Session 4pAA


David E. Marsh, Chair
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Chair’s Introduction—2:00

Invited Papers

2:05

4pAA1. Acoustical considerations for secondary uses of government facilities. Jack B. Evans (JEAcoust., 5806 Mesa Dr., Ste. 380, Austin, TX 78731, Evans@JEAcoust.com)

Government buildings are by their nature, public and multi-functional. Whether in meetings, presentations, documentation processing, work instructions or dispatch, speech communications are critical. Full-time occupancy facilities may require sleep or rest areas adjacent to active spaces. Rooms designed for some other primary use may be used for public assembly, receptions or meetings. In addition, environmental noise impacts to the building or from the building should be considered, especially where adjacent to hospitals, hotels, apartments or other urban sensitive land uses. Acoustical criteria and design parameters for reverberation, background noise and sound isolation should enhance speech intelligibility and privacy. This presentation looks at unusual spaces and unexpected uses of spaces with regard to room acoustics and noise control. Examples of various spaces will be discussed, including an atrium used for reception and assembly, multi-jurisdictional (911) emergency control center, frequent or long-duration use of emergency generators, renovations of historically significant buildings, and the juxtaposition of acoustically incompatible functions. Brief case histories of acoustical requirements, constraints and design solutions will be presented, including acoustical measurements, plan illustrations and photographs. Acoustical criteria for secondary functional uses of spaces will be proposed.
Acoustical Considerations for Secondary Uses of Government Buildings

Jack B. Evans, PE

Acoustical Society of America, Austin Meeting, November 10-14, 2003
Acoustical Considerations for Secondary Uses of Government Buildings

What Are Government Facilities?

- Legislative Chambers
- Administrative Offices
- Law Enforcement & Public Safety
- Civil & Criminal Courts
- Jails & Prisons
- Embassies & Consulates
- Military Facilities
Acoustical Considerations for Secondary Uses of Government Buildings

What *Else* Are Government Facilities?
- Convention & Exhibition Centers
- Residential Buildings
- Museums
- Research Laboratories
- Hospitals & Clinics
- Transportation Terminal & Maintenance Facilities
**Acoustical Considerations for Secondary Uses of Government Buildings**

What About Publicly Owned/Financed Facilities?
- Public Schools (K-12 and Higher Education)
- Performing Arts Centers
- Sports Arenas & Stadiums
- Recording & Broadcast Studios
- Retail Commercial Facilities
- Power, Water and other Utilities
- Parking Garages
Acoustical Considerations for Secondary Uses of Government Buildings

So what if governments own all kinds of buildings?

- Government Agency Acoustical Criteria - Mandates or Recommendations?
  - DOS / OBO - Embassies, Consulates
  - FAA - Airports
  - FHWA - Roadway (State DOT’s)
  - FTA - Trains, Busses
  - GSA - Offices
  - HHS - Medical/Healthcare (HIPPA)
  - HUD - Residential, Schools, Churches
  - OSHA - Hearing Protection
  - DOD - Laboratories, Alt. Hearing Protection
  - Etc., etc., etc., …
Acoustical Considerations for Secondary Uses of Government Buildings

What about criteria gaps, i.e. Unusual Spaces?

- Acoustical Consultants Should Develop and Recommend Criteria for:
  - Architectural Room Acoustics & Sound Isolation
  - Audio/Visual, Video & Communication Systems
  - Structural Vibration Control
  - Building Systems Noise & Vibration Control
  - Environmental Noise Control

- Base the Criteria on Functional Use of Space
Acoustical Considerations for Secondary Uses of Government Facilities

**Acoustics 101: Source - Path - Receiver**

- **Source Characteristics**
  - Loudness, Tonality, Intermittence, Temporality

- **Path**
  - Airborne, Structure Borne, Flanking

- **Receiver Requirements**
  - Privacy/Confidentiality
  - Speech Intelligibility, Music Clarity
  - Freedom from Intrusive Noise, Annoyance
Acoustical Considerations for Secondary Uses of Government Buildings

Examples of Secondary Functional Uses?

- Atrium Used for Reception, Speech or Assembly
- Exhibition Hall used for Performing Arts
- Recording/Broadcast from Legislative Chamber
- Industrial Shops/Central Plant Hearing Protection
- Courtyard/Lawn Ceremonies, Concerts, Weddings
- Museum Gallery Reception, Lecture or Music
- Interactive Video Conference Medical Treatment
Acoustical Considerations for Secondary Uses of Government Buildings

Examples of Unexpected Acoustical Criteria?

- Room Acoustics
  - Reduce T60, increase TL of Atrium for Occupation
- Sound Isolation
  - High TL for Indoor Firing Ranges in Offices, Schools
- Building Systems Noise & Vibration
  - RC vs. NC for Low Freq. Airborne Vibration Influence
- Outdoor Building Equipment - Environmental
  - Tonality or Low Frequency vs. A-weighted Level
- Environmental For Transportation Facilities
  - Airborne vs. Ground Borne vs. Water Borne?
Acoustical Considerations for Secondary Uses of Government Buildings

Examples of Unexpected Acoustical Criteria?

- Accepted Standards Referenced in Lieu of Criteria
  - ANSI S12.60-2002 - Acoustical Performance for Schools
  - ARI - Equipment ratings
  - ASHRAE - HVAC Noise & Vibration Criteria
  - ASTM - Testing & Procedures Standards
Acoustic Design of Government Buildings

Secondary Uses of Government Facilities

Legislative and Administrative

- **Primary Uses**
  - Hearings, Legislative/Council, Chambers, Meeting, Analysis

- **Secondary**
  - Administrative, Executive Offices, Receptions, Speech Assembly, Dining

- **Unexpected**
  - Recording/Broadcast Meetings
  - Interviews, Press Conference
  - Production, Printing Shops
  - Parking Garage Ventilation
Law Enforcement and Public Safety

- **Primary Uses**
  - Administrative, Executive Offices, Conference & Training/Meeting

- **Secondary**
  - Dining, Controlled Access, Maintenance Shops

- **Unexpected**
  - Disaster Response
  - Interagency Control
  - News Media, Interview
  - Cool off / Decompression
  - Sleeping
Primary Uses
- Hearing Rooms, Public (License, Title Registration, etc.)

Secondary
- Judge, Jury Chambers
- Prisoner Holding

Unexpected
- Witness Waiting/Isolation
- Media Studios, Interviews, Press Conferences
- Historical Renovation Constraints
Jails, Prisons Correctional Facilities

- **Primary Uses**
  - Day Room/Sleeping Cells
  - Administrative Offices

- **Secondary**
  - Shops, Recreation, Gym
  - Dining Hall / Assembly

- **Unexpected**
  - Classroom/Training
  - Interview/Conference Privacy
  - Infirmary/Clinic (HIPPA?)
Embassies, Consulates and Foreign Buildings

- **Primary Uses**
  - Administrative, Executive, Meeting, Analysis

- **Secondary**
  - Dining, Receptions, Speech Assembly, Controlled Access, Analysis

- **Unexpected**
  - Residential, Outdoor Assembly
  - Atrium Assembly
  - Marksmanship Range (indoor)
  - Motor Pool, Shops
  - Power Generator

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**Standard Embassy Design (SED)**

**Generator Roof and/or Utility Bldg.**

**Atrium Assembly Space**
Military Facilities

- **Primary Uses**
  - Administrative, Executive Offices, Meeting, Analysis

- **Secondary**
  - Dining, Receptions, Drill/Training, Shops,

- **Unexpected**
  - Residential, Community
  - Schools, Hospital, Chapel
  - Laboratories, Research
Government Owned Public Facilities

- Convention Center
  - Exhibition, Banquet Halls
  - Meeting Rooms
- Unexpected
  - Concert, Performing Arts
  - Recording (Antique Roadshow)
- Sports Arenas/Stadiums
  - Sports Events
- Unexpected
  - Concert, Performing Arts
  - Convocation/Graduation
  - Studio, Media Facilities
Government Owned Public Facilities

- **Museums**
  - Exhibition, Research
  - Meeting Rooms
  - Dining, Retail

- **Unexpected**
  - *Cinema / Interactive Theaters*
  - Assembly, Maintenance Shops
  - Lobby, Atrium Reception
Government Owned Public Facilities

- Public Schools, K-12 & Higher Education
  - Classroom, Music/Drama
  - Auditorium, Gym, Stadium
  - Labs, Shops
  - Office, Seminar/Meeting

- Unexpected
  - Research Labs with Critical Vibration/Noise Criteria
  - Interactive A/V Seminar
  - Restaurant/Café Dining
Government Owned Public Facilities

- **Hospitals, Medical Research**
  - Physician, Patient Rooms
  - OR’s, Procedures, Labs
  - Office, Seminar/Meeting

- **Unexpected**
  - *Research Labs with Critical Vibration/Noise Criteria*
  - *Interactive Medicine Suite*
  - Auditorium, A/V Conf.
  - Atrium, Dining, Lounge
  - Helicopter, Siren, Construction
Government Owned Public Facilities

- Transportation Terminals
  - Airports
  - Railroads
  - Truck docks
  - Ship / Container

- Unexpected
  - *Environmental Impact on Residential, School, etc.*
  - *Ground Borne Vibration*
  - *24 / 7 Operation*
  - *Outdoor P.A., Alarms*
Acoustical Considerations for Secondary Uses of Government Buildings

SUMMARY

What Are Government Buildings?

- Almost ANY Building Type

What Acoustical Criteria Should Be Used?

- Agency/Owner/Regulation Mandated
- Acoustical Consultant Recommended