

In renovations, hard lessons in room acoustics

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When changing from carpet to hard flooring in guestrooms, make sure your renovation and upgrade sounds as good as it looks.

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There is a "boutique-ing tsunami" that is washing over the hotel industry. Everyone wants their hotel to look "fresh," and to current thinking that's driving many interior design changes. From colors to light fixtures to furnishings to flooring, everything is getting a boutique-like makeover.

One of these trends in particular has triggered a wave of concern, frustration and guest complaints: the changing of carpet to hard flooring. Suddenly, everything has become louder. A dropped pill bottle or belt buckle sounds like a gunshot; moving furniture in the room above sounds like water buffalos in heat; high heels can be heard three guestrooms away.

The guest complaints are building.

Why? Fundamentally, it's just the laws of physics. Carpet is quiet; it absorbs a portion of sound striking it, and it helps to isolate the floor below from impact (or footfall) noise. Hard flooring does none of these things.

However, in an effort to be "helpful" (read: sell products), some manufacturers are making rather fantastic claims for magical flooring underlayment that, even though paper thin, claim to solve the noise problems of hard flooring.

Think about it: How convenient would it be if a hard flooring system could be the same thickness as the carpet and padding it is replacing? If only it were so easy. Here 's where physics comes in. The entire system between guestrooms comes into play. The density, thickness, construction and vibro-acoustics response of flooring, the underlayment, the screed, the structural concrete—all of it matters a lot.

If all structures were identical—same concrete mix, same thickness, same construction, etc.—that would make things a lot easier. Unfortunately, there is no one-size-fits-all solution. And, the solution for your renovation might not be simple. Do you have different wings that were built differently? Some planked and some pour-in-place? Some popcorn ceilings and some drywall?

Think about it: What should a guestroom sound like? Maybe like the guest's own bedroom? What do you want your guestrooms to sound like? Peaceful, relaxing, restful, safe, private, secure? Nothing says quality like quiet, yes?

A good working definition for reverberation is: the tendency for sound energy to bounce around in an enclosed space until it is absorbed.

So, not only do hard floors create noise, they reflect noise from other sources such as televisions, telephones, laughter, alarm clocks, etc. Hard surfaces in guestrooms create the equivalent of an echo chamber, allowing the overall level of sound to build upon itself.

When sound strikes a surface, it can be absorbed, reflected or transmitted. Transmitted sound is the opposite of isolation, especially when the sound is the result of impacts on hard floors. The hard floors become part of the structure, and the energy moves through the building structure much more efficiently than through air. The underlayment is supposed to be the barrier to this transmission, but that barrier must be tuned to the rest of the structural elements to be effective.

So, hard floors create noise; they reflect noise; and they transmit noise.

Prevention vs treatment

When do you want to find out if the specific flooring system being recommended by your contractor, architect or supplier will work in your specific property? Before or after installing 200 guestrooms?

What are the consequences of finding out later?

How do you chip out 200 guestrooms of bedded ceramic tile or un-stick engineered wood flooring, so that you can install the proper underlayment and build ramps to the new surface?

Well, fortunately, there are ways to prevent this nightmare scenario.

Consult an acoustician. A real one, not a manufacturer's representative. They will want to inspect and test the existing construction and each typical type of floor. Then using various formulae and software (laws of physics, remember?) and verified manufacturer's lab data, they

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will model the intended new flooring system, working with your architect or contractor to ensure that all of the details are explained and understood.

Then, after all of the above has been done to your satisfaction, build out one or two rooms of each type, and re-test. When all goes well, the results will pass your hopeful expectations and you can roll out the renovation.

Properly engineered flooring systems with proper underlayment can perform every bit as well as carpet. And they can be predicted and modeled before the major renovation work is done.

So, is it worth it? Is the ounce of prevention worth the pound of headaches, complaints and costs associated with fixing the problem after the fact? Sure it is.

Make sure your renovation and upgrade sounds as good as it looks.

Jeff established Electro-Media Design, Ltd., in 1990. For more than 20 years he has overseen production of the hundreds of designs created by Electro-Media's audiovisual engineers. Jeff remains active in the development of new products and design approaches that sometimes converge different technologies to enhance functionality, reduce system complexity and cost, and improve reliability. Through this work, Jeff has distinguished himself as a consultant's Consultant. He serves on technology committees for a number of industry associations and is a frequent guest lecturer at their conferences throughout North America. He has authored numerous articles for trade publications. Prior to EMD, Jeff managed the A/V Systems Design for the Marriott Corporation's Architecture and Construction Division from 1980 to 1990. He completed more than 250 projects for Marriott, including five-star resorts, convention/conference centers, corporate and educational facilities.

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