

We can see how decoupling the wall studs limits the vibration trying to conduct through the wall. We are left with the airborne transmission represented by the blue waves. Note how decoupling does not affect airborne transmission.

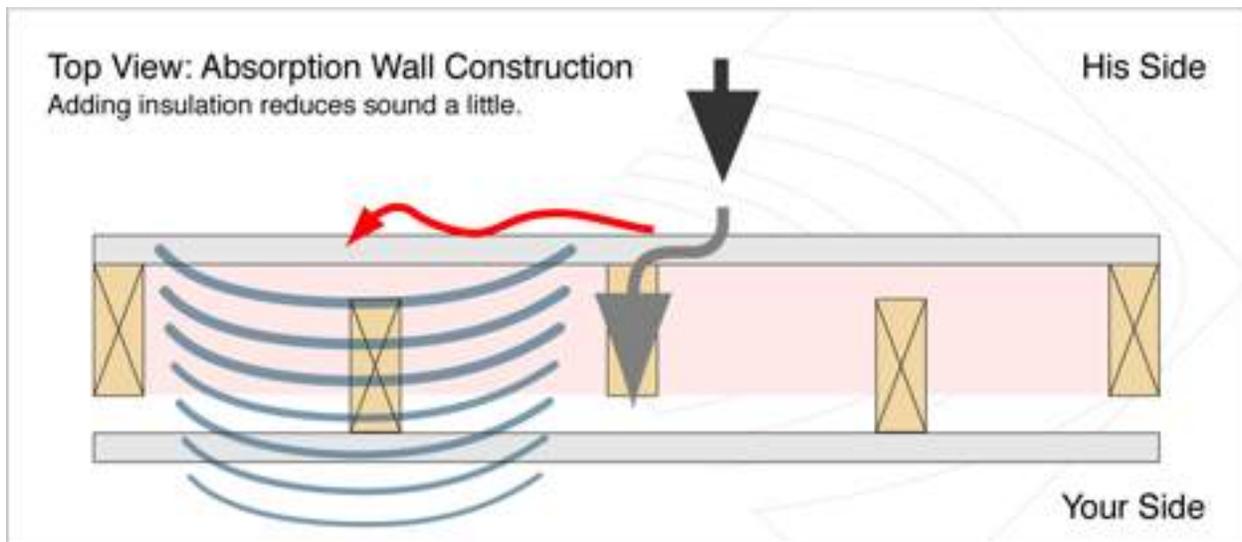
So our decoupled framing reduces a good deal of vibration, but not all. We need to continue to the other elements to reduce more.



## 2. Absorption

Air cavities will resonate. Ever “heard the ocean” in a seashell? Ever blow across the top of a bottle and heard the sound? Both sounds are actually the trapped air resonating. A hollow wall will also trap air that will resonate. When the wall is vibrated by sound (from your neighbor), the air in the wall cavity is also vibrated, just

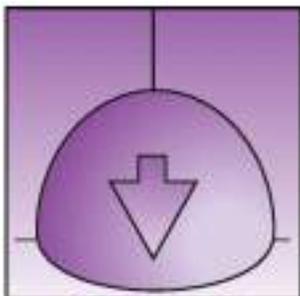
like a drum. This air cavity is another means for sound vibration to travel from one side of the wall to the other.



As you can see, even though the wall framing is decoupled, the vibrating air cavity will still transmit some sound through the wall between the wall studs. Simple fiberglass insulation will absorb some of this (absorption).

Insulation helps, and should be done if possible, but the vibration reduction is smaller than the other 3 Elements. You can use other insulation materials as well like cellulose, mineral wool and recycled cotton. The key is to keep the density low. Don't compress or pack the insulation.

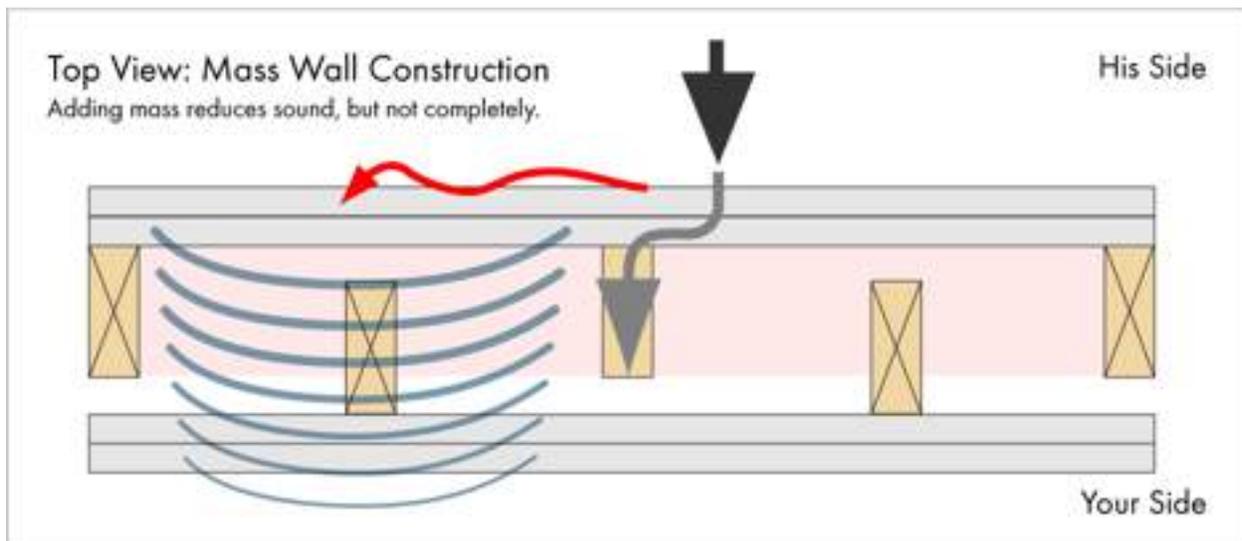
So now we have a de-coupled and insulated wall framing. These elements stops much vibration, but not all. What do we do now?



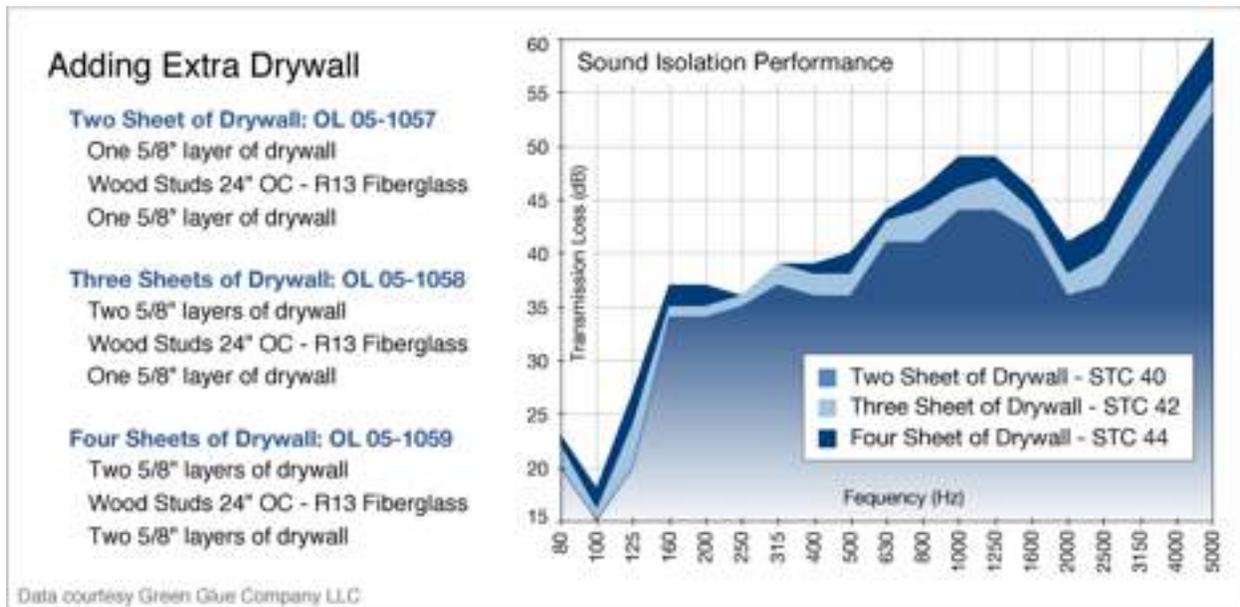
### 3. Add Mass

A very important element. In this case we simply mean make the walls as heavy as you can. Common cost effective choices for heavy materials include Drywall, Plywood, OSB, and Cement Board.

For sound to conduct through a wall, it has to actually move the wall ever so slightly. A heavy wall is harder to move than a lighter wall. Simple as that. Drywall is one of the lowest cost sources of mass available. Best to use two layers of 5/8" drywall. It is very important to note that a heavy wall will still vibrate, just not as easily.



Note that adding mass improved things. It's harder for sound to move this heavier wall. You will still hear low frequencies (bass) quite easily.



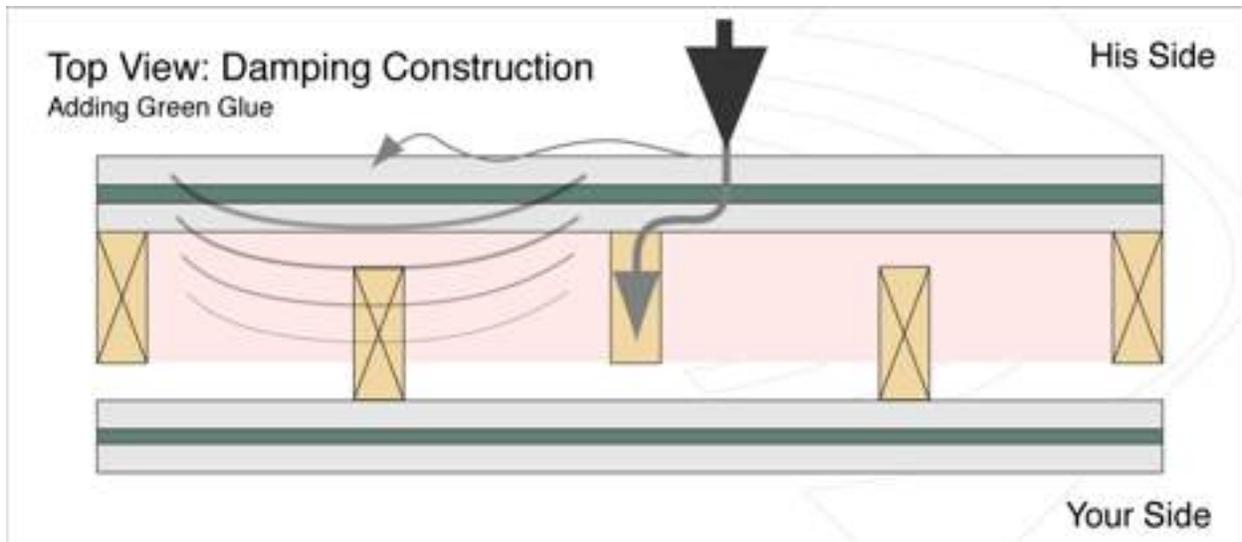
This graph illustrates the performance gains from adding additional drywall. While adding mass obviously helps, it doesn't help as much as we need.

So we have a wall that is decoupled, has some insulation, and is heavy. Stops much vibration but still not all. Is there anything else we can do to reduce vibration?

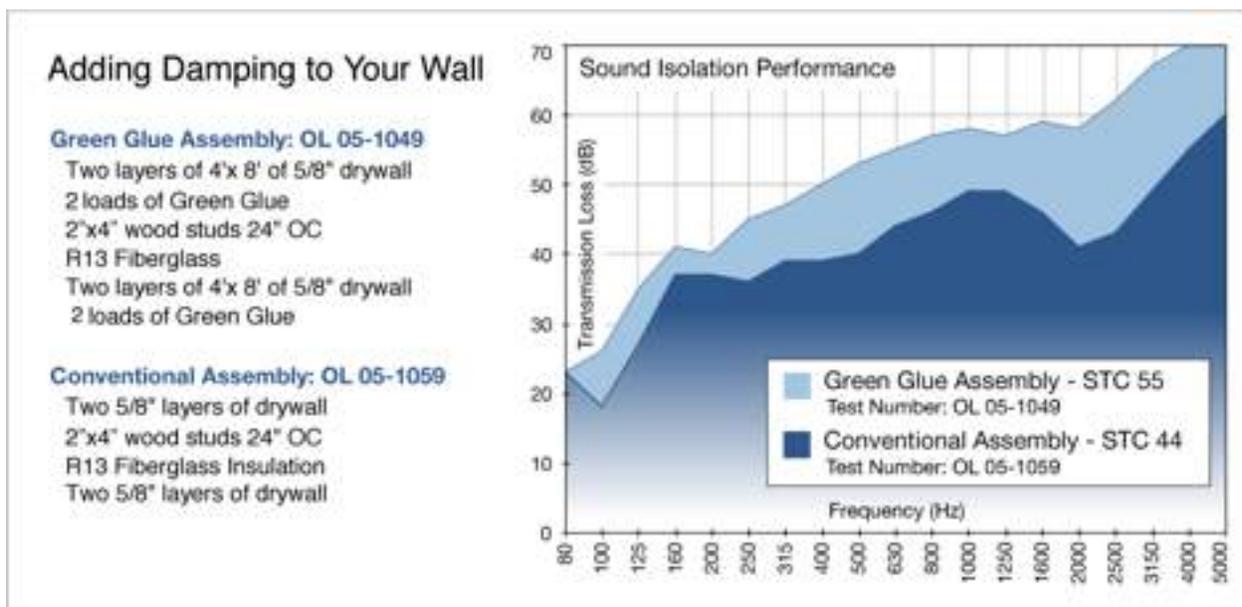


## 4. Damping

The last element for soundproofing. If we could reduce the drywall from vibrating in the first place, it would make the jobs of the mass, the insulation and the decoupling easier and much more effective. After all standard drywall is a HUGE surface area that is vibrating.



Note how damping the drywall on the sound producing side of the wall reduced all vibration immediately. Again, the decoupling, absorption and mass all have less of a job to do, resulting in significantly improved performance.



There are several products available that damp drywall. The highest performance for the lowest cost is Green Glue. Used between standard drywall, plywood, subflooring or MLV, Green Glue damps a higher amount of vibration than any other material available.

# Additional Sound Proofing Steps

## Acoustic Panels

### What Acoustic Panels will do for You:

- Acoustic Panels will quiet your space by absorbing noise.
- Acoustic Panels will add privacy to your space.
- Acoustic Panels will improve speech intelligibility, recording quality and listening quality.

### What Acoustic Panels are perfect for:

- Restaurant Acoustics, Office Acoustics, Church Acoustics, Hotel Lobby and Banquet Hall Acoustics
- Classroom Acoustics, Auditorium and Gymnasium Acoustics, Lecture hall Acoustics
- Home and Home Theater Acoustics, Recording Studio Acoustics

