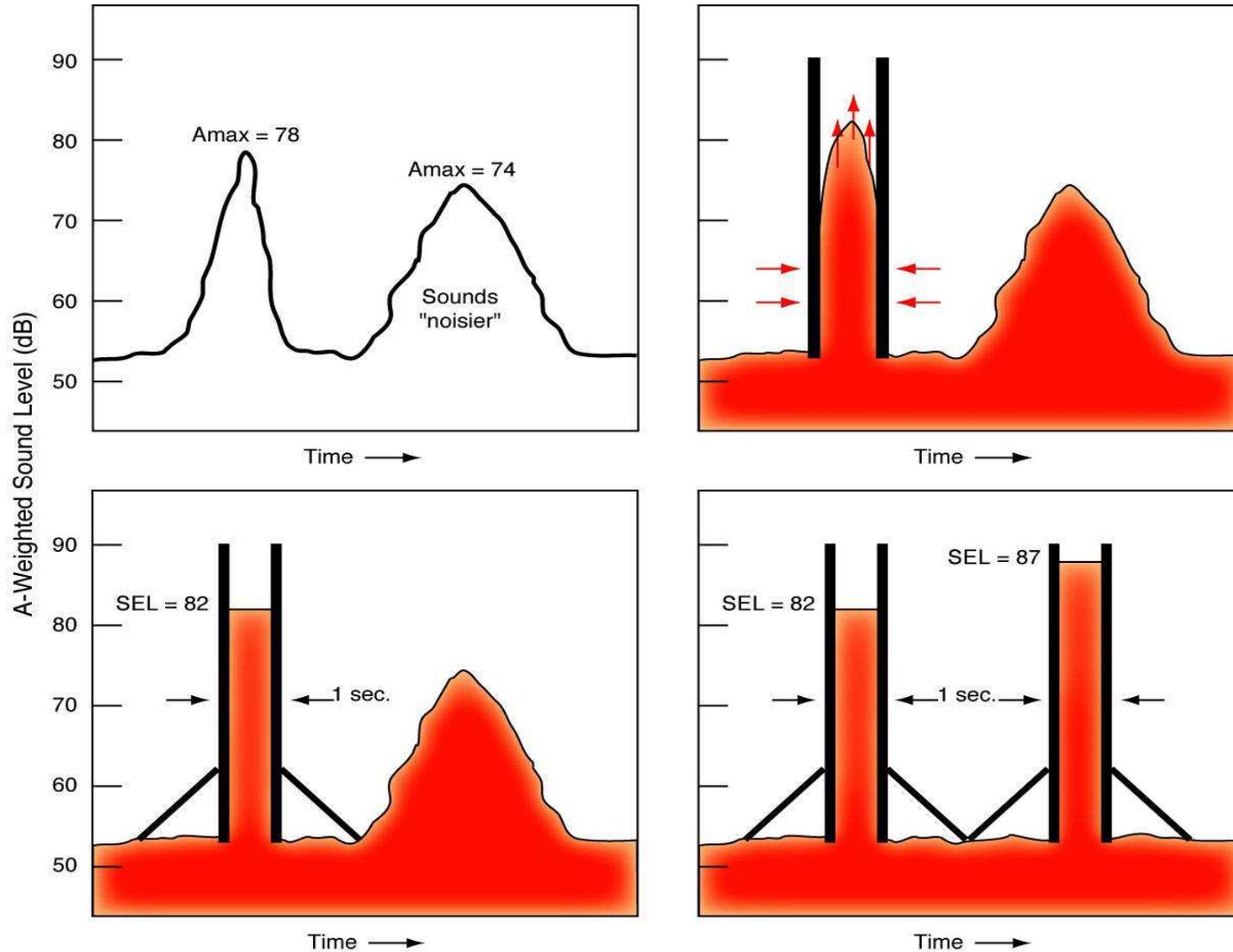


# What is the Sound Exposure Level

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- **Two events may have the same  $L_{max}$ , but very different overall noise exposures, because of duration**
  - An event with a higher  $L_{max}$  may result in less overall exposure and seem “quieter” if it is shorter
- **Sound Exposure Level (SEL) measures the total “noisiness” of an event, by taking duration into account**
  - The one-second long steady level that contains as much energy as the varying level over full event
- *A picture or two can help explain this...*

⋮  
**So what exactly does SEL represent?**



# What is the Day-Night Average Sound Level (DNL)

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- Describes 24-hour exposure
- Noise from 10 pm to 7 am is factored up by 10 dB
- The night “penalty” is equivalent to counting each night aircraft event 10 times
- EPA recommends use of DNL for environmental studies
  - FICON (1992) reconfirmed there is no preferable metric
- Also abbreviated “Ldn”

