

STUDIO ACOUSTICS: MIXING AND MASTERING



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Overview

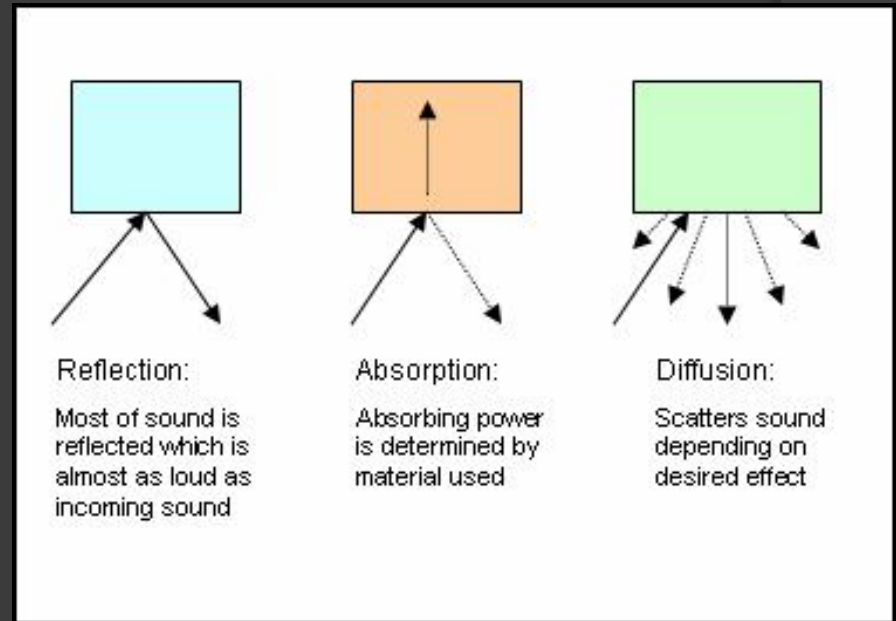
- Intro
- Studio Acoustics
- Microphone Placement/ Recording Vocals
- External environments and sound perception
- Masking
- Watermarking
- Mixing
- Mastering
- Conclusion



Studio Acoustics

Theory:

- Sound travels through solids better than through air
- Sound intensity is reduced in the transition from one material to another, as from the air to a wall and back
- Any motion caused by sound striking one side of the wall will result in sound radiating by the other side, an effect called coupling



What is the ideal construction for a studio?



○ Materials:

- 2 x 4 wood studs covered with 5/8" thick drywall, this will provide about 35 dB of isolation
- Double up when possible!
- Window between control room and studio is necessary
- Replace hollow doors with solid ones
- Carpeting is ideal for flooring
- Soft, absorption materials help reduce reverb time

Sound Levels

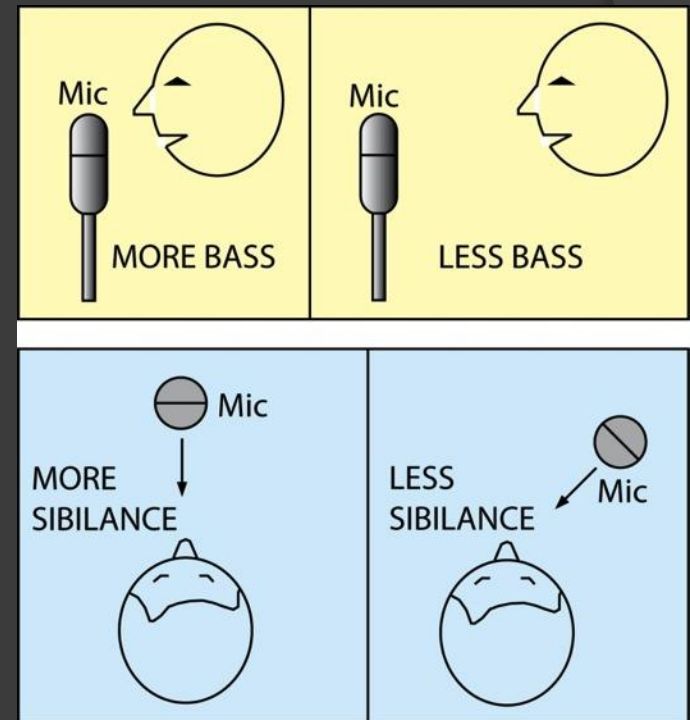
- Good Restaurant 35-45 dB
- Quiet Office 30-40 dB
- Hospital Room 25-35 dB
- Church 20-30 dB
- Concert Hall 15-25dB
- Recording Studio 10-20 dB

- A decent studio should measure in the 20s.



Recording Vocals

- ⦿ Microphone Placement
 - Experimentation is key, start with your head.
- ⦿ Angles and height
- ⦿ Pick the most suitable mic style for the voice:
 - Dynamic, condenser, ribbon, electret, large diaphragm, small diaphragm
 - Correct polar pattern



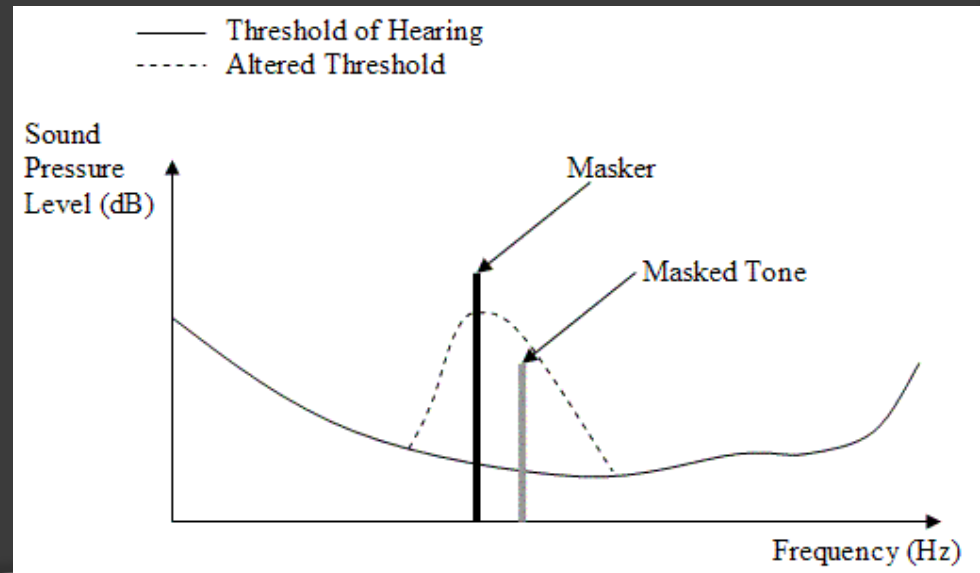
External Environments and Sound Perception

- Reflections/Environmental Factors
- Think of a car



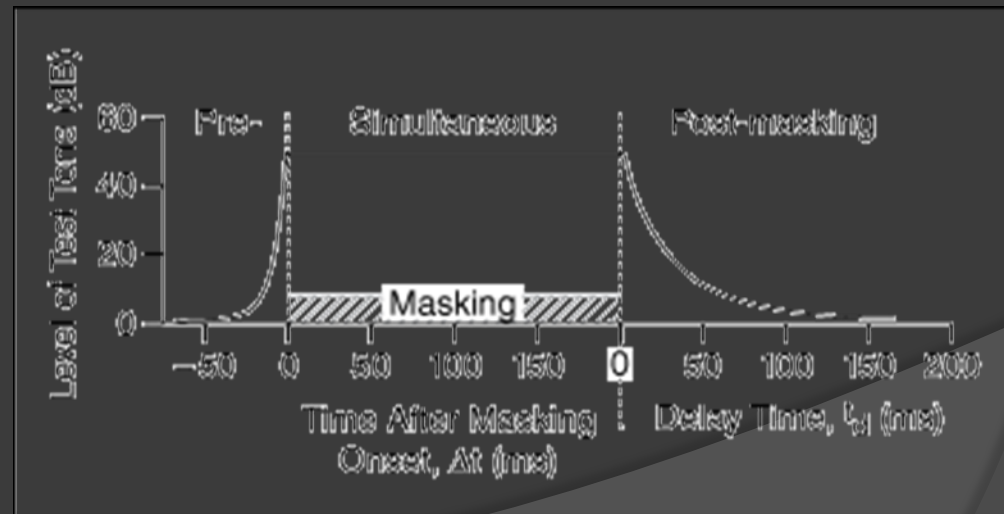
Frequency Masking

- Frequency, Sound Pressure and tone-like or noise-like sounds
- Broadband noise > tonal noise
- 400 Hz vs. 450 Hz



Temporal Masking

- Three Stages of Temporal Masking
 1. Pre-Masking
 2. Simultaneous
 3. Post Masking



Pre Masking vs. Post Masking

- Pre masking

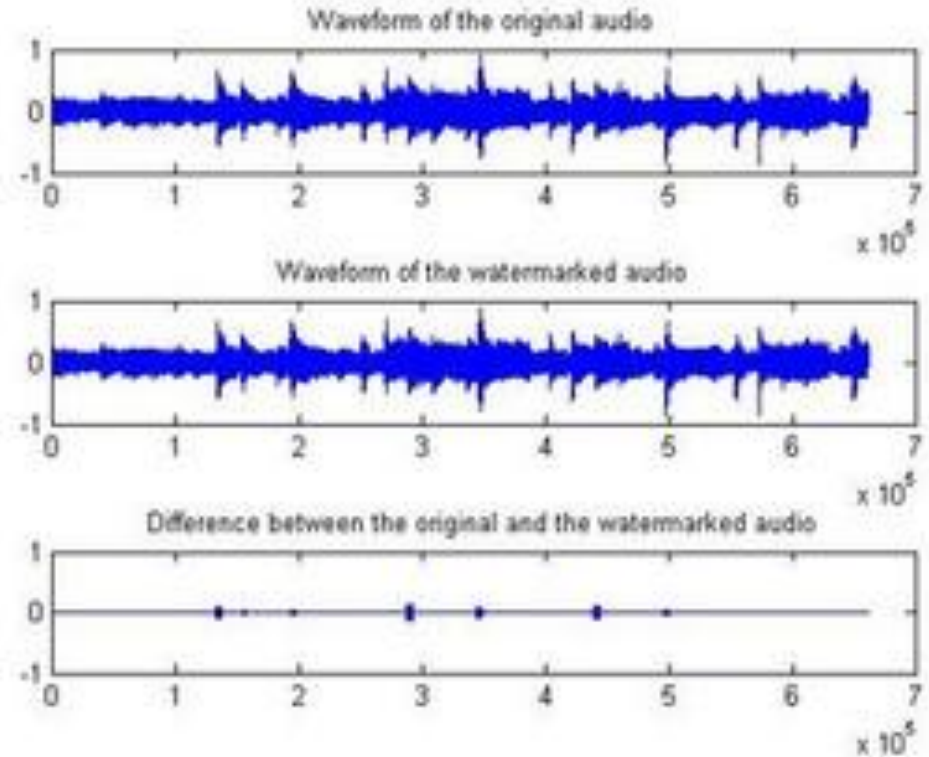
1. occurs 5-20ms before
2. Inaudible before masker is turned on

- Post Masking

1. 50-200ms after
2. Inaudible after masker is turned off

Watermarking

- ⦿ What is Watermarking?
- ⦿ Watermarking and temporal/frequency masking
- ⦿ Ability to remove a watermark



Mixing

- ◎ Before and After Example
- ◎ Equalization
 - Know the frequencies that correspond to the fundamentals of each musical pitch.
 - Know the frequencies that correspond to natural “hum”.
 - Cut before boosting.



Mixing (continued)

- Reverb
 - Used (primarily) to create a more realistic sound.
 - Avoid excessive reverb.
- Compression
 - Vocals
- Additional Effects
 - Dessers, tuners, filters, echo.
- General Rules of Mixing



Mastering

- ⦿ Correction of mistakes and enhancement of mix
 - Frequency Content
 - Width
 - Dynamics
 - Loudness
- ⦿ Methods
 - Equalization
 - Compression
 - Multiband Processing
 - Stereo Imaging
- ⦿ [Before and After Example](#)



Conclusion

- A mix of the right materials and right sound levels, with equalizing, helps limit or increase the possibility of masking of a song or beat to occur. If any mistakes are made during this time or you just don't like how the certain beats or frequencies mix, mastering the recording can correct these changes to produce what you wanted to record.