The Benefits of Building With Wood

Wood-Based Biophilic Design and Emerging Economic Opportunities In the Built Environment
Mass Timber: Better, Faster, Cheaper

Timber-based construction projects are not always considered representative of the industry’s cutting edge. In fact, a common misconception is that building with wood can often introduce challenges for certain project types, including higher material budget costs or limitations on building height.

In reality, these views represent outdated misperceptions, thanks to the development of mass timber technology. As mass timber continues to mature and grow as a mainstream structural material, awareness of the many benefits of building with wood grows as well, along with successful project case studies.

Wooden materials are renewable, they sequester carbon, and are five times lighter in weight than concrete. Projects using mass timber panel systems are completed faster and more efficiently, contributing to cost savings overall. Timber erection at Brock Commons Tallwood House, an 18-story student residence at the University of British Columbia, was completed in two and a half months—four months faster than a comparable project of pure concrete and steel.

Moving beyond near-term project schedules and costs, the benefits of building with wood to long-term asset ownership and occupancy are even greater. Buildings that utilize wood to satisfy biophilia, the innate tendency humans have to seek out and associate with nature, offer benefits that can improve a building’s long-term ROI. Further, exposure to wood is linked to many positive benefits for commercial and residential inhabitants. Savvy investors and owners are beginning to harness these benefits to develop spaces that create more value for their businesses, residents, and communities.

Mass Timber savings vs. Conventional Construction Methods

20% Schedule Savings

4% Cost Savings

Source: Solid Timber Construction Report
Wood-Based Biophilia

Biophilia, translating to "love of life", was first defined by Edward O. Wilson as “the urge to affiliate with other forms of life.” A growing body of research is deepening our understanding of biophilia and linking natural environments to improved physiological and psychological conditions in humans. For example, a 2010 study found that parasympathetic activity (innate relaxation) increased by 56% and sympathetic activity (innate stress) decreased by 19.4% when subjects spent time walking through a forest.2

- Incorporating natural elements into the built environment, where people spend most of their time, contributes to human wellbeing, with applications for a number of real estate markets. Children with access to nature exhibit lower levels of stress than those without; children in daylit classrooms have test scores 7-18% higher while children without daylight saw test scores drop by 17%.4

- Office employees with views of nature took sick leave an average of 11 hours less per year than those with no views, with view quality serving as the primary predictor of absenteeism.5 Similarly, a call center found that employees with views of vegetation handled calls 6-7% faster than those without a view.6

- Average stays for hospital patients with bipolar disorder and depression were 2.6 days more for patients in rooms without sunlight.7

- In retail environments, shoppers demonstrated a willingness to pay 25% more when shopping in stores that featured green vegetation,8 and a chain of stores “experienced a 40% increase in gross sales after the installation of skylights” across geographies.9
In total, hundreds of studies corroborate that natural elements like sunlight, views, vegetation, air quality, and use of natural materials have substantial impact on our wellbeing.

Similarly, exposure to wood in indoor environments invokes positive biophilic responses. Many people feel innately better in an interior wood environment, associating wood with nature, warmth, and health\textsuperscript{10}, and maintain a preference for wood versus other materials\textsuperscript{11}. Preliminary research shows wood surfaces reduce activation of the sympathetic nervous system\textsuperscript{12}, helping to calm the body before the onset of stress.

Architect Michael Green put it more eloquently when he described the way wood affected people in his buildings, “They react completely differently. I’ve never seen anybody walk into one of my buildings and hug a steel or concrete column. But I’ve actually seen that happen in a wood building. Just like snowflakes, no pieces of wood can ever be the same anywhere on earth. I’d like to think that wood gives mother nature finger prints in our buildings.”\textsuperscript{13}

A study of classrooms found that exposure to wood can have long-term effects as well\textsuperscript{14}. Over the school year, students in solid wood classrooms experienced a decrease in heart rate and perceived stress, while students in linoleum and plasterboard classrooms experienced an increase in heart rate and no reduction in perceived stress.
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These long-term residual benefits to occupants translate into an opportunity for many sectors to leverage wood-based design into the built environment as a tool to operate more efficiently and improve profits. Detailed below are many potential applications unique to different market sectors, but there are several high-level implications that span numerous market sectors:

**Increased Density:** People are more relaxed in wood environments, suggesting that similar or increased levels of comfort can be achieved in smaller spaces. Builders can attain smaller units in residential and hospitality settings, closer work stations in office environments, and smaller space requirements for retailers, resulting in higher net rentable square feet and ROI overall.

**Increased Design Longevity:** Visible wear and aging can be seen as a positive factor in wood materials. The implications for building owners are reduced long-term CapEx and OpEx expenditures stemming from fewer renovations, upgrades, redesigns, and adaptive reuse.

**Increased Market Demand:** As general awareness grows about the inherent benefits of biophilic design for wellness and productivity, demand for spaces finished with wood materials continues to grow. A mounting body of evidence shows that savvy businesses, residents, and institutions are seeking out wood-based design for their projects and, in many cases, willing to invest more for the additional benefits.
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As the effects of biophilia become more well known, innovative employers are incorporating biophilic design into office environments. Google Chicago Headquarters was specifically designed to create a sustainable and healthy environment for employees and features natural wooden surfaces throughout. The T3 building in Minneapolis is among the first of its kind and utilizes a pure mass timber superstructure. The superstructure was completed in just nine and a half weeks, and many timber elements including ceilings and structural beams are left exposed for occupants in the finished building.

Wood-based design presents a variety of opportunities for employers to impact operational efficiency. The desirable aesthetic of exposed wood can help companies attract and maintain top talent. The Human Spaces global study of 7,600 workers across 16 countries found that 33% of subjects state office design is important to their decision to work for a company or not.

The same study found that “employees who work in environments with natural elements report a 15% higher level of well-being, are 6% more productive and 15% more creative overall.” Another study of 700 participants found that happiness makes people, on average, 12% more productive. Improvements in productivity can translate directly into profitability gains. When calculated, “A typical company of 1000 employees, with an average compensation cost per employee of $33.24 per hour, could increase its profits by $3.9 million annually just by increasing its productivity margin as little as 6%.”

All of these features translate into benefits that owners can use to market to commercial lessees and tenants. In fact, the benefits of mass timber commercial offices often translate directly into higher premiums and ROI for building owners. When Killian Pacific built the Clay Creative building in Portland, the interior aesthetic of exposed glulam beams and timber ceilings garnered leases of $7 more per square foot than a comparable structure nearby.

Commercial Offices

Retail

Brick and mortar stores must increasingly rely on in-store experiences to attract customers and drive sales. As stores evolve to focus on people over products, store environment plays an important role in a retailer’s brand and profitability.

Retail environments designed to adhere to biophilic
principles have been proven to positively impact shopping behavior across multiple spectrums, including duration of stay, propensity to return, and price point. Wood-based environments contribute to increased happiness and decreased stress in humans, suggesting they may have similar positive effects on shoppers. Many companies are already using wood intuitively. In a 2016 profile of intentionally-designed biophilic retail stores, every store featured incorporated exposed wood elements.

In-store environments are usually designed with customers in mind, yet the benefits of wood-based design also apply to store employees and customer-employee interaction. When employees are happy and relaxed, they are more likely to provide exceptional customer service, resulting in happy customers and more profitable stores.

One study of 2,291 U.S. adults found that 89% of consumers who had a poor customer experience began doing business with a competitor afterwards and 86% of consumers are willing to pay up to 25% more for better customer experience. Employees staffing retail stores can make or break a customer’s experience, creating a competitive advantage and additional source of support for revenue generation. In fact, a positive interaction with a staff member can boost a customer’s satisfaction by 33%.

Hospitality
Hotels and businesses in the hospitality sector can experience similar benefits from wood-based design. Hospitality is an industry predicated on customer service. Happier, healthier workers influence speed and quality of service provided to guests. Happier guests can translate to longer stays and customer loyalty when traveling.
Wood-based structures also have the ability to mitigate the impact of other guests in a shared environment. Hospitality investors and developers should consider the acoustic properties of wood in their design and its ability to diffuse ambient noise.

In an interview with Architect Magazine, Lendlease program manager Jeff Morrow boasted that a new hotel constructed entirely of cross-laminated timber was so silent “you won’t hear your neighbors. You won’t hear people walking overhead.” The Candlewood Suites on Redstone Arsenal was constructed in ten weeks with an 11-person crew, a time savings of 37% and crew size of 40%.

Residential

Nowhere are the benefits of wood-based design more obvious and applicable than in residential spaces. Wood is seen as a premium material; home buyers and renters, whether first-time or experienced, know that hard wood floors equal a higher property value.

However, the material cost of installing real wood floors is not often feasible for multifamily, senior, or student residences. A tour of the top luxury apartments in most cities reveals a propensity of wood laminate flooring to imitate the real thing, while projects catering to other cost-conscious demographics frequently utilize some form of carpet or laminate. These materials, while functional, don’t invoke the same biophilic responses from people who encounter them, and they don’t provide the same unique and desirable aesthetic.

Projects that utilize mass timber structures offer an opportunity for developers and owners to cost-effectively provide residents with exposed wood features. Mass timber enables developers to offer premium, healthy, and sustainable dwellings while maintaining or increasing profitability.

Conclusion

Mass timber projects utilizing wood as the structural building core have demonstrated significant advantages in construction speed and reduced costs over steel and concrete structures, as well as inarguable benefits to the environment.

Further, the biophilic benefits of wood-based design make these projects financially compelling as long-term strategic asset investments, enabling both owners and tenants to boost profitability while offering an improved occupant experience.
References


Thank you.