

SOUND MASKING FOR FLEXIBLE SPACES

- “FLEX SPACE” MASKING FOR OFFICES WITH EXPOSED STRUCTURE DESIGN.
- RAISED ACCESS FLOOR SYSTEM MASKING

Presented by

DYNASOUND: INDUSTRY LEADER IN DESIGN-BUILD SOUND MASKING SOLUTIONS

- **OVERVIEW OF OPEN PLAN ACOUSTIC ISSUES:**
Major studies show that employees rate speech noise distraction as the #1 facility’s issue that impacts their job satisfaction and productivity.
 - The solution to speech noise distraction involves integrating higher performance ceilings, office furniture, and sound masking systems.
 - Sound Masking can increase speech privacy by 50% and is the lowest cost and most effective acoustical solution.
 - Studies show a 300% to 500% ROI with payback periods of less than 3 months, when employees are provided with acceptable speech privacy.
 - Sound masking systems frequently provide voice paging within the same system and thus eliminating the cost of a separate voice paging system.
- **OVERVIEW OF CLOSED PLAN ACOUSTIC ISSUES:**
 - Speech Privacy in today’s more flexible Private Offices can be poor. Confidential conversations can frequently be overheard by occupants who are located outside of these private offices.
 - Loss of sensitive and confidential information is a corporate Security Issue
 - Sound masking slightly raises the building’s background ambient sound level so that conversations cannot be understood.

PART ONE-FLEXIBLE SPACES:

- **OFFICE TRENDS IN FLEXIBLE SPACES:**
 - Studies show the average workspace “churn rate” for USA Corporations to be 42% per year. Many companies move offices/workstations at or in excess of 100% per year.
 - The use of exposed structures (no suspended ceiling), is increasing due to:
 - Increased flexibility.
 - Lower cost.
 - Faster construction time and occupancy.

- Changing employee desire for “non-traditional interiors” such as “open loft design” etc.
- Examples of high churn - high flexibility - users:
 - Call Centers (outgoing or incoming); constant employee turnover.
 - Customer care centers.
 - Industries undergoing high rates of business change.
 - Technology intensive users – some examples:
 - Financial services industry.
 - Customer service centers.
 - The entire Information Technology Industry.
 - Tele-Communications Industries.
 - Most service industries working in the information age.

● CHARACTERISTICS OF “FLEX SPACE”:

- Large floor plates combined with assembly, warehouse, research, and/or manufacturing space.
- High bandwidth communication.
- Extensive wiring and cabling systems, featuring “plug and play” connections.
- Increased use of raised access floors to manage cable systems access and change and/or the option to deliver HVAC into occupied spaces through a pressurized floor plenum.
- Ability to re-configure interiors rapidly, with ease and economy.
- High ceiling heights.
- Frequent use of exposed overhead structure design with no continuous use of suspended acoustical ceilings.
- Research shows many young workers in “information age” companies prefer to work in a non-traditional office interiors image... Exposed structure, loft design with high ceilings, a more “open” environment, etc.

● ACOUSTICAL ISSUES OF FLEXIBLE OFFICES:

- Exposed structures without suspended acoustical ceilings challenge the ability to provide acceptable degrees of speech privacy due to increased overhead reflection of distracting speech conversation.
- However, higher floor to structure buildings (162 +) will become less problematic because of the increase in room volume that will reduce sound pressure levels. This is generally the case except when a “barrel-vault” roof design is used that can reflect sound waves to a focus point.
- In some open structure facilities, without ceiling sound absorption, the acoustical problem may be echoing (sound reverberation). The use of sound absorptive furniture panels and/or additional sound absorptive acoustical elements will help to counteract objectionable reverberation.
- Despite a lack of ceiling absorption, it is still possible to achieve reasonable degrees of speech privacy by focusing on the performance of other acoustical components by having a well planned acoustical strategy:
 - A well designed and precisely tuned sound masking system is even more important in achieving speech privacy because of the lack of ceiling absorption (attenuation).
 - Furniture system acoustical performance is also very critical :
 - Higher panel heights of 603 to 663 are needed in order to increase speech noise containment within the workstation.
 - Use sound absorptive furniture panels to reduce echoing.”

● SOUND MASKING DESIGN, FLEXIBLE SPACES:

- Pendant mount (in space) sound masking speaker design and placement is very important in achieving sound masking uniformity. Since a suspended ceiling does not exist to help diffuse (spread out) the typical sound distribution pattern of a plenum based speaker, the above is very critical.

- Dynasound’s new “cylindrical pendant mounted masker” provides excellent sound distribution in high structures. Speaker on center spacings will vary depending on the building specifics and the performance of the speaker:
 - 122†Floor to deck height requires speakers @ 122o.c.
 - 182 Floor to deck height requires speakers @ 222o.c.
 - 222 Floor to deck height requires speakers @ 262o.c.
- Since the pendant mounted speaker is in full view, its architectural design is very important. There is a need to remove the “industrial look” of the typical sound masking speaker and to provide an architecturally finished appearance without any visible penetrations or terminations.

PART TWO - RAISED FLOOR - SOUND MASKING:

- **ACOUSTICAL ISSUES INVOLVED:**

- Air handling raised floor systems can operate at very low sound levels (NC 25) as compared to traditional overhead ducted HVAC systems (NC 35). This means the building’s ambient background sound level can be significantly quieter with the use of under-floor air distribution, thus speech noise distraction can be a measurably increased problem.
- Sound masking now becomes an even greater mandatory requirement to successfully inhibit employees from being distracted by speech conversations and noisy office equipment.
- In either static or air handling raised floors, careful design engineering is needed to provide *a uniform distribution of masking sound throughout the entire floor cavity* for both open and closed plan areas.
- Preventing “cross talk” and the loss of confidential privacy in closed offices with “open” supply air diffusers in raised floor cavities, is a major concern. The raised floor plenum can create a “sound tunnel” for speech transmission. This problem is easily corrected with the addition of raised access floor sound masking.

- **NEW - PATENT PENDING - STATE OF THE ART – RAISED FLOOR SOUND MASKING TECHNOLOGIES FROM DYNASOUND:**

- Low profile, high performance raised access floor sound masking speakers are specifically designed to provide uniform dispersion of masking sound in floors from 2 ½’ to 8’ in height.
- The new “raised floor masker” speaker design (patent pending) provides horizontal and vertical sound dispersion to create the required sound distribution for optimum performance within low profile raised floor cavities of *non-air handling* access floors.
- New high efficiency sound speakers are now available for air handling raised access floor systems, that are typically 12” or higher.
- Air diffuser specific speaker placement and/or sound deflectors (patent pending) are required for air diffuser penetrations that are used in raised access floors in order to achieve ASTM requirements for sound masking uniformity.

- **ACCESS FLOOR INSTALLATIONS USING DYNASOUND FLOOR MASKERS:**

- Harvard Healthcare, Boston, MA. (air handling raised floor).
- GSA, Portland, OR. (Static raised floor).
- Deloitte Consulting, Manhattan, NYC (air handling raised floor on several floors, most without the use of traditional ceiling systems).
- Perrier Company, Los Angeles, CA. (static raised floor).
- Cox Communications, Wichita, KS (air handling raised floor).

- **BENEFITS OF UNDER RAISED FLOOR SOUND MASKING:**

- Exceptionally uniform sound distribution (+ or -) 2 decibels.
- Lower installed cost than typical ceiling plenum sound masking.
- Removes the masking component from crowded ceiling plenums.
- Provides sound masking closer to distracting voice conversations than overhead masking. “Under floor” masking is more effective in covering speech noise that passes through raised floor openings for air supply.
- Sound masking speakers are individually secured to the raised access floor system and do not interfere with cabling requirements.

- **DYNASOUND - MASKING OBSERVATIONS:**

- **Achieving even sound distribution with raised floor air supply:**

- For air handling floors, ideally place the Dynasound floor maskers in the floor cavity between the supply air diffusers or provide baffling and volume controls as required to meet ASTM requirements for spatial uniformity of the sound masking. Dynasound’s experience has been excellent in achieving spatial uniformity.

- **How will masking sound pass through the dense concrete fill of raised floors:**

- Using properly designed under floor sound masking speakers with the appropriate transformer and power tap settings, will result in very sufficient room sound levels (46 to 48 decibels). This is achieved by transmitting the appropriate masking signal (shaped in 1/3 octave bands) through the thick and dense raised floor panels into the room space above.

- **Assuring even sound masking performance under raised floors:**

- It is Dynasound’s experience that when properly designed and installed raised access floor sound masking is used, it can be tuned to a (+ or -) 2 decibel sound level, 483†above the floor everywhere. Dynasound can assure clients of this high degree of performance.””””

- **Typical sound masking speaker placement under raised floors:**

- With proper design, Dynasound floor masking speakers can be typically located 122 to 142 on center in low profile static raised access floor applications. Speaker spacing for air handling raised access floors are more typically on 142 to 162†centers and will differ somewhat by air diffuser design and location.”

- **Why is under floor masking potentially less expensive than above ceiling locations:**

- The cost of raised access floor installations can be significantly less than ceiling mounted speakers because floor mounting does not require suspended drops (shots, pins, hanger wire, etc.) from structure above nor does it require the cost and time of using ladders or other mechanical lifts.”

• **Closed Plan Areas – Private Offices:**

- Static raised access floors do not present any difficulties. Sound masking will work well in private offices.
- Air handling raised access floor applications do present the potential for sound leaks of spoken confidential information to occur through the air diffusers via the open floor cavity **if sound masking is not used.**”

Dynasound’s experience shows that when sound masking is installed in raised access floor cavities, speech privacy is not impacted by the presence of air diffuser penetrations. In cases where there may exist some sound leakage (cross talk) from a particular diffuser design, into the common supply air plenum below, Dynasound has developed techniques to easily correct the problem. One of them is our patent pending air diffuser deflector.

Should future churn result in supply air diffuser relocation, sound masking speaker deflectors and/or volume changes can easily correct non-uniform sound distribution in the occupied space.