

CREATING RESTAURANT VIBRANCY WITHOUT NOISE

Dr Michael Haywood, Quiet Acoustics

With the majority of existing cafes, restaurants and social venues having had little acoustic input or consideration during construction, we are often faced with having to fix the reverberating noise issues retrospectively.

Noise is now the biggest complaint of restaurant goes worldwide, ahead of service and food, so this is something that needs to be addressed if our social culture is to flourish. Yet when you speak to many restaurant owners, their understanding is that vibrancy attracts crowds, and you need noise to be vibrant!

Perhaps out of fear of acoustical consulting fees, or a perception that it is an easy fix, many proprietors attempt to research the topic themselves, often implementing solutions that destroy the vibrancy, whilst not actually removing the vocal noise, reaffirming their initial beliefs that vibrancy = noise. Here is one theory on how we can fix this.

Figure 1 is a typical noise frequency response for a busy cafe, almost every cafe or restaurant is the same. This recording was taken using a \$1 Iphone application. The phones microphone pickup tends to roll off the frequency response under 60Hz, but above this it is surprisingly well calibrated to more expensive equipment that we use, so perfectly useful for this problem.

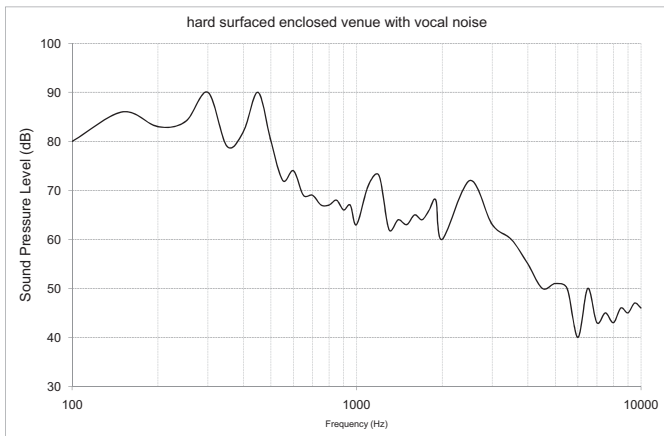


Figure 1. Noise frequency response for restaurant with no acoustic treatments.

What it tells us is that the majority of reverberated noise is coming from the fundamental harmonics of male and female speech (consonants and vowels) 80-500Hz. There are some higher harmonics showing up, but it is the lower frequencies that are reverberating, and dominating the sound pressure level in the room. Reverberation in this lower frequency range inhibits communication, forces patrons to speak louder to be

heard, and has been shown to lead to unease, restlessness, anxiety, and stress. None of which is good for café ambience!

What it also tells us is the frequencies above 1000Hz are not reaching noisy levels, yet this is the “vibrancy” that proprietors speak of. The upper harmonics of speech, the syllables, the music, glasses clinking, laughter, the barista, the cutlery, the general background ambience. Reverberation in this mid to high frequency band may actually be good for ambience, and has been shown by audiology groups around the world to be necessary for comprehension in classroom environments.

So is this how we separate vibrancy from noise? and can we treat one without the other?

Current theory is that hard clean lines and a lack of soft furnishings in restaurant design are bad for acoustics, but I’m going to go out on a limb here and say the opposite. Hard clean lines are excellent for social venues, as they amplify the mid to high frequency bands that contribute to ambience and aid comprehension without raising your voice.

Absorbing materials will remove this ambience, whilst failing to effectively remove the 80-500 Hz vocal noise. If you have ever been in a heavily carpeted fine dining restaurant and felt you had to whisper for privacy, you will understand what I am trying to say. Absorbing materials kill ambience.

The reading in Figure 2 is from a busy social venue with an abundance of soft furnishings and acoustic absorbing tiles. You can see the mid to high frequencies have been removed, which will make the room seem quieter, but the vocal noise remains. This is the opposite of what you want to achieve, and the reason many proprietors are scared of losing their vibrancy with acoustic solutions.

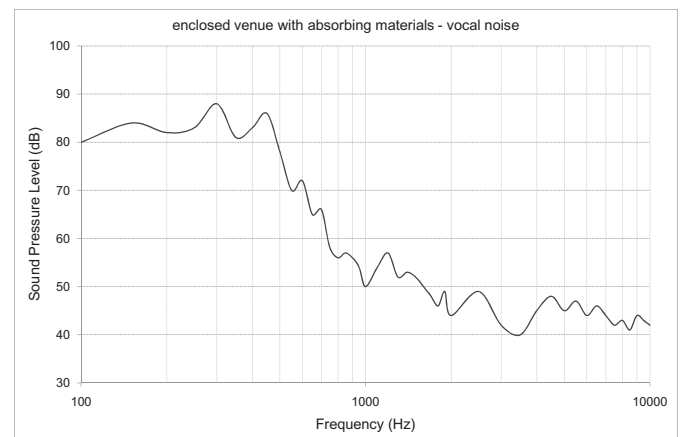


Figure 2. Noise frequency response for restaurant with absorbing and diffusing treatments.

So how do we remove low frequency reverberation without removing mid to high frequency vibrancy? Helmholtz would have a tear in his eye today if his resonators became mainstream in social settings, and as an engineer of these systems I would too. It is 100 year old technology, it can be built by anybody, and we can tune them to the exact frequency bands we want to remove, whilst not absorbing the vibrancy that proprietors keep telling us is so important for trade.

Two examples both commercially available today achieve noise reduction coefficients of 1 within their specific frequency bands. The effect of resonator panels within a hard surfaced, clean enclosed space is to lower the low frequency reverberation, whilst maintaining the mid to high frequency. When you have all frequencies humming in the ear at 70-75 decibels, this is vibrant ambience without noise.

Figure 3 is a recording for a busy venue with wooden resonator panels, tuned to the 100-315 Hz frequency band. You can see the vocal noise has been removed, with minimal effect to the mid to high frequencies.

The education that needs to be delivered to proprietors is that you can indeed have vibrancy without noise, and that there are simple techniques available, even on your phone, that can be used to quickly self diagnose your problem, determine how bad it is, and indicate what steps you need to take to develop perfect vibrant ambience.

To this effect, Quiet Acoustics have started an Australia wide restaurant noise awareness campaign, whereby proprietors can have their venue recorded for free, or take their own recordings, and have the data analyzed, rated, and classified according to current database averages.

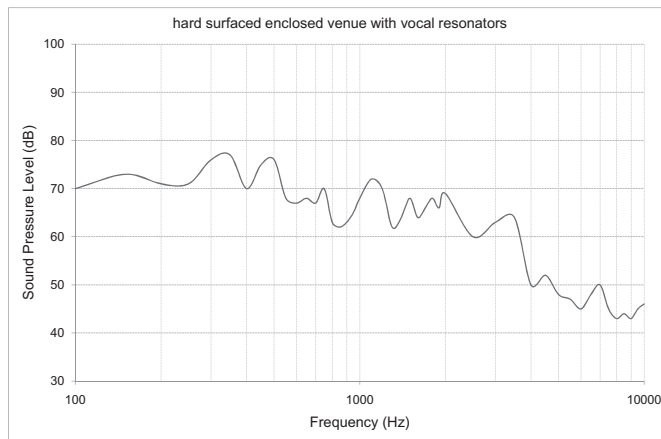



Figure 3. Noise frequency response for restaurant with low frequency vocal resonators.

By providing the restaurant and cafe industry with a simple tool to quantify noise levels, we are in a much better position to build such a database, and in turn make the industry more aware and appreciative of damaging noise levels.


If you would like to get involved with the program, have any ideas for improvement, or wish to understand vocal resonators more, please feel free to get in touch with Dr Michael Haywood from Quiet Acoustics at mike@quietacoustics.com.au.

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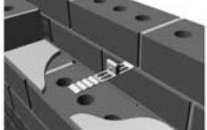
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