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**spicyitaliano**

04-16-2004, 10:52 PM

I have almost finished all the construction of my new studio. The next critical step is analyzing and treating the acoustics. While the control room is much more critical, I feel that the live room just needs to sound good.

My new live room is about 14 X 16, 9 ft ceilings, with all wood floors. The walls are standard wallboard. I walked in the room once it was all done just to see where I was in regards to acoustics. It was incredibly lively, very bright, with at least a 1.5 sec reverb time. Man, this is going to be a terrible room without some sort of acoutic treatment.

So I got a chance to hear some drums being played in it. The room seemed to amplify them x5, as they were incredibly loud! The cymbals made your ears bleed and the kick sounded like a giant boom.

So now I'm starting to think it's going to take a LOT of treatment to make this room usable. So let me start with a plan of action and see what you all think.

First off, an entire 8 ft wall needs to be covered with some sort of fabric or heavy curtains. Why? Well, we have a window that was originally there that we built around when we constructed the new sound-proof walls within the original room. We intend to build a "plug" made out of plywood and soundboard to be placed into the windows spot to sound proof the giant 4x6 window. I was hoping to find some really heavy curtains of something to cover the entire wall, covering up the ugly space. I hoped this would also help to calm down the room's lively acoustics.

Next step - the Ceilings. In a smaller room with lower ceilings, you will surely get some slapback into any high microphones. To combat this, I planned to use a collection of absorbers or hanging ceilings (absorbers). This would hopefully remove that factor from the equation a good bit, and over all would tighten up the acoutics. What do you think?

Gots to break up the walls. All the walls are pretty close to parallel, minus a slanted door. I was thinking that it may be a good idea to somehow diffuse the parallel walls a bit. I'm not sure how much this would audible do, considering that (at this stage, anyway) the room is incredibly lively. Maybe this is a bad move, and it may be a better idea to do this:

Calming down the room's reverb. The room is very bright and lively, and it makes listening to drums in this room very very hard. And we all know that if the instrument doesn't sound good in the room, then it won't sound good on tape. This is where I get confused. I want something that is aesthetically very pleasing but still provides the right treatment for the room. Overall, I thought about building large gobos. Essentially a large 4x8 piece of Plywood mounted upright on casters. Then soundboard on one side, covered in a fabric, and then if needed, additional acoustical foam appllied to the top. This would look very nice, and I could position these around the room for different purposes. For example - drums. I can now create a drum booth around the drums, or a vocal booth, or just along the walls to calm the acoutics down. And the best part, I can just spin them around and now I have wood all along the walls, giving my a very nice open room sound. How about that??

So anyway, those are my ideas. Thanks for taking the time to read this, and I hope to get some input from all of you. Thanks!

- Andy

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**LTA**

04-17-2004, 12:36 PM

Diffusers on your low ceiling would likely be more appropriate than absorption. They break up the hard echo.

Now, about the absorption: You are going to need a nice RTA, a nice omni test mic (calibration optional), a bit of theory, and an established understanding of room acoustics. You are basically "EQ'ing" the room for flat response across the largest frequency range possible. Just for you, I will say anything from about 300 Hz on up, since you were going to ask anyway. Your room may already be fairly flat. Not likely, but how would you know if you didn't check it out?

Now, about parallel walls: As long as you aren't getting flutter echoes, I prefer working in rectangular rooms with good dimensions. Rooms like this are just easier to figure out, both in terms of construction, and more importantly in terms of use.

Oh yeah, given your room size, you might want to shoot for an RT60 of about .6 seconds or so. Do some research on how to test RT60's for yourself before you buy absorption, if you haven't done either/both yet. You'll be happier than if you just guess.

(If you have more specific questions, ask and you may receive)

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**spicyitaliano**

04-21-2004, 09:28 PM

Thanks LTA.

Your thoughts about diffusers on the low ceiling is surprising! But generally speaking, I don't really want to do anything to help the lively acoustics of the room. It may be better for me to just remove the factor of having a low ceiling by absorbing as much of those reflections as possible. What benefits would I have over absorption by using diffusion?

The room sounds rather nice and natural, but that's just by ear. It's the live room that I'm trying to get right. My control room has been acoustically treated to the best of my abilities, and it is rather accurate. I never officially tested it, but my mixes translate well. But for the live room, myself and many other engineers I know aren't too worried about the perfect room response, but more importantly, that the room just sounds GOOD.

The parallel walls is something you just don't mention on the Johnlsayers.com website. Those guys will tell you time and time again that parallel walls are a big no no. Like you, it's never been a problem for me. But perhaps a bit of diffusion on the opposite walls would be a good idea.

Can you give me more details about what you mean by going for an RT60 of about .6 seconds? What is common practice to achieve this for smaller rooms like mine of 14X16.

Thanks!

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**LTA**

04-22-2004, 05:52 PM

"Desired" RT60 times are based off the room volume. So  $14 \times 16 \times 9 = 2016$  cubic feet. I looked it up on a chart to get about .5-.6 ms for the RT60 value. Common chart, yet people guard their secrets tightly :) Now, ideally, for a flat room, you want the rt60 to ideally be consistent across the various octave bands. The evenness is possibly even more important than the actual decay times, although if the room is too lively you will have a bit more of an issue with bleed between instruments and mics. Common practice of getting this is to measure your room as is, calculate the number of sabins absorption required for each octave, and then juggle numbers between various acoustical treatments until everything works out on paper. Buy your treatment as appropriate, and tack it to the walls. Play around with it, either by ear, by machine, or preferably by both, until everything is copesetic. Sit back and enjoy an even room.

$RT60 = .049 * \text{volume} / (\text{total absorption in sabins})$  Want to know more? Run a search on Sabine Equation. Now, for your room, you would need a total amount of absorption of  $.049 * 2016 / .6 = 165$  sabins at each octave band. A good chunk of this is already built into your room, so it would be easier to see how much more you needed by simply measuring it rather than calculating. Calculators may be nerdy, but they get you past alot of the trial and error. And if you are going to add acoustical treatment, you might as well do it right. More questions? Just ask.

Diffusion on the ceiling won't make your room more lively. It does cut down on the hard slap off the ceiling. 9 foot ceilings aren't really that high i terms of recording studios. Better than 8 foot

ceilings though :) Now, some diffusors will actually contribute a decent amount of absorption, depending on the design. If you use just foam to cut down on the ceiling reflections, you can easily make the room too dead (and still have the ceiling slapback).

Now, about the parallel walls. That is just opinion. A lot of the hexagonal commercial control rooms are actually rectangular rooms. They just have a lot of filler in the corners. Appearances are often deceiving. But if you decide to tear down the room and build it from the ground up, by all means consider making the walls non-parallel.

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**robmiller**

11-02-2011, 10:30 PM

Those interested in this thread may also be interested in an RT60 calculator web app that I put online last week. The calculator is intended to be a powerful and elegant tool that is a departure from the common spreadsheet. Suitable for rooms with a diffuse field, you can calculate Sabine, Eyring, Fitzroy, and Arau-Pruchades equations simultaneously. Database has about 400 combinations of materials and mounting types. A unique feature is dynamic ranging between different levels of occupancy in audience areas (best in Chrome and Safari). Register to save and export as CSV.

More features to this calculator and other tools are in various states of development. Check back regularly for new stuff.

<http://threedb.com>

Best,  
Rob  
rdmiller@gmail.com

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**Dave Burris**

11-04-2011, 06:38 PM

General rules:

Diffusion spreads out the room modes while absorption tames the decay times and lowers the peaks of the modes if at the proper frequencies.

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**FLZapped**

11-13-2011, 05:37 AM

Properly applied diffusion will actually lower the RT60 you're getting now, because as mentioned, you're getting flutter/slap echos. With the proper sequences, you can also control the frequency response to some degree.

-Bruce

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**eRoland**

01-28-2012, 10:18 PM

You will need some diffusion and absorption just start small and add if needed. One way that you find most useful is to make panels on stands that have diffuser on one side and absorber on other 2 X 4 size. You can mix and match to get the sound you want and move closer to some things or shelter mics from others. Put them along walls when not in use. Use small rugs on hard floor so you can roll up when you want hard floor and put under stands or feet to keep toe taping chair squeaks out of mics.

This mobile approach gives the ability to have a very flexible studio.

Food for thought.