

Sound Engineering: Controlling Acoustics in Multi-family Construction






Acoustical disturbances in multi-family construction are especially difficult to rectify after the building is completed. The problem is best resolved in the structural design engineering phase, where long-span composite steel deck slabs are a proven solution.

Use the right measure

Sound Transmission Class (STC) and Impact Insulation Class (IIC) standards are often applied to residential projects. Noise Reduction Coefficient (NRC) may also be referenced.

More municipalities now mandate minimum STC and IIC numbers due to repeated complaints in new construction. STC measures a floor's ability to block sound from travelling through it, including voices and audio-visual noise. IIC measures a floor assembly's ability to absorb impact sound, such as footsteps.

The NRC rating for steel decking is not the same as STC or ICC. NRC is a measure of noise absorption from the space below the deck. NRC has traditionally been addressed using secondary ceiling systems, such as acoustical drop ceilings. While secondary ceiling systems can address ambient noise, this often becomes a network of grid systems. Such systems

IIC-STC Rating Scale		
IIC-STC 70		Virtually Sound Proof No complaints of nuisance noise
IIC-STC 60		Superior Sound Proofing Minimal complaints May still hear low frequency nuisance noise
IIC-STC 50		International Building Code Loud speech not audible Impact-vibration noise significantly reduced
IIC-STC 44		Sound Proofing Below Code! Loud speech and impact sound audible
IIC-STC 39		No Sound Proofing! Loud speech and impact noise clearly audible

For multi-story residential construction, the International Building Code calls for an IIC-STC rating of 50. Thin-slab composite floors can be engineered to exceed this baseline.

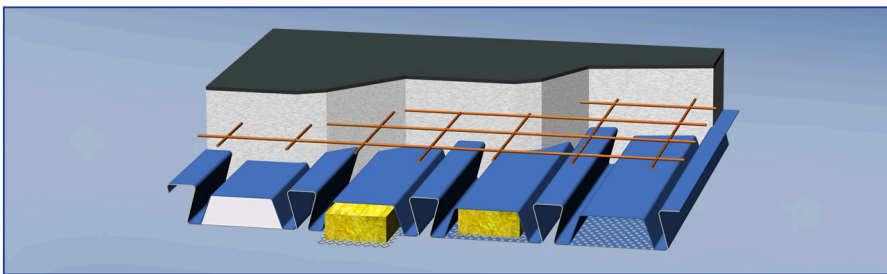
need to be laterally braced in seismic conditions. And they typically involve acoustical drop ceiling tiles, an approach that adds material, cost, and an all-too-common ceiling aesthetic.

Consider "thin slab" advantages

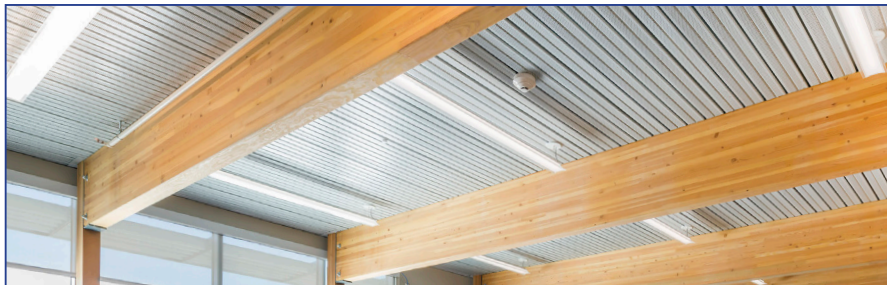
A proven alternative is an acoustical composite steel deck slab, which elegantly addresses the interrelated

design objectives of structure, acoustics, aesthetics and related total cost. The use of this system will readily answer STC and IIC requirements. This approach can also surpass the acoustic class requirements now established by the Federal Housing Authority (FHA) for multi-story building design and construction, requirements that are based on STC ratings.

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Noise reflection and impact absorption can substantially be addressed during the structural design stage, by specifying a long-span composite steel deck slab. The “thin slab” approach offers a range of profile depths and density options.

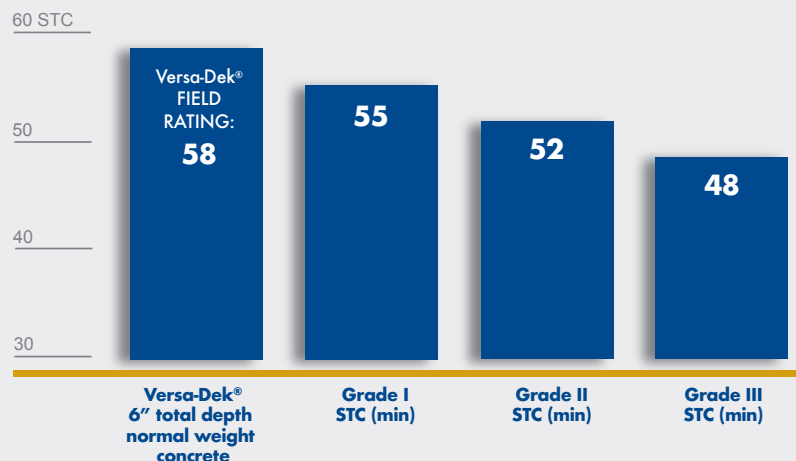


Acoustical long-span composite steel decking is a proven method for noise control in multi-story residential structures. An added advantage is the space-saving avoidance of intermediate columns from the interior design.

A long-span composite floor system comprises three elements: long-span metal deck, steel reinforcement, and a concrete slab. The basis for these longer spans initially lies within the long-span deck profiles, either a dovetail composite deck or a deep ribbed composite deck. The profile heights of dovetail composite deck are most commonly 2 inches and 3.5 inches, and the profile heights of deep ribbed composite deck are 4.5, 6, and 7.5 inches. A 3.5-inch dovetail composite deck can potentially reach a clear span of up to 28 feet and a 7.5-inch deep ribbed composite deck can potentially reach up to a 36-foot clear floor span. For reference, standard composite floor deck (CFD) comes in three common profile heights of 1.5, 2, and 3.5 inch and the maximum clear span is typically 14 feet.

ACOUSTIC CLASSES

Versa-Dek® S and XLS exceed all FHA STC grade requirements with a field rating of 58.



The Federal Housing Authority (FHA) has established acoustic class requirements for multi-story building design and construction based on STC ratings. New Millennium’s Versa-Dek® long-span composite acoustical deck surpasses this requirement, providing a space-saving 6-inch total floor depth with an STC field rating of 58.



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