LICENSED ARCHITECT

Association of Licensed Architects

A Publication of the Association of Licensed Architects

Fall 2021

Outlook 2022: Beyond the Pandemic

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PRESIDENT'S message

As another year draws to a close, most of you will be preparing for this festive season. This is a special time of the year, as it gives people a break from the hustle and bustle of our everyday working schedules. It provides many of us with some time to enjoy the company of family and friends that is all too often missing for the rest of the year.

We held the annual architecture conference in November over three afternoons. Marlon Blackwell headlined the program with a fantastic keynote address. All our speakers were outstanding and spoke on a variety of useful topics. Check out the conference tab on alatoday.org for 2021 and 2020 presentation videos.

The Design Awards judging was held on November 5, and we have 31 winning projects. This year, we've seen some impressive creativity, technical skill and innovation from architects. There will be an in-person celebration and Presidential Award presentation at Wingspread in Racine, Wisconsin in February.

We just held our annual meeting and despite the uncertainties of the past two years, we're optimistic about the future of architecture. Experts predict that construction is trending up for this year and next, particularly in the nonresidential sector. Long term, we're expecting materials and labor shortages to abate.

In January we kick off the year with our holiday social on January 13 and a conversational webinar, "Strategies for Success," on January 20. There are many important offerings coming in 2022: More continuing education opportunities, a brand-new industry newsletter, NCARB involvement and a member survey to share your thoughts.

Please renew your membership by December 31. We count on your support. Until next time, best wishes to all of you for a healthy and happy holiday season.

LICENSED ARCHITECT

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Architectural Outlook for 2022

Beyond the Pandemic: The Upswing of Architecture

BY: KAREN ANDREWS, SENIOR RELATIONSHIP MANAGER, PROFESSIONAL SERVICES GROUP, FIFTH THIRD COMMERCIAL BANK

After a challenging 2020, the architecture industry is enjoying a resurgence of business, with some firms challenged to find enough architects for the rising workload.

At the beginning of 2021, it was hard to find an optimistic outlook for the U.S. architecture industry. The AIA Consensus Construction Forecast Panel predicted a 5.7 percent decline in nonresidential construction spending, while research firm IBISWorld warned of a tough future for an industry where low single digit annualized revenue growth rates would be likely in the coming years.

But that was before the Biden Administration added another $1.9 trillion of fiscal stimulus into the economy and rolled out Covid-19 vaccinations nationwide. The combination propelled the U.S. economy to an annualized 6.5 percent GDP growth rate in the second quarter, as consumers spent stimulus checks and savings from what they didn't spend last year on services like consumer goods, entertainment and travel.

By June, the AIA Consensus Construction Forecast Panel had significantly upgraded its outlook for non-residential construction — the lifeblood for architectural firms, accounting for about 75 percent of the industry's revenue. The Panel still expects nonresidential building construction to decline 3.9 percent this year — significantly better than the 5.7 percent drop they forecast in January — and to turn positive in 2022 with a 4.6 percent increase in spending.

Business has flourished with the AIA's Architecture Billings Index (ABI) reaching a score of 55.6 in August — any score over 50 indicates billings growth.

The outlook for industry revenue growth is also looking up. Research firm IBISWorld is now anticipating a 2021 annualized 7.3 percent revenue growth rate for the U.S. architecture industry, compared with the 4.3 percent projected at the beginning of the year. It's not the double-digit growth rates other industries may achieve as the economy booms, but for a mature industry having endured a 19.1 percent decline in annualized

revenue growth in 2020, architects are optimistic.

Too Much of a Good Thing?

A strong economy isn't without its issues. From August 2020 to August 2021 the Consumer Price Index for all urban consumers (CPI-U) increased by 5.3 percent leaving architects to feel the impact of inflation and higher prices. By June, strong housing starts had slipped from March's peak, and residential construction demand started to buckle under the weight of rising timber prices.

The strength of the U.S. economic recovery has also exacerbated the labor shortage. By mid-summer, roughly six out of 10 architectural firms and 80 percent of large firms with annual billings of $5 million or more were reporting difficulties finding architects and other staff to meet rising demand.

The Art of Architecture

Nonetheless, the art of building design is once again on full display across cities, especially in Chicago, with fresh hotel and condo skyscrapers adding striking new facades on the U.S.'s most iconic city skylines.

Chicago will see several once-in-a-generation hospitality and residential buildings debuting this summer. Most notably, the 101-story St. Regis Chicago, designed by Windy City native Jeanne Gang of Studio Gang, just opened after nearly seven years on the drafting table.

Alessandro Munge of the Toronto-based Studio Munge has transformed the Carbide & Carbon Building — a 1929, Burnham Brothers designed Art Deco masterpiece, located at by 230 N. Michigan Avenue — into the 364-room Pendry hotel.

On the residential front, the late architect Helmut Jahn's last Chicago project — the 805-foot-tall, 738-unit rental tower dubbed "1000M" after its 1000 S. Michigan Avenue address — has resumed construction following a pandemic-induced work stop.

At the same time, zoning paperwork reveals that developer Jeff Shapack is proposing a new 26-story, 316-unit residential high-rise at 1353 W. Fulton Market Street as more than 1,000 units of housing were recently approved by the City Council for the Fulton Market neighborhood.

Restaurants

But it's not all about massive new towers in Chicago. Hundreds of smaller projects, such as new restaurants and retail spaces, which can be lucrative for architectural firms, are showing off brand new looks. Chef Noah Sandoval used his time during the pandemic shutdown to tap architects for a renovation that has tripled the size of Oriole, his Michelin-starred restaurant in the West Loop.

The outlook for industry revenue growth is looking up!

The Future Looks Bright

While those traditional design sectors continue to heat up, the future of architecture in Chicago will likely be driven by economic growth in sectors like life sciences, distribution, and manufacturing, says Michael Fassnacht, the CEO of World Business Chicago.

"I'm very, very bullish that Chicago will become one of the top leaders in life sciences in the world," he said in a public statement. "We think a huge opportunity [exists] in connecting all the real estate developers' start-ups with life science and health care, to make sure we have enough lab space."

Despite the economic challenges of 2020, the outlook for Architecture is promising for the remainder of 2021 and beyond into 2022.

LYONS DESIGN

Adam Lyons, LEED AP, NCARB, AIA, ALA

Founded in 2001, **The Lyons Design Group** is a custom luxury residential, retail, and commercial architectural firm located near Chicago's Northshore. Adam Lyons, principal Architect, heads the primary design functions, project management and production tasks of the practice. He and his talented team have projects spread across at least 14 states.

Along with specializations such as timber frame and post-frame design, the firm is known for its innovative ways in finding solutions and getting results for beautiful design, space, and functionality.

Pool House, Green Oaks, IL

Complementing the home and outdoor pool, this structure uses a unique hammer beam design, stone and timber selections. With the fireplace as a central feature, dark greens and vibrant plantings in the background, the primary materials and building forms are enhanced. Within a relatively small footprint, Lyons Design incorporates free-flowing circulation, an outdoor spa, kitchen, shower and changing rooms.

Mountain Retreat, Iron River, MI

Located on the upper MI shores of Sunset Lake, unique spaces and natural materials create this family's 'mountain-themed' home on a sloping terrain. A hybrid integration of timber and frame, stone and brick selectively applied both outside and in, the home offers varied experiences from room to room, all harmoniously connected to contribute to its comfort and personality.

Family Estate, Lake Forest, IL

Lyons Design demonstrates its abilities to adapt its designs to 'fit' the clients' personalities. Positioned on the property with 'tight' building limitations and easements, and manor-type French Provincial home, located on the beautiful Lake Michigan's shore, creates 3 full levels of design with an abundance of elegance and flair.

Iguana Wana Mexican Grille, Pleasant Prairie, WI

Lyons Design worked with the Contractor and owner to rehabilitate a former office building into a full-functioning restaurant and expansion for outdoor dining. The exposed structures, HVAC integrations, complementary lighting and a fun, vibrant, "cantina-style" theme and color palette, all contribute to a lively dining experience.

DII ARCHITECTURE

www.diiArchitecture.com

Jereme Smith

DII is a design/build architecture firm specializing in custom residential and commercial architecture; plus high-end remodels/renovations. They aim to creatively solve functional needs, while instilling graceful solutions for any project; small to large. DII strives for a honed, mature and warm modern feel. They pride themselves on high customer care and personal relationships, and try to let the projects speak for themselves.

Usually, a sense of highly crafted work emerges, which stems from a smaller scale materials and furniture background. Given the luxury of time, they relish the opportunity to experiment with as many design ideas as possible; ultimately to reach the best solution. DII believes that after rigorous due diligence via their design & build phases, the final product will be inventive, highly functional, and hopefully inspire.

PHOTOGRAPHY: MELLISSA SCHWOERER

Engrained Restaurant & Brewery, Springfield, IL

This nearly 9000 square foot project is comprised of a restaurant, bar, and brewery. It uses many eco materials including acid-etched concrete floors, recycled resin panels, and reclaimed barn wood. The name Engrained is the concept for the design and owners' philosophy that materials used in the building, systems, ingredients, etc. should all be thought of as a cohesive and natural whole.

Cascade, Arlington Heights, IL

A kitchen remodel led to the displacement of the existing staircase, which took on a dog-leg form. This fluid motion slides past the corner utilities. To avoid a column, a 20' lvl was inserted. A strong, yet light steel spine supports the stair. LED tread lights give a sense of floating. Natural light from front windows pours into the basement.

PHOTOGRAPHY: BLACK OLIVE PHOTOGRAPHIC

'Luxe Lobbies', Northbrook, IL

A large condo complex needed a complete overhaul of their two lobbies. The final design used fiber cement slats and high end porcelain tile. Subtle led lighting is seen in multiple spots throughout. A continuous curved wall-to-ceiling junction makes the space feel tall but comfortable. The entire end wall mirror doubles the room spatially.

PHOTOGRAPHY: BLACK OLIVE PHOTOGRAPHIC

'Wilke House', Arlington Heights, IL

A 1940s home with Cape Cod attic needed a new 2nd floor and 1st floor overhaul. The outcome was a new house from the foundation up. A 2nd floor was added, leaving a double-height space above the dining area. Light floods into both floors. A fresh take on the farmhouse is seen inside with white/black tones and warm woods; and outside, a reference to metal cladding.

PHOTOGRAPHY: PHILIP HEGEL PHOTOGRAPHY

Smith Kitchen, Prospect Heights, IL

Through the use of light and volume, a restructured vaulted ceiling accompanied by skylights, windows and a new sliding door, created a new, interconnected and light filled kitchen/dining area. The resulting space feels like a back-lit geode; interior architecture carved out of the ranch volume.

PHOTOGRAPHY: BLACK OLIVE PHOTOGRAPHIC

'Prospect Court', Prospect Heights, IL

The material palette is light and uplifting, counter balanced by walnut stained hardwood and reclaimed barnwood highlights. A stacked quartz see-through fireplace is a feature hub that all the spaces can enjoy. This family now has a new day-to-day living space as the central area of their home.

Changing Facilities for Adults

BY: KIMBERLY PAARLBERG, RA, SENIOR STAFF ARCHITECT AT THE INTERNATIONAL CODE COUNCIL

The International Codes continues to address new information, technologies or needs through its code change process. Code change E142-21 was approved as modified for the 2024 International Building Code (IBC) to require adult changing stations in the following locations:

- Assembly and mercantile occupancies that require an aggregate of 6 or more male and female water closets (e.g. multi-plex movie theaters, sports stadiums, airports, malls)
- Group B providing educational facilities that require an aggregate of 12 or more male and female water closets (e.g. college assembly hall and classroom buildings)
- Group E occupancies at assembly rooms that require an aggregate of 6 or more male and female water closets (e.g. high school basket ball gymnasium where the number of occupants in the seating would require 6 or more water closets – not the school itself)
- Highway rest stops and service plazas (e.g. the rest stops provided directly on the major highway – not the rest stops at exits)

The first item in the list might sound familiar, as this is where a family/assisted use toilet room is also required. The intent is to provide adult changing facilities in the same room as family/assisted use toilet rooms – but not to require an additional toilet room. There is the same requirement to not require travel through a security checkpoint. In the past this was mainly for airports, but it could apply to other facilities that had certain areas with limited admittance, like a suites floor in a sporting venue. For those large facilities, the travel distance allowances to the adult changing facility of 2 stories and 2000 feet was intended to require an adult changing facility in every other family/assisted use toilet room. The International Plumbing Code (IPC) allows for 500 feet of travel to separate sex toilet rooms, and then the IBC allows for another 500 feet and 1 story to get to the family/assisted use toilet rooms from the separate sex toilet rooms.

The reasons given for this requirement were to address the needs of families with adult severely disabled children or elderly persons who are unable to use a toilet or may need to use catheters

or adult diapers. An adult changing station contains a changing table large enough to accommodate an adult-sized person that is located in a toilet room with a lavatory, water closet and trash disposal. Without such facilities, severely disabled people could suffer from isolation because they and their caregivers must return home to be changed. This lack of access has a profound impact not

only on the person needing assistance, but on their caregivers who are often their immediate family members. Normal activities outside the home such as shopping, entertainment, and travel would otherwise be limited because of a lack of safe and sanitary places to change. These facilities will afford people with significant disabilities a measure of human dignity and protect their right to privacy.

The ICC A117 committee established a task group to develop requirements for adult changing stations. This group met every two weeks from August of 2020 to March of 2021 looking at proposed rules from multiple states. This committee included architects, code officials, accessibility advocates, suppliers of adult changing tables, and parents who needed these facilities. Code Change E142-21 was developed by this group. They did discuss that adult changing tables might be needed in other locations, like special education classrooms in schools, assisted living facilities, and nursing homes. However, in these cases the committee felt that where trained staff is the person offering assistance, instead of a family member, that the configurations provided there should be decided by that facility. For example, in a school, it might be better to provide changing facilities in a screened area of the classroom or in a nurse's office rather that in a toilet room that might be located away from where it was needed.

Now that this facility is scoped, what about the technical criteria? One of the issues with the proposed rules was that their were hardly any technical criteria provided. Investigating locations where adult changing was provided voluntarily, the task group found everything from adjustable electric tables, to stretchers, to fixed slabs. The committee discussed criteria for the table itself, including size, adjustability, clearances for transfer and to access the person on the table; and safety issues such as weight capacity and bars to stop someone from rolling off the table. The task group also looked at requirements in the room, both for the person receiving care and the care giver. This task group has proposed a change to the ICC A117.1 standard for the 2023 edition. The ICC A117.1 committee will start meeting in 2022 to discuss this proposal along with many others that have been submitted. Anyone can participate in these meetings. At this point the meetings are planned to be virtual. For meeting announcements and the posting of the proposals, watch the standards page in the ICC website at https://www.iccsafe.org/products-and-services/standards-development/standard-development-process/.

The original purpose of the family/assisted use toilet room was to allow for families with small children or adults that needed assistance to have a measure of privacy for assisted toileting. This went into the IBC in 2009. Adding the adult changing table in some of these toilet rooms makes these facilities even more inclusive.

Natural Materials in Biophilic Design

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In creating a direct connection to nature, wood ceilings and wall systems can boost occupant health, well-being, and productivity

There is no question that a walk in the park, the fresh air, and the sun's warmth on one's skin surrounded by grass and trees is a refreshing, positive experience. Driven by a growing body of research proving the physical, physiological, and emotional benefits promoted by connections to nature, architects and designers are actively incorporating natural elements, particularly wood, into their designs.

Biophilia—or the love of living things, as translated from ancient Greek—was first coined by the renowned psychologist Erich Fromm in 1964, in describing humans' attraction to things that are alive and vital. It was then popularized by biologist Edward O. Wilson in the 1980s in response to urbanization's growing disconnection with nature.

While civilization has lived an agrarian existence for centuries, with people predominately living among nature, the advent of the Industrial Revolution changed all of that.

"Throughout history, humans have been reliant upon and connected to nature for basic needs of food and shelter," says Pamela Lucas Rew, AIA, partner, KSS Architects, Princeton, New Jersey. "As we transitioned to an industrial society, we have become more dependent upon machines and technology for our basic needs and less connected to nature. This decreased connection to nature has a negative impact on our ability to relax, concentrate, control stress, socialize, and collaborate."

To help rectify this, the integration of natural materials into architectural designs is a growing phenomenon. And although biophilic design is not a new concept, companies and institutions are recognizing its positive impact on individuals' comfort, attitude, and health in their daily lives.

PHOTO COURTESY OF CERTAINTEED

Natural design materials, such as wood ceiling systems, contribute to occupant well-being by fulfilling a fundamental human need: connection with nature.

Although an indirect connection to nature has always been a strong component of architecture, biophilic design is now taking center stage, according to Angelica Paleczny, AIA, LEED AP BD+C, interior designer at global design firm Perkins and Will in Chicago.

While plants and greenery are generally associated with biophilia, designs also extend to water, natural light, stone, and wood. Countering concrete, smog, and noise, a well-designed biophilic environment can provide an oasis of calm and serenity, reconnecting occupants to a healthier outdoor environment.

Wood And Biophilia

Wood occupies its own special niche in biophilic design, doubling as a building material and, in some cases, a structural element. In most scenarios,

well-executed wall and ceiling designs can create a unique warmth and feelings of comfort for occupants.

"The natural grain patterns and textures, the natural aroma, and the warm colors contribute to reducing stress responses, lowering blood pressure, and improving overall mood," says Gary McNay, AIA, LEED AP BD+C, ILFI Ambassador, academic planning and design at Gensler, Atlanta.

Nash Emrich, senior sustainability consultant at Paladino and Company, Grand Forks, North Dakota, agrees: "There is no question that I behave and feel differently when I am hiking a mountain, floating a river, or riding single track through the trees. I do not feel this sense of wildness, perspective, and freedom when surrounded by concrete in a city or stuck in a typical office building looking at plastic furniture, ceiling tiles, and fluorescent lighting."

To counter this, Paleczny explains that surrounding one's day-to-day life with natural elements brings the comfort of nature into the interior, and it gives visual and tactical reminders of the environment beyond the walls.

Overall, biophilic design also offers sustainability benefits, such as reduced energy consumption by utilizing daylight and reducing artificial light, and better air quality by using natural materials with healthy ingredients.

"But the primary economic benefit has to do with the occupants of the building and their productivity," says Joey-Michelle Hutchison, RA, LEED AP BD+C, CSBA, senior associate, vice president of CallisonRTKL, Seattle. "Payroll is one of the biggest expenses of just about any U.S. business and biophilic design can increase employee satisfaction and productivity, and reduce employee absenteeism and turnover—which are all significant positive economic benefits."

Photo Courtesy of CertainTeed

Because of its wide-ranging aesthetic benefits and performance applications, wood emerges as a particularly effective material for biophilic design strategies.

Making The Case

Delving into the growing cache of biophilia research, many aspects of physical and emotional health are boosted in biophilic environments.

One formative concept, the Attention Restorative Theory, was introduced by University of Michigan Professors of Psychology Rachel and Steven Kaplan in their book, *The Experience of Nature: A Psychological Perspective*. The theory, which has been borne out by additional research, states that humans' ability to concentrate is finite and taxed throughout the day as they encounter numerous stimuli. Contact with nature serves to replenish those resources, thereby enhancing focused attention and memory, and reducing mental fatigue and stress.

Along these lines, a recent study at the University of Melbourne found that something as quick as a 40-second break in nature—regardless of whether its outdoors or indoors—increases one's ability to concentrate by 6 percent.

Another interesting approach called *shinrin-yoku*, or forest bathing, is the ancient Japanese practice of restorative walks through natural settings, most often forests. The efficacy of this method was best illustrated in one study that took 87 non-insulin-dependent diabetics and monitored their blood glucose levels over the course of six years.[1] The project compared the effects of taking 3- to 6-kilometer walks through the forest with exercising on indoor treadmills and indoor pools. While indoor exercise reduced blood glucose levels by 21.2 percent, forest bathing decreased blood glucose by 39.7 percent.

In the bigger picture, Lucas Rew explains that research supports the categorization of five basic human needs that can be satisfied by the connection to nature. These include the following:

- **Community**: People feel comfortable collaborating when they understand their place within a given community.
- **Identity**: People can be creative when they understand the defined identity of a place.
- **Navigation**: People can afford to be curious when they feel safe to explore and navigate an environment with ease.
- **Transition**: People can be confident when they control the way they transition from one space or activity to another.
- **Choice**: People can be independent when they have the choice to control their own experience.

Despite all of these benefits, the bottom line often proves to be the most convincing argument. In analyzing how much organizations spend on their personnel versus other business expenses, more than 100 times more, on average, is spent on people than on energy costs within the workplace.

Photo Courtesy of CertainTeed

The economic benefits of biophilic design are as convincing as the aesthetic and performance benefits—studies show that connections with natural elements can increase employee productivity and reduce absenteeism and, as a result, improve bottom lines.

In a white paper titled *The Economics of Biophilia: Why designing with nature in mind makes financial sense*, the respected New York-based sustainability consulting firm Terrapin Bright Green found that 90.3 percent of costs per square foot are devoted to salary, whereas 8.9 percent go toward rent and mortgage, and 0.8 percent is spent on energy costs. Further, financial losses due to absenteeism and presenteeism (working while sick) account for 4 percent.[2]

"These statistics make it clear that the smartest economic investment is an investment in employees, their productivity, and their overall satisfaction" according to Terrapin Bright Green. "Commercial spaces that give occupants access to nature serve as a release to outside stresses and tend to cause less environmental stress themselves. It makes fiscal sense for companies to try to eliminate environmental stress that cost them thousands of dollars per year in employee costs. Small improvements in productivity and reduced absenteeism could boost profits and the bottom line more dramatically than reducing energy costs. In short, productivity drives profit."

Wood Biophilia Research

Among research proving the positive benefits associated with biophilic design, wood stands out as being a particularly effective strategy. With a high level of design and application flexibility, wood is not dependent on access to windows, like some other biophilic design strategies, and when exposed, it can simultaneously serve both biophilic and functional purposes.

Compiling a number of noteworthy studies in *Wood as a Restorative Material in Healthcare Environments*, Design With Science Principal Sally Augustin and FPInnovations Research Leader David Fell report that physical well-being is enhanced when wood is employed.[3]

Looking at some key studies, a group of researchers at Japan's Shimane University found that adding cedar wood panels and rice straw paper to the walls of a hospital isolation room reduced the stress levels (measured by cortisol levels) experienced by people in the space compared to people in rooms with concrete walls.[4]

In another study, as presented at a Netherlands Conference on Environmental Psychology, the stress levels in Austrian classroom students exposed to wood were compared to non-wood conventional classrooms.[5] The heart rate variability increased in students in the wood classrooms. This variability is tied to the parasympathetic nervous system that acts to reduce stress levels and promote healing and recovery functions in the body.

Fell was also involved in another study that analyzed the autonomic responses of 119 subjects in wood and non-wood offices, with and without plants, before, during, and after a stressful mental task.[6] Results showed that the wooded offices delivered the most stress-reducing effects.

PHOTO COURTESY OF CERTAINTEED

A recent study of office designs revealed that those designed with wood offer the most stress-reducing effects for workers.

Taking an interesting approach to analyzing responses to wood, researchers in Australia and New Zealand presented images of office lobbies furnished with wood and lobbies decorated with other materials.[7] The wood-finished lobbies were perceived as being associated with more prestigious, energetic, innovative, comfortable, and desirable companies for which to work.

Studying wood from another angle, the Japan Wood Research Society analyzed the blood pressure of participants exposed to a wooden wall vs. a white steel wall.[8] In the latter case, those with a dislike for steel experienced an increase in blood pressure, while those who like steel experienced no change. On the contrary, people who like wood as a finishing material found their blood pressure dropped significantly when they faced the wooden wall, whereas those who dislike wood found their blood pressure was not affected by viewing it.

Another study by the same Japanese group sheds some key insights on how to optimally design with wood. The project analyzed the heart rate and blood pressure of occupants inside rooms with 0 percent, 45 percent, or 90 percent of the surfaces covered with wood.[9] While blood pressure levels were the lowest in the 90 percent coverage rooms, the 45 percent wood-covered spaces are actually the most preferred by occupants as being the most comfortable.

"Covering less than half the surfaces appears to be the sweet spot," observes Augustin.

Unique Aspects Of Wood

One key point with all of this research is that to reap these benefits, the wood grain on the interior surfaces has to be exposed. Consequently, if the wood is painted, these biophilic effects will be lost, as the grain is one of the most important aspects lending authenticity to the wood.

"The texture, color, grain pattern, and overall appearance of wood make

Photo Courtesy of CertainTeed

Wood is an ideal biophilic design material because it is multisensory, appealing to occupants' senses of touch, smell, sight, and sound.

each piece unique," explains Alana S. Morris, IIDA, NCIDQ, EDAC, senior interior designer manager and team leader at ESa, Nashville, Tennessee.

Commenting on some unique aspects of the material, Paleczny says that wood has the ability to straddle multiple design styles by making the space feel inviting and familiar yet cool and collected at the same time.

Wood is exceptional at sound absorption, temperature, and humidity control, and can offer hypoallergenic qualities in many cases. Wood interiors are easily recyclable and are therefore sustainable.

Wood is also a multisensory material, capable of influencing four of the five basic senses: touch, smell, sight, and sound. Jennifer Walton, principal and corporate studio director at H. Hendy Associates, Newport Beach, California, points out that wood:

- Represents a celebration of local materials, helping humans connect with the nature surrounding the built environment inside the building.
- Provides a connection to craftsmanship—a sense of human touch instead of machine-made products.
- Is pliable and can be shaped to represent the rhythm of natural materials through organic expression.
- Matures and changes over time, giving people a sense of time that helps shape human life and behavior.

In a similar vein, Peggy Bennett, IIDA, LEED AP, associate vice president and director of commercial interiors for Hoefer Wysocki in Kansas City, says that wood does an excellent job of creating a sense of place to localize commercial interior design through site integration, which prioritizes the use of materials that are native to the area.

In integrating wood ceilings and walls while keeping biophilic principles of recreating nature in mind, Emrich advises selecting light-colored species. "The sky is usually brighter than the ground, even on a cloudy day, so a dark wood ceiling can be counterproductive, depending on the desired space usage and occupancy type," he says.

THE 14 PATTERNS OF BIOPHILIC DESIGN

With growing numbers of building owners and designers looking to incorporate biophilia into their building designs, the environmental design consultancy Terrapin Bright Green—run by the respected William Browning, Hon. AIA—has created a most useful document: *14 Patterns of Biophilic Design Improving Health & Well-Being in the Built Environment*.[10] The paper establishes more than a dozen approaches to biophilic design with the science behind each pattern, metrics, strategies, and considerations for how to apply each pattern. The objective purpose is to help the industry move from biophilic research to design application with the goal of enhancing health and well-being.

The comprehensive white paper, co-authored by Terrapin Bright Green's Catherine Ryan and Joseph Clancy from the Pegasus Planning Group, is the culmination of extensive interdisciplinary research and is supported by empirical evidence from more than 500 publications on biophilic responses.

The 14 Patterns of Biophilic Design are:

1. Visual Connection with Nature: A view to elements of nature, living systems, and natural processes.
2. Non-Visual Connection with Nature: Auditory (sound), haptic (touch), olfactory (smell), or gustatory (taste) stimuli that engender a deliberate and positive reference to nature, living systems, or natural processes.
3. Non-Rhythmic Sensory Stimuli: Stochastic (random) and ephemeral connections with nature that may be analyzed statistically but may not be predicted precisely.
4. Thermal & Airflow Variability: Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments.
5. Presence of Water: A condition that enhances the experience of a place through seeing, hearing, or touching water.
6. Dynamic & Diffuse Light: Leverages varying intensities of light and shadow that change over time to create conditions that occur in nature.
7. Connection with Natural Systems: Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem.
8. Biomorphic Forms & Patterns: Symbolic references to contoured, patterned, textured, or numerical arrangements that persist in nature.
9. Material Connection with Nature: Materials and elements from nature that, through minimal processing, reflect the local ecology or geology and create a distinct sense of place.
10. Complexity & Order: Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature.
11. Prospect: An unimpeded view over a distance for surveillance and planning.
12. Refuge: A place for withdrawal from environmental conditions or the main flow of activity in which the individual is protected from behind and overhead.
13. Mystery: The promise of more information, achieved through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment.
14. Risk/Peril: An identifiable threat coupled with a reliable safeguard.

Honing in on Biomorphic Forms & Patterns, Material Connection with Nature, and Complexity & Order, Browning's team classifies them as Natural Analogues, which are described as designs that address organic, non-living, and indirect evocations of nature. It is important to note that natural materials that have been processed or extensively altered only provide an indirect connection with nature. While they are still considered real, they are only analogous to the items in their "natural" state. "Real materials are preferred over synthetic variations because human receptors can tell the difference between real and synthetic, so minimally processed materials from real nature are preferred whenever possible," states Browning and his team.

Biomorphic Forms & Patterns is based on what is called the Fibonacci sequence, which is a numeric series that occurs in many living things, particularly plants. Phyllotaxy is the spacing of plant leaves, branches, and flower petals so that new growth does not block the sun or rain from older growth, and it often follows in the Fibonacci sequence.

In applying these forms and patterns, which includes wood surfaces, the design guide suggests the following:

- Apply on two or three planes or dimensions (e.g., floor plane and wall; furniture, windows, and soffits) for greater diversity and frequency of exposure.
- Avoid the overuse of forms and patterns that may lead to visual toxicity.
- More comprehensive interventions will be more cost-effective when they are introduced early in the design process.

The Material Connection with Nature pattern is described as rich, warm, and authentic, and sometimes stimulating to the touch. In working with the pattern, the objective is to arrive at the characteristics and quantities of natural materials optimal for engendering positive cognitive or physiological responses. This might involve sifting through layers of information in materials that enhance the connection, such as learned knowledge about the material, familiar textures, or nested fractals that occur within a stone or wood grain pattern.

Drawing from these Patterns of Biophilic Design, Mallory Taub, LEED AP BD+C, WELL AP, senior sustainability specialist at Gensler, New York, says related considerations for wood ceilings and walls could include "the design of a textured finish that creates haptic stimuli that evokes a non-visual connection with nature, the development of a patina that evokes a connection with natural systems, or the creation of contoured surfaces that are biomorphic forms and patterns."

Barbara Horwitz-Bennett is a veteran architectural journalist who has written hundreds of CEUs and articles for various AEC publications. **www.bhbennett.com**

It is not uncommon for wood ceiling designs to create the impression of a tree canopy, suggesting a sense of shelter, warmth, and protection.

For the walls, he recommends wood as an accent or trim. “When you are in a forest, you will never see a blanket of wood—there are breaks between the trees and visual cues like foliage in the depth of field,” Emrich adds. “The wood in nature is broken up, and wood in biophilic design should similarly offer visual breaks.”

Wood Ceiling Systems

In sorting through the various wall and ceiling product types and systems available, it is helpful to understand their design and performance characteristics, installation, and common applications.

Panels

Available in a variety of veneers with narrow reveal or semi-concealed edges, wood panels include perforated, slotted, and channeled patterns for enhanced acoustics. When backed with an acoustical infill like fiberglass or mineral fiber, panels can improve sound absorption, delivering a noise reduction coefficient (NRC) from 0.40 up to 0.90.

Typical panel sizes are 2 feet x 2 feet and 2 feet x 4 feet, and can easily be installed into an acoustical suspension system, also known as a T-bar grid. To support larger-sized panels, alternative installation methods can be utilized.

Wood panels are also available as wall systems. They can be 4 feet x 8 feet or larger and absorb sound at similar values to ceiling systems. In addition to flat, the panels can be curved.

Wood panels are often used in front-of-the-house corporate settings, atriums, and conference rooms, and can be applied in assorted ways to elevate traditional lay-in ceiling design. They offer a rich, warm, and polished aesthetic.

Grille Modules

Natural wood grille modules, solid or veneered, are vertical planks, typically between 1–2 feet x 10 feet, with varying thickness in height and width. “Used as walls and ceilings, they provide a visual depth and dimensionality to a space and break up the monotony of a standard white ceiling,” explains Zachary Donahue, product manager of wood ceilings and walls, CertainTeed, Malvern, Pennsylvania.

Cost will vary from MDF on a fire-retardant particle board all the way up to high-end walnut or cherry wood. In the middle range, a good value is poplar or basswood, which can be finished to replicate walnut or cherry.

The modules are relatively easy to install and modify on-site. They easily integrate into the infrastructure (e.g., HVAC, lighting, and sprinkler heads) and do not require custom measurements. With an infill, they

offer an NRC up to 0.90 or higher. In general, fire-protection requirements for solid wood materials are Class C per ASTM E84/ULC S102, and veneered materials on fire-retardant MDF or fire-retardant particle board are Class A per ASTM E84/ULC S102.

The systems can be used on the ceiling and walls. And because the modules are available in a variety of sizes and orientations, a high level of customization is possible. For enhanced acoustics, black infill panels increase NRC ratings.

"Using grille modules can create a less-heavy-looking ceiling while defining separate collaboration or resting spaces," Bennett says. "Another benefit is disguise, as the modules can cover an unsightly, exposed ceiling by specifying a felt backer to lay above the wooden slats."

Lucas Rew likes to design with grilles, in addition to panels and planks, on account of their ability to align scale, patterning, and materials with other building aesthetics and materials. She also appreciates their span, timeless aesthetics, accessibility to building systems, and ability to meet performance specifications for acoustics, seismic, and maintenance.

Linear Planks

These planks can be tongue and groove, with the boards butted up against each other to create a closed flat surface for an NRC of 0.90 or higher when installed with channels. Or they can be designed as an open reveal with space between the planks. When felt or other acoustic material is installed in between, sound absorption properties can be up to 0.65 or 0.75 NRC.

Wood planks create a very attractive flat linear visual surface that works well for large, open spaces and applications such as airports and stadiums. The product can also be used for accent walls—for example, in elevator lobbies or behind flat-screens or monitors—as it provides an alternative visual than typical surfaces.

Depending upon the selected species, the planks can also be used in some exterior applications, such as a garden or gazebo.

For wall applications, the planks can be directly attached to studs, furring, or Z-clips. For ceilings, clips or other mounting applications can be used to attach the planks directly to the framing or standard acoustical suspensions systems.

Panelized Linear

Panelized ceilings offer the same visual as a linear plank, but unlike the former where each plank must be installed individually, panelized linear can install more quickly. Whereas linear planks typically create inaccessible plenums, panelized linear can be installed in the ceiling with changers or on the wall with Z-clips to make spaces behind accessible.

With an NRC of up to 0.75, the modules are well suited for creating visual interest in spaces like conference rooms, offices, kitchenettes, and cafeterias. They also work well in hospitality applications where a warm, comforting interior is the goal.

Lay-in Grilles

Available in reveal and narrow reveal edges, these horizontal and vertical slats add dimensionality to the ceiling. They are an ideal choice for renovation spaces with existing acoustical suspension systems and can be found in conference rooms, board rooms, and common shared spaces.

When used vertically, the blades take on a three-dimensional appearance, while the horizontal blades appear two dimensional. Design possibilities include herring bone patterns and checkerboard, among others.

Basswood or poplar are commonly selected and offer up to 0.90 NRC when specified with sound-absorbing infill.

Common installation methods can be used for a fully accessible ceiling plenum.

Canopies

A high-end design aesthetic for open spaces, clouds, and canopies are independently suspended panels available in rectangle and other shapes that can be concave, convex, or flat as well as S-curved.

Common applications include elevator lobbies, small entryways, lobbies, and conference rooms. They work well when the design intent is to create a more intimate, cozy space or draw attention to a specific area, particularly when working with tall ceilings. For example, with an information desk, reception area, or security checkpoint, the canopy can be used to frame the space without having to build a separate room.

Canopies do a good job of defining spaces in rooms that need a more formal feel. Solid canopies can hide mechanical or audio-visual equipment, while curved canopies can help distribute sound. If sound absorption is required, perforated canopies can be used with acoustic infill to improve the acoustics of a space.

Open Cell

These decorative, solid-wood cell ceilings come in different finishes and a range of configuration options. Traditionally a lay-in panel, the system creates visual interest with a cubic look and serves as a way to bring down the ceiling space with natural materials. Open cell also frames the space while still giving visibility to the ceiling above.

With an acoustic infill, NRC values of 0.75 or higher are possible. Common installation methods can be utilized, and the open-cell system can be independently suspended from the ceiling space.

Typically, all of the wood ceiling and wall products discussed above have been confined to customer-facing areas, executive spaces, and entryways. However, in recent years, a focus on health, well-being, and biophilic design is expanding wood elements into employee work areas so that all occupants can benefit from the warmth and comfort of wood interiors.

In viewing wood ceiling systems with a biophilic lens, McNay suggests that layered, natural, textured, and open wood ceilings exhibit more natural patterns than flat, smooth systems. Natural branching or wave patterns integrating with structures, open grilles, or trellis frames that are rhythmic or non-rhythmic can inspire positive human connections. Additionally, ceiling panels that float can be more analogous to tree canopies, clouds, or even flocks of birds.

Real, Engineered, And Faux

In evaluating real wood versus engineered wood versus faux wood for wall panels and ceilings, a number of elements must be taken into consideration.

While real wood is best for biophilic design, the other options can offer biophilic benefits if the panels display an authentic-looking grain. This means that the repeat patterns should not be obvious and the surface should appear to be real. This is essential for walls, as they are seen from up close, whereas ceilings are viewed at more of a distance.

"If you have a relatively distinctive knot, for example, you have to make sure that it does not appear repeatedly across the wall or ceiling," explains Augustin.

With engineered wood, authenticity is not an issue. Furthermore, these products are less expensive, less likely to expand from humidity and moisture, and are structurally more stable. At the same time, specifiers should take a good, hard look at the product, as sometimes the engineering of wood can be systemized to the extent that it loses natural properties and aesthetics.

Another issue is vetting the adhesives used within the product. "Formaldehyde and other VOCs in composite wood products will negatively affect air quality and therefore occupant health, negating the positive health effects of using wood as a biophilic material," cautions Hutchison.

Where sustainability is the main priority, real wood trumps all. In addition to sequestering carbon, it is a renewable resource and is highly valued by green building rating systems. "Wood can be recycled, salvaged, and reused or become a natural nutrient in nature instead of adding to a land fill," adds McNay.

Photo Courtesy of CertainTeed

Some wood products can be engineered to contribute to other aspects of occupant well-being, like wood ceiling systems that help control the acoustics of a space.

To ensure that the material is truly sustainable, architects should verify the product chain of custody and sourcing to ensure that the wood did not come from a species that is threatened or endangered, and that it has been harvested from sustainably managed forests. Doing so can be more challenging to track with engineered wood, as it can contain multiple species of wood.

Photo Courtesy of CertainTeed

Real wood is the best material for biophilic design strategies, but wood-look materials—particularly those with realistic-looking grains—can also offer biophilic benefits with added performance advantages, like indoor/outdoor applications.

Real wood also embraces local materials, the environment, local craftsmen, and the natural beauty inherent in the material's maturity over time. Authentic wood gives off a natural smell, thereby strengthening its biophilic properties.

With green building rating systems, wood products can score quite well, although the credits will vary for the different programs.

In LEED v4, wood can qualify in the Regional Materials category, depending on the project location; Building Disclosure and Optimization with environmental product declarations; Building Life-Cycle Impact Reduction and Interiors Life-Cycle Impact Reduction; and Low-Emitting Materials.

For the Living Building Challenge, which is considered the most progressive building rating system, wood is associated with five prerequisites, one of which requires that a biophilic design workshop be conducted with the project team to create a plan that is developed and used throughout the design phase of a project.

With the WELL Building Standard, designs should show a direct connection to nature through strategies relating to plants, water, light, or views; an indirect connection to nature including the use of natural materials; and the integration of natural elements throughout the design.

Photo Courtesy of CertainTeed

Traditional-looking wood ceiling panel designs provide a comforting biophilic backdrop, while wood canopy installations can up the aesthetic value by offering an unconventional, sculptural look.

Acoustics

Because wood naturally reflects sound, as noted in the discussion of the different wall and ceiling systems, the addition of acoustical fabric or acoustic infill or insulation behind or above the panel/tile may be needed.

"Wood ceilings and wall systems can significantly impact the acoustics of a space through the modulation and shape of surfaces, texture, and porosity of materials, and with the use of framing and backup systems that can be integrated into the system to incorporate acoustical properties," states Lucas Rew.

For example, by selecting perforated panels or reveals between wood panels, a certain percentage of the sound will pass through the panels. Similarly, wood lattice and grid systems will help reduce acoustic reverberation, though they often require a backup sound-absorption material. As an alternative, McNay recommends systems with asymmetrical geometries that work to help reduce reverberation.

For applications where acoustics are prioritized, including theaters, school auditoriums, salons, galleries, or restaurants, products such as a fiberglass infill can help achieve the required NRC ratings.

Standard Versus Custom-Engineered Solutions

Another issue that often comes up when specifying wood wall and ceiling systems is whether the design can be supported by standard products or an additional investment is required for a custom solution.

"Having a wide array of standard products to choose from is always ideal," Paleczny says. "Standards provide a great baseline for decision making. They provide a modularity that can integrate other ceiling components with greater ease, they can

reduce the lead times significantly, and they can be economical solutions for elevating spaces."

Whereas custom-engineered systems frequently require a highly specialized installer, standard wall panel and ceiling systems are contractor friendly, which opens up bidding to a wider range of installers, as most manufacturers include very detailed installation drawings and instructions.

Hutchison agrees that a wide range of standard products—not only in terms of color and texture but also shape, installation method, panel size, and acoustical properties—provides flexibility to specify wood products for a variety of space types and in a variety of locations without the added expense of custom systems.

At the same time, there seems to be a misconception that standard products are limiting and impinge upon designers' creativity. On the contrary, Lucas Rew asserts that these off-the-shelf solutions offer a wide range of possibilities. "A unique design solution can be customized and created by combining multiple standard products by varying patterns, shapes, and colors," she says.

Bennett raises another point, which is the fact that more costly custom-engineered solutions run the risk of being value engineered out of the project. Consequently, if the design team is able to work within the framework of standard solutions, there is a much better chance of keeping the design aesthetic while staying within budget.

Ultimately, whether standard or custom engineered, wood wall and ceiling systems have a proven track record of creating inviting, warm interiors that capitalize on the wellness, productivity, and biophilic benefits that this natural material offers. As building owners, organizations, and society itself continues shifting toward a health and wellness mindset, biophilic design will continue to gain traction.

End Notes

1 Ohtsuka, Yoshinori. "Shinrin-Yoku (forest-air bathing and walking) effectively decreases blood glucose levels in diabetic patients." International Journal of Biometeorology. February 1998. Web. 10 February 2020. <www.researchgate.net/publication/51324277_Shinrin-Yoku_forest-air_bathing_and_walking_effectively_decreases_blood_glucose_levels_in_diabetic_patients>.

2 Browning, William. "The Economics of Biophilia: Why designing with nature in mind makes financial sense." Terrapin Report. Terrapin Bright Green. September 2015. Web. 10 February 2020. <www.terrapinbrightgreen.com/report/economics-of-biophilia>.

3 Augustin, Sally and Fell, David. Wood as a Restorative Material in HealthCare Environments. FPInnovations. February 2015. Web. 10 February 2020. <www.woodworks.org/wp-content/uploads/Wood-Restorative-Material-Healthcare-Environments.pdf>.

4 Ohta, H. et all. "Effects of redecoration of a hospital isolation room with natural materials on stress levels of denizens in cold season." Shimane University. 24 October 2007. Web. 10 February 2020. <www.ncbi.nlm.nih.gov/pubmed/17957390>.

5 Kelz, Christina. "Interior wood use in classrooms reduces pupils' stress levels." Ninth Biennial Conference on Environmental Psychology. September 2011. Web. 10 February 2020. <www.researchgate.net/publication/326479468_Interior_wood_use_in_classrooms_reduces_pupils'_stress_levels>.

6 Fell, David. "Wood in the human environment: restorative properties of wood in the built indoor environment." November 2010. Web. 10 February 2020. <open.library.ubc.ca/cIRcle/collections/ubctheses/24/items/1.0071305>.

7 Ridoutt, Bradley G. "First Impressions of Organizations and the Qualities Connoted by Wood in Interior Design." Forest Products Journal. October 2002. Web. 10 February 2020. <www.researchgate.net/publication/279711405_First_impressions_of_organizations_and_the_qualities_connoted_by_wood_in_interior_design>.

8 Tsunetsugu, Y. "Physiological Effects in Humans Induced by the Visual Stimulation of Room Interiors with Different Wood Quantities." Journal of Wood Science. The Japan Wood Research Society. 1 February 2007. Web. 10 February 2020. <link.springer.com/article/10.1007/s10086-006-0812-5>.

9 Sakuragawa, S. "Influence of Wood Wall Panels on Physiological and Psychological Responses." Journal of Wood Science. The Japan Wood Research Society. April 2005. Web. 10 February 2020. <link.springer.com/article/10.1007/s10086-004-0643->.

10 Browning, William. "14 Patterns of Biophilic Design: Improving Health & Well-Being in the Built Environment." Terrapin Report. Terrapin Bright Green. 2014. Web. 10 February 2020. <www.terrapinbrightgreen.com/reports/14-patterns>.

CE Test Questions
Biophilic Design

1. Which of the following materials are considered biophilic?
   a. Plastic and rubber
   b. Metal and linoleum
   c. Stone and wood
   d. Brick and glass

2. What is Attention Restorative Theory?
   a. Forest bathing
   b. Contact with nature works to restore people's ability to concentrate
   c. Another word for biophilia
   d. None of the above

3. What is unique about wood as a biophilic design strategy?
   a. It is a warm, inviting material
   b. It is not dependent on window access
   c. It can double as a structural material
   d. All of the above

4. Research shows that the optimal percentage of wood covered interior surfaces for occupant comfort is:
   a. 30 percent
   b. 45 percent
   c. 75 percent
   d. 90 percent

5. To boost wood's biophilic benefits, designers recommend:
   a. Selecting light-colored species
   b. Selecting dark-colored species
   c. Selecting a mix of light- and dark-colored species
   d. Selecting wood with a repetitive grain

6. Which of the following is NOT one of the 14 Patterns of Biophilic Design?
   a. Non-Visual Connection with Nature
   b. Circadian Rhythms
   c. Dynamic & Diffuse Light
   d. Complexity & Order

7. For which wood ceiling system do the units need to be installed individually?
   a. Linear planks
   b. Panelized linear
   c. Grille modules
   d. Canopies

8. When specified with mineral fiber or another sound-absorbing infill, lay-in grilles offer a noise reduction coefficient (NRC) of up to:
   a. 0.70
   b. 0.75
   c. 0.80
   d. 0.90

9. Like real wood, engineered or faux wood can still offer biophilic benefits if:
   a. They are light colored
   b. They display a repetitive grain
   c. The panels display an authentic-looking grain
   d. They cover 90 percent of the surface

10. What advantage does a standard wood ceiling system offer?
   a. Modularity to easily integrate with other ceiling systems
   b. Reduced lead times
   c. Less expensive
   d. All of the Above

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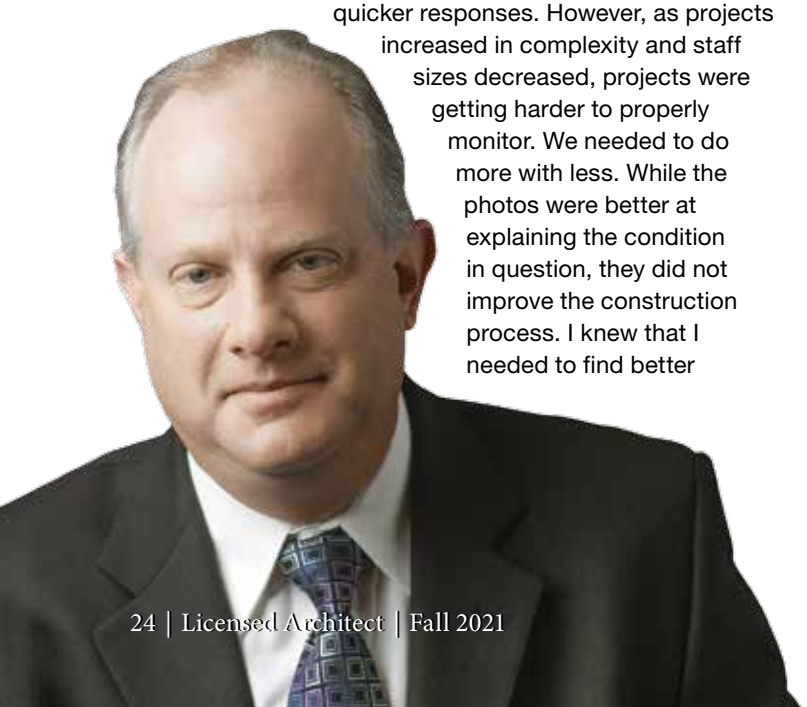
Impact Of Newer Technologies

BY COREY ZUSSMAN, DIRECTOR OF QUALITY MANAGEMENT—ILLINOIS & WISCONSIN, PEPPER CONSTRUCTION GROUP

As a young architect starting my career, I was tasked with construction observation. My equipment consisted of a tape measure, one half-size set of construction documents, a legal pad, and a pen. If I was lucky, I was occasionally able to use the company film camera. As the years went on, I requested a digital camera for my reviews, which I had to earn by producing a punch list on a specific project that numbered more than 500 items. Needless to say, I apologized to the contractor ahead of time and earned my digital camera.

The camera changed my approach to reviews and the quality of information I was able to deliver to the contractor. The reports were easier to understand, which generated quicker responses. However, as projects increased in complexity and staff sizes decreased, projects were getting harder to properly monitor. We needed to do more with less. While the photos were better at explaining the condition in question, they did not improve the construction process. I knew that I needed to find better tracking abilities and a way to leverage all our construction projects to better understand what was happening. Without proper data management, I could not determine what issues were being repeated throughout the company, lessons learned or how we could improve.



Over my 30-year career, my roles and responsibilities have evolved. I have served as an owner's representative, a developer and now, a contractor, as the Director of Quality Management. My current role requires me to actively track more than 30 projects concurrently, and between 50-75 projects annually for a large commercial contractor in Chicago. We construct in every market, from small interior projects to very large entertainment venues and high-rise buildings. As you could imagine, construction monitoring for all these projects takes a smooth process, contractors who understand the details before they get to the jobsite and continuous improvement throughout the entire system.

While the industry average for correcting installations ranges between 3 percent and 5 percent of project cost, our

A construction monitoring program allows contractors to explore new and exciting ideas that are emerging every day and evaluate the intent of these ideas with overall goal of building effectively

average rework cost is 0.37 percent, which is almost 10x less than the industry average. Our record is a direct result of effective pre-installation meetings and the construction monitoring tools we use.

The Role of Pre-installation Planning

We have found the best way to monitor construction is to prepare the team before they are on site. We do this through pre-installation meetings with the trades and by ensuring that the drawings are correct with regard to sequencing, compatibility and coordination. This allows questions to be asked and addressed ahead of time, which results in better installations and makes construction monitoring more efficient.

Leveraging Construction Monitoring Technology

Our monitoring system reduces cumbersome procedures and scales to fit the needs of each project.

During the pre-installation planning, we reference our construction monitoring information and use new tools such as 3D printed models and 3D PDFs to better examine specific details in a more productive manner. These tools also help us monitor for quality in the field.

We also developed a web-based mobile reporting system in-house that tracks specific repeating concerns throughout the company and alerts our project teams. These items are then incorporated into the pre-installation process to avoid future issues. The system also tracks rework costs per item, contractor, trade, etc. and monitors them on a dashboard to help identify trends and inform

teams about trade partner performance for selection on future projects.

Drones have raised our monitoring during construction to a new and more confident level. They allow us to focus on areas that are difficult or dangerous for our staff to reach. We typically utilize our in-house drone operators, working with our quality department, to assist in the review. With the addition of the thermal camera for the drone, we are able to provide a better overall building for our clients.

Looking Forward to What is Next

Today is only the beginning of what we will be able to accomplish with regard to construction monitoring. My next challenge is to turn the images we capture on site into smart photos, with the ability to identify basic detailing and verify installations. The use of AI in photos is reaching a point where the basic installation can be verified with the touch of a button. With more data and understanding, more complex detailing could be verified, tagged, qualified for cost and time required to correct and quantified - all with just a few photographs.

We have come a long way from my days of wagering an outcome with my boss to obtain a digital camera to do the simplest of reviews. New technologies are finding their way into everyday construction in new ways. A construction monitoring program allows contractors to explore new and exciting ideas that are emerging every day and evaluate the intent of these ideas with our overall goal of building effectively and efficiently. From RFID sensors to better monitor and control material on-site, to handheld 3D printed models that help the team understand the details better, these tools will help us build more effectively as a team. I am excited to see how this industry takes quality management to a better and more productive future.

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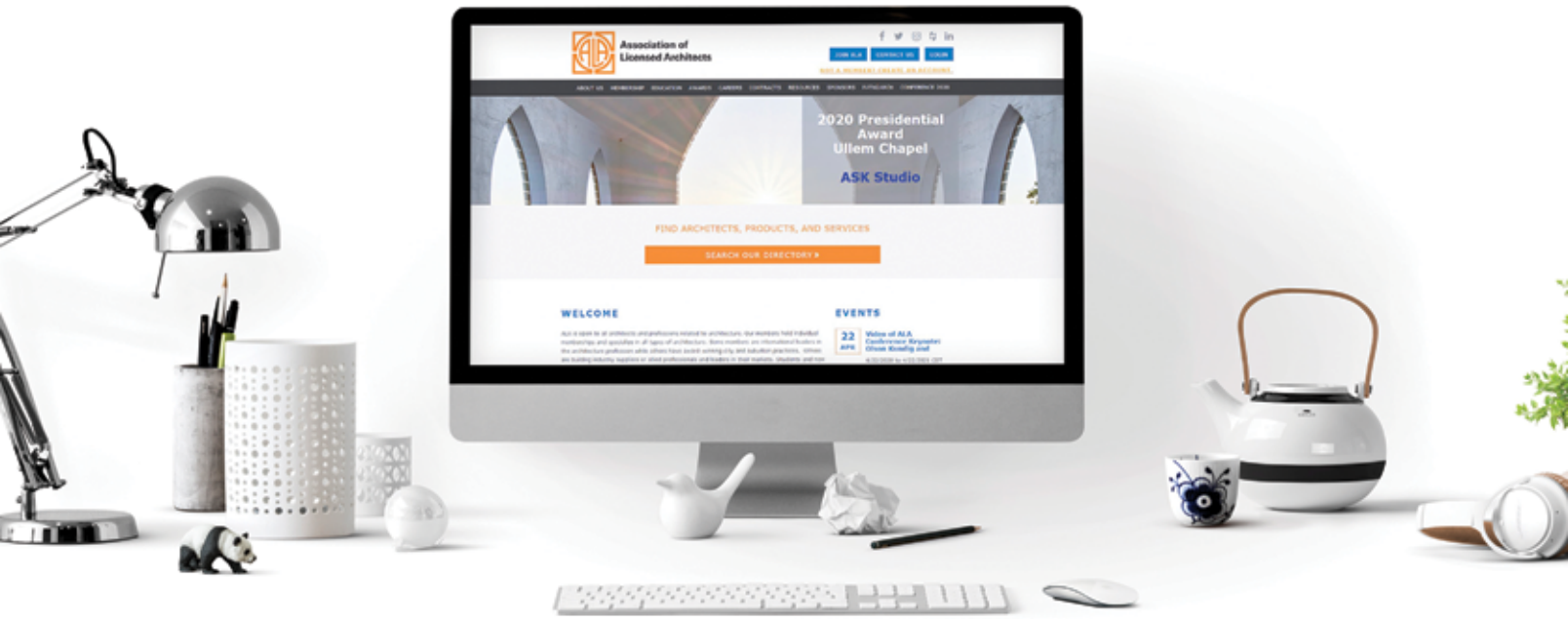

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