

## “YOU COULD HEAR A PIN DROP”

by Robert N. Andres, CSP, INCE

“It was so quiet you could hear a pin drop.”

What if you just bought a new condominium and it was so quiet that you could hear the pin drop – but the pin you heard was falling on the floor in the unit above you? It isn't usually that bad, but there are plenty of condos throughout North America where floor/ceiling systems between units are a bit less than perfect. The noise can be even worse if the owners in the condo above decide to replace existing carpet with tile, stone or wood. You may not hear a pin drop, but you might hear just about everything else.

Noise in a building comes from two sources: Airborne sound from one unit (or from outside) that passes through a wall or floor to another unit - and sound generated from impact (no matter how slight) that “excites” the floor above causing it to radiate sound below. The ability of a structure to reduce airborne sound transmission is defined as its Sound Transmission Class (STC). The ability of a floor/ceiling assembly to control “structure borne” noise is defined as the Impact Insulation Coefficient (IIC).

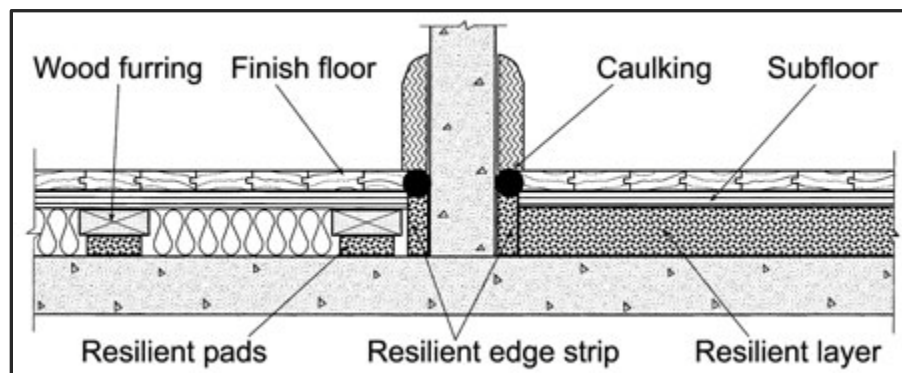
Standards for minimum sound isolation requirements in condominiums, townhouses and other multi-unit residential housing are spelled out in the “Guide to Airborne, Impact and Structure Borne Noise Control in Multifamily Dwellings,” published by the U.S. Department of Housing and Urban Development (HUD) in 1974. This document, TS-24, establishes STC and IIC minimums based upon class of use: Grade I “Luxury Rating,” appropriate for better class or “luxury” settings; Grade II “Average Rating,” appropriate to units in average settings; and Grade III “Minimum Rating,” appropriate for “noisy locations. Nearly 40 years later, it remains the definitive standard for building design and construction to control noise.

Poor sound isolation can be due to several factors: Inadequate design by architects unaware of HUD/FHA TS-24 and inexperienced in designing luxury housing where a higher level of sound isolation is appropriate; shortcuts in construction that compromise material quality and procedures; and construction errors, such as improperly sealed penetrations, lack of insulation, or butting rigid flooring directly against a wall instead of using perimeter isolation and caulking, so that vibration in the floor is transmitted into the wall and below.

The combination of sub-standard underlayments and poor installation is the cause of most multi-unit noise complaints. The international building code establishes only *minimum standards of construction*, which mirror the HUD Grade III minimums. While concrete construction generally meets the STC requirements, any rigid flooring that is installed without a proper underlayment and perimeter isolation will have a problem meeting even the minimum IIC.

Since the party in the condo or apartment below the proposed floor is most affected, the building manager or condo association must play a key role in controlling what is installed on the floor of any unit above grade – and how it is installed. Each entity should assess the construction of their buildings, determine what STC and IIC requirements are appropriate for their price range and resident expectancies. The next step is to develop and enforce rigid specifications for materials, installation and,

importantly, staged inspections, to assure that the residents are protected. It should never be necessary for the owner of a unit below to add a suspended ceiling and insulation in order to achieve an acceptable level of noise from above – nor that the owner of that new ½” thick polished granite floor be forced to cover it with carpeting. Doing it right the first time just makes good sense!



*Illustration showing proper installation of hard flooring in a multi-unit dwelling*

A selection of underlayment and isolation products are available, specific to the type of finished flooring – carpet, ceramic tile, stone, engineered wood/parquet, hardwood, or resilient vinyl/linoleum. Choose only those products with performance claims backed by test results by a recognized third-party laboratory to ASTM E-2179 – and an installer who understands the requirements of a “floating floor” and the difference between a “membrane” and an “isolator.”

*Robert N. Andres is the principal of Environmental and Safety Associates, with offices in Naples and Syracuse, NY. He is an independent noise and safety consultant, and serves as Director of Government and Public Affairs for the Suncoast Chapter of the American Society of Safety Engineers and Technical Advisor to Noise Free America. He is a Certified Safety Professional; Board Certified Forensic Examiner and a member of the Institute for Noise Control Engineering. He may be reached at [esaconsulting@comcast.net](mailto:esaconsulting@comcast.net).*