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There goes the neighborhood: Acoustical considerations for mixed-used developments - by Thomas McGraw

November 06, 2015 - Owners Developers & Managers



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For millennia, people have developed and settled in mixed-use patterns. However, industrialization led many countries to introduce governmental zoning regulations to separate different functions, such as manufacturing from residential areas, due in large part to concerns about pollution,

including excessive noise. During the last two decades in the United States, mixed-use zoning has once again become desirable for a variety of reasons, but concerns about noise remain. Whether a mixed-use development comprises a building, a complex of buildings, or a district of a city, noise is often one of the most common sources of complaints. Fortunately, these problems can often be addressed, but they almost always require careful planning and detailing.

At the urban scale, noise complaints are most common at the property line between different zoning types, such as commercial or industrial impacts upon residences. One might assume that the solution is the simple passing and enforcement of local noise ordinances, but unfortunately the situation is not always so clear. For example, what should be done if commercial spaces are designed before the adjacent properties are developed for residential use, and it is only later that neighboring residences are constructed? Even more challenging, what should be done when industrial properties are designed to comply with the noise limits for existing industrial neighbors, but then later the neighboring properties are converted to residences?

At the architectural scale, noise complaints are most common between different uses within a given building, such as residences located above ground-floor commercial space. When mixed-use buildings include office space, the offices can serve as a useful buffer between loud commercial tenants and quiet residences. However, without this buffer, the adjacencies can be more difficult to resolve. For example, to mitigate structure-borne vibration from fitness facilities and aerobics studios, these spaces are best located on grade, but what should be done in mixed-use buildings with underground parking levels? At the top of mixed-use buildings, rooftop bars have recently become very popular, but they are located immediately above the premium penthouse residences; will it be affordable for the developer to upgrade the roof/ceiling assembly sufficiently to avoid complaints from top-floor residents? Ground floor commercial space is often leased to busy restaurants and active retail clothing stores with loud sound systems, but how should base-building shells be designed when future commercial tenants have not yet been selected? Emergency generators are notoriously loud and expensive to attenuate, and therefore they are most suitable for underground parking levels, but what are the next-best options given the lessons learned from the flooding during Hurricane Katrina?

Within mixed-use buildings, acoustical challenges remain between residential units as well. Empirical evidence clearly shows that most tenants are not satisfied with demising constructions that merely meet the building code's minimum requirements for sound transmission class (STC) and impact insulation class (IIC). Therefore, what is a more appropriate range of STC and IIC values for designers and developers to aim for in various types of residential units? Perhaps more importantly, what are the limitations of these metrics, and where should designers and developers think beyond single number acoustical ratings.

At ABX session A04 on Tuesday, November 17 at 8:00 a.m., Acentech's acoustics consultant Thomas McGraw will present a series of case studies highlighting typical acoustical challenges and possible solution options for mixed-use projects. Please join us for a robust discussion.

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