
THORBURN ASSOCIATES INC.
Acoustic and Technology Consultants
Newsletter

Summer 1994

Welcome to the Summer '94 issue. If your address is incorrect, or this is a copy of someone else's newsletter and you want your very own, please let us know. We try to keep our database up-to-date and current (a never ending task!) and any help you provide would be much appreciated. Simply indicate the change or addition on the current mailing label and fax or mail the correction to our office. As always, if you have a special topic you would like addressed in these newsletters just let us know.

Residential Sound Isolation

We frequently get calls from owners and tenants who wish to improve the sound isolation between apartments and condominiums, particularly in older units. The call often begins with, "I want something I can spray on to the wall to soundproof it so I don't hear my neighbor's stereo..." or "My neighbor's snoring keeps me awake at night". Unfortunately, just putting something on the surface of the walls will not really improve things.

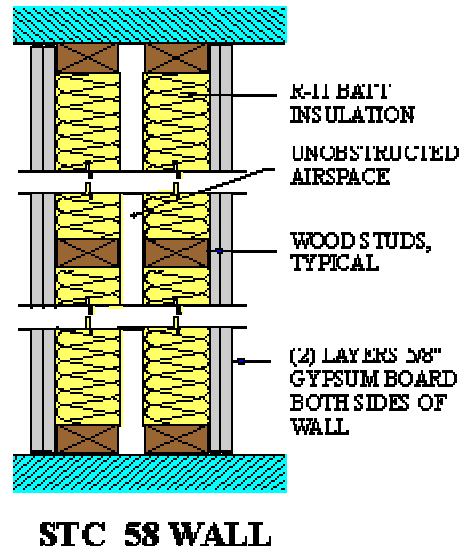
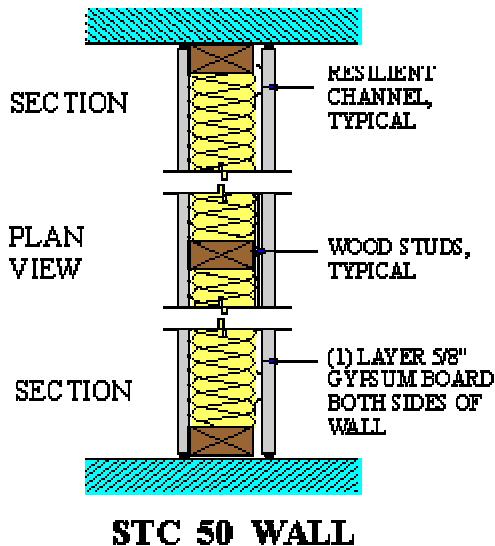
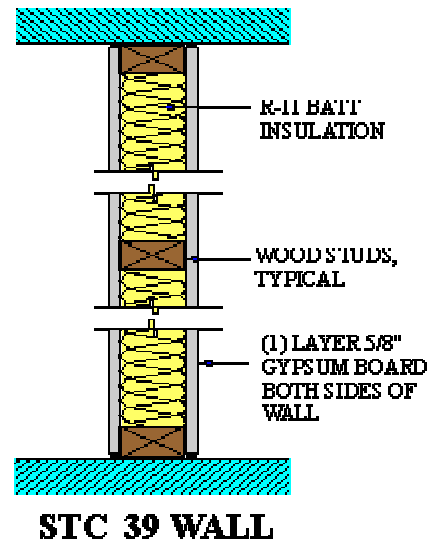
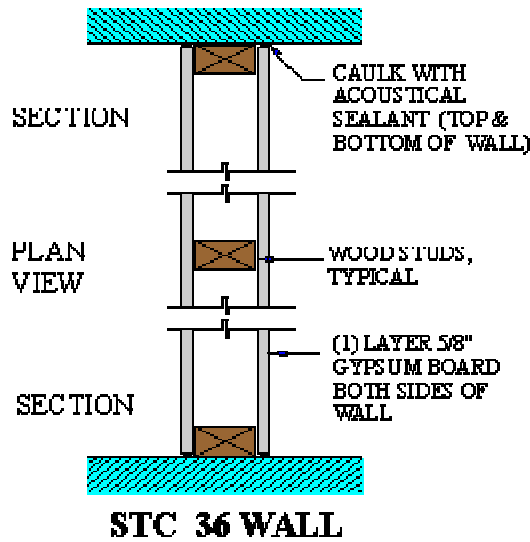
Sound absorbing materials only "color" the sound in the room the material is added to. Typically in a very absorptive room such as a bedroom, adding more absorption has little effect on things. Experience has shown there is only a 2 to 4 decibel change in sound levels between an unfurnished room and a completely furnished one.

"But what is a 2 to 4 decibel difference?" is usually the next question. In a typical setting, the sound level would need to change by 3 decibels for you to be able to hear a change. An example of this is the change in the sound level if you are listening to two loudspeakers side-by-side and then turn one off then back on.

"Okay, but isn't there some type of minimum code requirement?" The answer here is that in 1973 the State of California adopted Title 25, which required that the minimum sound isolation across party walls and floor/ceilings in hotels, motels, condominiums, and any other dwelling area, be at least STC 50. This code has been adopted, amended, changed and is presently Title 24, Chapter 35 of the California Building Code. In case you are wondering, STC is the Sound Transmission Class of a partition. It is a single number rating system which is used to compare the sound insulating properties of different walls, floor/ceilings, doors, etc. primarily in respect to speech and small appliance noise. In a building the actual construction of a STC 50 partition is approximately equal to 50 decibels of sound isolation. The higher the STC number the greater the sound isolation properties of the partition.

So how do we reduce the noise if sound absorbing materials don't work? If there is no "magic" material to spray on to the walls? As you might have guessed, the answer is to upgrade the wall or floor/ceiling constructions to increase the STC rating of the partition. This usually involves removing the existing gypsum board, adding batt insulation, then mounting or hanging new gypsum board on resilient channels. This construction has an STC 50 rating versus an uninsulated wall with an STC 35 rating. An increase of 15 STC points! (Please see diagrams.) In some cases, when it is not desired to remove the existing gypsum board, a "new" wall can be furred out from the existing wall.





"But how much sound isolation is enough?" As we have discussed in recent articles this is a "signal-to-noise" issue. The quieter the background environment where you will be listening, the greater the insulating properties required to keep loud noises out. What works in an urban setting with bus and auto noise will not work in a quiet, rural area with only wind and birds.

Sound Masking

Whether you call it white noise, pink noise or NC systems, sound masking is probably the only time that an acoustical consultant will admit that some noise is good. The shift to open plan offices and demountable partitions from the traditional "private" office with gypsum board construction has created the need to raise the background sound levels in the work place (in a controlled manner) to cover over or mask distractive office noise.



The trick is to determine how much noise a person can tolerate before their concentration is disturbed. Telephone conversations in adjacent spaces, copiers, printers and impromptu hallway and water cooler conferences generate disruptive noise in the work space. As discussed in a previous newsletter, when the background noise throughout an office space is uniform (not too loud, not too quiet) a worker's perception of the acoustical isolation is significantly improved. If a particular sound is covered or masked by another noise, a person will not be able to understand the quieter sound and it will not be disturbing. A uniform background sound level can best be accomplished with a sound masking system which fills in and raises the overall noise level in the office during the quieter periods of the day.

There are a number of different ways to provide a uniform background sound level in the work space:

- The careful design of the supply and return air diffusers systems will work for small areas. This type of system utilizes the turbulence noise generated by air flow through the diffuser. This method requires a very careful selection of the diffuser type, quantity, and locations. Very close coordination with the Mechanical Engineer, Architect, and Acoustical Consultant is required, along with an accurate knowledge of the final airflow requirements of the space to allow the selection of a diffuser with the proper airflow-to-turbulence noise rating.
- Install small self-contained units (noise generators) often supplied by furniture vendors or other sales representatives.
- Have a sound masking system designed and installed as you would any other technical system, be it electrical, mechanical or structural.

All of these systems must be properly adjusted to work. System balancing and adjustment helps to minimize the intrusiveness of the system. Far too often, a system is installed then just turned on and not adjusted.

Systems provided by furniture supply houses or turn key pre-manufactured systems are often the worst offender of this problem and are sold as a quick fix. These "simple" systems are often perceived by the workers as being very harsh or too loud and are usually turned off within a month of installation.

However, a well designed sound masking system will have the ability to control and adjust the background noise spectrum in many different frequency or tonal ranges. The sound masking system will automatically change the volume over the course of the day, adjusting for quiet, early morning and late night hours as well as busy mid-day hours. A good masking system will also provide methods to prevent tampering or unauthorized access (computer control, security lockouts, etc.).

A sound masking system makes a open plan office area more functional and acceptable than it would be without it. However, any system that is not adjusted properly and is a major source of noise will be a problem. Unfortunately, this includes a sound masking system.

When a sound masking system is properly installed and adjusted, the quality of the work environment is significantly improved.



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