Q&A

Q. Reducing Garage-Door Noise

We recently completed a residence with a basement garage and a single 20-foot-wide garage door. The door is equipped with a commercial opener attached directly to the framing. Because the homeowners — who have a master suite directly above the garage — have complained about the noise the door makes while in operation, I've been looking into quieter openers. But I'm also wondering if it would be better to try to isolate the working parts of the door from the structure of the building instead. What's the best solution?

A. *Bonnie Schnitta, owner of Sound Sense LLC, a full-service acoustic consulting firm and manufacturer of specialty sound-control products, responds:* Most of the noise from a garage door is structure-borne and results from the opener motor being rigidly connected to the joists or ceiling of the garage. Typically, structure-borne noise from a garage door can range from as little as 5 decibels (dB) to as much as 20 dB above background noise levels; regardless of the amount of background noise, any 5 dB noise increase is considered significant and perceivable. Even a 5 dB noise-level increase represents more than a 50 percent energy-level increase, and can travel several stories above or several rooms adjacent to the garage. The solution is to decouple the motor from the structure.

To isolate the motor's vibration from the structure the motor is attached to, our company often installs decoupler clips (**see photos, left**). Depending on the horsepower of the motor and the weight of the garage door, these clips will typically reduce the vibration to only 2 dB (or less) above background, a level that's barely perceivable. The ones we use (PAC International, 866/774-2100, www.pac-intl.com) have rubber mounting feet and can support approximately 36 pounds per clip; they cost about $15 apiece.

Depending on the garage-door opener motor, there can also be significant airborne noise. This can be reduced by enclosing the motor first with an absorber that has an NRC (noise reduction coefficient, a simplified rating of a material's sound-absorbing properties) of .85 or greater, and second with a barrier that has an STC (sound transmission class, a measure of how effectively a material prevents sound transmission) of 27 or greater. For the barrier, we prefer a mass-loaded vinyl, since its flexibility — which inhibits the movement of the acoustic wave — aids in structure-borne decoupling. Some mass-loaded vinyls have a higher transmission loss than standard one-pound loaded vinyl, and are therefore more effective at reducing airborne garage-door motor noise, which is typically a low-frequency sound.

Some noise-control products function as both barrier and absorber, making installation easier and more cost-effective. For example, my company makes a quilted fiberglass insulation with a mass-loaded vinyl barrier backing. For more on sound-control techniques, see "Innovations in Sound Control" (3/06).

Q. Can Heat From a Wood Stove Damage Taped Drywall Joints?

We've been called back to repair the ceiling of a vacation-home addition we built last year. The 5/8-inch fire-rated drywall ceiling is covered with 14 inches of blown-in insulation. All the tape joints performed well except those within a 6-foot radius above the wood stove; they've lost adhesion and curled. The Northern vacation home is unheated when not occupied and undergoes 12 to 15 heating and cooling cycles annually. What caused this problem, and what's the best way to fix it?

A. *Myron Ferguson, a drywall contractor in Galway, N.Y., responds:* Framing, drywall, joint tape, and compound expand and contract at different rates. Under normal conditions, these differences don't amount to much, but when you factor in all those heating and cooling cycles and the heat from the wood stove, the joint failure you've observed is not that surprising. Under sustained temperatures of more than 125°F, drywall, compound, and tape gradually deteriorate, while tape can crack, pop loose, or peel when panels shift significantly due to structural movement.

Remember that problems can also arise during installation. For example, under very dry conditions (which can be caused by direct sunlight as well as by the heat from a fireplace or wood stove), freshly taped joints can dry out too fast and the tape can come loose. If too much compound is left behind the tape, or if the compound is thinned down too much, taped joints become weaker and more susceptible to cracking.

To fix your problem, try removing the loose material and retaping with an extra-strength mesh tape like Perfect Finish FibaTape (800/762-6694, www.fibatape.com) and a setting compound. However, I can't say for sure that this will hold up under the conditions you describe. You may have to cover the area with a suspended ceiling and fire-resistant ceiling tiles, which don't depend on any heat-sensitive material or adhesives to stay in place.

Q. Fixing Cracks in Engineered Flooring

Last spring, I installed floating engineered flooring over the original vinyl-covered concrete-slab floor of an old New York City apartment. Even though I followed the manufacturer's installation guidelines, the 8-inch-wide planks began to cup, and cracks measuring 1/32 to 1/16 inch opened up between some of them during the following winter heating season. I assume that the cracks and cupping were caused by this building's wide swings in relative humidity, and that the flooring will return to normal this summer. But my client is unhappy and claims that either the flooring or the installation is defective. Is there a way to remedy this situation, short of removing the flooring and starting over?

A. *Tandy Reeves, a certified flooring inspector and CEO of Flooring Inspection Training Services in Tulsa, Okla., responds:* Even though engineered hardwood flooring is more dimensionally stable than solid wood flooring, the wood-veneer layers that make up the face are susceptible to shrinking and swelling with changes in temperature and humidity. It's common for the top layer to face-check when the humidity varies as much as you describe, but most of that may disappear as the relative humidity elevates again over the summer.

As with all wood floors, one key to a successful installation — and to the long-term life of the wood floor — is to install and maintain the floor at a temperature between 60°F and 80°F, with the relative humidity measuring from 30 percent to 50 percent.

Another is to install the flooring when it has reached equilibrium with the room environment, which is when the moisture content of the subfloor and that of the new flooring are within 2 percent to 4 percent of each other. This should be checked using a good pin-type moisture meter, and the readings documented in case there are issues with the installation later on.

If the flooring doesn't return to its originally installed condition after seasonal humidity levels return to normal, you can replace the worst planks (rather than the entire floor). After cutting out and removing a plank, you may need to use a router and rasp to clean dried glue off the tongue-and-groove profile of the remaining sections of flooring. Then trim off the underside edge profiles on the ends and one side of the new plank so it can be slipped into position; apply yellow carpenter's glue to all of the edges; install the new plank; and weight the installation for at least three hours, or until the glue has cured.

Check with your flooring manufacturer for its step-by-step instructions for plank replacement.

Q. Best Underlayment Fasteners

When we install vinyl flooring, we like to fasten the underlayment with staples because they install quickly and don't need setting or filling afterwards. But occasionally we've noticed minor squeaking in some of our floors. Assuming that we're using the correct number of fasteners, would we get better results with ring-shank nails?

A. *Peggi Clouston, assistant professor of building materials and wood technology at the University of Massachusetts Amherst and a specialist in engineered wood products, material mechanics, and timber design, responds:* Floor squeaks occur when the shank of a nail or staple rubs against the wood fiber surrounding it. Relative movement between the fastener and the underlayment — which can happen when someone walks across the floor — causes friction; the squeak you hear is the release of stored energy. If you can prevent the relative movement, you can prevent the squeak.

Ring-shank and spiral-shank nails are the best fasteners for this application because they are grooved to increase friction and resist withdrawal. In fact, studies at Clemson University in South Carolina have shown that these nails have as much as twice the holding capacity of smooth-shank nails and staples.

For maximum holding power, the length of the fasteners should be approximately equal to the total thickness of the subflooring and underlayment. This prevents the fasteners from punching holes through the subfloor that can cause the nails to loosen over time. To prevent shrinkage problems, which can also contribute to squeaks, the subfloor should be dry at the time of installation. Interestingly, the nailing pattern — though important for strength — should have no effect on the floor's squeakiness, provided you follow guidelines for proper edge distances, end distances, and nail spacing (**see chart, above**).

For more information on the installation of plywood underlayment for resilient floor coverings, see APA Form No. L335L, available free online from the APA/Engineered Wood Association at www.apawood.org.

APA-Recommended Underlayment Fastener Schedule

Plywood thickness	Fastener size	Fastener spacing (in inches)	
		Edges (3/8 inch from edge)	Intermediate
1/4 inch	3d *	3	6 each way
11/32 inch	3d *	6	8 each way
15/32 inch	3d *	6	8 each way
19/32 inch	4d **	6	12 each way
23/32 inch	4d **	6	12 each way

* 1 1/4-inch-long ring-shank or spiral-shank, min. 12 1/2-gauge shank diameter
** 1 1/2-inch-long ring-shank or spiral-shank, min. 12 1/2-gauge shank diameter

Courtesy APA/Engineered Wood Association

For best results under resilient flooring, sanded-face underlayment-rated plywood panels (or their equivalent) should be staggered at the joints, spaced 1/32 inch apart, and fastened according to the schedule above. Before installing floor covering, fill all seams and holes with quick-setting filler and sand smooth when fully cured.