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Noise pollution is a real issue: Sustainable acoustics for better buildings - by Kristen Murphy

October 04, 2019 - Green Buildings

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Just because we can't see airborne pollutants like particulate matter, radon, VOCs (and so on) in the spaces we inhabit doesn't mean that we can ignore them. The same is true for sound. Noise pollution is a real and well-researched issue that affects both human and wildlife. Studies show that poor sound quality is bad for our health: It increases our stress levels (which can cause hypertension and cardiovascular problems); it disturbs sleep; it limits concentration at work and school; and can even increase the recovery time of patients at the hospital.

The interior sound level and quality in our buildings is very dependent on a number of design decisions. Almost any aspect of a building's design can carry noise implications, such as the building site; proper space planning; the construction type of the walls, floors and roof; the envelope and fenestration; the air delivery system; different rooms' volumes and finishes. It is a lot to think about, but thankfully, there are many resources and professionals that can help make sound decisions.

Some of the biggest building sustainability and health and wellness rating systems have specific acoustic criteria that green building professionals can look to in order to create the very best spaces for their occupants. This includes LEED, WELL and Fitwel. In fact, acoustics is so important in some of these rating systems that they have become requirements. For example, you cannot have a LEED for Schools project or WELL-certified project without giving consideration to a building's acoustic design.

Although good acoustic design is most clearly linked with occupant health and wellness, there are many ways in which acoustically-driven choices can work in harmony with other sustainable strategies. Having a tightly-sealed and insulated building envelope is great at keeping out air infiltration as well as unwanted noise. For the HVAC system, using passive strategies to reduce the heating and cooling load followed by properly-sized mechanical equipment with variable speed drives is not only great for energy reduction, but also helps reduce the amount of noise from the

fans throughout the ductwork.

Perhaps one of the largest impacts on building design from acoustic-driven needs is in material selection. Luckily, there are many options available that are not only effective acoustically, but also environmentally responsible in their material composition and production, and healthy for occupants. For example, the acoustically-absorptive materials that are necessary to control noise buildup can consist of recycled content, rapidly renewable sources, and certified wood. There are also acoustic products with third-party validation such as Health Product Declarations, Environmental Product Declarations, GREENGUARD certification, Declare Labels, and Cradle-to-Cradle certification.

Unfortunately, not all sustainable and healthy building strategies go naturally hand-in-hand with effective acoustic strategies. For instance, locating your site in an urban area is great for access to public transportation and many other health and social benefits, but denser areas are generally louder and therefore require careful envelope design to keep out excess noise. Providing on-site fitness spaces in work and living spaces is a great way to encourage occupants to move more, but the loud and sometimes high-impact activities can transmit throughout the building if not properly controlled. Daylighting is so important for many things – exposure to nature, improved circadian rhythm, electric lighting demand – but glass is often acoustically “weaker” performing than other, more massive elements, especially if they are operable! The good news is that it is possible to incorporate all of the above options into your building and have good acoustics. As long as the building team (including the owner, designers, and engineers) has an awareness of some of these challenges and get input from a qualified professional (the earlier, the better!), the easier it will be to blend a building’s acoustic needs along with all of the others.

In closing, providing our buildings with proper acoustics is an important aspect to how these spaces are received. If not carefully considered, poor acoustics can even negatively affect our health and aptitude! Because the needs of acoustic design are interconnected with many other aspects of building design, make sure you have the guidance of a reputable source.

Good acoustics work well with many other aspects of responsible design, so let’s dedicate ourselves toward making buildings that sound, look, perform, and DO great!

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