World-Class Studio Designer Jay Kaufman on Acoustics & Isolation

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ACOUSTICS MYTHS—AND

—A lucky 13 ways you might not really know what's going—

I have a deep love and respect for mythology (Norse is my current favorite). While the myths and stories of our ancestors may not be an abundant source for scientific truth, they are packed with meaning that can inspire us and enrich our lives. This kind of meaning is what drives art in general, and without artistic meaning, what's the point of recording music?

As a result, I'm not a big fan of "mythbusting" or "debunking". Implied in these terms are absolutes that I rarely agree with: that the "myth" (taken as a synonym for "lie") being "debunked" has no truth to it whatsoever, and that anyone who "believes" in it is therefore ignorant and/or stupid.

On the contrary, I find that many of these "myths" have their roots in truth. More often, the problems tend to come when the truths are misinterpreted or taken to an extreme that isn't always the most accurate way to think about the problem at hand. Like all mythologies, audio myths are an invitation to think more deeply about a given scenario.

Furthermore, acoustics is one of the most counterintuitive sciences out there. So many things in acoustics just don't make sense at first glance, and once you dig in, turn out to not be as they appear. Though the situation is much better now than it was 10-15 years ago, when we saw a lot of egg cartons stapled to walls in music rooms for "acoustic treatment," there remain some commonly-repeated ideas circulating in the audiogeek-o-sphere that aren't the most accurate interpretations.

I'd like to address some of the most common ideas I encounter in my day-to-day work as an acoustics consultant, where I help people improve the sound of their rooms. I'll try to find the germ of truth within the myth and show how we can benefit from better understanding.

1. Parallel walls are bad

This is perhaps the most common example of "rooted in fact but taken to misleading extremes". The argument goes something like this: parallel walls cause standing waves, which will wreak havoc on your bass response in the room.

The fact is, all rooms have standing waves, whether there are parallel surfaces or not. And furthermore, standing waves are only one manifestation of acoustics problems that occur in rooms. In other words, even if we could completely eliminate standing waves from a room, there would still be acoustics problems to address.

Here's the truth in this idea: parallel walls cause flutter echo. Flutter echo is definitely a problem; it sounds almost like a metallic "boinging" sound. If you have a staircase that is finished in drywall, it's easy to hear extreme flutter echo by going into it and clapping your hands.

Luckily, flutter echo is one of the easiest acoustics problems to solve. It can be done with absorption or diffusion. Even a thick blanket put across one of the parallel surfaces will improve or solve flutter echo. In fact, this is a great way to test and see where it is coming from, since it can be applied temporarily as a test (either with duct tape, or by draping the blanket over a mic stand set up in a T shape). Real acoustic panels, either broadband absorbers or diffusors, work even better.

But rooms with parallel walls have a plus side! They are very predictable acoustically, they are relatively easy to treat, and they are simpler (which usually means cheaper) to construct. In fact, if I wanted to build an audio room to maximize cost-effectiveness, then I would build a rectangular room, taking up as much of the available space as possible (such as in a garage or a basement), and make sure that no two dimensions of the room are

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equal or even multiples of one another, which minimizes harmonic relationships that accentuate problem frequencies.

If you have the space, you can use some of the suggested room ratios for the three dimensions of the room (length, width, height). There are several good ratios that work well, such as the Sepmeyer ratios of 1:1.14:1.39 (for a room with tall ceilings) and 1:1.6:2.33 (for a room with short ceilings).

So in a room with low ceilings, the latter ratio means a good room would be 8' x 12.8' x 18.64', which is about the size of a one-car garage. This room is only about 1900 cubic feet which is a bit small (2500 is a good minimum), so a lot of bass trapping will be needed, but well-treated rooms this size can work surprisingly well and are simple enough to build.

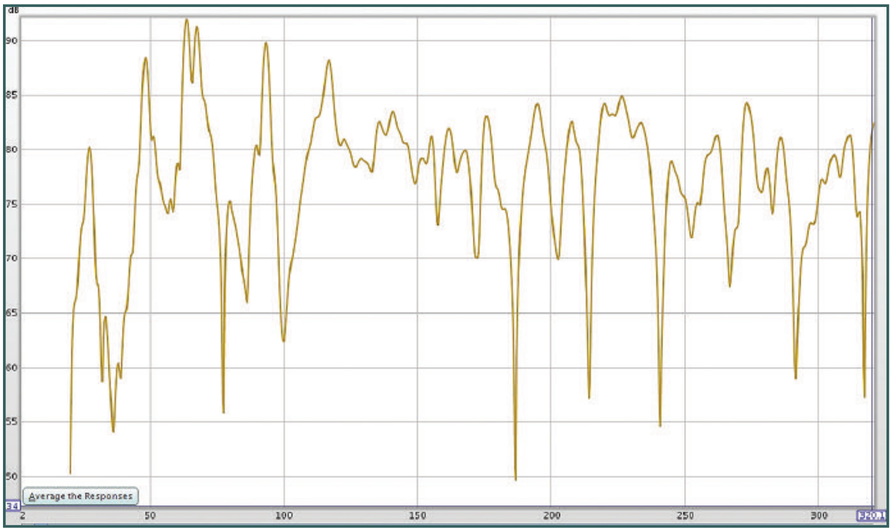

Figure 1. Frequency response of a typical room. Note the difference of 40 dB or more between the highest peak (at about 60 Hz) and the deepest nulls (at about 190 Hz).

2. Most listeners don't have treated rooms, so why should a mix engineer?

This is another common one, and I can see the logic of it. Mix engineers often rely on "real world" situations to verify their mixes, hence the popularity of less-than-accurate monitoring systems like earbuds, NS10s, and Auratones. The idea of monitoring on something similar to what the final listeners will use makes sense, right?

Unfortunately, the answer to this one is just as counterintuitive as many other things with acoustics. First we have to take a look at what happens in an untreated room. The short version is: comb filtering. Reflected sound waves interfere with direct sound waves from the speakers, creating all sorts of acoustics artifacts and problems, such as the jagged frequency response from comb filtering:

As you can see in Figure 1, there are large, narrow peaks and nulls in the response of this room, more than 30 dB

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from the highest peak to the deepest null. All small (meaning smaller than, say, a basketball court) rooms will exhibit a response like this, meaning there will be peaks and nulls this severe in most untreated rooms. The difference between rooms will be in *where* the peaks and nulls occur. In other words, all untreated rooms do not sound the same.

This is the the hidden presupposition in this myth, and it reinforces the idea that all treated rooms are "perfect" and all untreated rooms are identically bad (see Myth 13 below). The fact is, a treated room will have a much flatter frequency response, therefore at any given frequency it will be much closer to the frequency response of each listener's room.

To illustrate the point: imagine a single frequency of, say, 41 Hz. In the mix engineer's room, there is a null of -25 dB at 41 Hz, but in a listener's room there is a peak of +10 dB at 41 Hz. This means that for a song in the key of E, the root bass note of the song (which happens to be 41 Hz) will be 35 dB softer in the mix engineer's room than the listener's room!

However, if the mix engineer had treatment in the room to get rid of the null, the difference would be only 10 dB, an improvement of 25 dB—equivalent to over 300 times more power, or going from a 10W amplifier to a 3162W amplifier! And this is just for one (albeit very important for many songs) frequency.

In short, a properly treated room greatly improves the accuracy of the mix environment, which means that mixes done in that room will always translate better to any other audio system for reproduction. This means a mix engineer can work faster, with more confidence, and produce better results. These are all good things.

3. Bookshelves are diffusors

Here's another common misconception. It arises from the design of a one-dimensional QRD Diffusor, with its uneven build with wells of various depths, as shown in Figure 2.

Figure 2. A one-dimensional QRD-style RealTraps diffusor with wells of varying depths. Photo courtesy RealTraps.

It does kind of look like a bookshelf, stuffed with books of various sizes, doesn't it? And it is true that a bookshelf will help to break up sound waves a little bit, as well as absorb a bit of sound. Books are similar to wood in the sense that they do have a tiny amount of absorption, relative to smoother/stiffer materials such as concrete or drywall, though the amount of absorption is nowhere close to that of a soft blanket, much less a real acoustic panel.

However, breaking up sound waves from an uneven surface is not the same thing as diffusion. A diffusors scatters sound *evenly in all directions* across its effective plane, which for diffusors of this type are left/right, unless the diffusor is installed horizontally in which case it will be up/down. To achieve this even scattering, the sequence of well depths is critically important. The well depth pattern isn't random—it is a specific mathematical sequence that must be calculated and precisely constructed. If the calculations or the craftsmanship is off, then the diffusor won't work in terms of providing actual diffusion.

I should add that diffusion has a specific sound to it, one that most people who haven't worked in rooms with diffusion haven't experienced. It's really difficult to emulate the sound of diffusion without actually using diffusors. That said, given the choice between a bookshelf and a bare, reflective wall, in most cases I'll take the bookshelf if I can't use real acoustic panels.

4. Wood sounds "warmer" than other reflective materials

This "myth" might be the most controversial of all these, and also it may be the least myth-worthy. Perhaps I should call this one "as-yet-undetermined" rather than definitively a "myth."

In general, I find rooms with a natural wood finish to be gorgeous, and definitely conducive to creativity in my mind. However, the question at hand is, do they differ much from regular household rooms finished in drywall, concrete, or even linoleum? This question is polarizing, and there are well-known audio people I respect on both sides of this question. One side says that if a wood room sounds really good, it probably doesn't have much to do with the wood itself. The other side will undoubtedly observe that there are a lot of great-sounding rooms with a wood finish. Who is right?

There's no way to tell. The only definitive test would be to build two absolutely identical rooms—same size, dimensions, layout, and equipment—with wood and non-wood walls. This isn't likely to happen any time soon, so we're left with three less-than-scientific arguments: anecdotal evidence ("Wood sounds good because the acoustic guitar room at my local store is wood, and it sounds amazing in there"), argument by authority ("Wood sounds good because Expert So-And-So says it sounds good"), and tradition ("There are quite a few good-sounding wood rooms in the world").

But we're not done yet. The "wood finish" in many of these good-sounding rooms is part of the acoustic treatment! For example, slat absorbers are custom-built treatments that have decades of proven use, and can perform very well—but the visible fronts of absorbers like this often use wood slats, and many people may not realize they are acoustic treatments.

Then there's the fact that wood is a critical part of the design of many acoustic instruments. We know that well-made resonant wood structures are essential to violins, guitars, etc., so we assume that this must be true of wood surfaces. But damped wood, such as a parquet floor over concrete, definitely doesn't sound much different than other reflective surfaces such as drywall or concrete. See realtraps.com/art_surfaces.htm for details on these properties of damped wood relative to other materials, with some test data.

I was discussing this myth with a friend of mine, who is a well-known studio designer for whom I have great respect. He is convinced that wood sounds better than drywall. He told me to alternately hold a piece of wood and a piece of drywall up in front of my face and speak into them each in turn. The difference, he assured me, would be easy to hear.

I tried his test, with a small, 16" square scrap of plywood, and couldn't really discern much difference. Of course it wasn't a double blind test, so it could have been plagued by expectation bias or other prejudices, but in my case my only prejudice was to see which one sounded better! In other words, I'm not attached to any particular outcome, I just want to know the truth of the matter.

When I told him my results, he said that the $^3/_4$" plywood I had used is much more damped than a board. He's quite right, of course, which brings up another issue: what kind of wood? How thick? What density? Just to be sure, I repeated the test both with the plywood, and a scrap of a pine 1x10 I had, with similar results. I just didn't hear much difference.

If you or someone you know has tried building two identical rooms, one with wood and one without, to test this theory, please let me know—I'd love to see the results! Until then, feel free to use wood in your rooms if you like the way wood looks. Maybe a wood room might sound better, but using wood finish is no substitute for properly treating the room to begin with. Perhaps most importantly, if your room is other than wood, you can still get a great sound (see Figure 3 on the next page).

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5. Bass waves need room to "develop"

This one is common in recording tutorials, often in the context of miking up a bass amp or a kick drum. They will discover that moving the microphone back (or forward!) several inches or even a few feet will dramatically change the amount of low end

Figure 3. BassLab Studios in Salt Lake City is an outstanding example of a wonderful sounding room using parallel walls, and no wood on the walls or ceiling (the wood floor is fully damped). The fact that it is built inside shipping containers makes it even cooler. Photo by Steven Comeau, used with permission.

picked up by the microphone. In addition, wavelengths for low frequencies are very long, measured in feet (for instance, the low E of a bass guitar is 41 Hz, which has a wavelength of more than 27.5 *feet*).

People therefore conclude that you have to be a certain distance away from a sound source to perceive the low end. This conclusion is demonstrably false; if it were true then it would be impossible to hear bass in headphones, when the drivers are just an inch or two from your eardrums.

So what accounts for the microphone phenomenon described above? Why, when you move a mic back, does the low end often get louder? The answer is for the same reason that bass trapping is so important. As bass waves move around the room and reflect from surfaces, they start to interfere with one another, creating peaks and nulls relative to the frequency of the wave, and the position of everything involved (the kick drum or bass cabinet speaker, the mic, and nearby walls/floor/ceiling). When you move a mic and the bass gets louder, it means that you are moving the microphone out of a null point of the room, relative to the frequency the bass is playing.

This is one area where a good understanding of room acoustics can really help a recording engineer. For instance, not only can you get better bass sounds by taking advantage of null points, but you can also place microphones for other instruments (such as vocals, which don't have much low frequency content) in the room at null points for the bass, to reduce the amount of bass bleeding into the microphone.

Spend some time experimenting with these principles; once you get the miked-up bass amp sounding really good, have your bassist play while you move the vocal mic around the room. You'll find a place where the bass is softer; if you can, set the vocalist's mic up there. Aim the null points of the polar patterns (for cardioid or figure-8 mics) toward sounds you don't want to record for even greater isolation.

6. Bass traps must be 1/4 wavelength thick to be effective

This is another idea that people might encounter as they dive more deeply into room acoustics. I have even heard this from several well-known studio designers or acousticians. It is rooted in truth, and perhaps contains more truth than some of these myths. For instance, it is certainly true that a thicker bass trap or absorber will perform better at low frequencies, all else being equal.

But think about this for a moment. In the above example (Myths 2 and 5), we

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talked about the fundamental low E of a bass guitar being 41 Hz, with a wavelength of just under 28 feet. According to the logic of this myth, then any bass trap that isn't 7 feet thick won't work! Double that frequency to get the low E of a guitar, and you'd still need a 3.5' absorber!

But this is demonstrably untrue. For instance, a RealTraps MiniTrap has an absorption coefficient of 0.93 at 80 Hz when measured in a corner, which means it absorbs 93% of the sound at 80 Hz. And a MiniTrap is only 3" thick!

The distinction is in *how much* sound can be absorbed at given thicknesses. It may be true that 1/4 wavelength thickness is required to get 100% absorption, but even this is debatable, in large part because it's really hard to accurately test absorption at very low frequencies. But even if thinner traps can't absorb 100% of the sound, they can absorb quite a lot of it when only a fraction as thick, as the MiniTraps test data reveals.

This idea comes from real-world practice. Very thick bass traps were common in old-school studios, and were very effective, though these studios had plenty of space to account for traps several feet thick. For instance, it was common to install a false rear wall, a fabric grille, that covered raw insulation (or other older technologies, like bass hangers) 6 to 10 feet thick. No doubt this strategy is quite effective! But these days, it's clear that we can still get very good results without sacrificing nearly that much floor space.

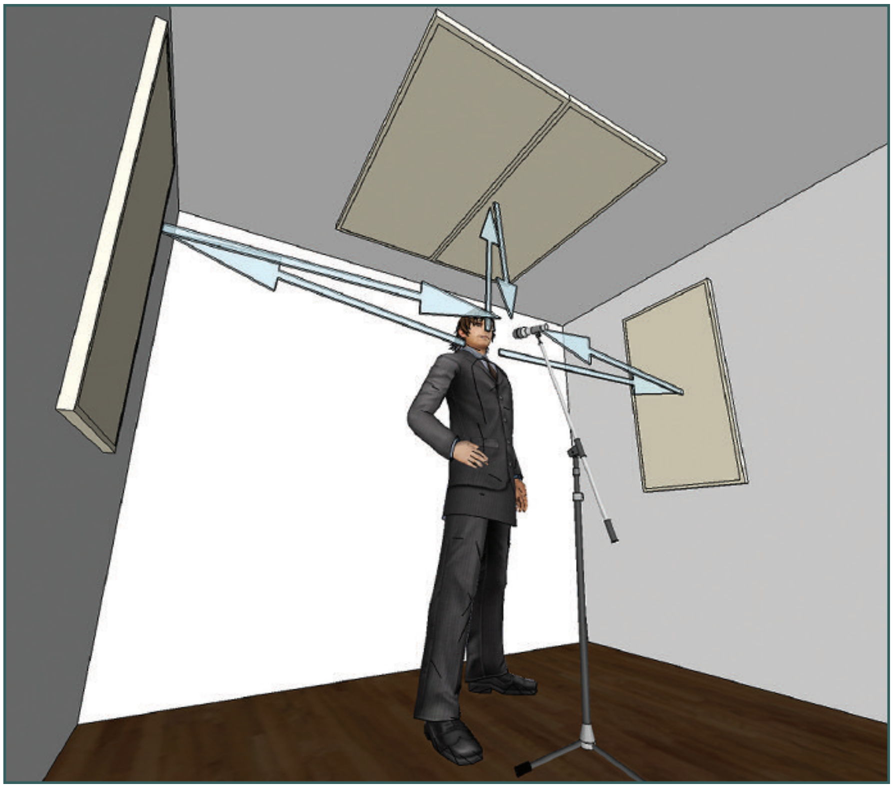

Figure 4. This drawing shows good placement of absorbers at nearby reflection points between the singer and the microphone while tracking vocals in a small room. Similarly to listening in a Reflection-Free Zone in a control room, absorbing early reflections improves the clarity of recordings.

7. Floating floors give better isolation and better sound

The idea of a wooden riser or a floating floor also comes up a lot in audio forums. The idea is to frame out a deck from solid joists, float the frame on pucks or neoprene spacers, then build a floor as thick as possible on top of the joists. One problem with this strategy is the airspace created between the joists. Any volume of air enclosed between joists and floors will have resonant properties, up to and including resonance within the audible spectrum. Filling the spaces with insulation might help some, but they should really be filled with mass such as dry sand, which is sometimes not possible due to weight considerations. The last thing you *ever* want to do is to exceed weight and load limits of the larger structure—risking collapse, catastrophic damage, and injury/death.

Furthermore, if you are going to suspend floor joists on pucks or neoprene spacers, then you have to very carefully calculate the weight of the floor, and everything that will rest on the floor, to ensure that you are getting the correct response from the pucks. Too much weight or too little, and it won't work correctly. Think of a shock absorber: it works best when there is enough weight to get the shock absorber to move, but not so much weight that it is completely compressed and no longer functional.

It's the same with the floating floors; you want the weight to be in the "Goldilocks zone" of just the right amount of weight to make the pucks work correctly. But even when the weight calculations are right, the resonant frequency of a structure like this will depend on its mass more than anything else, and because it has less mass than a concrete slab, a wooden deck can often resonate under 80 Hz (or above, if it's a small, thin deck).

In *Home Recording Studio: Build It Like the Pros,* author and studio designer Rod Gervais recommends building straight up from a slab where possible. This construction is simpler and cheaper, and it usually performs better in terms of both isolation and sound.

One benefit of risers, particularly for drums or bass instruments, is that you can raise the height of the instrument, and get it away from the boundary effect where bass is exaggerated next to walls or floors. Getting the instrument off the ground can sometimes sound better. And if the deck is resonating, as long as it's tuned to the drums it can enhance the sound. If it's not tuned to the drums... well, good luck.

8. You need a vocal booth to make good vocal recordings

It's important to remember that vocal booths were created out of necessity: to get clean vocal takes, without much/any bleed from other instruments, so that you can easily overdub or re-record the vocals later in the recording process. To this day, the image of the vocal booth remains essential to some conceptions of the recording studio.

Many people therefore feel it necessary to build tiny rooms to record vocals, and then wonder why they are struggling to get a good tone. All too often, these booths are 4' x 4' x 8' (for building economy) and are lined with foam or blankets to kill the room tone. The result is a tone that is wildly inaccurate at bass frequencies—boxy and boomy or thin depending on the frequency—and very dead at high frequencies.

The fact is, big studios with good-sounding vocal booths have much more space; often these booths are the size of a bedroom or larger, equivalent to an entire home studio. Certainly these booths are not square, with the third dimension harmonically related to the other two (as is the case with a 4' x 4' x 8' booth). You can often get better results tracking in a larger room, using absorbers or portable mic-stand-mounted microphone isolators (even blankets hung over mic stands) in closer proximity to the microphone, or by using absorbers at nearby reflection points.

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Again, little booths like this are sometimes necessary for isolation purposes. You see them used quite often in the voiceover community, where it's important that you not hear cars or other external voices in voice tracks. So you can sometimes make them work for these reasons, but these should be seen as a last resort and not a necessity for getting good vocal tracks.

9. Speakers sound better with early reflections than without

I come across this one a lot, though it's more common in audiophile circles than it is in professional audio and the recording studio world. This one surprises me; I would have thought the oft-discussed Reflection-Free Zone (RFZ) concept had taken root enough to eliminate this misconception, yet it persists. Did you notice I'm trying to contain my snarky "myth-busting" language on this one?

In all seriousness, the only thing I can say to someone who believes this is that they haven't ever listened to music in a good Reflection-Free Zone. There is room for all sorts of preferences in the audio world — so much comes down to a matter of taste, after all, but the benefits of the RFZ are numerous.

When listening to speakers in an untreated room, the first thing we hear is the direct sound, coming in a straight line from the speaker to our ears. A few milliseconds later, we start to hear early reflections coming from the side walls and ceiling. Unless you have a large room, these reflections are early enough in time (under 25–30 ms) that we don't perceive them as distinct echoes, but rather as the same sound coming from more than one place.

As such, our localization cues, as part of the psychoacoustics process, get confused. We are not able to discern exactly where the sound is coming from. So in a Reflection-Free Zone, we can get rid of these reflections (either by angling the walls & ceiling, or by using good absorptive panels at the reflection points), so that all we are left with is the direct sound of the speakers.

The improvements of this strategy are clear, as shown by Figure 5, a graph of frequency response with and without a Reflection-Free Zone in place.

These benefits are also clearly audible. The coherence of the stereo image and soundstage is greatly enhanced, almost like listening through quality headphones, but retaining the spaciousness and tone that only speakers can provide. For the mix engineer, this means things like panning, adjusting reverb/delay tails, and subtle midrange EQ tweaks to get tracks to sit together better become much more audible. After an engineer adapts his ears to working in a RFZ, mixes come together more quickly, with less guesswork, so the engineer's confidence can grow.

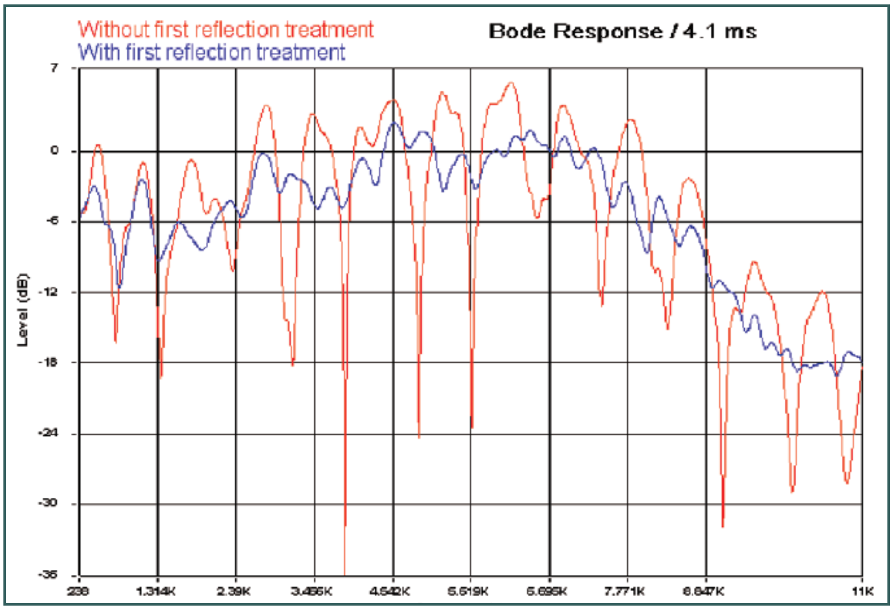

Figure 5. Look at the deep, 30+ dB nulls in red caused by early reflections.

10. Listening rooms should be wider than they are long

There are some well-known people who espouse this rule. Despite my respect for some of these folks, I am still going to include this in the "myths" category because it is easily shown to be mistaken.

But first, like all myths, there is truth in this one too. In the previous myth, we covered the notion of the Reflection-Free Zone, and this one is related to that. The logic is that, by moving the side walls further away, we are improving things by both weakening the reflections (sound is 6 dB softer every time the distance it must travel is doubled), as well as pushing the reflections further back in time. Makes sense, and all else being equal, it would be correct.

But all else isn't equal. In the small, rectangular rooms many of us are working in, to make a room wider by facing a long wall, we would be moving the rear wall closer to us. This is bad for a lot of reasons, and it does far more damage to the sound we hear than having the speakers firing into the longer part of the room and properly treating the reflection points with good absorbers.

Reflections from the rear wall are, it turns out, the most damaging reflections that occur in most listening rooms, which is why we want the rear wall to be as far behind us as possible. Unlike early reflections on side walls, rear wall reflections are damaging in two ways. First is the same way side wall reflections are damaging, in the sense that it can muddle our sense of placement and introduce comb filtering.

But there is a second issue with rear walls that is made worse the closer the rear wall is to us. Typically there is uneven bass response along the length of the room. For instance, if you were to put on music, and stand in your room with your back to the rear wall, chances are (in most rectangular rooms) that the dominant bass frequencies, the lowest fundamental of the room and its related harmonics, will be very loud when you are listening from this position. As you listen, if you start to walk forward, you will likely hear the bass get softer and softer, until it practically disappears entirely near the center of the room.

Getting in the right place to avoid one extreme or the other (severe peaks or nulls) is a key part of a good room setup strategy; you want to make sure your listening position is in the most accurate spot possible. This spot will often be 38% of the way into the room from the front or rear wall (again, given a simple rectangular room). The 38% point is much closer to the middle of the room than the rear wall. In most household rooms doubling as studios these days, there simply isn't enough room to avoid these sorts of problems, if we are setting up in a short, wide room and are prioritizing an accurate bass response. The only effective treatment for the rear wall in these situations is very thick absorbers, the thicker the better (see Myth 6 above), in a situation where there isn't much depth to work with.

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11. High frequency absorption on the front wall is important

You see this a lot, particularly in older-school rooms, where there are blankets, acoustic wedge foam, or acoustic panels covering the front wall (meaning the wall you face while listening). It probably comes from older acoustic treatment strategies, in which the main concern is reducing the reverb time of the room. This is a simple matter of adding enough absorption to the room to get the reverb time down to where we want it, without much concern for specific placement of the treatments. The front wall is a convenient place to add treatment in many rooms, so many people would cover the entire front wall with absorption.

However, compared to the other three walls, absorption on the front wall isn't nearly as important, assuming rectangular rooms with conventional speakers. The speakers are firing away from the front wall, which means that any sound that gets absorbed on the front wall has to travel all the way across the room, reflect off the rear wall, and then travel across the room again to be absorbed.

There is another old-school design related to this idea, which is the idea of a "Live-End Dead-End" (LEDE) room. The idea here is that the front half of the room is treated heavily with absorption, and the rear half of the room is allowed to be more reflective or reverberant. The more modern notion of a Reflection-Free Zone is the evolution of this strategy, and works better in most modern rooms.

12. EQ can substitute for room treatment

Over the past decade, as awareness of room acoustics has grown exponentially among musicians, recording engineers, and producers, there have been a lot of products released that claim to "fix" your room via electronic means, including EQ and DSP. These products have certainly gotten more sophisticated, and there are definitely situations where they can help improve things. But they are not a substitute for a properly treated room to begin with (see Scott Dorsey's article on page 50). There are a few reasons why.

First is the idea of flattening the frequency response of a room. The logic is: if you know the frequency response of a room, you can correct it by applying an inverse EQ to the transfer function of the room, thus "fixing" things in the room. The logic appears sound, but has several limitations. One limitation is that each point in the room will have its own frequency response. So even if you can "fix" the room at one location (such as the listening position), you are almost certainly making things worse everywhere else in the room.

Another is the phenomenon of ringing, in which certain frequencies (usually in the bass region) resonate, and continue to do so after the exciting sound source is gone. Even if the frequency response could be corrected, EQ or DSP cannot correct for ringing, at least not in the same way as bass trapping.

It is important to remember what is causing all the problems to begin with: reflected sound waves moving throughout the room interfere with one another, and depending on the various phase relationships at play, narrow peaks and nulls are created. Acoustic treatment absorbs (or diffuses) these excess, reflected sound waves, which means there is less interference happening, which reduces the size of the peaks and the nulls. Treatment therefore prevents the interference from happening in the first place, which is a different strategy than attempting to counteract the effect by distorting the signal (in a complimentary way) in the first place.

These room correction algorithms aren't without merit, however. For instance, once a room is properly treated, there are sometimes some stubborn, broad peaks at bass frequencies. This is a perfect place for a small (3 dB or so) EQ cut, inversely matched to the frequency and bandwidth of the peak, to clearly make things better without making things worse elsewhere. My clients who have been using strategies like this find that they need to recalibrate their system after installing treatment, and most of them find they prefer to not use these algorithms at all.

13. A treated room is "good," and an untreated room is "bad."

The most common manifestation of this misconception is the question I get regularly: how much will it cost to treat my room? By which they usually mean, what's the least amount I can spend to make my room sound good? And there's the rub: what do you mean by "sound good"?

Rooms aren't toggle switches with two settings: sucky and perfect. The fact is, there is no such thing as a perfect room, and any room can be improved. Sure, there are sweet spots along the way, where you can get the room really good, and further improvements are a matter of diminishing returns. It's always a matter of doing the best you can with the available resources and budget.

I've heard untreated rooms that sound really good for recording, with tons of character and vibe. I've heard treated rooms that were lifeless and uninspiring. If you have the budget to properly treat your room with proven acoustic products, then great. Or, if you like to learn things and have some craftsmanship skill to make your own treatments, that can be really cool too.

This exploration of myths in acoustics is an invitation to think more deeply about some of the ideas many of us take for granted. Hopefully this discussion will contribute to both clarity and inspiration in your music recordings.

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