



Flanking Noise

“Flanking noise is noise reaching a room by an indirect path, either through the air or through the structure. It is how ‘sound cheats.’”

For example noise reaching the room above your home theater from some route other than through your ceiling, perhaps through a heating vent, return air vent, fireplace etc. Perhaps even by traveling up the wall studs, across your ceiling beams [above the drywall] and back down again into the neighbouring room. Anything other than directly through the wall.

In the field, flanking noise can ruin even the best-constructed assemblies if proper planning is not exercised.

Imagine you have a single stud wall with 1 layer of **QuietRock 527** on one side and one layer of Type X on the other, that wall will stop about 55 dB of sound over much of the vocal range, which would mean that 80dB of source noise would become 25dB on the other side of the wall. 25 decibels of sound would pass through the wall.

If 40 dB of sound passes through the ductwork, however, then the net sound reduction isn't 55dB anymore, it is only 40dB. If noise makes it through other paths as well, the net sound isolation may fall even further. In the hypothetical case above, the net noise reduction falls from the 55dB potential of the wall to just 39 dB - all because of flanking

In this case, the only way to improve the sound isolation is to improve the ductwork, or to box it with **QuietRock**. Imagine that you improved the wall by adding 10 more layers of **QuietGlue** and drywall... you will still have 41dB of noise in the receive room because that is how much noise is making it through the ductwork + concrete slab, etc.

NOTE: Laboratory measurements vs. the field [real world].

Laboratory tests are immensely valuable because they are done in standardized ways, in certified labs that meet various requirements, and allow us to compare the sound-stopping potential of different walls. But in laboratories the results reflect just the performance of the wall, with no flanking noise effects at all. In your home, if flanking noise is suppressed, then you can most definitely attain near laboratory results but if flanking is not addressed, your sound deadening will be less.

Types of Flanking paths

1. Doors and Windows

These are generally to the weak link and sound is likely to come through them than through any high quality wall. Various manufacturers offer specialty, engineered acoustic doors and windows with elaborate seal systems that allow performance to be much higher than normal ones. Ask manufacturers for transmission loss data at lower frequencies as well as looking at overall STC values.

Use heavy solid-core interior slab mounted in an exterior jamb. Mass is one of the key components of any sound isolation scheme, and it's important in doors as well. The solid core contributes mass, and the exterior jamb has weather-stripping all around for a reasonable seal. For windows, triple glazing such as **QuietHome Windows** is often suggested to isolate external noise from entering living or working environments.

Concentrate on ensuring that seal quality is good. Specialized seals should be considered when performance is critical. Whatever route you take, you must ensure that seal quality is very good.

2. Electrical outlets, switches, media connections and plumbing

All physical penetrations can cause sound isolation problems as well. Ensure you use **QuietPutty** in behind all such outlets and opening edges. To avoid compromising sound isolation with follow these basic guidelines:

- a. Never put outlets back to back, always put them in separate stud cavities
- b. Seal the outlets edges with **QuietSeal**
- c. Use insulation in the wall as it helps absorb some sound as it travels through the assembly

3. HVAC and ducts

These things can be problematic for the simple reason that it can provide a direct air path for sound to travel. There are many products available for controlling sound coming through ducts. Among these are:

- a. Flexible ducts
- b. Long, complex ducts
- c. Duct liners
- d. Frame ductwork exposed to sound:
If ductwork has to be exposed to sound, it is preferable to frame it with **QuietRock**.
- e. Coating a duct:
if there is no way to avoid having ductwork exposed to direct sound, coating the duct with a viscoelastic material such as **QuietCoat** will help tremendously as it will mitigate structural sound, but in general this shouldn't be considered as valuable as framing the duct.

4. Structure-borne noise

Noise can travel as mechanical vibration through the structure of your construction such as through studs, joists, subfloors and walls, to remote locations where the vibration can stimulate wall, ceiling and floor panels to create noise. Structural noise can be controlled in a variety of ways such as:

a. Mechanical decoupling

Construction methods such as staggered or double studs can be effective by keeping sound vibration from reaching the structure in the first place. That is how these systems are effective; they provide breaks that keep drywall on the inside of a room from being in mechanical contact with the rest of the structure, or they keep the flooring components separate by the use of an underlayment such as **QuietFoam** and other options.

By far the most effective form of decoupling is the “room within a room,” where double rows of studs are utilized in combination with separate ceiling joists to create a situation where almost no mechanical connection exists between the room and the rest of the structure. As a result, structure-borne noise is reduced, as there is no mechanical path from noise to the main structure of the construction.

b. Viscoelastic damping

Viscoelastic damping materials such as **QuietRock**, **QuietWood** and **QuietGlue** can contribute greatly to reducing structure-borne noise. This is because damping, by definition, is energy dissipation. As energy travels along an undamped structure, very little of it is dissipated, and it can travel great distances. When energy travels over a highly damped structure on the other hand, the energy is quickly dissipated - the damping materials convert the energy to heat.

The use of **QuietProducts** in a structure can dissipate structure-borne noise faster than undamped structures. Quite simply, the noise cannot travel far enough through a very well damped structure to cause disturbance at long distances.

c. Structural breaks

The use of floating floors can help mitigate flanking noise via structural paths as well. A floating floor is a floor that has a surface “floating” on top of some type of resilient layer. The floating surface may be materials such as **QuietWood** with the resilient layer coming in the form of **QuietFoam** to other elaborate engineered

5. Air Leaks

Seal quality and other small air cracks directly connecting two rooms is important because where ever air can travel, so can sound. Even the smallest seal failure can have negative consequences to a high performance assembly, so proper sealing practice is critical. Poor seal quality will make a poor performer out of any partition, even one of the best possible walls like a **QuietRock** damped wall.

For this reason special attention should be paid to any physical penetrations within a wall including light switches, media and phone outlets and plumbing. Acoustically engineered putty such as **QuietPutty** helps to substantially mitigate sound transmission in these areas.

Here is what you could expect with a properly constructed QuietRock assembly vs. a regular gypsum wall:

■ **QuietRock THX** Double Stud Wall, STC 80 ■ Standard Wood Single Stud Wall, STC 36

Q: Do I need a specialized acoustic **QuietSeal** and **QuietPutty**?

A: You should always strive to use an acoustic sealant and putty because they have been designed to be flexible, and to remain flexible and never dry. Flexibility prevents the seals from cracking over time and is an important component.

You should strive for multiple caulk layers on partitions where sound isolation is critical. This helps ensure that a quality seal is attained by “doubling up” on seals - if one layer has compromised quality, it is backed up by the other layers.

Many different sealant patterns can be utilized with success. And 10 perfect seals aren't much better than 2 perfect seals (one on each side of the wall), BUT (and that's a big but) redundancy ensures that sealant performance will be good, so we strongly recommend it.

6. Resilient mounts

Resilient channel or high performance engineered sound clips call for special construction practices. To get performance as good as the lab tests, particularly low frequency performance, it is generally recommended to leave 1/8” to 1/4” between the drywall and any other surface, and then fill that gap with very flexible acoustic sealant. This creates a “floating” wall in the truest sense. However, as with any such installation, if these walls are active, meaning being touched in a regular manner, separation is a real possibility. Remember not to hang anything from a resilient wall as compressing it to the stud, or any resulting nail/screw holes will render it ineffective. In general, RC walls fail 90% of the time due to improper construction and the incorrect use of the finished assembly.

Summary

We have taken a look at flanking noise and how to potentially cope with it. The suggestions given are as much a component in the success of your project as is the selection of wall or ceiling type. Ultimately the success of any sound deadening project relies on competent planners, designers, and installers.

For additional information, go to www.sounddivide.com > Critical Information > Practical Guide

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