Solution for a Quiet Party Wall

BY ROB CORBO

Last year, a customer we had worked for six years earlier called to inquire about our availability. Previously, we had renovated her home in Hoboken, N.J., and she was now in the process of buying the attached brownstone next door. She wanted us to work with her and the architect again. The project called for gutting and renovating the first and second floors of the new home and leaving the basement level alone; the basement, an existing finished space, was in the flood zone of the Hudson River and could only have been renovated for storage. Although the project required a significant amount of detail work, including lots of structural work (not unusual for a 125-year-old attached home in Hoboken), the one detail the homeowner emphasized during our initial phone conversation was soundproofing the common wall between the two homes. If she was going to buy the property and renovate it for resale or as a rental, she wanted to make sure there was no sound coming through the common wall on the west side of her home.

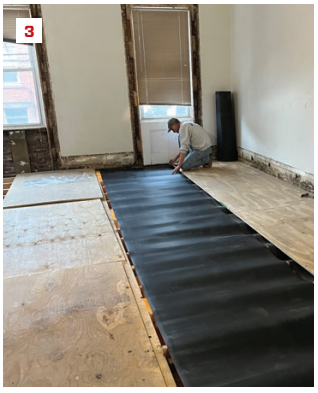
The two properties were separated by an 8- to 12-inch-thick brick party wall, and our client heard little in the way of conversations from next door but often heard music. When I examined the plans, a mass loaded vinyl (MLV) membrane was specified as the major component of a soundproofing system outlined by the architect. MLV was not a product I was familiar with; over the years, we've done little soundproofing beyond insulating bathroom walls. So, of course, I put the plans down and did an internet search on MLV. That revealed what MLV is, but opinions varied regarding its effectiveness and associated cost for varying soundproofing needs. Technically, MLV consists of viscoelastic materials such as polyvinyl chloride or vinyl filled with dense inert compounds such as barium sulfate or calcium carbonate. For those "chemical" laymen out there like me, it's dense, flexible, thin (we used 1/8 inch), extremely heavy, and expensive. Its density, weight, and flexibility are what give MLV its ability to reduce and absorb sound. We weren't building a sound stage or sound studio, so I didn't let the diversity of online opinions keep me up. All we wanted was to reduce the sound of voices and music at a Hoboken party wall. A professional architect designed a soundproofing system to do that, and all I had to do was implement it.

I learned from my research that a sound transmission class (STC) of 65 would eliminate most sounds. STC ratings assign a measure to the acoustical performance of household materials; in our case, a wall made up of numerous components, each of which provided a degree of soundproofing. Those components were an 8-inch-thick brick party wall, a 1-inch space, a 1 5/8-inch metal-stud wall with mineral-wool soundproofing insulation, a 1/8-inch-thick MLV membrane installed on the metal studs, and 5/8-inch drywall on the interior side of the stud wall but not on the party-wall side. (We used 1 5/8-inch studs because the building was only 14 feet 6 inches wide, and every inch counts.) An 8-inch-thick solid brick wall has an STC rating of 52, mineral wool is rated at 40, and the MLV is rated at 26. The total of those three components is 118. I didn't include the 5/8-inch drywall because it was applied to only one side. The brick party wall made achieving an STC rating of 65 easy. For comparison, and using a more suburban construction example, a 2x4 wood wall with batt insulation and 5/8 rock on each side has a 39 STC. Add MLV, 26, to one side, and you get a 65 STC rating. Add MLV to both sides, and you get 91.

Mass-loaded vinyl is installed over a row-house party wall.

Photos by Rob Corbo

Second-floor joist system. The architect specified that, in addition to the party wall, the second-floor joist system be soundproofed with MLV. The entire second floor, a footprint approximately 15 feet



The architect called for adding mass-loaded vinyl (MLV) to the floor assembly as well as to the party wall **(1)**. By rolling it out over plywood **(2)**, a crew member was able slide it into position **(3)** and align it so sheets abut each other at the edges **(4)**.

The MLV sheet is nailed in place to the top of the joists **(5)** before the seam is taped. Seen from the first floor, the MLV drapes between joists **(6)**. The staircase stringer was secured to the party wall with a double 2x6. The combined 4 1/8 inches leaves room for a 1-inch air space, steel studs, MLV, and 5/8-inch drywall **(7)**. This plane carries up to the second floor **(8)**.

by 40 feet, had to be leveled. There was a 4 3/4-inch difference from the high point of the floor at the front wall to the low point at the stair opening, over a distance of about 20 feet. The floor level then rose from the stair opening to the back wall, with a net 2 3/4-inch difference between the front and back walls. The variation was significant enough for us to give it a "fun house" nickname. (Framing for stair openings in Hoboken often failed because the mortise-and-tenon connections split at the header and/or trimmers.) With the joists exposed, I am sure the architect figured, why not add soundproofing to them.

Joists in Hoboken are pocketed 4 to 5 inches into party walls. Sounds and vibrations on the second floor would be transferred both into the brick party wall and down to the first floor. By draping the MLV into the joist bays of the second floor and insulating with fiberglass up from the floor below, we created a layer of soundproofing in each joist bay that absorbed and deadened vibrations and sound. We installed the MLV tight across the walls, but we draped the MLV into the joist bays to expose more surface area and create a looser, more absorbent buffer.

Staircase. A 1 5/8-inch metal wall is wimpy. As mentioned, the soundproof wall was specified as 1 5/8 inches to conserve space. Normally, to save space, we would plumb a 1 5/8-inch wall up against any party wall it was covering and make a few attachments for added support and stability. For soundproofing purposes, however, we left a 1-inch space between the brick wall and the metal wall so there was no contact and no sound would be transferred. This meant there would be no attachments to strengthen the wall. Ordinarily, this wouldn't be a problem, except in this case, we had a new staircase in the middle of the 40-foot soundproofing wall. We were not comfortable attaching the stair stringer to a 1 5/8-inch metal wall. So, we brainstormed over lunch and found a solution.

The steel-stud cavity is filled with mineral-wool insulation before the MLV sheet is installed **(9)**. All penetrations, including electrical outlets **(10)**, must be sealed with acoustical caulk and the seams in the MLV sheets taped off **(11)** before the 5/8-inch drywall is installed **(12)**.

The solution took into consideration that a brick wall, due to its mass, is more effective than most walls at reducing sound transmission. We glued and screwed a double 2x6 ledger to the brick wall to attach the stair stringer to the wall. In hindsight, we should have put MLV on the first 2x6 attached to the brick party wall. The double 2x6 plus the stringer provided a 4 1/8-inch surface on which to run the soundproofing wall up to the second floor. The wall didn't run alongside the stairs but over the double 2x6 and the stringer. The 4 1/8-inch surface allowed us to have a 1-inch space off the brick wall, a 1 5/8-inch wall, 1/8-inch MLV membrane, 5/8 rock, and a molding where the drywall sat on the stringer. We didn't feel great about making contact with the party wall but felt we had no choice.

We purchased nine rolls—1,215 square feet—of MLV from Acoustiblok and used eight full rolls and a bit of the ninth (acoustiblok.com). Rolls measured 4 1/2 feet by 30 feet, or 135 square feet. Each weighed 135 pounds and cost $390, plus tax and delivery. Delivery was about $600. Accessory products we purchased that were recommended by the distributor were two rolls of tape at $30 each, and two tubes of sound sealant, $26 each. We know we paid dearly for the accessories, but we wanted to use the manufacturer's recommended products. We used backer-board screws for the walls and used a coil gun with 1 1/4-inch siding nails for the second-floor MLV installation. Both types of fasteners were selected for their larger head. All in all, we spent approximately $4,500 on MLV materials. The 1 5/8-inch metal studs, mineral wool, and labor were additional.

We didn't have any before or after sound tests to compare and judge the effectiveness of the soundproofing we installed, so I interviewed our customer to get her firsthand experience. Not very scientific, but if the customer is happy with "living results," then I am happy, and I am able to report the customer is happy with the results. It's been 10 months since we finished the project, the house has been rented to a family, and our customer hasn't heard a peep. The common wall she shares with her tenant includes a combined living room and kitchen, stairs to the second floor, and two second-floor bedrooms. The new tenants have a living-room stereo and TV, and the kitchen and living room are the center of many of their activities. The second-floor bedrooms each have TVs. Our customer doesn't hear voices, music, TVs, or the use of the stairs. To quote our customer, it's "all quiet on the western front."

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