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CTIOA FIELD REPORT 2001-12-1

SUBJECT: SOUND RATED FLOORS

Discussion:

Probably the most important thing to understand when discussing sound rated floors is that the terminology is incorrect. It really is not the floor system in of itself that is the sole contributor to sound attenuation (reduction). The floor system, the substrate, the ceiling below, the space between the bottom of the floor substrate and the ceiling (known as the plenum) what is installed in the plenum space, and how the ceiling is mounted, all contribute to sound reduction.

It is for this reason that no singular product is considered as sound rated but rather the entire system including all its components. Sound rated horizontal systems are therefore specified by listing all their components as well as critical dimensions that affect their performance. Generally the thinner the related components that makes up the system (such as the floor substrate and the plenum), the more substantial and resilient the membrane separating the tile from same must be.

Two Types of Sound:

There really are not two types of sound but the Industry categorizes sound reduction into two classes.

The first class is known as STC (sound transmission class) which deals with airborne sound waves and these are generally in the higher frequencies.

The second is IIC (impact insulation class) which deals with sound caused by impact and these are generally in the lower frequencies.

Higher frequencies are readily interrupted by mass such as gypsum sheathing or a concrete slab (given they are of suitable thickness.) But impacts have more punch and unless a mass is really substantial reducing it with mass alone becomes impractical. The hardest sound reduction class to meet in horizontal assemblies is IIC. In many instances, the use of a plenum (with sound insulation) and a gypsum board ceiling material (on resilient channel) may not be enough to reduce sound generated by impact to an acceptable level.

An added reduction in impact sound transference is accomplished by introducing a
"buffer" between hard surfaces such as the floor substrate and finished flooring, and therefore impeding the sound/vibration and transference. These "buffers" need to be
fairly "porous" for lack of a better term to prevent the sound transference.

The buffers used, create a challenge to the Tile and Stone Industry as typically, in order to provide a adequate reduction in impact sound transference, they must be resilient. This in turn reduces the support of tiles that are laid over them. Usually then, if a sound attenuation membrane is used in conjunction with Ceramic and Stone tiles, a supporting overlay between the membrane and tile should be used. These consist of mortar beds, backer boards, and pumpable cement, gypsum or cement/gypsum matrices. This of course adds thickness and expense to the system which creates problems with limitations on finish floor elevations and puts them at a competitive disadvantage to finish flooring (such as wood) that may not require, in many cases, the additional support. To date there is no sound attenuation membrane that we know of that can accomplish a reasonable impact sound reduction and adequately support tile in a direct bond application. This has led to, regrettably, less than forthright information from select manufacturer's concerning the performance of their products.

This would include:

- Testing their membrane over an assembly that is so substantial (and therefore impractical) to pass a sound attenuation test.
- Using a tile that has a high breaking strength relative to those most commonly used to pass a concentrated load test.
- Using a thinner (and therefore less resilient version of the membrane) to pass concentrated load and then using a thicker version (therefore more resilient) to pass sound reduction.

I have no doubt that in the near future a group of "new generation" sound attenuation products will be developed that will simplify the current protocol. Until that time, it is recommended that you consider the following when specifying sound rated ceramic and stone tile horizontal systems.

1. Review the system as tested. This includes every component such as subfloor, plenum and ceiling below.

2. Look for suitable floor performance such as a minimum residential rating when tested in accordance with a Robinson Floor Test protocol. Pay particular attention to the breaking strength of tile tested vs. that which you intend to use.

3. Check the configuration and properties of the membrane as tested vs. that, which is to be installed. Do not assume that products that appear similar will produce the same results.

4. Insist on a field test. Usually jobs requiring sound rated floors are of a magnitude where a field-test to insure satisfactory results is well within the budget. This also gives the installer an opportunity to work with the product, the consultant and or manufacturer to insure a smooth and proper methodology during field production.