

Green Acoustics for Interior Construction: The Challenges and Benefits of Modular Walls

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For many years, walls made from studs and drywall have been used to divide space, provide visual and acoustical privacy, and contain power and communications for access to technology. With the emergence of sustainable design, building professionals are looking at new ways to improve the performance and flexibility of fixed wall construction while maintaining its benefits. To improve their bottom line and remain nimble for changing workplace configurations, many companies are finding modular wall solutions, such as moveable and demountable walls, as a high-performance alternative to fixed interior wall construction.

Benefits of Modular Walls

While first costs for moveable walls are comparable to traditional construction, their long-term benefit is realized in terms of organizational adaptability. As truly sustainable products, modular wall systems allow facility managers the ability to significantly change and reconfigure the layout of spaces without the cost, demolition waste and downtime associated with traditional stud and drywall construction.

For companies facing rapid growth cycles or with a strong culture of collaboration, modular walls can provide many benefits over an open office plan. Demountable partitions offer greater acoustical separation than open workstations, and the proper choice of height and materials can mitigate most sound transmission concerns. Many systems offer the ability to detail and customize the interior solution in a way that bridges the gap between architecture and office furniture.

One option is to integrate office furniture that consists of solid barriers at lower elevations, with transparent materials, such as glass or Plexiglas, at higher elevations. A combination of these two approaches can create visual openness in the work environment along with reduced sound transmission as a result of the increased barrier height.

The Myth: Modular Wall Systems = Insufficient Acoustic Performance

There is a common misconception that demountable and moveable walls do not provide the same acoustical separation and performance as closed offices and divided rooms. If teams utilize appropriate design, correct background sound, and insure proper installation, this misconception can be easily corrected.

Acoustical privacy results from the successful balance of four factors:

- 1) The loudness of the noise source (such as the office neighbor who shouts into the speakerphone, or the animated discussion in an adjacent conference room);
- 2) The ability of the demising constructions (walls, windows, doors, etc.) to reduce the noise (noted in their Sound Transmission Class, or STC, rating);
- 3) The background sound level where the listener is (a pleasant background sound covers intruding noise better than a space that is "pin-drop" quiet); and
- 4) The sensitivity of the listener (some people can tolerate an aircraft flying overhead, while others are bothered by the sound of potato chips being eaten).

In most cases, designers have little control over the first (the shouting speakerphone employee) and fourth factors (the "librarian sensitive" listener), so it is important to focus on the middle two factors. Using "blocking" and "covering up" techniques in the design will help mitigate acoustical privacy concerns normally associated with modular wall construction.

The first acoustical design strategy - block - means increasing the acoustical effectiveness of the barrier between neighboring spaces. In traditional wall construction, materials form a continuous barrier that runs from the floor to the ceiling. With floor-to-ceiling modular wall constructions, it remains important to use panels that effectively block sound (STC 40-45) and seal well to each other for reducing sound transmission that might otherwise pass between the panels. It is important to use installation contractors who understand how these seals work and implement them properly during the installation. Together with glass or Plexiglas, these constructions have the benefit of blocking sound transmission and distributing daylighting.

Introducing a pleasant and innocuous background is a good instance of the other design strategy - cover-up. Examples include sound-masking systems or speech-privacy systems, which can provide an unobtrusive background noise that covers up the offending noise. Newer privacy systems can be installed through a ceiling tile by facility personnel, instead of an electrical contractor. When modular walls are used with a system that provides elevated levels of background sound, the acoustical privacy provided by modular wall products can be comparable to traditional basic stud wall construction (STC 40-45).

It is important to remember that current sustainability rating systems such as LEED® do not specifically define an acoustical credit in their checklists. However, sustainable products and building systems can work synergistically to produce acoustical benefits and contribute to a LEED Innovation Design credit.

When to Use Modular Wall Systems

Not every project is the right setting for modular wall systems. Highly complex technical environments, which might require more stringent sound and air control, are a case in point. However, many industries that traditionally opt for hard interior construction may be surprised by the benefits and applicability of modular wall systems.

In the case of Shire Pharmaceuticals, the company constructed a traditional new office space in its laboratory facility in 2007. When major changes were required as the project neared completion, necessitating significant demolition and new mechanical and electrical systems, facility managers began looking at ways to provide organizational changes without the same impact on operations.

Shire did three things that serve as a blueprint for others: they studied the probable design scenarios that might occur in the future, looked at the impact on the delivery of utilities and where fixed elements must be located, and worked collaboratively with the wall panel manufacturer to customize the product choices and installation details within the traditional construction process. As a result, the modular wall product was then tailored to provide the most efficient utility delivery system and maximize future flexibility. Shire is currently constructing a new combination office and laboratory building that includes significant moveable walls based on the successful experience gained from past projects.

Conclusion

Combining modular wall systems with an integrated approach of sound absorbing finishes, proper installation, and background sound masking in ceiling and flooring products can result in a highly performing, adaptable environment that meets or exceeds traditional wall construction. The goal is a holistically designed building insuring that all systems are working together to produce high performance exterior and interior environments. Through this integrated design process, the modular wall systems can maximize acoustical performance with exceptional sustainability.

About the authors

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