

Soundproofing Fundamentals



Acoustic Essentials for Musicians

It'd be a safe bet to assume the majority of musicians have, at one time, thought about building a home studio or, at the very least, soundproofing a section of their home for the purposes of practice. The first thing to explain to anyone considering a "soundproofing" project is just what the term means. Soundproofing means to literally stop the sound, whereas sound conditioning or room acoustics are often what a musician actually seeks. ♣Ellen E. Eldridge

THE GOALS OF SOUNDPROOFING A STUDIO/REHEARSAL ROOM

Contacting a professional for help in evaluating specific spaces and in setting goals will help independent musicians avoid costly mistakes. Joel Fannin, a Senior Sound Control Specialist for Super Soundproofing Co. (www.soundproofing.org), took the time to explain the basics of sound and how to best determine needs for bands interested in sound conditioning or soundproofing. These principles apply to both recording and rehearsal spaces.

To their credit, Super Soundproofing Company has built custom panels for Megadeth as part of a super soundproofing wall/ceiling system the band had built, including a drum room, control room, rehearsal rooms and space for recording.

BASIC ACOUSTICS

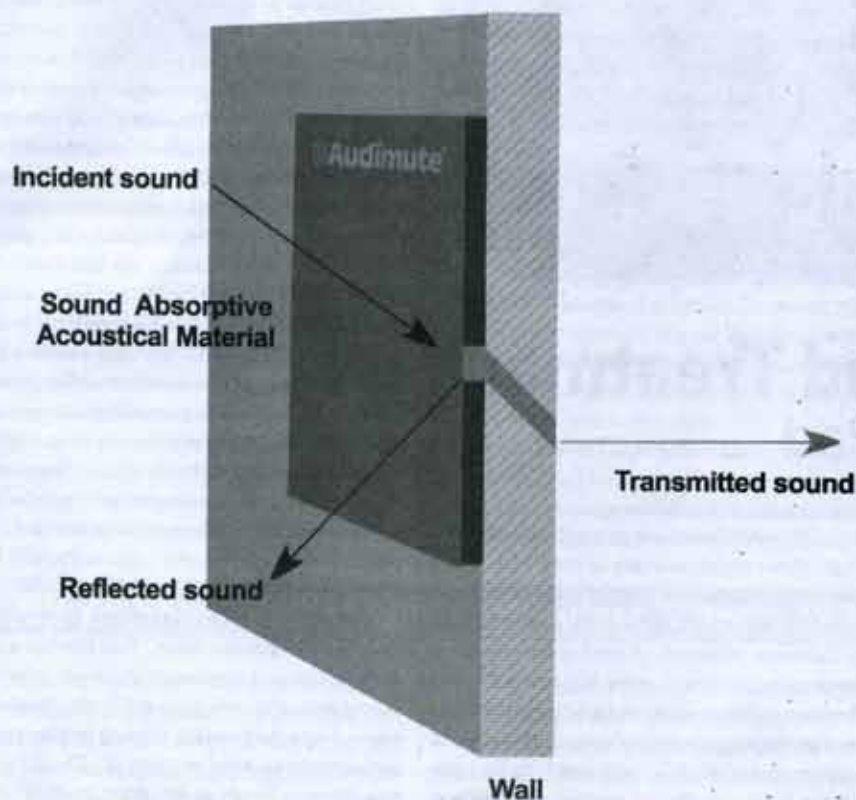
The first step is determining whether or not separate sound rooms like a drum practice room, a control room, and/or a recording room are needed. If so, the goals of each room will vary according to the way in which the sound is conditioned. A control room, for example, will need to block sound from coming in and a drum room would need to block sound from traveling out.

ELEMENTS AND MATERIALS

Decoupling means mechanically separating the vibrating surface from the surface to which it's attached. Joel Fannin explains, "Drywall is like the face of a speaker and the screws are like electric wires hooked up to the speaker. The framing, studs, etc. are like the amplifier and decoupling means unplugging the wires so the sound can't transfer through the fastener into the structure." To decouple, one can use something as inexpensive as isolation tape, which sells for about 23 cents a foot. More expensive options include Resilient Channel, a thin, flexible metal channel that is screwed to the studs. Drywall is then screwed to the resilient channel, and the flexibility of the channel creates a decoupled wall. Sound isolation clips (rubber-containing devices that screw to the studs of your wall) also provide decoupling by virtue of their resilient rubber components, which ultimately support the weight of the drywall. These sell for about \$5.40 each.

Absorption refers to absorbing and blocking sound within a contained space. Fannin says, "A lot of people talk about 'dead air space' but in construction there is no such thing unless it's sealed

Sound Absorption



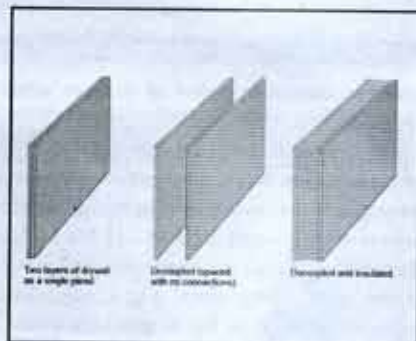
with caulk; what one actually has is contained air spaces which can be filled with natural, cotton fiber insulation (appx. 83 cents for 3.5 inch thickness). Recycled denim insulation is four to five times as effective as fiber glass at absorbing and blocking sound within a contained space." Drummers sometimes absorb sound in the bass drum by filling the space between the resonant and batter drum heads with a pillow.

The *mass/barrier element* works on the idea that the heavier something is, the harder it is to make it vibrate. Sound vibrates off surfaces as it is transmitted, losing energy and dissipating over distance. High frequency sound dissipates quicker because it

has a shorter sound wave. Fannin explains, "A sound like a low E is about 60 Hertz and has a 22-foot long sound wave. When the volume is increased, like when played through an amplifier, the sound wave thickens by two or three feet depending on how much the volume is increased. When this massive sound wave hits the wall surface it has enough 'impact' energy to resonate through the surface material in all directions and into the structure. That's why damping is so important - you want to 'kill' that low frequency resonance at the first surface it hits - otherwise you'll get bass bleed-through." Mass loaded vinyl (MLV) is one option to solve this problem, and can be purchased for about \$1.13 a square foot from

Super Soundproofing Company.

The fourth basic element, *damping*, can be accomplished in a room like a basement (which would ideally have fewer windows and doors for sound to travel through) by reducing the amplitude of sound vibrations. "Once you hit 87 decibels and up, another measurement comes into play, sound pressure level (SPL). Because now you're pushing air and as each note ends, it snaps back and reverberates, or resonates, transmitting sound laterally like water across a driveway, over 200 feet. Damping kills the lateral vibration," says Fannin. Green Glue is a damping material, classified as a viscous adhesive or viscoelastic materials designed to work with low frequencies. Fannin explains, "When the damping compound, Green Glue, is used between two sheets of drywall, instead of letting the lateral vibration travel, it's killed which equates to a 13-15 decibel drop in low frequency/impact sound transmission. That's a dramatic difference!"



FINAL THOUGHTS

Fannin recommends people call to figure out the best way to approach individual projects. A professional can assess your particular needs and advise on the best course of action. They can also offer tips on installation and best practices.

For musicians who don't own their practice space and can't build or modify an existing structure, the best option may be to look for a commercial rehearsal space. This combats issues with annoying the neighbors and the ability to play into the wee hours of the night without the expense and time of changing the home.