Sound Advice on Renovations

You can get gains in soundproofing from small remodeling extras

by Jon Eakes

We rarely think about adding soundproofing during renovation projects. But small extras that improve the sound control in a building make good sense and should appeal to many customers. While total soundproofing is too costly in a retrofit, small steps can have a noticeable effect. Good sound control begins with careful construction practices.

Walls properly designed for sound control often do not perform well simply because of poor workmanship. Inversely, ordinary walls can perform surprisingly well with just a little attention to detail. Add a few simple extras, and both quiet and noisy rooms will be kept to themselves while your reputation as a contractor will spread.

Flanking Paths

The major offenders in sound transmission from one room to another—or from one apartment to another—are connecting air paths, called "flanking paths" by acoustics engineers. Most flanking paths can be sealed off during renovations.

Although back-to-back electrical and plumbing installations (two sides of the same wall) are considered a bad idea acoustically, researchers find that if they are sealed airtight they don't increase sound transmission very much. Often you can use the same air-sealing techniques here that you would use for energy conservation.

Drywall panels should be caulked to the floor with acoustical sealant. The sealant has no special acoustical properties, but is used as a resilient connection between surfaces. It works simply because it has no solvents, and therefore will neither shrink nor harden.

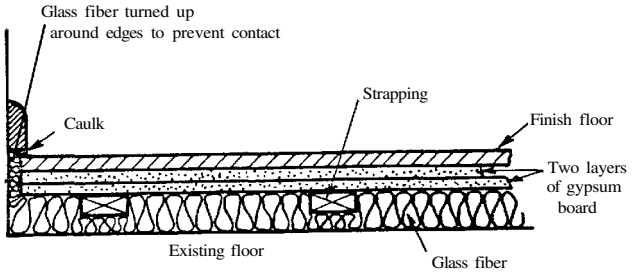
Crawl spaces, floor spaces, ceiling spaces and roof spaces that span two rooms must have a physical barrier to block airborne sound from traveling between rooms. The nature of the barrier is not important as long as it blocks the air flow from one area to another.

I have tracked down a sound leak that went into a light switch, up a hollow wall, across the ceiling, down another hollow wall, and out through an electrical outlet in a distant bedroom—right around all kinds of "soundproofing" in the wall separating the two rooms.

Building tightly and sealing off air paths can often be billed as part of the job. But it is useless if, say, there is a louvered door between the rec room and the kitchen. Recommending a good door—and, in demanding cases, even a good weatherseal—could be a critical addition.

Ductwork is another major flanking path. Where good sound control is required between adjoining rooms, avoid directly connecting the rooms with heating ducts. At a minimum, run a separate line (supply and return) to the room that you wish to isolate. This will direct the sound to the furnace room and back before it reaches the rest of the house.

In extreme cases, you may want to block off all ducting to the isolated room and install baseboard heating and a separate ventilation system. Small, through-the-wall, air-to-air heat exchangers make this practical.



Before finishing a basement ceiling, *consider adding drywall under the floor boards.*

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Absorption

While the wall or the ceiling is open during a renovation, it doesn't cost much to add a bit of sound-absorbent material, such as insulation, to the cavity. For sound control, you can put insulation in the front of the cavity or in the back. Don't worry about air spaces. No vapor barriers are needed and no fancy fitting—just some padding.

Sound tests show that there is no real difference between glass fiber and rock wool—density is not important for this function. For all practical purposes, ordinary thermal insulation works just as well as special sound blankets. The researchers tell us that—for soundproofing—there's little benefit from using batts thicker than three inches. But of course batts come in 2½- or 3½-inch sizes. Take your pick.

Rugs have little effect on stopping sound transmission through floors, but they do stop the creation of impact noise. And if the noise isn't made, you don't have to worry about it traveling and bothering anyone.

Uncoupling

Sound also travels through the structure of the house itself. Any time you uncouple one or more surfaces (walls, floors, or ceilings) from the structure, you will be making great progress in controlling sound—especially for the lower frequencies and impact sounds.

Double-stud and double-joist construction is effective but expensive. An easy renovation extra that is worth its cost is to add resilient channels (often called "Z" bars) to the studs or joists before hanging the drywall. This uncouples the drywall from the structure, and it will "dance to a different tune." If you caulk the perimeter of the drywall, it literally floats free of the house.

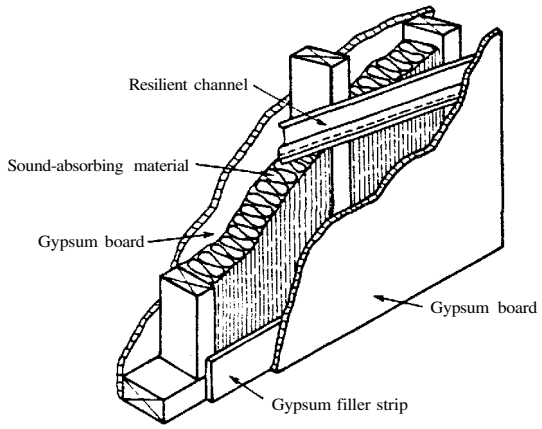
Z bars are not expensive, they install rapidly, and they do not slow down drywall installation. In remodeling, Z bars can be added to existing walls. Before installing the drywall, you may want to punch some holes in the wall and blow or pour in some sound-absorbing material. You don't have to patch the holes because you will be covering the whole wall with new drywall.

Floors can be uncoupled by adding 1x3 sleepers over either existing, useless carpets or about an inch of fiberglass insulation. Then add your new subfloor and finish. Also, the ceiling below can be hung from Z bars.

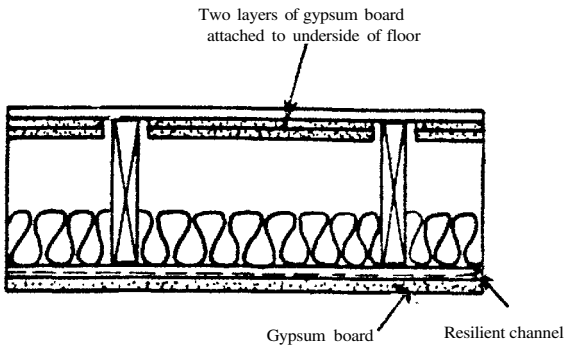
Mass

Heavy structures transmit less sound than light structures do, especially in the higher frequency range. In theory, a wall could profitably have as many as five layers of half-inch drywall—although two on each side is the practical limit.

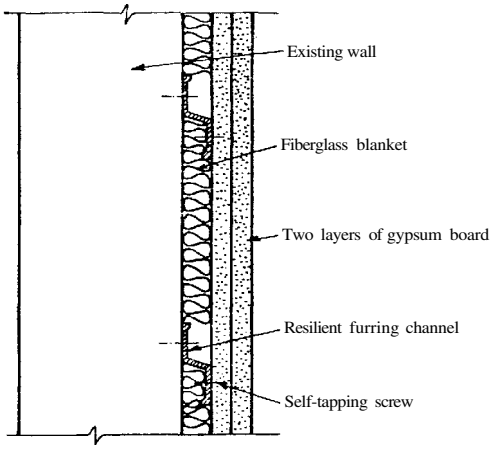
You can hang up to two layers of drywall



Over an existing wall finish, *you can soundproof with resilient channels and double drywall*



An *inexpensive floating floor* *can be bulk using sleepers* over *an inch of insulation or old carpeting.*



Resilient channels *and fibrous insulation upgrade a partition's ability to block sound.*

In theory, a wall could profitably have as many as five layers of half-inch drywall for soundproofing, although two on each side is the practical limit.

on Z bars. You can nail two layers to the underside of the floor boards in the basement before finishing the ceiling. Or you can add mass by laying drywall over an entire floor under a new subfloor.

Combinations

Sound control is an additive thing. The first steps you take help a lot, and subsequent steps continue to help, but with diminishing returns. Each of the steps contributes in its own way, and each is most effective in a given frequency range.

True soundproofing exists only in recording studios, but a modest amount of work can take you a long way. A little bit of mass, a bit of uncoupling, a fair amount of absorption, and a lot of sealing of flanking paths can add up to a small hike in job costs—and a great leap in customer satisfaction. ■

Jon Eakes is a home renovator, author and instructor specializing in energy and Canadian construction practices.