Sound Masking Basics

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Course Description

This course is for anyone wishing to learn the basics of Sound Masking and how it is applied to improve Workplace Acoustics and to reduce Workplace Distractions.

Designed to remove the mystery and myths so prevalent today as employers and facilities look for ways to improve office acoustics and improve employee productivity.
Learning Objectives

At the end of this Presentation, participants will be able to:

1. Understand the concept of using masking sound to cover or mask unwanted sounds

2. Assess the advantages of adding a masking system in an office to reduce workplace distractions
Learning Objectives

3. Identify where masking sound can be utilized

4. Explore some concepts of Masking Design in order to create privacy in today’s open plan workspaces
What Is Sound Masking?

By definition, the word “mask” means to cover up or disguise something

Sound Masking uses electronically generated, low level sound to cover unwanted distractions

The masking sound contains no information

One of the earliest uses of sound to mask other sounds was the use of water fountain “noise” to mask or cover the sounds of wagon wheels on cobblestone streets in early times
Why Sound Masking?

Most open plan office employees say they want quiet, when really what they want is freedom from workplace distractions.

Poor workplace acoustics, coupled with a lack of privacy, affects employee comfort, error rates and the ability to learn.
Why Sound Masking?

Some trends in Commercial Office Designs-

-Office Architecture trends now favor no cubicle dividers, little or no ceiling grids, polished concrete floors

-Office real estate isn’t cheap, so more and more occupants are being put into offices with the resulting increase in noise levels

-More glass is being added to buildings allow more light, but glass is highly reflective of sound
Why Sound Masking?

Some trends on Commercial Office Designs-

- Private conversations being heard and understood even behind closed doors
- Too noisy, hard to concentrate with tasks
- Lost productivity due to these distractions, up to 21 minutes a day per employee
Why Sound Masking?

A Little Background info

-Sound Masking for the workplace isn’t new

-Sound Masking Technology has been around for 40 years or so

-Early Sound Masking Systems used “White Noise” which is the wrong spectra and was annoying to the office occupant
Advantages of Sound Masking

- By far, the least expensive way to improve Workplace Acoustics

- Sound Masking works at the listeners ears and benefits the entire space, not just where people are sitting

- BGM and Paging can be added to a Masking System

- "Masking Sound" supplements acoustical room treatments in “live” or reverberant spaces
Advantages of Sound Masking...

- Masking Sound can be ramped up over time to help acclimate occupants
- Privacy can be easily adjusted by lowering or raising the masking signal
- Sound Masking can help Hospitals and Clinics comply with HIPAA regulations

*Health Insurance Portability and Accountability Act of 1996*

“To protect conversations your doctor has had about your care or treatment with nurses and other Healthcare Professionals.”
Distraction Reduction in the Open Plan Office

radius of distraction = 45 feet without soundmasking

radius of distraction = 15 feet with soundmasking

Without Masking = 6300 sq. ft of exposure
With Masking = 700 sq. ft of exposure

Sound Masking Basics
Potential Disadvantages of Sound Masking

- Un-realistic expectations from a customer...sound cancelling, sound blocking, etc.

- Occupants with hearing loss and or visual handicaps can sometimes have issues with the slightly elevated background sound

- Incorrect Commissioning of a plenum or above ceiling masking system
Some Examples of Masking Sound Use

- *Call Centers and Commercial Offices* can benefit from Masking Sound as a well designed and Commissioned masking system reduces distractions and improves productivity.

- *Banks and Financial Institutions* have their own HIPAA Act as oral conversations between the customer and the bank are required to be protected from the inadvertent “listener”

- *Pharmacies along with Hospitals* all can benefit from the addition of Masking Sound to help increase oral privacy
Any Facility That Has Employees Can Benefit From Masking Sound!

- Open Offices
- Closed Offices
- Hospitals (HIPAA Compliance)
- Pharmacies (HIPAA Compliance)
- Call Centers
- Libraries
- Schools
- Secure Government Facilities (SCIF rooms)
Where Do We Install Masking Loudspeakers?
Where Do We Install Masking Loudspeakers?

Open Ceilings

Sound Masking Basics
Where Do We Install Masking Loudspeakers?

Above the Ceiling

Sound Masking Basics
Plenum Based Masking Speaker Installation

A large percentage of masking systems have the loudspeakers above the ceiling tiles, hidden from view. These speakers “point” upwards so the masking signal reflects off the deck.
Where Do We Install Masking Loudspeakers?

Under A Raised Access Floor
Where Do We Install Masking Loudspeakers?

Direct Field or Down Firing
Where Do We Install Masking Loudspeakers?

Direct Field using Pendant Style

Sound Masking Basics
Masking Design Rules & Concepts
Design Rule One

Masking Sound is placed where the “Listeners” are

“I want privacy in my office, so people outside cannot understand what I am saying, so put a system inside my office”

This is incorrect, the listeners are outside the office, this is where the Masking Sound needs to go
Fundamental Design Concepts

Design Rule Two

-The Masking Systems must be truly background by conveying as little information to the listener as possible.

-The Masking Sound should not call attention to itself

-The Masking Sound should never be turned off, but slowly adjusted to suit the office noise.
Fundamental Design Concepts

Where are the best places to locate Masking Loudspeakers?

- Speakers under a raised floor create a very spatially uniform masking signal
- Speakers in an Open Ceiling with 20ft deck height
Fundamental Design Concepts

Where are the best places to locate Masking Loudspeakers?

-Speakers above the ceiling grid, this is most common

-Direct radiating or down firing speakers require more speakers placed closer together to achieve good uniformity
What Equipment Is Needed To Create Masking Sound?

- A Masking Generator which produces the Masking Signal and provides $1/3^{rd}$ octave equalization to tune the signal if required

- The Masking Generator may have built in amplification

- The Masking Generator may have inputs for Background Music and Paging

- The Masking Generator may be able to be muted when the Fire Alarm is triggered
What Equipment is Needed to Create Masking Sound?

An Amplifier to amplify the Masking Sound

A Masking Loudspeaker to Play the Masking Signal
The Masking Signal Explained

Sound Masking Systems Are Incorrectly Called White Noise Systems!

The initial masking signal is created in the generator and is a random broadband noise signal (no information)

This signal is always connected to audio filters that “shape” the signal in a very specific way

This is called 1/3rd octave equalization of the masking sound
Masking System Tuning

In a *Plenum Based Masking System*, where the loudspeakers are located above the ceiling, part of the Commissioning process is called “Tuning”

- Tuning must be done prior to occupancy

- An “A” weighted 1/3<sup>rd</sup> octave meter is used

- The systems filters are adjusted while measuring so the resultant response matches a preferred curve
Masking Curves

Open Plan Curve

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<th>160</th>
<th>200</th>
<th>250</th>
<th>315</th>
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AtlasIED recommends the equalization spectrum below for proper system performance in most conventional Closed Plan Offices.

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This curve, when adjusted properly, produces a smooth, unobtrusive masking sound at the listener.

Sound Masking Basics
The Masking Curve
Measuring The Masking Signal

A common sound level meter. It measures the entire audio spectrum, but not in narrow bands for Sound Masking.
Measuring The Masking Signal

Software based App

Atlas IED

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Measuring The Masking Signal

Highly Accurate Type I Meter

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This Concludes Sound Masking Basics
Thank You For Your Time!

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