

REAL ESTATE

Soundproofing for New York Noise

By ROY FURCHGOTT DEC. 11, 2015

Pietro Cicognani, an architect, made a risky promise when he undertook the \$3.5 million renovation of a Fifth Avenue penthouse with wraparound terrace views. When finished, he said, the apartment would be silent.

It was risky because noisy elevator motors and rooftop exhaust fans had required the previous residents to raise their voices to be heard, and the apartment shook so much that “if you had a tub full of water,” he said, “you could see the surface of the water ripple.”

The building’s management had deemed the problem irreparable, and settled for turning off the ventilators when the penthouse’s residents were trying to sleep. The noise, Mr. Cicognani said, was the most severe he had heard in his 28 years as an architect.

But Mr. Cicognani said he was comfortable gambling his reputation because he had an ace up his sleeve: a mechanical engineer who is an expert in acoustics.

The engineer tested the penthouse to find the problematic noise frequencies, then used accelerometers to measure the shaking. She determined which noises were airborne and which were from vibration. With that information she was able to specify materials and construction methods that would hush the rattle and hum.

Throughout the 3,500-square-foot apartment, pipes and ducts were wrapped in acoustic barrier insulation, walls and ceilings were hung on vibration-absorbing rails and floating floors were installed, at a total cost of about \$200,000.

When the owners visited the treated apartment, Mr. Cicognani said, “the relief on their faces” let him know that his reputation as a designer was safe. “We have clients that spend a

lot of money for these things,” he said, “and silence is as luxurious as a beautifully wood-paneled room.”

Unfortunately, apartment noise is not relegated to the one percent. Sirens, rooftop fans, construction and upstairs neighbors who clomp about like a team of clog-dancing Clydesdales are common conditions of city living.

There are no reliable figures, but anecdotally the noise-control industry has been growing along with the demand for, and number of, noise control materials — from recycled rubber padding to insulation made of shredded bluejeans.

Sound Seal, a manufacturer of noise control materials based in Massachusetts, said this year its sales were up 15 percent over last year for new home and remodeling products, and sales of its Impacta sound-absorbing flooring were up 22 percent.

These materials make it possible for contractors, architects and even do-it-yourselfers to tackle noise. While adding rails, springs, pads and special wallboard to quiet even a modest apartment can run into tens of thousands of dollars, sometimes a fix requires as little as \$100 worth of acoustic seals for a hallway door.

The solution is seldom as simple as adding insulation. Noise is insidious. No two room hums are exactly alike, and what silences one might make another worse. “What a contractor did across town that worked 99 percent of the time might not work for you,” said Alan Fierstein, an acoustical consultant who owns a 39-year-old New York firm called Acoustilog.

Bonnie Schnitta is the owner of SoundSense, another of New York’s acoustical consultancies. Dr. Schnitta, who has a Ph.D. in signal processing, and who worked with Mr. Cicognani on the Fifth Avenue apartment, was recently called to a family’s fashionable NoHo walk-up. Three years ago, the 2,200-square-foot apartment had been taken down to the studs, and a floating floor had been installed. Floating floors isolate noise by both absorbing and blocking sound.

In this case, two layers of plywood subfloor were covered with a vibration-isolating mat, topped with another layer of plywood and capped with 200-year-old hemlock flooring salvaged from a Philadelphia factory.

Despite great care on the part of the architect and the contractor, there was a problem.

When the family's twins hit the toddler stage, the downstairs neighbors said the floor hadn't worked. Rugs were added upstairs, to no avail, then rug pads, which didn't help much either. Contractors were consulted. They suggested steel plates or poured concrete at a cost of \$60,000 to \$70,000.

Dr. Schnitta entered the picture at this point. She took readings and recommended a 7/16-inch-thick sound-damping mat that combines dense vinyl with a springy foam layer. This fall, after \$2,000 of the padding was installed under the rugs, the sound downstairs went from a measurement of 30 decibels to 5 decibels.

"It was the difference from the sound of a starter pistol to that of a car door closing at a distance," Dr. Schnitta said.

Part of the difficulty in damping sound is that it moves in two ways. Both high- and low-pitched noises can be airborne, like a child's incessant piano practice that comes through a wall. Low-pitched noise, like the grating sound of a chair scraping the floor above, tends to move as vibration through a structure's framing. Sometimes it's a combination of the two, like from a TV mounted on a common wall.

A compounding issue is that it takes only a very small gap to let in a lot of sound.

"If you have a weakness in a wall that is only 1 percent of the total area, the sound transmitted through could double," said Ryan Glotzbecker, the founder of the acoustical consulting firm Eremos in New York. "This could be the difference between hearing a slight beat from your neighbor's stereo to being able to pick out the lyrics and sing along."

Gaps can appear in walls that seem completely solid. The most common are electrical outlets placed back-to-back on a shared wall, in-wall speakers, crevices where walls meet the floor or ceiling, air-conditioning units (which are basically unrestricted openings to the street), badly glazed windows and in-ceiling lights.

"From an acoustical standpoint, they are just holes in your ceiling," said Mr. Glotzbecker, who has a bachelor's degree in mechanical engineering and a master's in acoustical engineering.

All kinds of tradesmen claim to be noise experts, including handymen, glaziers and contractors, and some are successful, but when that annoying nighttime squeak just won't go

away, an expert may be called for. Acoustical consultants come from the ranks of engineers, physicists, acousticians and the self-taught. The New York Department of Environmental Protection maintains an “Approved Noise Consultant List for Commercial Music Mitigation,” which can also be used as a guide to mitigators of other kinds of racket. The list contains the names of persons who have met department requirements for knowledge and experience, although even some on that list say the requirements are too lax. (All the consultants mentioned in this article are on the D.E.P. list.)

Consultants use a variety of tools. To find the origin of an airborne leak, they play loud static-y white noise in one room and take readings with a sound-level meter in another. To measure structure-borne floor noise — sound that travels through the building from one apartment to another — there is a “tapping machine,” a contraption that repeatedly picks up and drops weighted metal cylinders on a floor, while readings are taken downstairs.

While this kind of testing is a big part of the value consultants offers, it’s also a big reason people often don’t initially hire them. “Unfortunately it’s a little bit expensive,” Mr. Glotzbecker said, “on the order of a couple of thousand dollars.” And that is before any construction work is done.

One group of clients that doesn’t seem to mind the cost is lawyers. Noise lawsuits are a steady source of business for law firms, said Steven D. Sladkus, a partner in Schwartz Sladkus Reich Greenberg Atlas, which represents co-ops and condominium boards in New York City. “Noise complaints are the most acrimonious of all of the real estate cases I handle,” he said.

Part of the reason for the acrimony is that the outcome often determines who will pay for a potentially pricey fix. “If it turns out there is a problem in the construction of the building, it’s the building’s responsibility to address it,” Mr. Sladkus said. If not, one of the tenants will have to pay, or learn to live with the noise.

The state Division of Building Standards and Codes specifies how much noise can be passed through walls, ceilings and floors, and the city Department of Environmental Protection determines how loud mechanical devices like rooftop heating and cooling equipment can be. But different codes apply to buildings of different ages, with newer buildings generally having to meet stricter codes.

To measure sound, Mr. Fierstein, the acoustical consultant, uses a machine that he calls a “tamper-proof calibrated recording system.” With it, he said, he can recreate an offending noise at the volume it is heard in an apartment. Sometimes a dispute is resolved just by playing the recording for a neighbor.

“I have had situations,” he said, “where a neighbor merely has to listen to what it truly sounds like when their kids run across the carpet to say, ‘It’s like the floor amplifies it! I had no idea it was that much louder where you are.’ ”

Other times the recording becomes Exhibit A, a handy way to show a judge how loud a sound is without a physics lesson on decibel readings. “If you have to convince an upstairs neighbor, or a co-op board, or a judge, that a noise is unnecessarily loud,” Mr. Fierstein said, “decibel numbers are nebulous.”

In the end, no matter who causes a noise or where it comes from, there are limited ways to address it: block, absorb or a combination of both.

The primary strategy for blocking airborne sound is to add a layer of dense, flexible material to the problem surface. Often used is mass-loaded vinyl, a sheet of vinyl infused with a nontoxic metal to make it weighty — standard weight is one pound per square foot, although heavier grades are available. Lead-lined wallboard, commonly used for X-ray rooms, can also be employed.

Stopping vibration-borne noise is usually trickier and more expensive. It requires suspending walls, ceilings or floors so that the vibrations aren’t conducted to a building’s framing, which can transmit sound throughout a building.

“If someone next door is playing the tuba, it’s harder to block than someone playing a flute,” said Eric W. Wood, a former president of the Institute of Noise Control Engineering. Lower notes, like those of a tuba, tend to be transmitted both by air and by vibration, while higher notes tend to be primarily air-transmitted.

Floors are often floated on rubbery resilient mats that act like shock absorbers, or in extreme cases, are suspended on springs. Double walls can be built with an air space between them, or wallboard can be attached to a hanging rail system that puts a rubber gasket between the wallboard and the wall studs.

Once the right systems are specified, the problem becomes installing them correctly. A wall that is designed to move can be particularly perplexing. “I’ve seen it hung upside down,” Mr. Glotzbecker said. “A carpenter will say, ‘It’s a lot more secure if I install it that way.’ ” Of course, making it more secure ruins the effectiveness.

For the worst cases, an acoustical consultant might combine numerous materials and techniques.

Katherine Gleason, a writer in New York, was suffering from lack of sleep because of her upstairs neighbors. It wasn’t just the shooting noises and sirens from what she assumed were epic Xbox tournaments, or the arguments or even the 4 a.m. Bee Gees singalongs that were the most disconcerting.

“I could hear their dogs breathing,” she said. “I could hear their dogs peeing on the floor upstairs.”

Ms. Gleason was referred to Dr. Schnitta by a fellow resident who had been disturbed by extravagantly amorous neighbors. About 380 square feet of ceiling was treated with mass-loaded vinyl and hung on springs. Radiator pipes were placed in sound-isolating mounts, at a total cost of \$24,000. “It’s incredibly worth it. I sleep through the night,” Ms. Gleason said. “It was either that or move.”

Noise abatement, of course, isn’t just for beleaguered apartment dwellers. Even in the quietude of the Hamptons, people are willing to pay for the opulence of even more quiet.

Jay Bialsky, a developer who has built in the Hamptons for 23 years, said he began using soundproofing in his new construction about 15 years ago. “Soundproofing and sound-deadening products have evolved as a trend,” he said. “Anywhere there is a chance for pass-through noise, we are soundproofing.”

At a recent project of his in Bridgehampton, a \$26 million 10,000-square-foot barn-style house, the silent treatment included soundproofing walls and ceilings, wrapping pipes to quiet the sound of toilets flushing, wrapping heating and cooling ducts, and suspending floors. The cost of soundproofing a new house of this size, he said, runs between \$100,000 and \$300,000.

Dr. Schnitta said that fixing a problem in a finished room typically costs between \$10

and \$45 a square foot, depending on how severe the problem and how much quiet is required. For spaces that are already under renovation, the cost can be much lower.

When Robin Eshaghpour, a real estate portfolio manager, combined five condominiums in New York into one 4,200-square-foot duplex for his family, he summoned Mr. Glotzbecker. “We wanted to sort of have the feeling that we are in our own world,” he said. Because the entire space was gutted, he estimated the additional cost of soundproofing at a 2.5 percent increase over standard construction.

Not that Mr. Eshaghpour didn’t raise an eyebrow when he saw the consultant’s bill. “I think gaining the know-how, which we paid Ryan for, is really the larger investment,” he said. “There is a recipe to how it should be done, and that has its costs.”

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