



Speech Privacy & Sound Masking

in modern architecture

Presented By

Todd Berger CET, CTS-D, DMC-D
Manager of Field Sales Engineers

Cambridge Sound Management
a Biamp Systems Company

Course Description

about this course



This course will increase the student's understanding of the principles behind speech privacy. Students will learn the fundamentals of how speech privacy is achieved and what metrics are used to measure speech privacy. Participants will also learn what role sound masking systems play within the context of speech privacy.

Learning Objectives

what you will learn



ACOUSTIC PRIVACY

Understand the importance of acoustic privacy in the workplace



SOUND MASKING

Understand what sound masking is and what role it plays in speech privacy



THE ABCs OF ACOUSTICS

Describe the principles involved in the ABCs of good acoustical design



DESIGN ISSUES

Identify some of the major design issues related to speech privacy in open offices, private offices and health facilities



SPEECH PRIVACY

Understand what speech privacy is and how it is measured

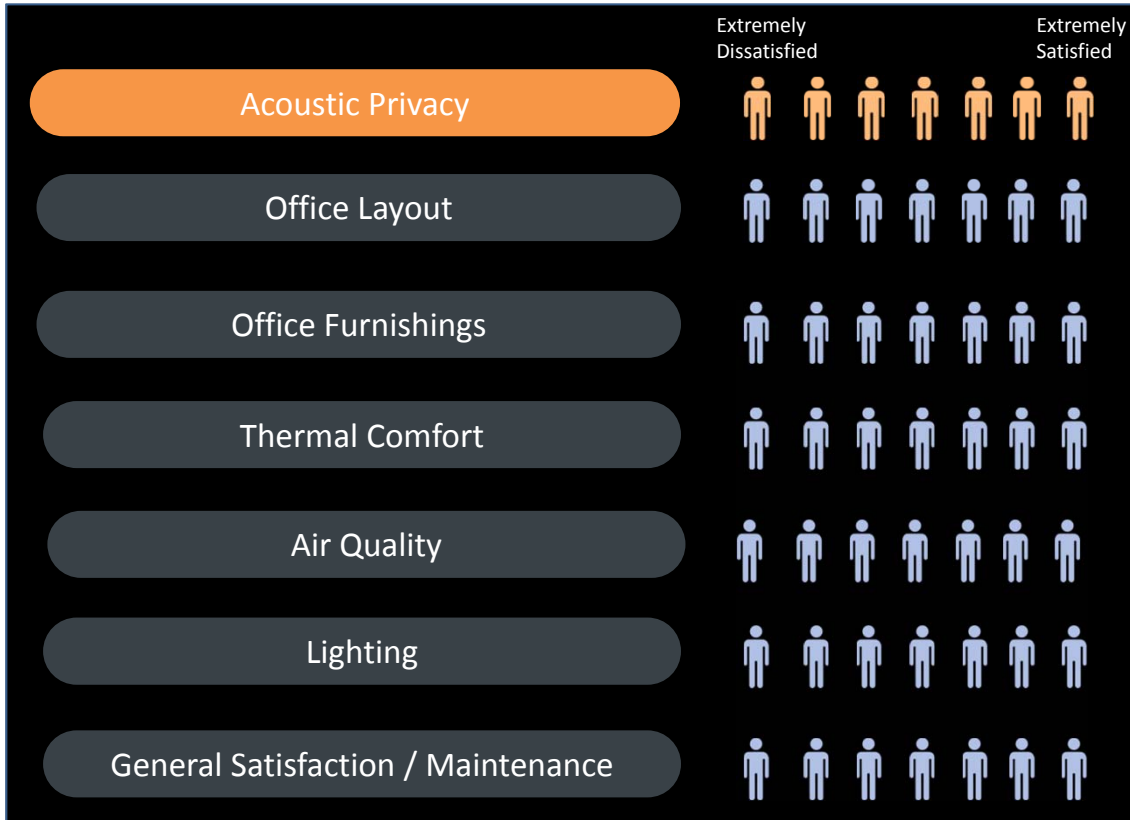


Acoustic Privacy

Improved acoustic privacy enhances worker productivity, comfort and fulfills legal requirements.

The Case for Acoustic Privacy

worker concerns



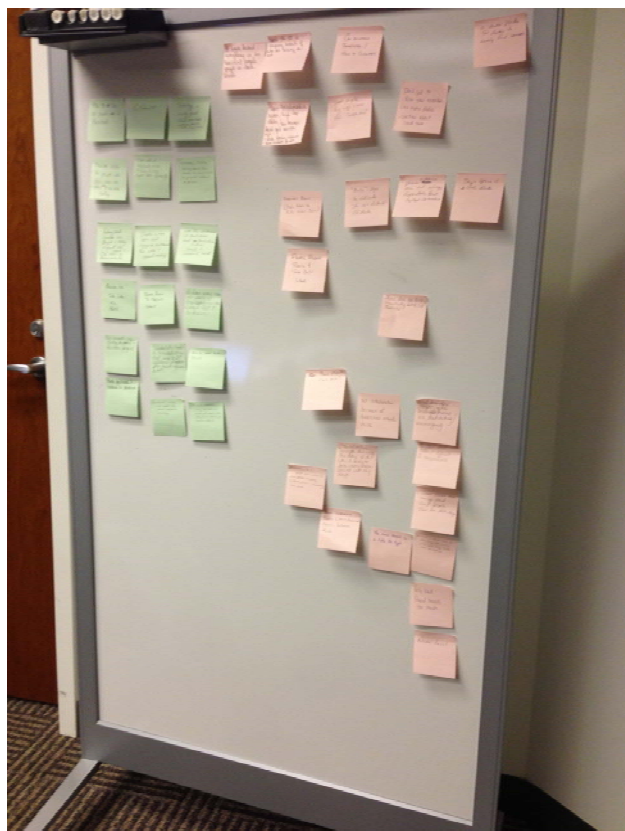
“I currently work in a cubicle – my neighbors are a man in the midst of a divorce, a woman with a problem child, another woman with an elderly parent who should be in a care facility. The only cure for my personal hell would be a quiet room with a door. Perhaps my employer would then get his money’s worth from my workday... did I mention that I am across from the copier?”

-GSA, Sound Matters (2012)

Survey of 25,000 Workers / 2000 different Buildings –
By: Center for the Built Environment

The Case for: Acoustic Privacy

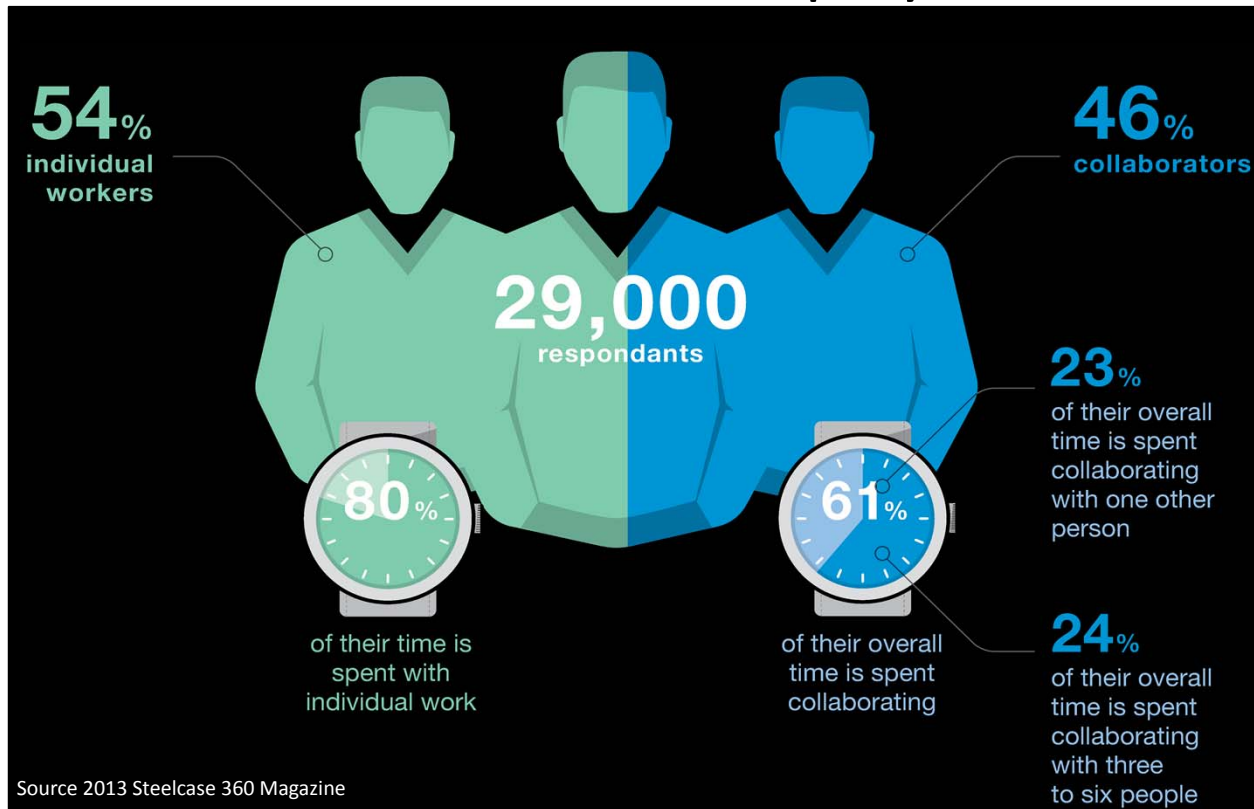
Worker Concerns



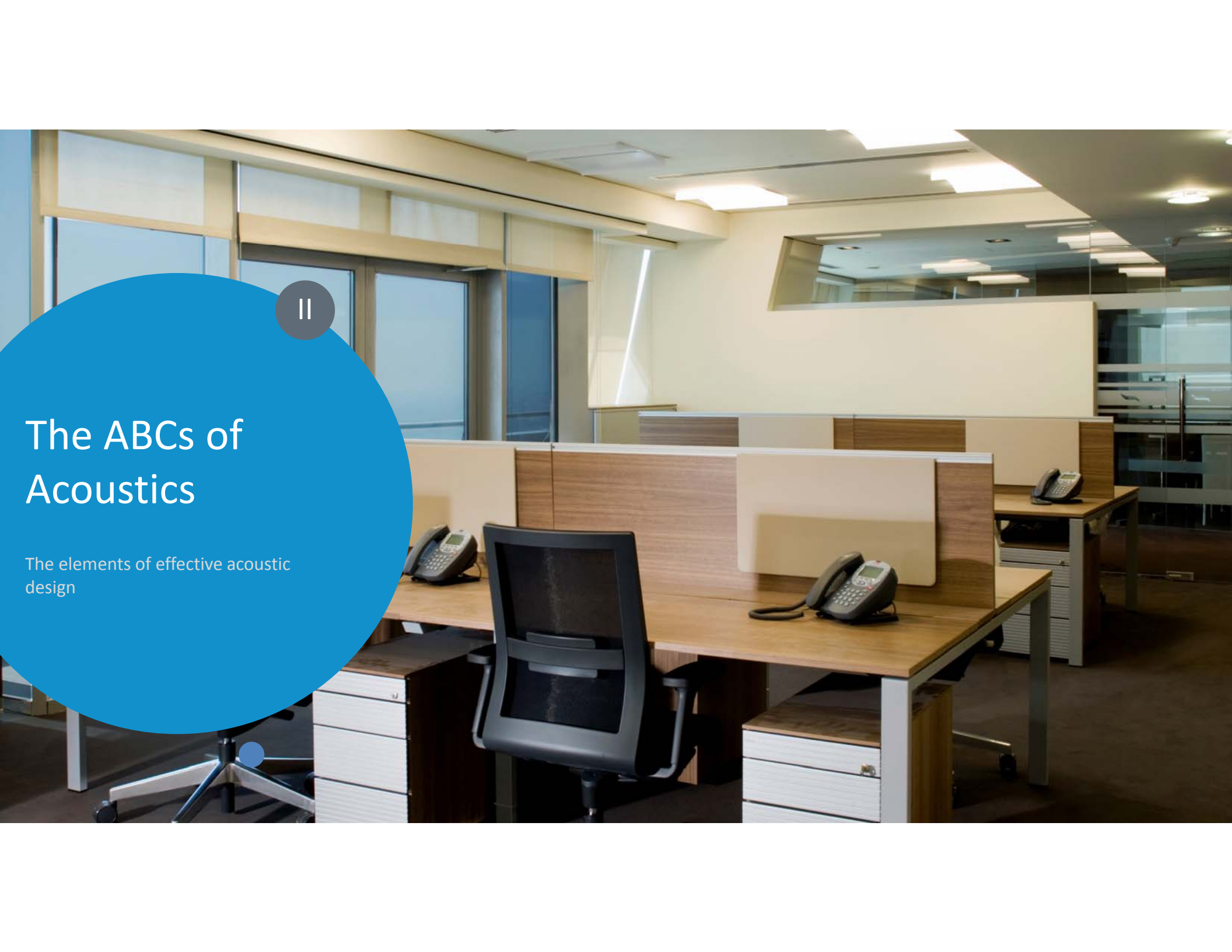
- "Very loud. Sound travels too much"
- "Some conference rooms (noise/conversation) carries between them"
- "Some areas are noisy and loud, people can be distracting"
- "Can be noisy sometimes/hard to concentrate"
- "Noise level too high"

The Case for Acoustic Privacy

employer concerns



“Nearly 80 Hours per year lost productivity due to the distractions of others.”



The ABCs of Acoustics

The elements of effective acoustic design

The ABCs of Architectural Acoustics

the elements of effective acoustic design



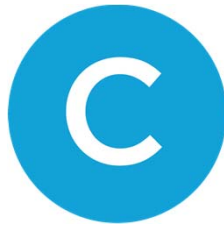
Absorb

i.e., acoustic ceiling tiles, acoustic wall panels



Block

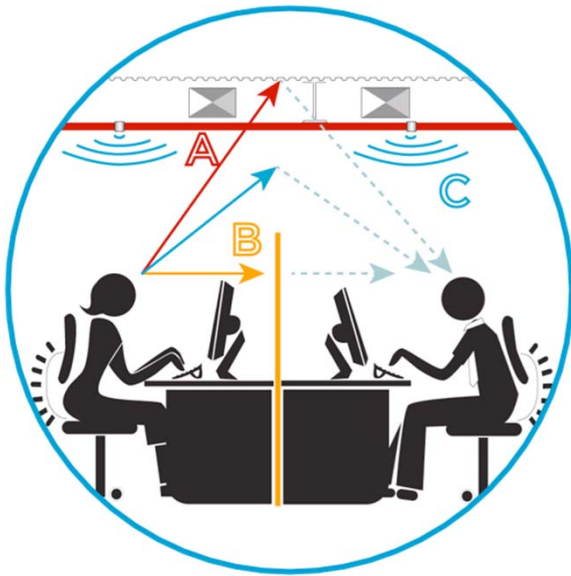
i.e., cubicle partitions, walls



Cover

i.e., background noise, sound masking

Furniture & Construction Trends

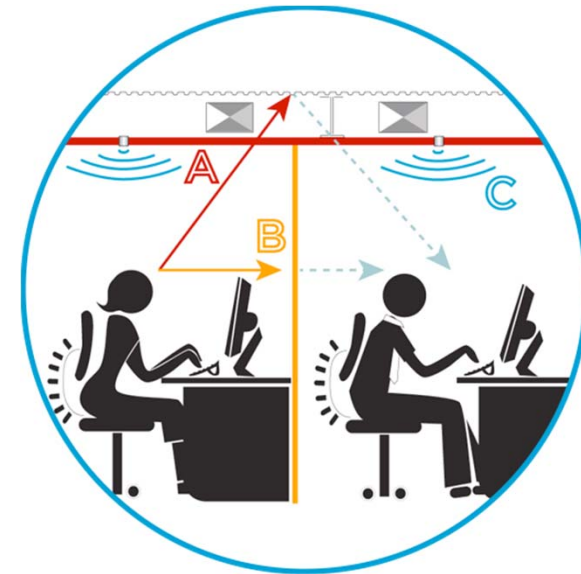


OPEN PLAN AREA

- Lower partition height
- Denser, smaller cubicles
- More reflective surfaces

ENCLOSED AREA

- Demountable walls
- Fewer walls to the deck
- Increased use of glass





Speech Privacy

What is speech privacy?
How is it measured?

What is Speech Privacy?

highlights from decades of scientific research

Speech Privacy

speech pri•va•cy (noun)

Speech Privacy is the inability of an unintentional listener to understand another person's conversation.



Speech privacy complaints are due to distractions caused by overheard conversations.



The perceived level of distraction relates directly to the intelligibility of the overheard conversation.

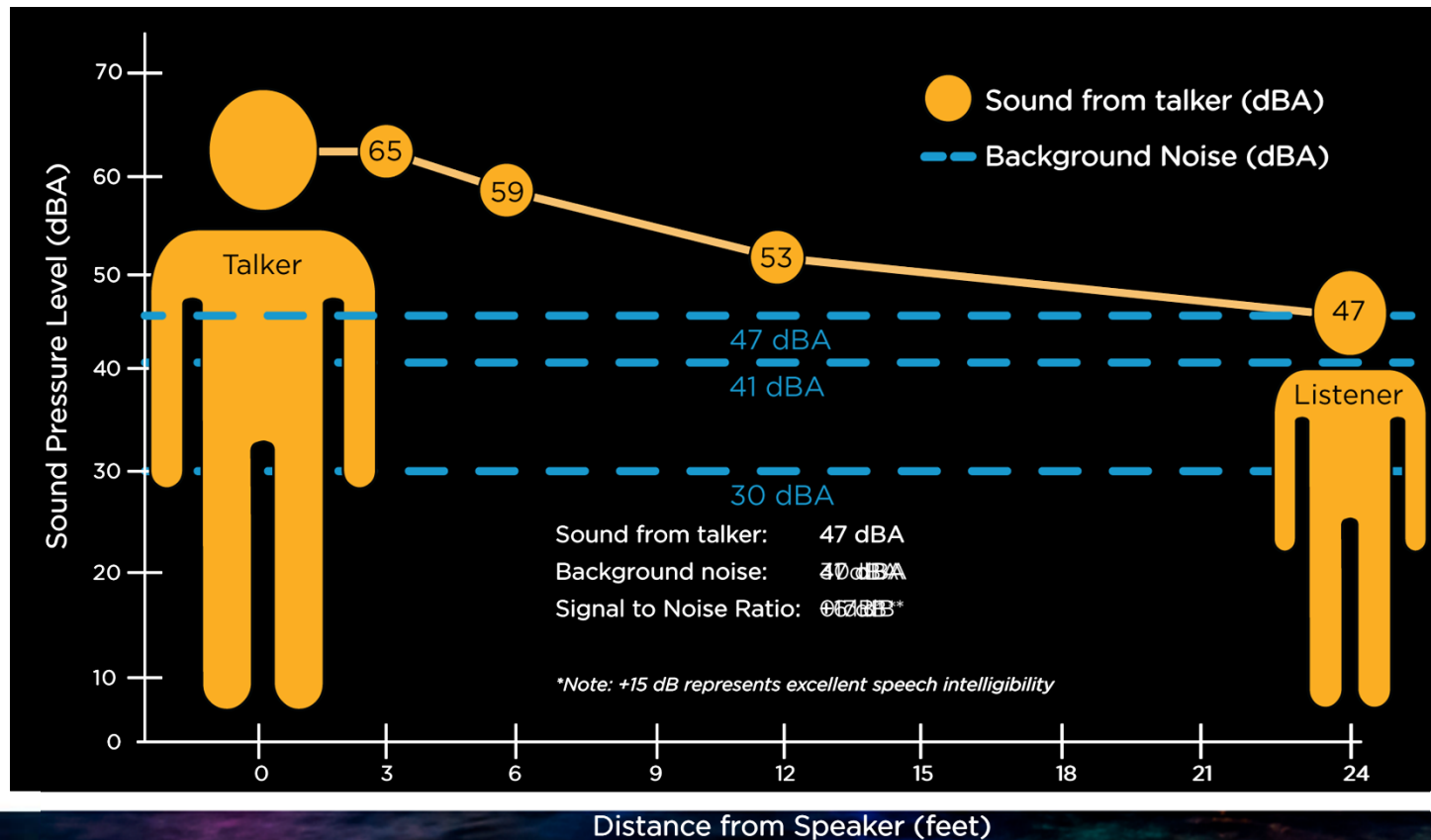


Intelligibility depends on the loudness of overheard speech compared to the loudness of the background noise.



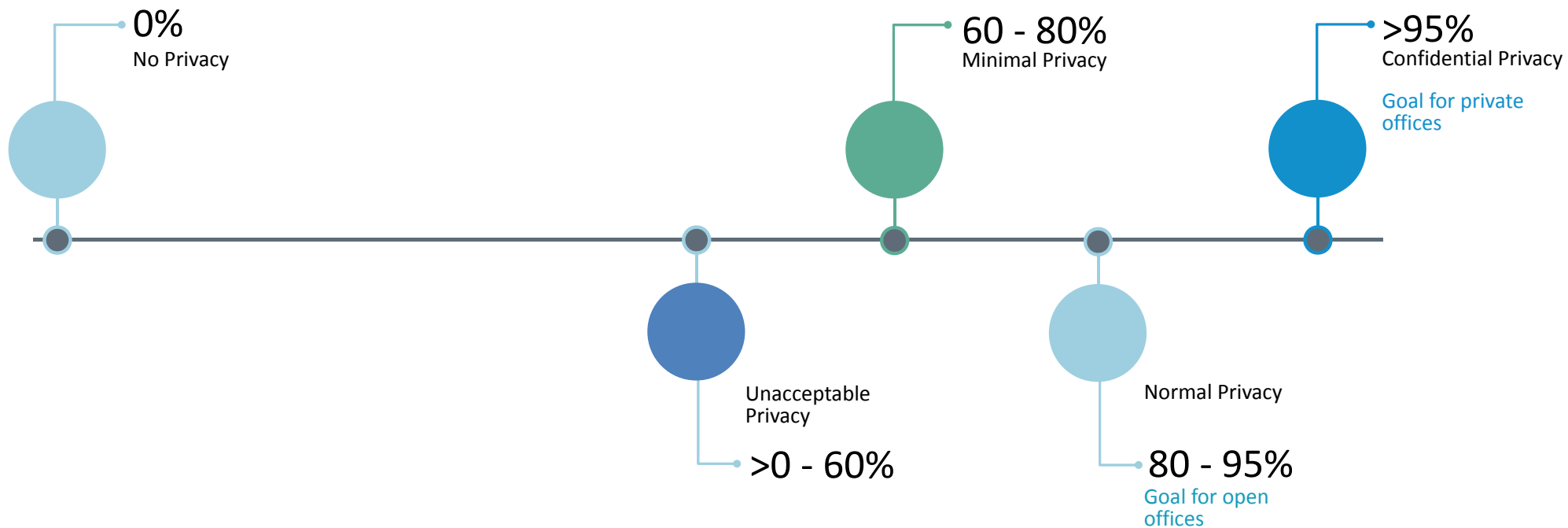
Signal to Noise Ratio

the higher the ratio, the clearer the signal



What is the Privacy Index?

how private is my conversation?



Speech Privacy Potential (SPP)

Speech Privacy Potential

A measurement used primarily by the GSA to determine speech privacy. The measurement is the sum of the space's sound isolation (*Noise Isolation Class*) & background noise (*Noise Criteria*).

Privacy Rating	SPP	Description of Privacy
Total	90	Shouting is barely audible
Highly Confidential	85	Normal Voices - not audible Raised Voices - barely audible
Excellent	80	Normal Voices - barely audible Raised Voices - audible, mostly unintelligible
Good	75	Normal Voices - audible, mostly unintelligible Raised Voices - somewhat intelligible
Fair	70	Normal Voices - Audible, somewhat intelligible Raised Voices - Intelligible
Poor	65	Normal Voices - Mostly intelligible
None	< 60	No Speech Privacy



Sound Masking

What is sound masking?
What does it sound like?

IV

Sound Masking

what is it?



Sound Masking is the process of adding low level background sound to an environment to promote speech privacy and freedom from distractions.



It is believed that one of the earliest examples of sound masking is the Roman's use of water fountains to mask the sound of chariots on cobblestone streets.



In the late 1950's and early 1960's, an acoustical consulting firm in Boston known as Bolt, Beranek, Newman (BBN) pioneered the first electronic sound masking systems.

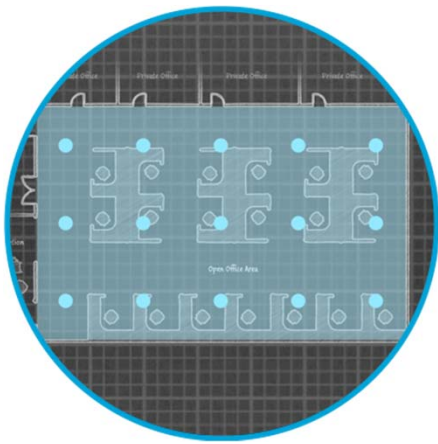
2019

ICT CANADA
PRESENTED BY BICSI

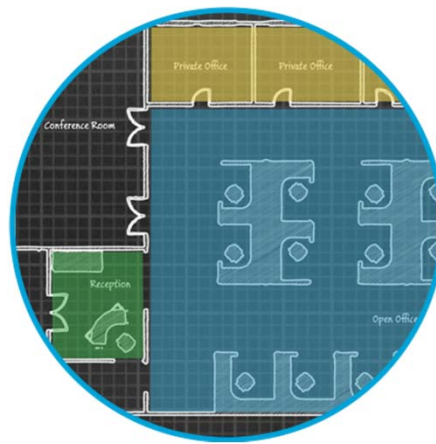
Bicsi

Sound Masking Key Elements

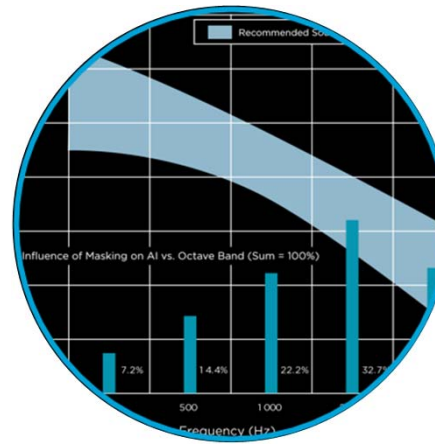
how to establish an effective sound masking system



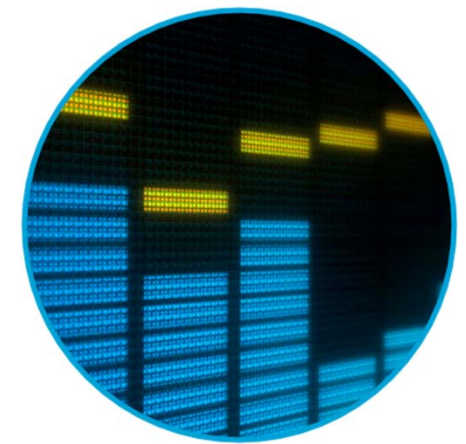
UNIFORMITY



PROPER ZONING



SOUND SPECTRUM

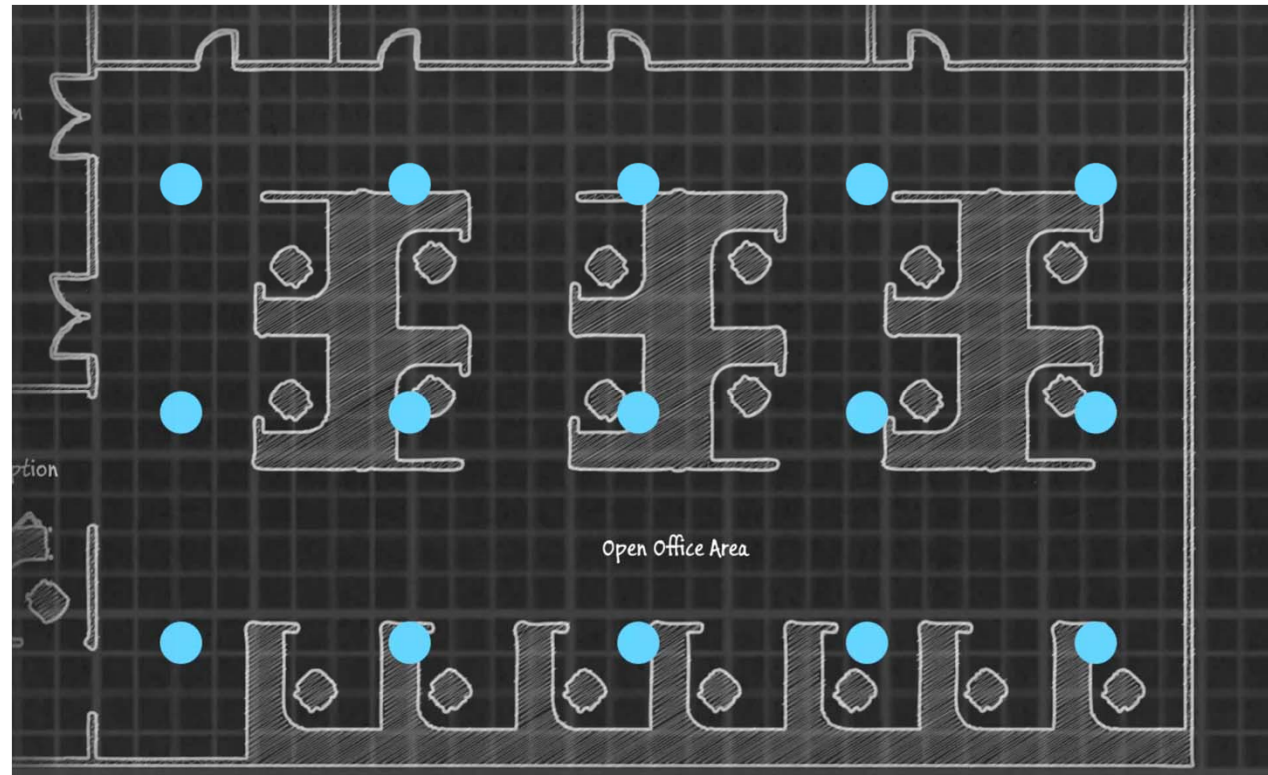


SOUND LEVEL

Key Elements: Uniformity

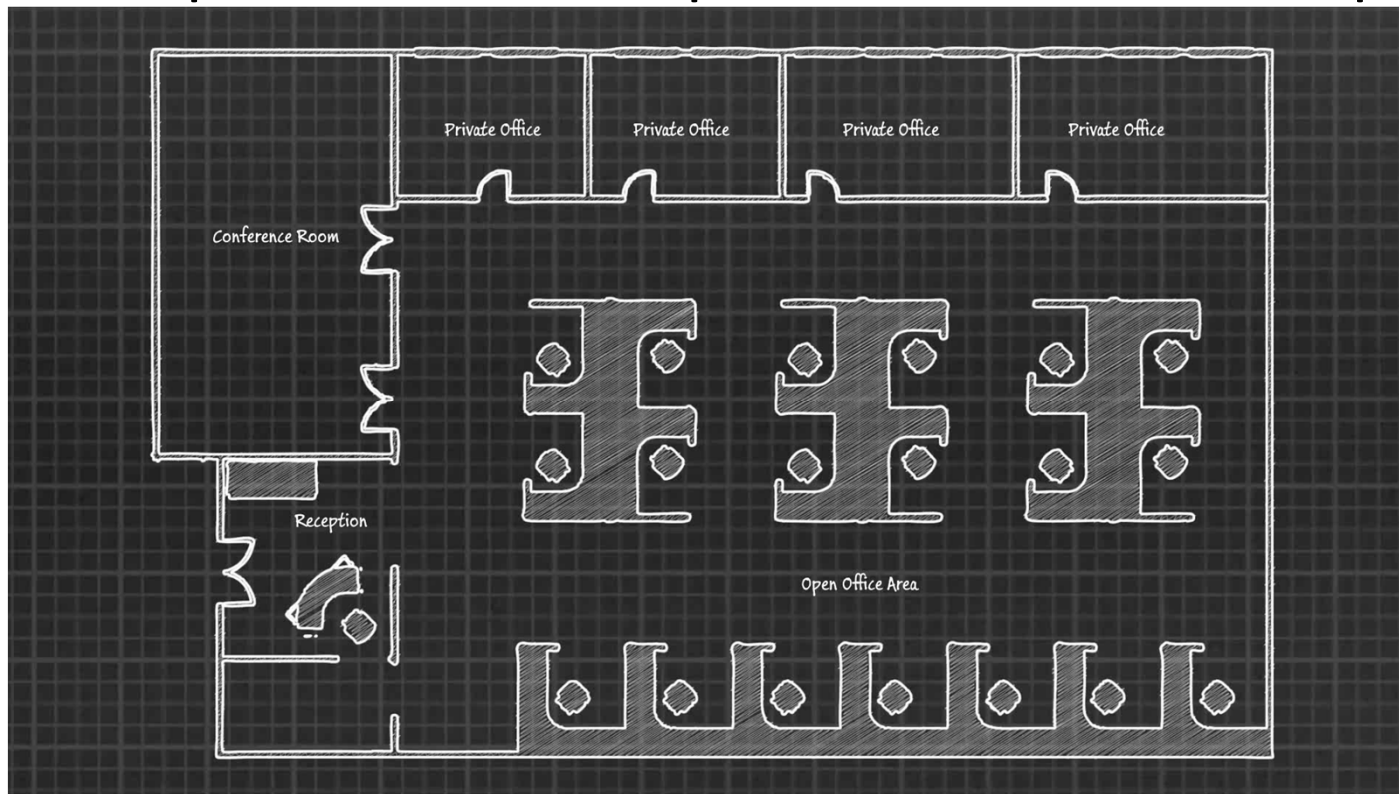
uniformity = undetectable

Sound is emitted from an array of loudspeakers, distributing a consistent and uniform sound masking signal. (which sounds much like air movement)



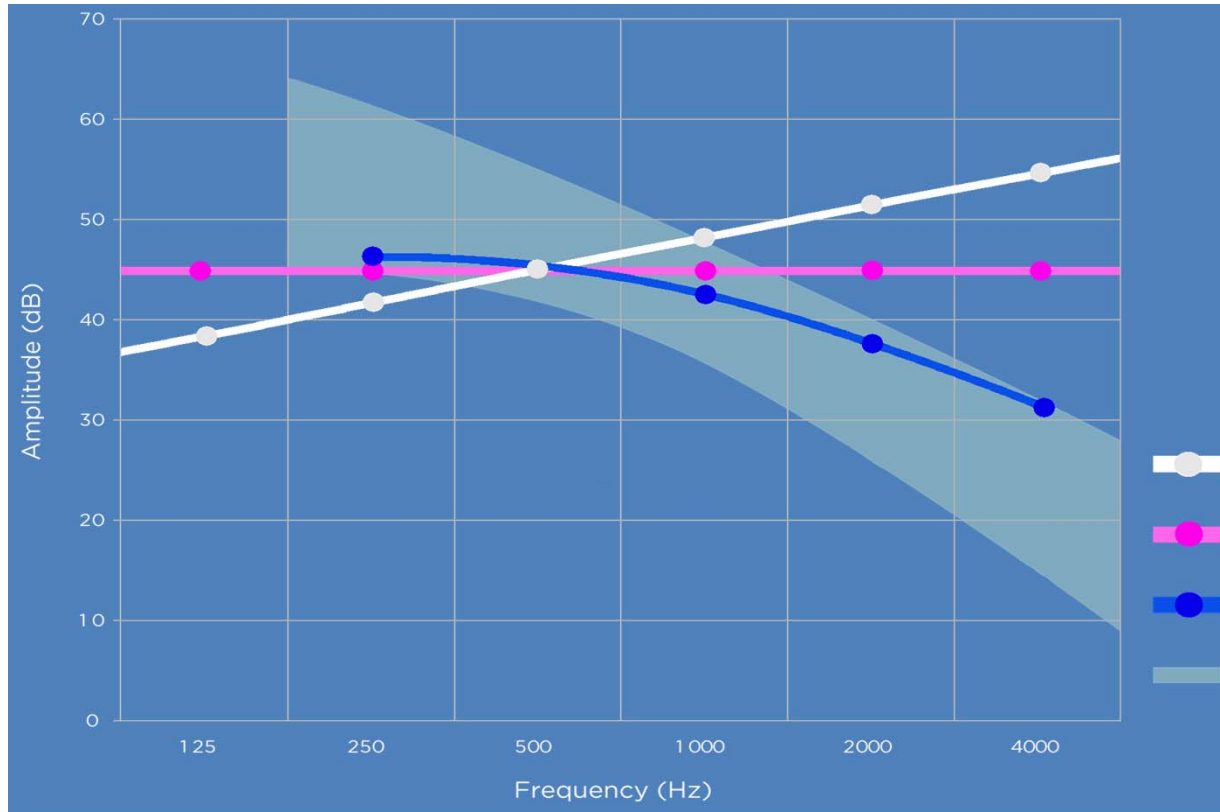
Key Elements: Proper Zoning

zones help to meet the requirements of diverse spaces



Key Elements: Sound Spectrum

the color of noise: sound masking is not white noise



Those in the sound masking industry generally agree on a spectrum for effective sound masking

When sound masking operates within this spectrum, it is simultaneously effective and unobtrusive.

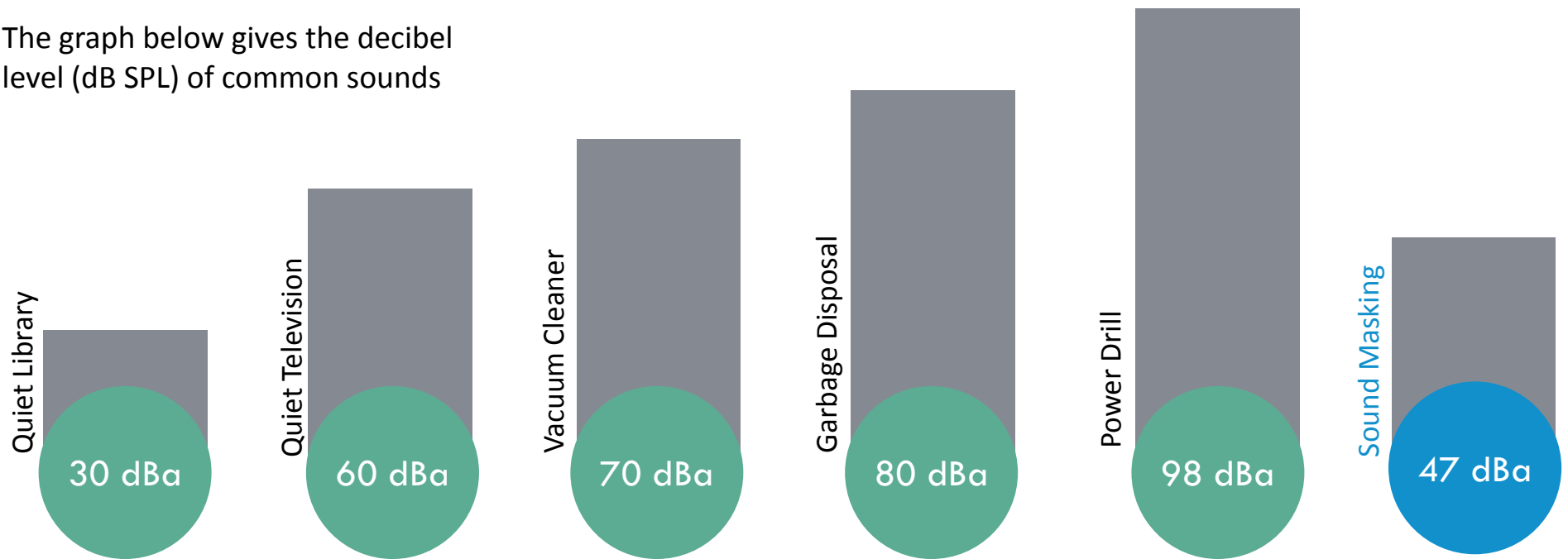
- White Noise
- Pink Noise
- Masking Noise
- Recommended Spectrum



Key Elements: Level of Sound

comparing common noises to masking sound

The graph below gives the decibel level (dB SPL) of common sounds



Sound Masking Myths

setting the record straight

- HVAC noise is a substitute for a sound masking system
- Sound masking can reduce noise that is already too loud (i.e. restaurants/bars)
- Sound masking cancels sound
- Sound masking absorbs other sounds
- Sound masking can block sound
- Sound masking will prevent face-to-face communication
- Sound masking causes headaches, or is otherwise detrimental to health
- Sound masking will interfere with hearing aids or cochlear implants



V

Design Issues

How can I achieve acoustic privacy in open office environments?

What are the best practices for improving acoustic privacy?

Open Office Design: Privacy

Privacy Goal: PI = 80 - 95%

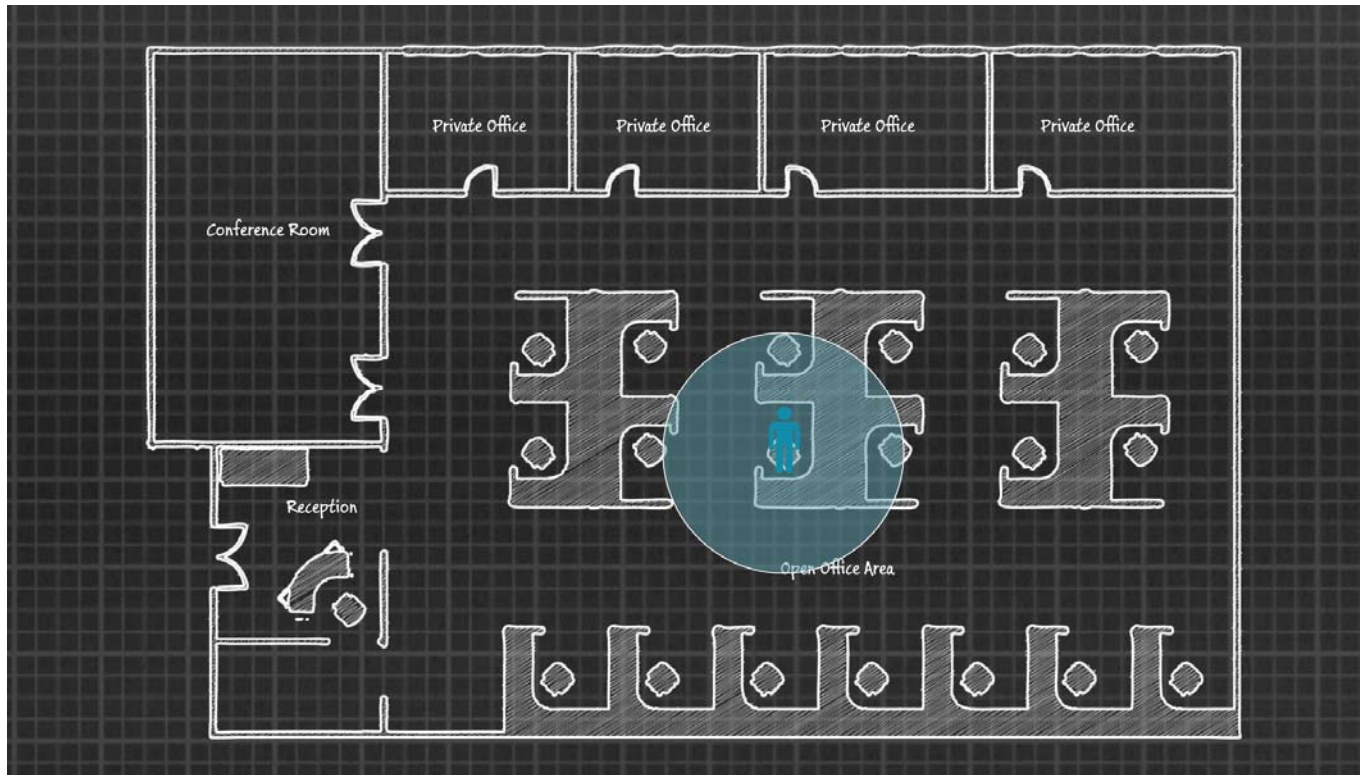


Key Parameters for privacy:

- Distance between Talker and Listener
- Ceiling / Room Absorption
- Barrier Effectiveness
- Background Sound Level

Open Office Design: Goals

reducing the radius of distraction



Open Office Design: Trade Offs

improve acoustics while preserving aesthetics

Acoustic Environment	Sound Masking	Partition Height	Ceiling Tiles (NRC Rating)	Average PI	Average Cost
Typical Office	No	48"	0.5	58.83%	-
Increased Absorption	No	48"	0.95	73.79%	\$\$
Increased Blocking	No	80"	0.5	81.5%	\$\$\$
Increased Coverage	Yes	48"	0.5	87.25%	\$

Other Applications



Summary

what we have learned today

- Employees and employers both can benefit from increased acoustic privacy.
- Absorption, Block, and Covering define the speech privacy potential of a space.
- Controlling the background sound of an environment with sound masking has the greatest impact on speech privacy and distractions.

Questions & Answers



Go ahead. Ask away.



THANK
YOU



See you soon!