

OVERVIEW: Sound Proofing

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In this TV segment we followed a sound proofing specialist through a home, testing it for problems, and indicating some solutions. Elsewhere in this database you will find more through discussions on soundproofing various parts of your house. The photo shows the use of Z-bars or resilient bars on the ceiling, designed to uncouple the transmission of low frequencies through the structure. The flexible metal bars go across the joists and the drywall is screwed to the face of the z-bar, and the drywall "floats" slightly uncoupled from the floor above. Click here for videos on working with z-bars. The acoustical specialist we visited with was Martin Pilchner of Pilchner/Schoustal Inc. in Toronto. Years after this TV show aired Joanne wrote in trying to figure which contractor, with all their different answers, was the right one to solve a problem of sound penetrating from the apartment above. This is what I wrote back to give her an overview which might help her with the specific articles on this site, and the differing recommendations from her potential contractors.

SOUNDPROOFING OVERVIEW

Soundproofing is never perfect and tasks undertaken do not add up easily -- doing twice as much work will generally not give twice the results -- so try to focus in on what is bothering you most. There are three paths for sound to travel: 1) through air leaks; 2) through the air by vibrating surfaces; 3) through the structure itself. Each of these are dealt with by different materials and techniques -- no one thing will do it all. If you are hearing air borne sound from above -- like voices, TV, music (other than heavy base notes), it is probably coming through open air paths, like plumbing raceways or holes around wires. These "flanking paths" can send noise right around all other efforts. They must be sealed up with caulking or foam in place polyurethane or other air tight barriers. If you are hearing high frequency sounds that are not intelligible, like singing - that is probably coming through surface vibrations. This is more common with poorly built walls than with denser floor/ceiling arrangements. Here the sound in the air in one room causes the drywall to vibrate, which vibrates through an empty air space in the stud cavity, which vibrates the other wall surface and sends sounds into the next room. These are blocked by that sound batt insulation combined with heavy materials, like double drywall. Foam is a good material for sealing air leaks but not for absorbing sound vibrations, except for "soft" foams like Icynene. If you are hearing music base notes and impact footsteps these are being transmitted through the structure itself -- right past both items above. The best defense is to eliminate the impact itself -- which is what happens with that soft carpet compared to the hard kitchen floor -- or putting speakers on soft pads so that they cannot directly vibrate the floor or wall. When that cannot be done above on a floor/ceiling assembly, then we need to uncouple the ceiling below from the floor assembly with something that will not transmit these sounds. We use resilient bars or Z-bars between the floor joists and the ceiling drywall. This way, the impact vibrations coming through the joists are not transmitted to the drywall. This is usually combined with two layers of drywall on the ceiling to create a mass that dampens those impact noises even more.

One important clarification: acoustical tiles on the ceiling do almost nothing to stop noise from going through the floor/ceiling assembly in either direction. Acoustical tiles help to control the quality of the sound inside a room, not stop noise from going in or out of the room. They are not heavy, they are not sealed air tight and they have little capacity to absorb sound. They do prevent sound from bouncing off a hard ceiling making an echo in a room.

One other detail which came from CMHC research: if you hate your neighbours or just can't stand crying babies, you will probably never get it sound proof enough. If you appreciate babies, or like the same music, you could be happy with a division between apartments that is technically not very good. Expectations have a lot to do with construction satisfaction. So a "best" assembly between two apartments with wood frame construction is:-- a soft floor covering-- all air paths totally sealed air tight-- the joist space at least half filled with snug fitting sound batts -- no open air paths through the batts (yes leaving some air space above or below is actually better than filling the space tightly with batts)-- resilient bars to uncouple the ceiling--

double drywall on the ceiling with off-set joints. Any of the above can help a problem a great deal and if you can't do them all, try to concentrate on which of the three sound transmission mechanisms bothers you most. If you only need to eliminate the sound of clicking dog nails on the floor above, use sound batts and uncouple the ceiling. This is not a simple task but I hope this information helps. jon

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