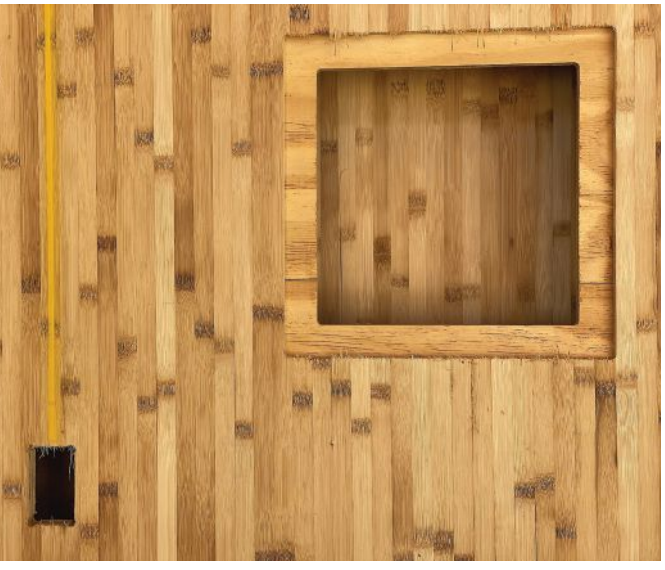
ARCHITECT

AIA Awards
Alda Ly Architecture
Spring Product Highlights
Racism in the Workplace

architectmagazine.com
The Journal of The American Institute of Architects

2021 AIA Gold Medalist Edward Mazria

Champion of Climate Action



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Designing for wellness has drawn increasing attention during the past decade.

BUT THAT INTEREST HAS UNDERSTANDABLY SKYROCKETED DURING THE GLOBAL COVID-19 PANDEMIC, especially among high-end clients, who want their homes to protect and nurture their families' physical and mental health.

How will luxury residential design morph to create even healthier environments as a result of the pandemic? What existing trends will evolve to contribute to healthy homes?

WATCH THE ON-DEMAND WEBINAR "Redefining the High-End Healthy Home," produced by Hanley Wood University and sponsored by Gaggenau. In this roundtable, recorded during a live virtual event in May 2021, facilitator Jennifer Castenson leads a discussion of the emerging and evolving trends in healthy home design. **She's joined by a panel of residential architects:**

Kevin Alter
Partner, Alterstudio

Danielle Tillman,
Managing Principal, bKL

Noah Walker
Principal, Walker Workshop

Takashi Yanai
Partner, EYRC

hanleywood UNIVERSITY

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ON-DEMAND WEBINAR:

REDEFINING THE HIGH-END HEALTHY HOME

How luxury single- and multi-family residential design is responding to a post-pandemic need to maintain and improve the health of inhabitants.

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Visit go.hw.net/wellness to view the webinar and complete the quiz. Courses are free of charge once you create a new learner account. Returning users log in as usual.

This webinar is approved for AIA and IDCEC continuing education credit. In addition, course registrants will gain access to a white paper on the same topic.

Contents

Volume 110, number 04. May/June 2021.
On the cover: 2021 AIA Gold Medalist Edward Mazria; photo by Roberto E. Rosales.
Below: Twenty-Five Year Award winner Burton Barr Phoenix Central Library; photo by Bill Timmerman.

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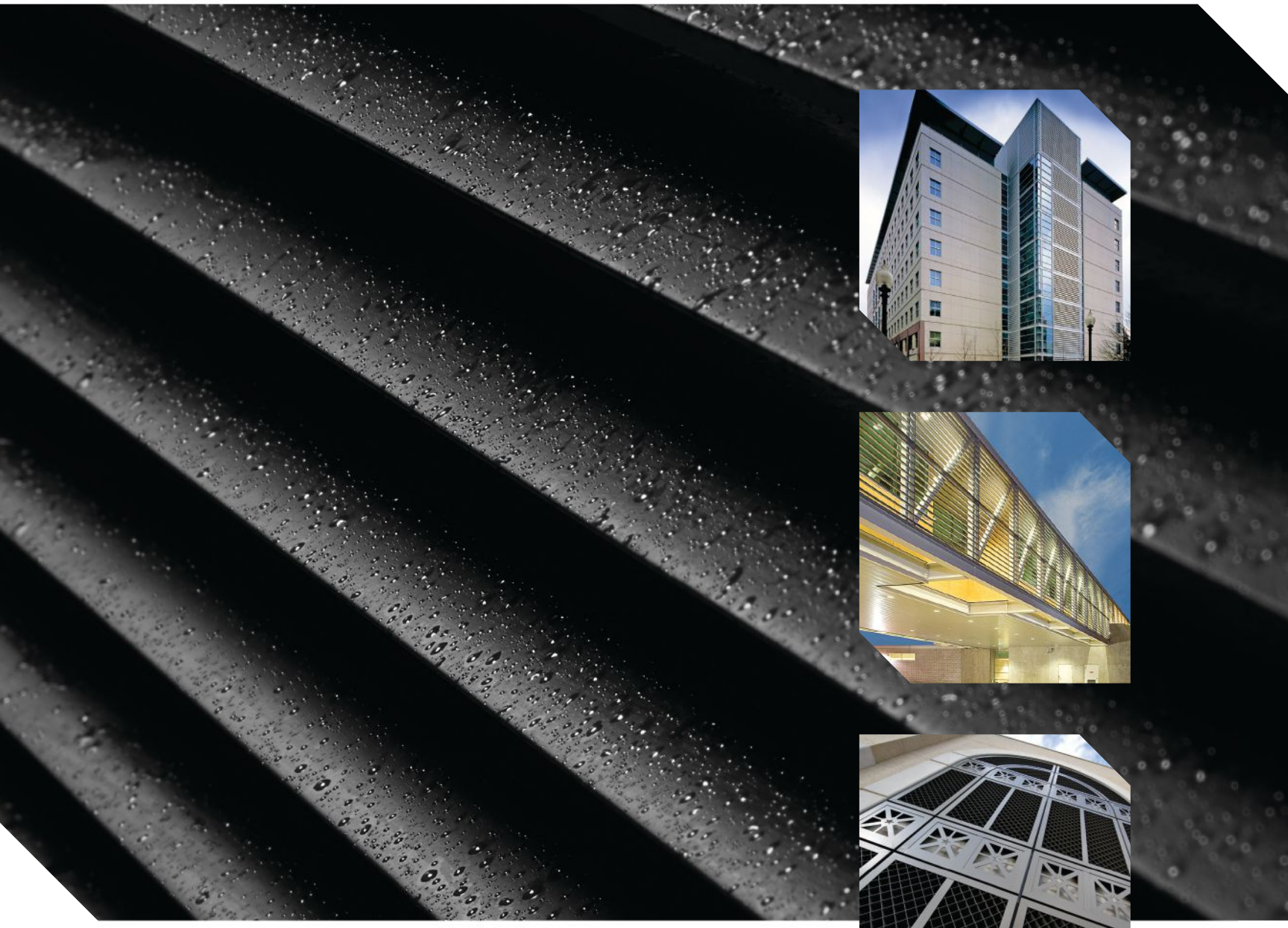

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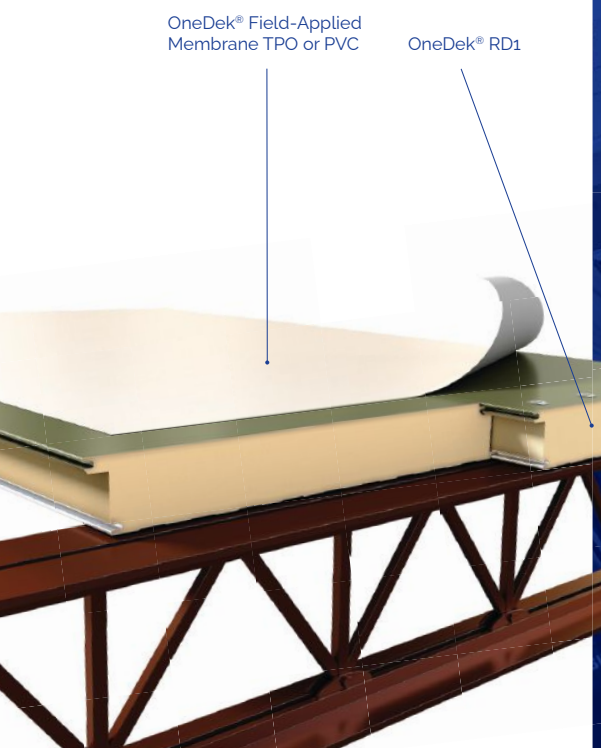

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AIA Architect

The AIA Architect section of this magazine is produced by the Institute as a benefit to its members in partnership with ARCHITECT's editorial and production teams. Please direct any questions or comments to Frank Scanlan, MD, Strategic Communications & Content for AIA.

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Next Progressives: Alda Ly Architecture

EDITED BY ERIC WILLS

Location:
Brooklyn, N.Y.

Year founded:
2017

CHRISTINE HAN

Firm leadership:
Alda Ly, principal

Education:
M.Arch., Harvard University Graduate School of Design; B.A. in architecture, University of California, Berkeley

Experience:
Rafael Viñoly Architects, 212box, MASS Design Group, HWKN, Leong Leong

Firm size:
Six full-time staff

What led to the founding of the firm:
I'm a woman of color working in a field traditionally dominated by men. Initially, this launched me on a path designing for women, but it quickly morphed into designing for those who aren't typically considered. At the core of our process is listening to potential users and learning their stories. We don't just talk to the person who's hiring us; we make sure to uncover the voices of the people who will use the space every day—whether they are patients, janitors, receptionists, or executives. By asking questions, we inevitably find some shared experience that resonates with us.

Firm mission:
Our goal is to create architecture that is shaped by care and empathy. When the intended audience steps into one of our spaces, their first reaction should be, "Wow, they heard me."

First commission:
The Wing, a 10,000-square-foot women's coworking space in New York

Defining project and why:
Parsley Health in New York City. We were hired because we didn't have any experience in health care—the client knew we could bring fresh ideas to stagnant spatial typologies. They wanted a doctor's office like no one had ever seen before—and we delivered. This was the beginning of our health and wellness portfolio, which includes some of the work we're most proud of: HealthQuarters in New York, Liv by Advantia Health in Washington, and Tia Los Angeles.

Most successful collaboration:
Our office is currently all women. Some amazing collaborations happen when our client, consultant, and general contractor teams are also all women. There are no egos. Everyone works intently with the same common goals. Problem-solving is collaborative. And it's fun! While it's a rare combination in the field, we're proud to say that we work hard to seek out partnerships with clients who have a collaborative, open, and experimental approach like we do.

Personality of the practice:
Intentional, considerate, and playful

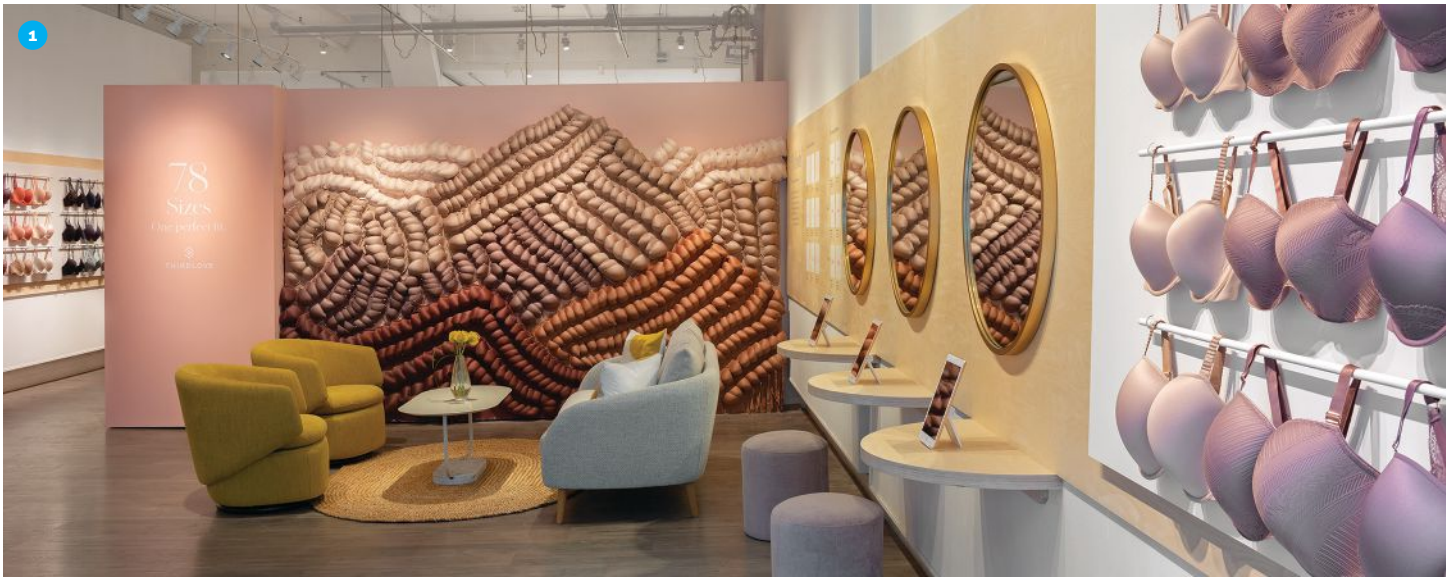
Design tool of choice:
iPad Pro and Pencil 2. I use them daily for sketching plans and ideas. More importantly, they've helped to solve some of our studio's need for creative collaboration while working remotely. All of our designers received iPads and Pencils during the pandemic. We have regular sketch sessions during the early design phases for each project. We can quickly layer sketches over floor plans, post our screenshots on Slack or Google Slides, and go around the group for discussion. This is our pandemic version of a pinup.

Currently on the bookshelf:
Radical Candor by Kim Scott. Recommended by Marissa Feddema, one of our super-talented directors.

Skills you hope to master:
Servant leadership. It's an ever-evolving skill that's impossible to perfect, but I aim to keep getting better.

> *For more about Alda Ly Architecture, visit bit.ly/AldaLyNextProgressives.*

Next Progressives:
Alda Ly Architecture



1, 3 (RIGHT): BILYANA DIMITROVA; 2: NICOLE FRANZEN

1. When the online bra-seller ThirdLove wanted a bricks-and-mortar outpost in New York, Alda Ly Architecture responded with a playful yet sophisticated design. Individual dressing rooms are topped with neon breast-shaped occupancy lights, and a residential-style lounge features an abstract wall sculpture made from bras. **2.** The reception area and waiting room for the flagship location of HealthQuarters, a health care start-up in New York, make it clear that this isn't your traditional doctor's office. Slatted screens demarcate different program areas in the three-story project, and white-oak millwork and curved accents help create an inviting atmosphere. **3.** The Brooklyn outpost for the Wing, a women's-only coworking space, sports a sunken lounge, beauty room, and plush materials palette that brings a renewed vibrancy to what was an old tape factory. **4.** At the Parsley Health's flagship center in New York, Alda Ly Architecture prioritized the patient experience, giving the exam rooms a soothing vibe and modeling the hallway lighting scheme on biophilic principles.

3 (LEFT): TORY WILLIAMS; 4: REID ROLLS

Architect: LEVER Architecture
General Contractor: P&C Construction
Photo: Jeremy Bittermann, Joel B Sanders Agency

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Architect: LEVER Architecture
Builder: Schommer & Sons
Photo: Jeremy Bittermann, Joel B Sanders Agency

Architect: 4240 Architecture, Inc.
Builder: Estes and Gallup
Photo: Rob Karosis

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Builder: Reworks
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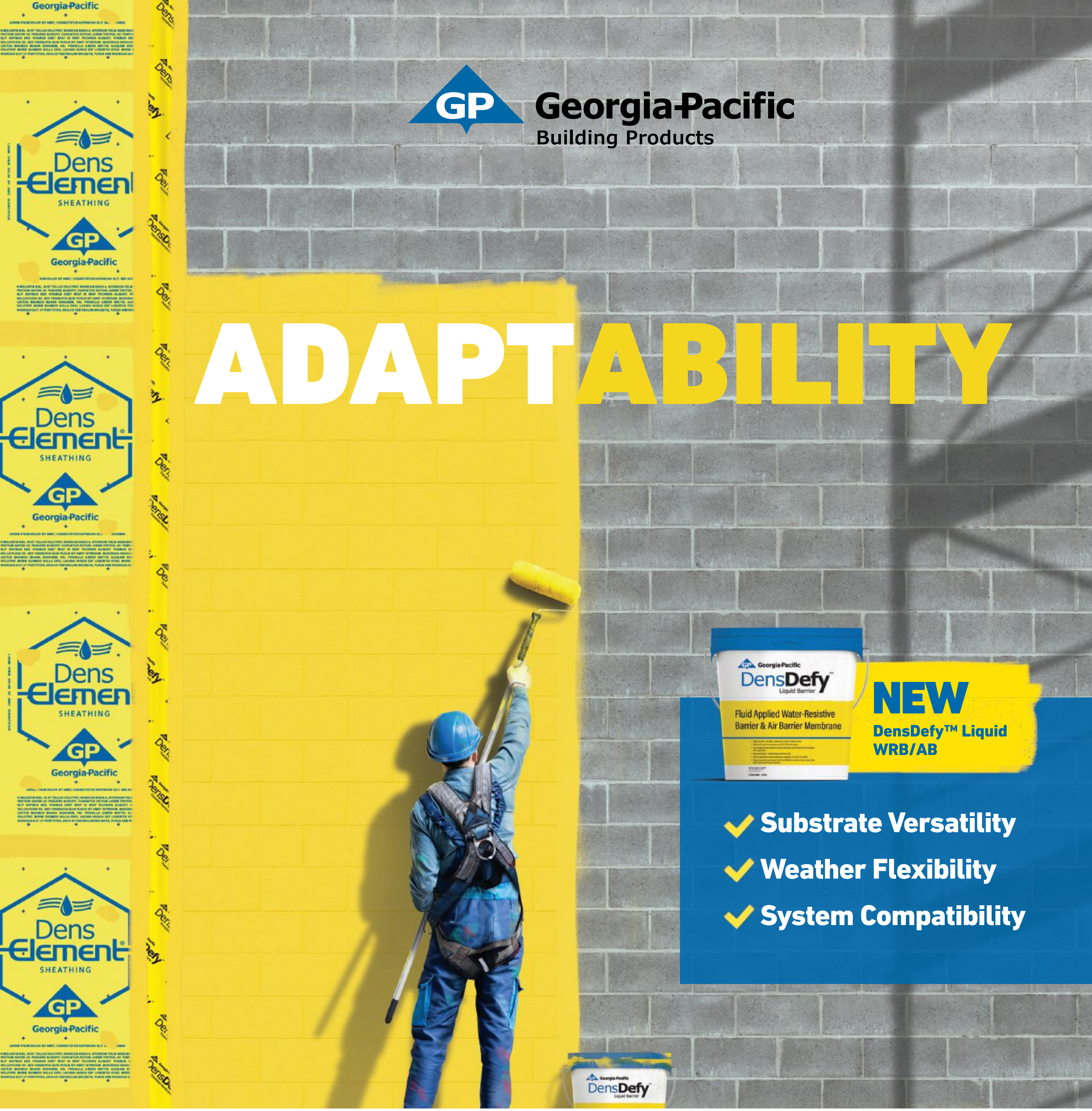
Spring 2021 Product Call Highlights

TEXT BY ARCHITECT STAFF

As the building industry begins to buzz again, many manufacturers are eager to highlight their latest offerings. Selected from 198 entries to ARCHITECT's third annual Spring Product Call, these 23 products embody clean aesthetics, scientific breakthroughs, and an intent to improve our built or natural environment.

2021 Design Collection, 3form
Used in light-diffusing surfaces, partitions, and panels, 3form's translucent panels get a fresh color palette of 13 neutral hues, from off-whites and cool grays to dusty blues. Available in three material options—Varia, Chroma, and glass platforms—which 3form says are durable and easy to clean. They also hold third-party certifications in several environmental sustainability programs. Varia and Chroma are offered in 4'-by-8' and 4'-by-10' panels and in a variety of thicknesses. *3-form.com*

> *To see more innovative products submitted to ARCHITECT's Spring 2021 Product Call, visit bit.ly/ARspc21.*



A WRB/AB system that won't compromise performance or design intent gives you the confidence that helps bring your vision to life. For products that work the way you work, trust DensElement® Barrier System and new DensDefy™ Liquid Barrier System, only from Georgia-Pacific.

Request a sample at DensDefy.com/Adaptability

Spring 2021 Product Call Highlights

Gen3 Prime Wall System, BamCore
BamCore uses bamboo's inherent strength to engineer a customizable, code-compliant, dual-panel, studless wall-framing solution that can eliminate the need for OSB, furring, jack and king studs, and even drywall. The wall system consists of an inner and outer 4'-by-8' BamCore panel with a top and bottom wood plate; insulation can later be blown into the cavity. BamCore fabricates the panels—with custom knockouts for services and fenestration—and then numbers, palletizes, and delivers them to the job site. No heavy equipment is needed to erect the walls. *bamcore.com*

ESD-411-CP Faucet and Soap Combo, Sloan
With an angular and prominently positioned design, this sensor-activated faucet and soap combo from Sloan's Chicago-inspired Clark Street collection brings precise angles into harmony with subtle curves that capture light and attention. The modular one-piece assembly attaches to the deck surface while a motor assembly suspended under the counter connects to the soap-dispenser spout and has a battery life of up to 45,000 activations. Ships with two bottles of foam soap. *sloan.com*

Solarvolt BIPV Glass Modules, Vitro Architectural Glass
These building-integrated photovoltaic modules can be used in exterior glass surfaces on commercial buildings, including balustrades and balconies, skylights, spandrels, and canopies. The BIPV modules passively generate solar power and offer shading, which can also reduce cooling costs. The modules can be sandwiched between two glass lites or manufactured using glass-film techniques. Available in nearly any shape, in sizes up to 98" by 146", and in customizable configurations. *vitrosolarvolt.com*

Fluropon Continuum, Sherwin-Williams
Developed using decades of weathering research, this metalescent coating for coil and extrusion applications—including curtain wall frames, louvers, sunshades, and soffits—comprises a mica-based formulation that eliminates the need for a clear coat. Applied in-factory in two coats and available in 120 standard colors or custom colors. *sherwin.com*

Americana, Landscape Forms With Loll Designs
A reinterpretation of the classic Adirondack lounge chair, Americana offers a wide and tall profile to accommodate a range of seating positions and to help with ingress and egress. Constructed of ultraviolet-resistant, post-consumer recycled plastic, the outdoor chair requires little to no maintenance. Its polyester powder-coated aluminum supports and under-structure will resist fading and chipping, while its HDPE construction will not get too hot or cold for year-round comfort, according to the manufacturer. Americana comes in four vibrant colors and with an optional tablet arm and bag hanger. *landscapeforms.com*

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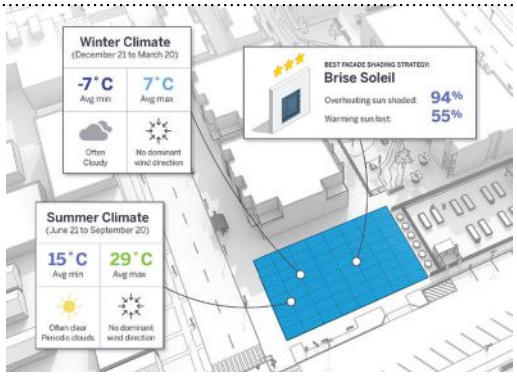
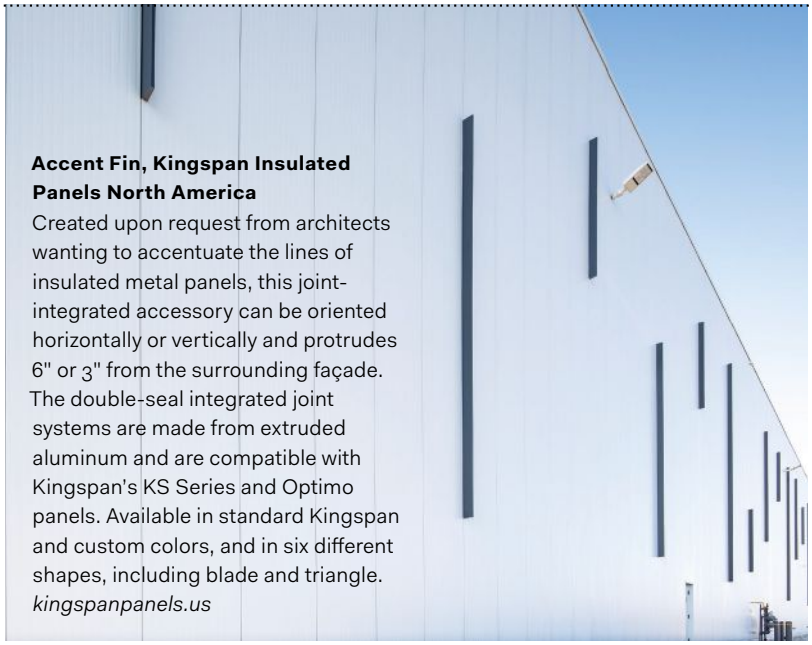
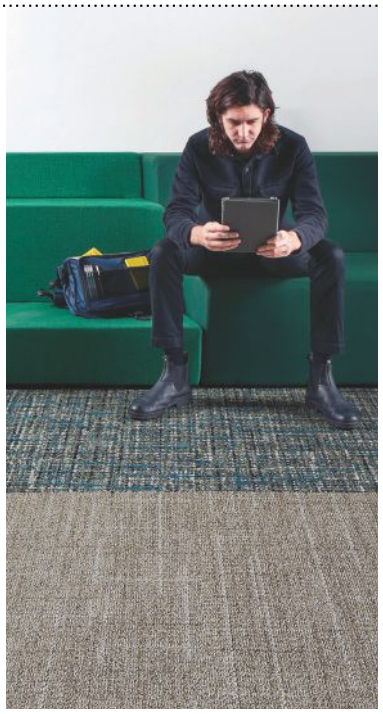
SketchUp PreDesign, Trimble
Through PreDesign, architects can test design strategies and understand the impact of climate and environment on a project at the conceptual design phase. By gathering climate data on a specific site, the software delivers information and insights into a design's architectural response, shading options, glazing size and type, daylighting, and potential for outdoor spaces. *trimble.com*



Ori, Focal Point
Inspired by origami, these eye-catching, sound-absorbing acoustic ceiling tiles come in 10 cut-and-folded shapes formed from a flat sheet of polyester felt that contains up to 50% recycled material. The tiles are designed to fit in 2'-square grid ceilings with 9⁄16" or 15⁄16" grids, can readily pair with architectural troffers, and offer an average NRC of 1.1. Available in more than two dozen colors, as well as custom designs and sizes. *focalpointlights.com*



Accent Fin, Kingspan Insulated Panels North America
Created upon request from architects wanting to accentuate the lines of insulated metal panels, this joint-integrated accessory can be oriented horizontally or vertically and protrudes 6" or 3" from the surrounding façade. The double-seal integrated joint systems are made from extruded aluminum and are compatible with Kingspan's KS Series and Optimo panels. Available in standard Kingspan and custom colors, and in six different shapes, including blade and triangle. *kingspanpanels.us*



Open Air, Interface
Designed with open spaces in mind, this modular carpet tile collection is carbon neutral across its full life cycle and Green Label Plus–certified by The Carpet and Rug Institute. The collection's premiere offering, Open Air Neutrals, comprises 22 geometric, linear, organic, and textured patterns that are available in 25cm-by-1m planks, as well as 50cm-square tiles, in both cool and warm neutral colors. Each product uses a tufted textured loop construction with 100% recycled content nylon. *interface.com*

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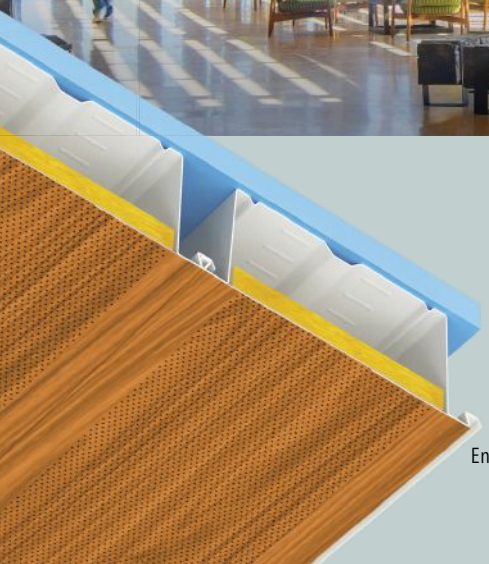

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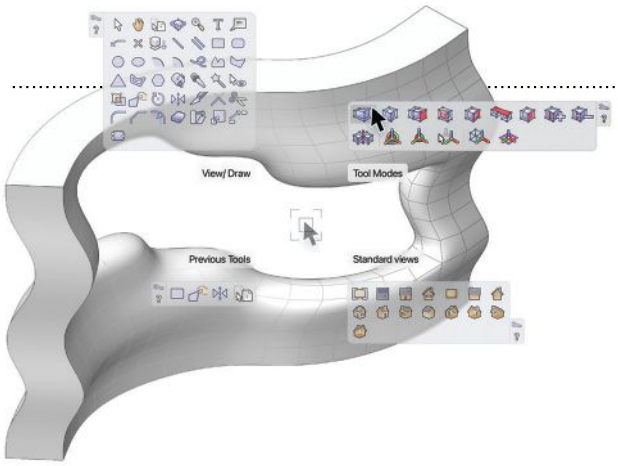
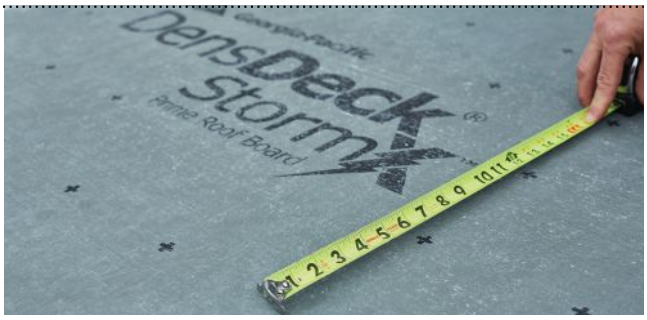


Vectorworks Architect 2021, Vectorworks
Supporting the entire design process from modeling to documentation, this BIM software's latest release offers a large number of import and export capabilities, support for OpenBIM and IFC, and interoperability with Microsoft Excel and Adobe PDF files. A new Materials feature allows users to define material graphical attributes and data in one location. *vectorworks.net*

SunGuard SuperNeutral Essential 50/25 Coated Glass, Guardian Glass
This blue gray–colored, low-E coating for exterior commercial applications can minimize the green look of glass and increase the visual comfort of occupants by reducing glare. It offers a visible light transmission of 50% and a solar heat gain coefficient of 0.25. The coating is applied on the number 2 surface of a standard insulated glass unit. *guardianglass.com*

DensDeck StormX Prime Roof Board, Georgia-Pacific
This high-performance gypsum roof cover board can help prepare commercial rooftops to withstand severe hail and extreme weather events. Classified for use in approved assemblies meeting FM Global's Very Severe Hail standard, the roof board resists dents and damage from hail and puncture from debris, and has increased resistance to moisture absorption, according to the manufacturer. *densdeckstormx.com*



Coterie, Carnegie Fabrics
Created in collaboration with Polish felt artist Anna Spakowska, this collection of four division panels provides visual and acoustical buffering for a variety of spaces. Crafted from plush Italian wool felt, the panels feature abstract geometric cutouts inspired by the traditional Polish pastry *faworki* ("angel wings"). Available in nine hues, each panel measures 47.5" wide, 118" tall, and 3.5mm thick. Panels can be suspended or floor-mounted using Carnegie hardware. *carnegiefabrics.com*

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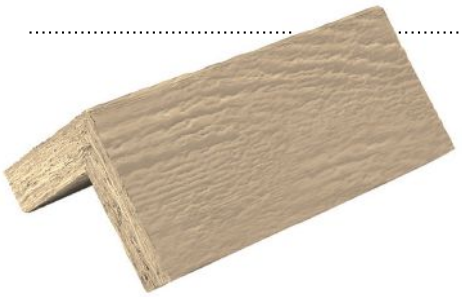
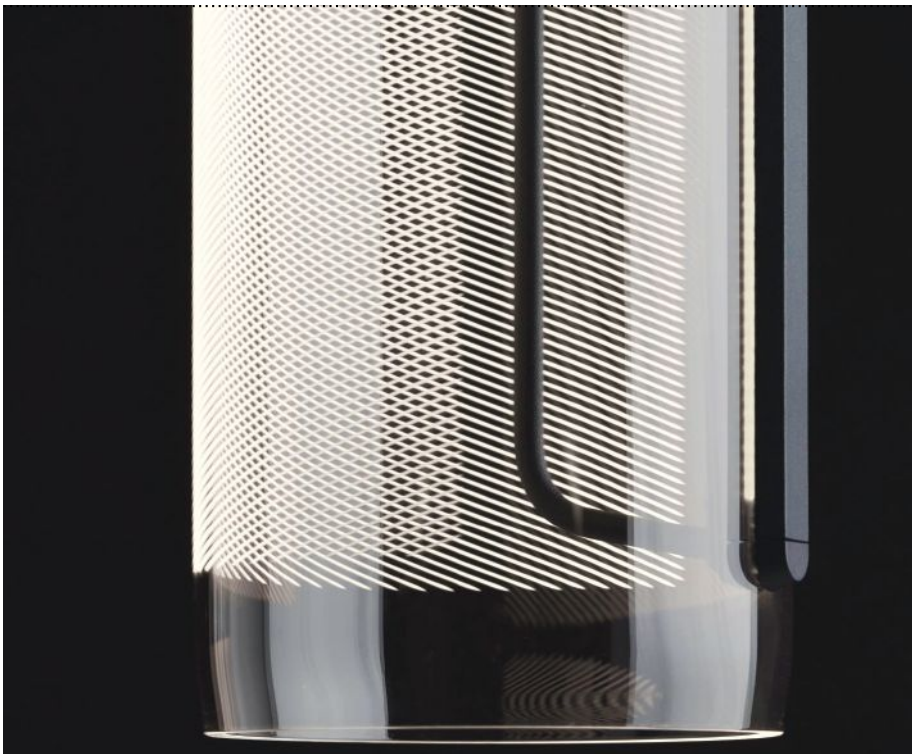


LP SmartSide Outside Corners, LP Building Solutions
These prefabricated trims create a clean corner look while eliminating the need to build corners during construction, improving jobsite efficiency. Available with a cedar-grained texture and pre-primed for painting, the trims are designed to resist water intrusion or seam separation. The 0.97"-thick pieces come in 10' lengths and 3.5" and 5.5" widths. *lpcorp.com*



Guise, Vibia
German designer Stefan Dietz combined Bohemian glass cutting, luminous street signage, and a contemporary vision for this collection of LED pendant and ceiling lamps, in which the light emanates from the piece of glass while the source remains invisible. The pattern of striations etched into the borosilicate glass refracts, radiates, and reflects the light coming from the fixture's longitudinal-located LED source. When switched off, the lamp seems to disappear. *vibia.com*

Handmade to Order, Walker Zanger
This customizable, single-batch ceramic tile collection was designed for those seeking aesthetic exclusivity and personalization in interior residential or commercial spaces. It includes 32 white clay body shapes varying from mesh-mounted mosaics to field and organic shapes. Out of the collection's 108 color options, 38 are new to the brand and were developed to create a spectrum of warm and cool tones. *walkerzanger.com*

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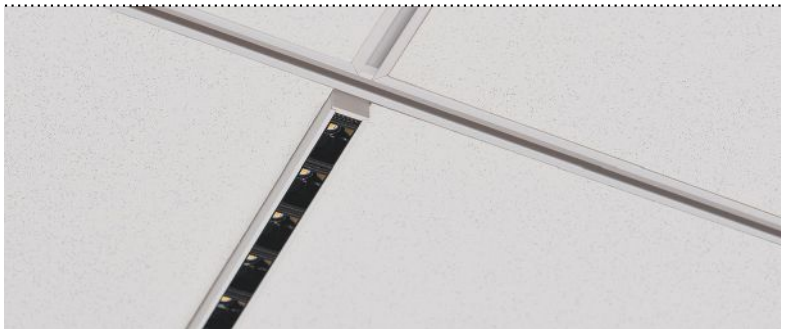
Spring 2021 Product Call Highlights

Purifii Aer Wall, Luminii

Designed with high-traffic commercial and occupied spaces in mind, this low-profile, upper air germicidal ultraviolet system has been engineered with industry-proven UV-C technology to eliminate most viruses, bacteria, and other microorganisms in the air—including SARS-CoV-2. As part of a portfolio of lighting products, Aer Wall uses LED technology to provide a continuous plane of UV-C light and can disinfect an environment at a faster rate than HVAC alone, eliminating up to 99.98% of pathogens, according to the manufacturer. *luminii.com*

ArmorGarde and ArmorDefend, Oldcastle BuildingEnvelope

These single-sourced, forced entry–resistant glass and glazing systems integrate with OBE's ArmorGarde and ArmorGarde Plus laminated safety glass—available in both monolithic and insulating glass units—to delay forced entry via a variety of means, including multiple attacks from bullets, bricks, wrenches, baseball bats, and even sledgehammers. The systems are designed and tested in ArmorDefend and ArmorDefend Plus storefront and entrance systems. Available with a 2" or 2.5" sight line and a 4.5" or 5" depth. *obe.com*



T-BAR LED 9/16" Multi-Reflector Lens, JLC-Tech

Designed to replace the cross members in suspended grid-ceiling systems, this lighting system consists of full-cutoff microreflectors and tight LED spacing for optimized glare control. The reflectors provide intense, direct, and uniform light on a desk or conference table, while creating a clean ceiling plane. Available with a metallized, black, or white finish, a low profile the height of a T-bar, and in 2' and 4' lengths. *jlc-tech.com*

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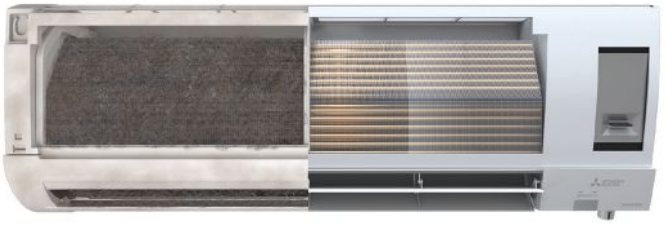
Spring 2021 Product Call Highlights

Weathered Plank, Dutch Quality Stone
Created by artisans based in Ohio's Amish country, the stone-composite veneer mimics the look of reclaimed barn wood using a molding process that captures the grain and character of natural wood, including knots, grooves, and nail holes. Made from a lightweight Portland cement–based aggregate, the 4"- or 6"-wide planks come in two color palettes, industrial gray or Winesburg. *dutchqualitystone.com*



Deluxe Wall-Mounted Single-Zone System With H2i Plus Technology, Mitsubishi Electric Trane HVAC
Equipped with Mitsubishi's Hyper-Heating Inverter technology, this single-zone system for residential and light commercial spaces can provide 100% heating capacity in outdoor ambient temperatures as low as -5 F. The company's Dual Barrier Coating on internal components helps minimize dirt, dust, oil, and grease accumulation (see above, right)—and thus maintenance. *mitsubishicomfort.com*

QuickDrain Shower Bench, QuickDrain USA
This ADA-compliant shower bench offers a place to sit, relax, or store items in the shower. Offered as a rectangular bench or as a large or small corner bench, with custom sizes available, and made with 100% recycled, 2" rigid-plastic foam panels sourced from up to 400 recycled water bottles. Can be assembled within hours and without mechanical fasteners. *quickdrainusa.com*

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Opinion: The Long Echo of Racism

TEXT BY DAVID WANG

With the growing calls for equity and social justice sparked by the #MeToo and Black Lives Matter movements and the surge in attacks against people of Asian descent, awareness of systemic racism has never been higher. Like many designers of color, during the course of my professional career I have been subject to acts of discrimination—acts that I inherently believe were racially motivated. That's the challenge of covert racism: It's hard to prove the reason or reasons behind these microaggressions, which is why so many of us suffer in silence.

I am sharing my experiences here for several reasons. I hope to empower others who find themselves in a similar predicament to recognize the signs of discrimination and to know they are not imagining these issues. I also hope others will not have to internalize the burden of being a victim.

Among many incidents in my career, three stand out. After working at a firm for several months, I asked my supervisor if opportunities were available to be involved with projects in the design phase. "Unfortunately, that's all that is available right now," was the dismissive reply, referencing the construction drawings I was slated for. I later learned in conversations with three other colleagues who started at the same time—and who happened to be white—that they had been specifically asked by their supervisors about their project and work preferences. During my entire tenure at the firm, I was never given this consideration.

The second incident was regarding a major client presentation. Two of my peers and I worked around the clock for two weeks straight. Because of skills I had gained from prior work experiences that my peers did not have, I was singularly responsible for creating the physical base model, 2D renderings, and 3D massing images.

The evening before the presentation, we convened with the team leaders to review the agenda and rehearse. My name didn't appear anywhere on the script—I was the only one among my peers without a role in the presentation. Trying to hide my disappointment, I asked a team leader if I should be in the room for backup. "Unfortunately, there aren't enough chairs," was the reply. It sounds as egregious now as it did then. Despite my performance, this manager did not want me at the client presentation—or invite me to the client dinner afterward with the rest of my peers. I later learned I was excluded from other client meetings. This was when I began to realize that no matter how well I performed, I would always be treated as a second-class employee because I didn't have the right "look."

The third incident led me to resign from a job. The company had mandated annual performance reviews of all employees to be completed by a set deadline. Being a hard worker with a strong skill set, I submitted a letter requesting a salary increase to human resources along with a positive preliminary review from my direct supervisor.

COURTESY DAVID WANG ARCHITECT INC.

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Opinion:
The Long Echo of Racism

The manager conducting my official review had been the source of several transgressions. When those incidents occurred, I had kept my mouth shut because I still believed that I could be successful if I just continued to work hard.

The weeks passed with no word from the manager. Other peers began discussing their reviews and raises to my growing frustration. When I followed up with a call to HR, I was simply told to be patient. In order to avoid the inevitable salary conversations at the time, I took to eating lunch at my desk alone.

Finally, a month after the company's deadline for reviews and still with no word from the manager of a forthcoming appointment much less the actual performance review itself, I resigned. In my one-line email, I made up an excuse that I was leaving due to a family illness. I did this to allow the manager to save face. I did this to bury my pain and to avoid having to admit they got the better of me.

I know these accounts are one-sided. I also know that the other parties involved may not remember me. I wish I could say the same and simply forget all of this. I hate myself—I absolutely hate myself—for not speaking up then. But I know that if I continued to stay quiet, nobody would ever know about these incidents or how they can take a toll on one's aspirations.

Writing this has been cathartic. I don't want anyone else to suffer in silence or isolation as I did. It took me years to speak of these events, and only now can I say, "May the bridges I burn light the way."

If you are dealing with covert or overt displays of racism or discrimination, the time has never been more appropriate to speak up and effect change. Tell HR, document everything, and use the power of your voice to change the course of action today. The passage of time alone will not dissipate your memories or heal your wounds. This I can assure you.

David Wang is the founder of David Wang Architect Inc., a full-service architectural design firm based in Toronto.

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UC Merced Pavilion | Courtesy SOM | Photo: Dave Burk

Courtesy SAFTI FIRST

HOW UC MERCED REINVENTS THE POSSIBLE

The California university sets a new standard in sustainability and functionality.

Much will be written in coming years about the University of California, Merced.

Some will marvel at how the institution started with an empty grassland field in 2002 and rose to its present stature as a major research university of nearly 9,000 undergraduate and graduate students on a residential campus of 14 buildings.

Others will study its groundbreaking achievements in sustainability, now a template of best practice in higher education. Many will learn from the school's historic public-private partnership (P3), the largest ever executed in the U.S.

Watching over all this since the inception of the master plan is Michael Duncan, FAIA, senior design partner in Skidmore, Owings & Merrill's San Francisco office. "This project is a privilege. Usually, higher education buildings are done one by one, with a master plan goal set out many decades in the future. Rarely does it come together so rapidly and at this scale," Duncan says.

UC Merced was developed in phases, with the $1.2 billion phase two portion completed last year. Duncan served as the phase two design leader, overseeing the work of a diverse architectural team. Recently Duncan discussed several aspects of the award-winning project.

- **Sustainability.** The school counts many firsts in its short history, including becoming the first U.S. public research university to achieve carbon neutrality, with all buildings certified LEED Platinum. "The lessons learned here show how an entire campus can perform sustainably. Others can study how the infrastructure works and apply the ideas to their campus," observes Duncan.
- **Densification.** "Phase two expansion allowed us think critically of the campus character," Duncan says. "We folded the campus back in on itself, blending the academic and housing cores. The heart and soul of the campus is now well-rooted in a tight footprint, without sprawl." Service vehicles, for example, use an innovative below-grade handling area to preserve a pedestrian-friendly environment. "There are no back doors," Duncan says.
- **Visual Communication.** To help achieve the connection to nature and daylight, glazing is "a big part of the campus language," the architect reports. Fire-resistive glass proved instrumental in expanding that vocabulary. Duncan cites two examples:

"We have a communicating stair in the dining hall that allows natural light and creates fire separation. It's important in helping bring people together. In the lab buildings there's fire-resistive glass adjacent to a chemical storage area. One is all about communication, the other about functionality."

The fire-resistive glazing came with a bonus. The production facility of Safti-First, the manufacturer, is a 10-minute drive from the campus, helping earn transit LEED points. Safti-First glazing was specified in eight buildings. Interior and exterior 1- and 2-hour fire-resistive glass, rated as ASTM E-119 walls, were installed using SuperLite II-XL. Full vision 60- and 90-minute doors were also installed.

For Duncan, the project is humbling. "I'm amazed projects this large and complicated can still come in on-time and on-budget. The school is a beacon of inspiration for the entire San Joaquin Valley."

Learn more about UC Merced and how Safti-First fire-resistive glass helps expand the campus design palette at **Safti.com**

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Insulated Roof Deck System Provides an Innovative, Streamlined Alternative to Traditional Low-Slope Roofing Materials

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LEARNING OBJECTIVES

1. Explain the history of low-slope commercial roofing and understand the technology behind the advanced design of an insulated roof deck system.
2. Describe the advantages of an insulated roof deck system and why it exceeds the typical materials used for low-slope roofing.
3. Explain diaphragm shear and describe the benefits offered by using the diaphragm insulated roof deck system.
4. Recognize the components for design and discuss installation methods used in insulated roof deck systems, as well as the benefits for green building certification.

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The commercial low-slope roofing market has grown to an estimated 1.8 billion square feet over the last decade. Most of the revenue lately has come from roof replacements, especially as older buildings require updates to conform to new and more stringent energy codes and modern materials are better equipped to handle a wide range of weather conditions. Growth is good, but higher demand, fewer skilled workers, and strict energy-efficiency regulations are making it more challenging for architects and contractors to provide long-lasting, cost-effective solutions.

A focus on sustainability, quality, and more streamlined project management requires a different kind of roofing product. Insulated roof deck systems provide a simpler product with better performance and environmental attributes. They are made of at least 30% recycled steel content, are recyclable or reusable, and enhance a building's structural integrity—all with a simpler, faster installation than traditional low-slope roofing materials.[1]

HISTORY OF LOW-SLOPE COMMERCIAL ROOFING

Because steep-slope roofs are known for their built-in ability to shed water, the demand for low-slope roofs didn't arrive until the Industrial Revolution. Larger buildings for factories meant that steep-slope roofs were less economical, and low-slope roofs proved to be more cost-effective and maximized the amount of available space.

The Certified Commercial Property Inspectors Association (CCPIA) commented that low-slope roofs were "a symbol of modernity," especially in the American West. It was common for buildings to feature a false front to hide a steep-slope roof.

Coal tar was the first low-slope roof membrane, which was waste from coal-gas production and, later, steelmaking. By the late 1800s, asphalt emerged as a new low-slope roof membrane. Both options were layered and applied over roofing felt on wood decks. This was the first-ever built-up roof.

Historically, all roofs were constructed with heavy beam-supported wood planks, which were between 1.5 and 2 inches thick. The heavy wood construction placed a significant amount of stress on the structure, and the wood was susceptible to expansion and contraction depending on the weather. Wood beams and planks also offered virtually no insulation.[2]

It wasn't until the 1960s that other roofing membranes, and insulation, began to be used. During this time, modified bitumen and single-ply roofing membranes were used and preferred for their waterproofing and durability properties.[3]

Insulated roof deck systems consist of factory poured in place foam insulation bonded between interior and exterior factory coil-coated steel skins. The exterior skin is combined with either a field-applied TPO or PVC membrane. Insulated roof deck systems feature a tongue-and-groove joint with a sealant that's factory-applied and combined with a field-applied perimeter bed sealant. Together, this assembly replaces traditional low-slope roofing products that require many components to achieve a sufficient air, water, and thermal barrier.

TRADITIONAL LOW-SLOPE ROOFING MATERIALS

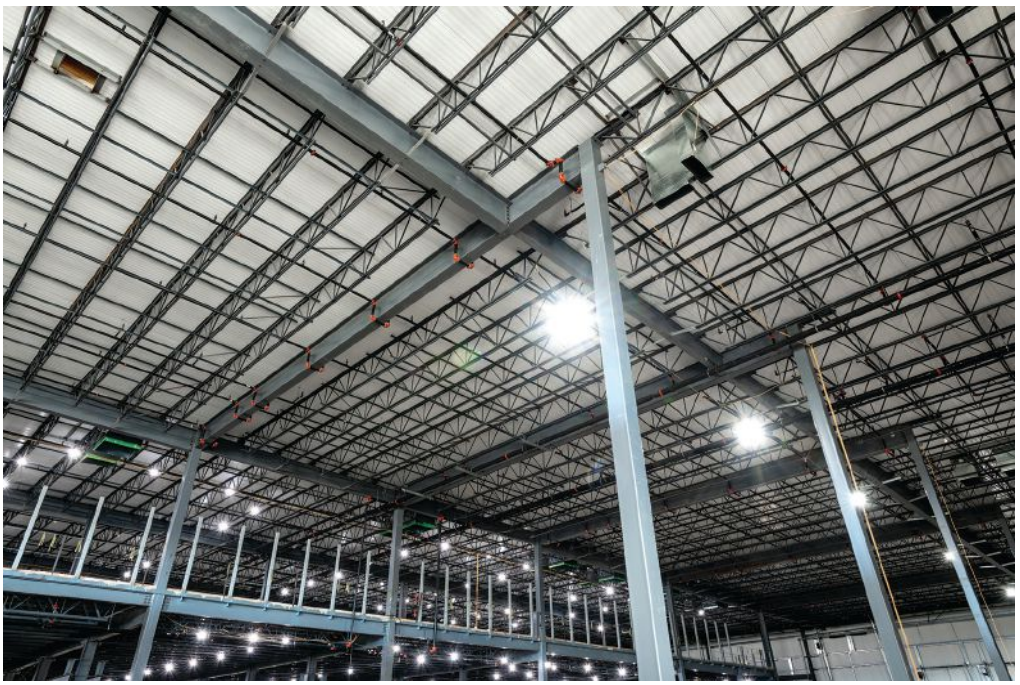
Traditionally, commercial buildings have a few standard options for low-slope roofs. These include ethylene propylene diene monomer (EPDM), also known as rubber roofing; thermoplastic polyolefin (TPO); polyvinyl chloride (PVC); and built-up roofing (BUR). The choice of which roofing material to use depends on several factors, such as budget, project application, desired aesthetic, and material availability.

EPDM, or rubber roofing, has the advantage of being the least expensive of traditional low-slope roofing options. It's a synthetic rubber material made up of ethylene, propylene, oil, and natural gas. It comes in white and black. EPDM has been in use for around 60 years and has a lifespan of about 25 years.

Rubber roofing is light and easy to install. Durability is overall good, the material won't scratch or scuff easily, and the black material can easily withstand UV rays. Despite these advantages, it's not the most aesthetically pleasing. Beyond that, the black material can become a burden on air conditioning systems because it absorbs so much heat and energy. It is also prone to damage from hail and other situations that could puncture the material. Finally, the adhesives used to bond seams can wear out over time and cause leaks, and if left untreated or undiscovered, lead to water damage.

TPO roofing is also relatively inexpensive and lightweight. The material is a single-ply membrane made in 5- to 12-foot widths. It comes in white, which helps to reflect UV rays. TPO roofs are installed using either adhesives or fasteners, giving the option of a more airtight and watertight seal. Unlike rubber roofs, TPO roofing is more puncture resistant. It's known to be rigid; durable; and resistant to mold, mildew, and bacteria.

PVC roofing is a single-ply membrane material composed of polyester acting as



Insulated roof decks can be integrated into the roof system design to enhance structural integrity and increase R-values per inch of thickness, something that traditional roofing solutions cannot efficiently match; the entire system is a continuous water and vapor barrier, and it acts as insulation and an engineered roof diaphragm.

GLOSSARY

Diaphragm: The structural element that transfers resistance loads from the building to the foundation or soil.

Dried in: The stage of building construction when the roof is protected and the entire building envelope is in place.

K-factor: Defines a material's thermal conductivity or the rate at which heat flows through it; a lower number indicates greater insulating ability.

C-factor: Heat transfer coefficient describing heat flow through the entire thickness of a material, not just 1 inch.

U-factor: Overall heat transfer coefficient describing heat flow through the entire thickness of a composite structure, including environmental components such as air-filled spaces.[26]

R-factor: Measures an insulating material's resistance to conductive heat flow; the higher the number, the better the insulating material.

Load path: Regarding vertical or lateral loads, load path concerns the transfer of forces through a structure.

Vertical load: Loads acting upon the structure in an up-and-down direction; examples include snow on the roof or building attachments like decks or multiple stories.

Lateral load: Loads acting upon the structure parallel to the ground; examples include seismic and wind forces.

Shear load: Ability of a wall system to withstand stress caused by lateral or vertical loads.

reinforcement between two layers of PVC; these layers include additives that provide UV stability and flexibility. PVC roofing is known for its durability, long lifespan, and chemical resistance. It is also extremely strong, can stand up to high winds, and has high solar reflectivity. PVC roofing materials come in 5- to 12-foot widths and various thicknesses, with the most common being 60-mil (0.06 inches). Like with TPO roofing, insulation is a separate material. PVC roofing tends to be more expensive than TPO.

Built-up roofing (BUR) has been in use for more than 100 years, though materials and installation techniques have continued to evolve. Modern BUR roofing consists of three layers: bitumen, ply sheets, and surfacing materials. The bitumen material may be hot, meaning it is heated to a liquid state during installation, or it may be cold and applied like an adhesive. Of the two, cold bitumen is more environmentally friendly. Ply sheets may incorporate various fabrics, such as asphalt, plastic, or rubber polymers. The layers join to create a membrane, and the roof itself is coated with a liquid or aggregate, like gravel.

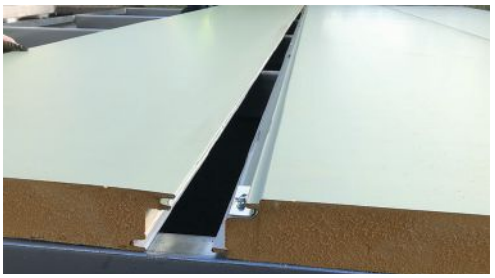
BUR roofing can have an incredibly long lifespan, ranging from 15 to 40 years. It offers excellent UV protection and water resistance but requires significant time, labor, and money to install. Common problems include open seams, blisters, undulations, and cracks.[4]

Challenges With Traditional Low-Slope Roofing Materials

Traditional low-slope roofing options generally have a few things in common:

- Substantial labor
  - On-site installation typically requires staging, setup, and construction.
- Several different types of chemicals and fasteners
  - Traditional low-slope roofing can use various chemical additives and extra fasteners in the installation process.
- Complex installation
  - Though some materials are better than others in this regard, traditional low-slope roofing materials involve a multi-step installation process.

Then there is the material and its impact on insulation. Even multi-layer materials may still require an additional, separate layer of insulation, or thicker membranes, to achieve satisfactory R-values for roofing. Traditionally, R5 per inch requires staggered rigid boards, which increases the thickness, and weight, of the roof.



Insulated roof deck systems consist of factory poured in place foam insulation bonded between interior and exterior factory coil-coated steel skins.

Roof fasteners also tend to detract from the overall aesthetic, as they are visible from inside the building.

INSULATED ROOF DECK SYSTEM

Insulated roof deck systems are a modern, more innovative solution for low-slope commercial roofing projects. Generally, insulated metal panels have acted as non-load-bearing wall and roof cladding materials to create high-performing building envelopes. However, the composite nature of IMPs creates a very rigid assembly when continuously fastened together and can act as a roof diaphragm.

Insulated roof deck systems consist of factory poured in place foam insulation bonded between interior and exterior factory coil-coated steel skins. The exterior skin is combined with either a field-applied TPO or PVC membrane. Insulated roof deck systems feature a tongue-and-groove joint with a sealant that's factory-applied and combined with a field-applied perimeter bed sealant. Together, this assembly replaces traditional low-slope roofing products that require many components to achieve sufficient air, water, and thermal barriers.

The innovation behind the material emphasizes project simplicity. Insulated roof decks can be integrated into the roof system design to enhance structural integrity and increase R-values per inch of thickness, something that traditional roofing solutions cannot efficiently match. The entire system is a continuous water and vapor barrier, and it acts as insulation and an engineered roof diaphragm.

According to Matt Nance, Business Development Manager for a national insulated metal panel manufacturer, "With the proper fastening and design, the shear load capacity of insulated roof deck systems is comparable to 1.5-inch-deep, 22-gauge B deck systems but without the need for welding decking to framing. Insulated roof deck systems can, therefore, provide structural support in addition to a fully clad thermal envelope."[5]

The ease of installation significantly reduces the amount of skilled labor required to install the material. There are fewer components, fewer penetrations, and fewer contracts to place for roof materials. The result is a roof system that requires less design and installation complexity and higher overall performance and sustainability when compared to a typical commercial low-slope roof. And because insulated roof deck systems are also sealed at the joint, construction can be staged ahead of time. As a result, the project can be completed faster and at lower overall cost.

Plus, with energy code requirements becoming more stringent, it's becoming a necessity to use building materials that focus on sustainability. Insulated roof deck systems' lifecycle reduces the product's carbon footprint through innovations in material content and installation methods. The environmental impact and cost of transportation are also reduced, as insulated roof deck systems require fewer vehicle miles

Insulated roof deck systems are composed of only two layers—a TPO or PVC membrane and an insulated metal deck panel—versus traditional low-slope roofing systems that require many components to achieve sufficient air, water, and thermal barriers.

to source and supply materials. There is also less material waste on site.

Insulated roof deck systems are low maintenance and add value to the structure. They offer a streamlined architectural appearance with a variety of interior color options.

STATE OF THE COMMERCIAL ROOFING INDUSTRY

In the past year, the roofing industry has been resilient. Contractors have adapted to change and continue to look toward the future with an eye on innovative opportunities. Commercial roof replacements make up most of the work, with about one-quarter of revenue coming from new roof construction. Low-slope roofing still holds the majority of market share among commercial roofing contractors, making up more than half of total roofing volume.[6]

At least half of roofing contractors indicated they expect to surpass the previous year's sales despite the pandemic in 2020, and profit margins remained strong. The outlook for the rest of 2021 and through 2023 remains positive.

A shortage of qualified workers is a top challenge, in addition to bidding wars and building material costs. This can be especially challenging for contractors still using traditional roofing products that require a significant amount of labor to install.

Single-ply roofing products, such as those mentioned above, remain at the top of preferred materials—TPO, EPDM, and PVC being the most popular. Metal and single-ply roofing products are growing quickly, however. 67 percent of commercial roofing contractors expect the sales of single-ply roofing products to increase in 2021 and beyond.[7] In North America, only about 1 in 10 roofing projects utilize IMPs, and most IMP installations are for walls. Europe, by contrast, uses IMPs in about half of all building projects and in most of their roofing applications.[8]

This article continues on http://go.hw.net/AR6217.
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QUIZ

1. _____ was the first low-slope roof membrane.
   A Asphalt
   B Coal tar
   C Modified bitumen
   D Single-ply roofing membranes

2. Insulated roof deck systems provide a barrier against:
   A Air
   B Water
   C Thermal
   D All of the above

3. About how many contractors expect metal roofing products to experience an increase in demand?
   A 25%
   B 50%
   C 75%
   D Nearly all

4. Insulated roof deck panels can achieve R-values ranging from _____.
   A 12 to 50
   B 16 to 60
   C 16 to 62
   D 20 to 50

5. Diaphragm designs can withstand lateral loads, which means they can resist:
   A Wind
   B Seismic forces
   C Both A and B
   D Neither A nor B

6. Non-diaphragm panel designs can resist the following:
   A Wind uplift loads
   B Seismic forces
   C Both A and B
   D Neither A nor B

7. Examples of vertical loads include all the following EXCEPT:
   A The building's own weight
   B Multiple stories
   C Snow on the roof
   D Wind

8. An insulated roof deck diaphragm shear application reduces the amount of _____ required for the project.
   A Fasteners and structural steel
   B Structural steel and insulation
   C Rigid boards
   D None of the above

9. What is the minimum slope for an insulated roof deck?
   A 1/8:12
   B 1/2:12
   C 1/4:12
   D 3/4:12

10. What is the minimum amount of recycled steel used to manufacture insulated roof deck panels?
    A 25%
    B 30%
    C 35%
    D 40%

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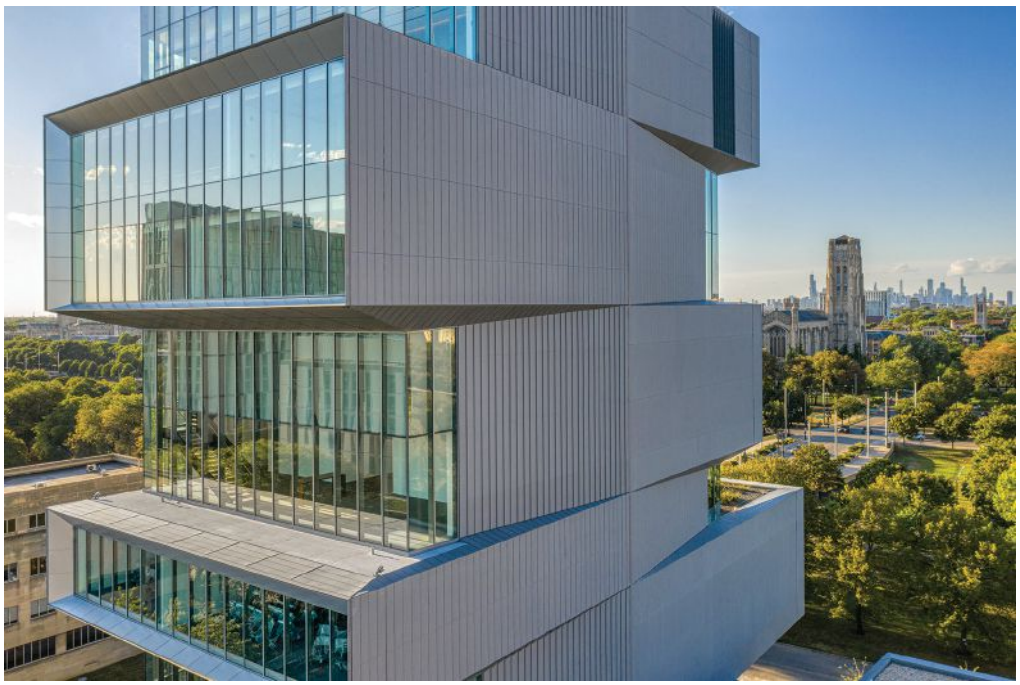

Photo credit: @ Brett Beyer

LEARNING OBJECTIVES

1. Understand the basic design principles behind LEED, Net Zero, and Passive House buildings.
2. Examine how technologically advanced metal siding and roofing products can be used in sustainable building design.
3. Discover how these innovative metal building technologies can help projects meet LEED, Net Zero, and Passive House standards.
4. Explore case studies where metal building products were used to meet green building standards in both commercial and residential projects.

CONTINUING EDUCATION

This course is approved for AIA & GBCI Learning Unit Credits. GBCI AIA Continuing Education Provider

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INTRODUCTION: ENERGY AND THE U.S. BUILDING SECTOR

As global temperatures rise alongside energy prices, many individuals, corporations, cities, and countries are striving to mitigate climate change and invest in renewable resources. Commercial and residential buildings alone are responsible for approximately 40% of total U.S. energy consumption.[1] This puts architects, engineers, and other design professionals in a unique position to help effect positive change.

The Whole Building Design Guide (WBDG) maintains the building sector can help to reduce the nation's energy consumption "by incorporating energy-efficient strategies into the design, construction, and operation of new buildings and undertaking retrofits to improve the efficiency of existing buildings." On- and off-site renewable energy sources can further help to address climate change by lessening dependence on fossil fuels.[2]

Currently, oil, gas, and coal account for about 80% of U.S. energy needs,[3] and renewable electricity accounts for nearly 20% of total installed capacity and almost 18% of total electricity generation. Of that, hydropower is responsible for about 42% of renewable electricity generation, wind for 35%, solar for 11%, biomass for 9%, and geothermal for 2%.[4]

U.S. trends, however, demonstrate that renewables are on the rise. In 2017, renewable use increased by 7.4% while natural gas, nuclear, and coal decreased by 1.4%, 0.1%, and 2.6%, respectively.[5] Renewables are also responsible for around 60% of U.S. electricity capacity additions,[6] which can be defined as "the maximum output of electricity that a generator can produce under ideal conditions."[7] In other words, increasing the amount of installed renewables equates to their ability to supply larger quantities of the country's energy needs, making the U.S. less reliant on fossil fuels. For instance, as solar electricity capacity has increased in recent years, coal-fired electricity generation, or the amount of energy produced over a designated time period, has decreased.

For those in the architecture, engineering, and design community, reducing energy use in general and constructing more energy-efficient buildings can lead to long-term

cost savings for home and business owners, in addition to environmental benefits. The WBDG recommends the following strategies for energy-efficient building design:

- Reduce heating, cooling, and lighting demand through passive strategies such as climate-responsive design, daylighting, and conservation practices.
- Specify efficient HVAC and lighting systems that consider part-load conditions and utility interface requirements.
- Employ renewable energy sources such as solar heating for hot water, photovoltaics, geothermal space heating, and groundwater cooling, sized for the reduced building loads.
- Optimize building performance by employing energy modeling programs during design.
- Optimize system control strategies by using occupancy sensors, CO2 sensors, and other air-quality alarms during operation.
- Monitor project performance through a policy of commissioning, metering, annual reporting, and periodic recommissioning.
- Consider retro-commissioning of buildings that were never originally commissioned.
- Integrate water-saving technologies to reduce the energy burden of providing potable water.[8]

Making buildings more energy efficient must involve materials, specifications, design, construction, building envelope, energy systems, and renewables. This course will specifically examine the ways in which technologically advanced metal siding and roofing products can be used in energy-efficient building design and to help achieve sustainability goals such as LEED, Net Zero, and Passive House standards.

STRUCTURES AND SUSTAINABILITY: LEED, NET ZERO, AND PASSIVE BUILDINGS

LEED

One of the most well-known green building certifications is the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) rating system. It is globally recognized and is "the most widely used green building rating system in the world."[9] Its overall goals are "to transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves quality of life" by "using less energy and water, avoiding waste, saving on maintenance costs, improving indoor air quality, offering comfort to [...] occupants, and creating less environmental burden on [the] community."[10]

LEED "is for all building types and all building phases including new construction, interior fit outs, operations and maintenance, and core and shell."[11] More specifically, LEED provides guides to certification for project teams, including "Commercial," "Neighborhood Development," "Residential," "Volume Supplement," and "Cities & Communities." These guides include policies, procedures, and pricing, and detail the ways in which design professionals can earn one of four LEED rating levels—Platinum, Gold, Silver, and Certified—that are awarded based on points earned within the rating system. While there are some mandatory prerequisites, other credits are optional.

Once a project team can demonstrate it has met the mandatory prerequisites and has chosen credits to pursue, as well as having performed various calculations and analyses,

GLOSSARY

Above Sheathing Ventilation (ASV) Spacer Shims—a new product on the market made of an engineered thermoplastic material; ASV spacer shims are designed to be stackable and provide ventilation spaces in increments of 3/8 inches up to 1 1/8 inches.

Insulated Metal Panels (IMPs)—a single unit comprised of insulation sandwiched between two layers of metal skin, which minimizes labor and material costs.

International Living Future Institute (ILFI)—mission "to lead the transformation toward a civilization that is socially just, culturally rich, and ecologically restorative" in order to "reconcile humanity's relationship with the natural world."

Leadership in Energy and Environmental Design (LEED)—"the most widely used green building rating system in the world." Its overall goals are "to transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves quality of life" by "using less energy and water, avoiding waste, saving on maintenance costs, improving indoor air quality, offering comfort to [...] occupants, and creating less environmental burden on [the] community."

Passive House Institute (PHI)—founded in Germany in 1996 and is a pioneer in energy-efficient construction and renovation.

Passive House Institute U.S. (PHIUS)—developed the *PHIUS+ Passive Building Standard – North America*; the standard takes climate conditions into account as well as materials and changing markets across the U.S.; depending on the location of a project site, some standards will be easier or more difficult to meet than others.

Solar Air Heating Panels—also known as transpired solar collector wall panels and are a simple, renewable, and efficient technology that uses the sun as a source of heat; once installed on building walls, these panels can be used for heating building space, utilizing outside air, processing hot air trapped in ceilings, and subcooling air.

Solar Reflectance (SR)—"the ability of a roof to reflect solar energy."

Solar Reflectance Index (SRI)—"Solar Reflectance Index is a measurement of the solar reflectance and thermal emissivity of materials and is an indicator of how hot the material is likely to become when solar radiation is present on the surface. The lower the SRI, the hotter a material may become in direct sunlight. The higher the SRI, the greater the surface's capability to reflect and release heat from the sun."

Thermal Emittance (TE)—"the ability of a roof to radiate absorbed heat."

Zero Energy (ZE) Certification—one of the programs geared toward helping the ILFI achieve its global sustainability goals; "was created to allow projects to demonstrate zero energy performance, building an advanced cohort of projects with the integrity of third-party performance certification."

Zero Net Energy Building—is "a highly efficient building that produces on-site, or procures, enough carbon-free renewable energy to meet building operations energy consumption annually."

it can apply for LEED certification. The USGBC in conjunction with Green Business Certification, Inc. (GBCI) will then award a certification based on the number of points a project has earned. For instance, commercial Platinum Certification requires 80 or more points, Gold 60–79, Silver 50–59, and Certified 40–49. For detailed information on how to meet LEED standards, earn LEED credits, and apply for LEED certification, interested parties should review the relevant USGBC "Guide to LEED Certification."

Overall, building green and becoming LEED certified begets a variety of benefits:

- Helps to achieve global pollution-reduction goals.
- Reduces carbon emissions, energy, & waste.
- Conserves water.
- Prioritizes safer building materials.
- Lowers human exposure to toxins.
- Offers operating and maintenance cost savings.
- Increases asset value in new builds & retrofits.[12]

CASE STUDY 1: RUBENSTEIN FORUM

Location: University of Chicago campus, Chicago, IL
Architects: Brininstool + Lynch and Diller Scofidio + Renfro
Contractor: Turner Construction
Metal Wall Panel Installer: Tuschall Engineering
Project Type: Institutional
Size: 97,000 sq. ft.

Background

The Rubenstein Forum, located across from Rockefeller Chapel on Chicago's Midway Plaisance, has a two-story base and an eight-story tower. However, architects and occupants alike view the Rubenstein Forum as organized into stacked, diverse neighborhoods offering "formal and informal, calm and animated, focused and diffused, scheduled and spontaneous" spaces to engage in intellectual dialogues, workshops, and lectures.[13]

Brininstool + Lynch note that each neighborhood "coalesces around a central private social lounge that offers a sense of community and identity."[14] As visitors to the Forum climb higher in the building, "there is a progressive retreat from the everyday to more contemplative spaces with dramatic views of Chicago and Lake Michigan."[15] Rather than being cut off from external surroundings, the Rubenstein Forum has no front or back but instead offers 360-degree views that present limitless perspectives of Chicago.

All of the building is post-tension concrete slabs, and large spans are supported by shear walls and four columns at the center of the building. A 40-foot-long cantilever begins where the glass ends on the north side of the building and creates a large covered plaza. Currently, LEED Gold certification is being pursued.

The Building Envelope and Façade

The innovation of the Rubenstein Forum extends to its building envelope and façade. Giannantonio Bongiorno, from Diller Scofidio + Renfro and design architect on the Rubenstein Forum, likens the skin of the building to the rings of a tree: "The skin of the building has been designed as a series of envelopes" much like when a cut tree displays its inner rings. "In a similar way," continues Bongiorno, "we wanted to show an interior skin and an outer skin. That's why we developed this specific language of chamfers around the glass opening that then connect with the interior skin, which in some locations is drywall and in others is chamfered metal panels."

Jim Tuschall, Tuschall Engineering, states that the concept of tree rings, or a series of envelopes, is specifically "a rainscreen" design. Most of the metal panels [on the structure] are over a poured in place concrete structure. They put a weather resistant barrier on concrete, then furring, then insulation, then another layer of furring, then the metal panels on top of that. Everything is a vertical orientation."

Photo credit: @Brett Beyer

These concepts of verticality and connectivity continued to the exterior of the building where the spaces of the interior neighborhoods were clearly delineated in a series of stacked "boxes." Bongiorno maintains, "The façade of the building is an integral part of this idea of being tailored with a design that connects glazed surfaces with opaque surfaces." Similarly, the assembly rooms that face north are connected with the social spaces that face south, most of which are also chamfered.

To express the idea of connectivity on the façade, the design team opted for 1-millimeter-thick custom zinc panels. "Zinc," says Bongiorno, "is a natural, durable material that is timeless and creates its own patina that protects the material for a long time. The beauty of the material varies in color throughout the day, reflecting sunlight." Form and function were equal considerations for the design team, and zinc offered both beauty and resistance to corrosion in a multi-faceted façade. The university also symbolically valued the concept of timelessness.

Vertical panels further accentuated the height of the building and created a continuous variation between vertical and horizontal surfaces. One of the challenges of the façade related to sub-framing panels, notes Bongiorno, and "trying to avoid oil canning. We had to make sure alignment of the panel was consistent across the project and make sure that all of the soffits were coming together at the correct angle at the right location."

As the *Chicago Tribune* notes, the Rubenstein Forum "offers a powerful study in projections and recesses. Its in-out visual rhythms make it an arresting presence" where passersby can "gaze into its double-height meeting spaces" and the energy of its rooms "enliven the building's surroundings."[16] The concept of connecting neighborhoods and individuals, then, extends beyond the Rubenstein Forum and out into Chicago.

Net Zero: The International Living Future Institute's Zero Energy Certification

The International Living Future Institute (ILFI) has a mission "to lead the transformation toward a civilization that is socially just, culturally rich, and ecologically restorative" in order to "reconcile humanity's relationship with the natural world."[17] One of the programs geared toward helping the ILFI achieve its global sustainability goals is the organization's Zero Energy (ZE) Certification. The ZE Certification "was created to allow projects to demonstrate zero energy performance, building an advanced cohort of projects with the integrity of third-party performance certification."[18]

A zero net energy building is "a highly efficient building that produces on-site, or procures, enough carbon-free renewable energy to meet building operations energy consumption annually." This definition can be applied to both new and existing buildings, and, generally speaking, can be achieved by first reducing carbon-based energy consumption "through building design strategies and efficiency measures" and next "through on-site renewable energy generation."[19]

This article continues on http://go.hw.net/AR6216. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

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ATAS International, Inc. is a leading manufacturer of metal wall cladding, roofing, ceilings, interiors, perimeter edge metal, and accessories. The ATAS portfolio features an expansive selection of products available in aluminum, steel, zinc, stainless steel, and copper. With sustainability at the forefront of modern building design, ATAS proudly supports green building objectives. For more information, visit www.atas.com or call 610.395.8445.

QUIZ

1. Commercial and residential buildings alone are responsible for approximately ____ of total U.S. energy consumption.
   a. 20% b. 30%
   c. 40% d. 50%

2. Currently, oil, gas, and coal account for about _____ of U.S. energy needs.
   a. 80% b. 70%
   c. 60% d. 50%

3. Which of the following is a strategy recommended by the WBDG for energy-efficient building design?
   a. Specify efficient HVAC and lighting systems that consider part-load conditions and utility interface requirements
   b. Optimize building performance by employing energy modeling programs during design
   c. Employ renewable energy sources such as solar heating for hot water, photovoltaics, geothermal space heating, and groundwater cooling, sized for the reduced building loads
   d. All of the above

4. The PHIUS+ Passive Building Standard – North America was first released in _____.
   a. 2015 b. 2016
   c. 2017 d. 2018

5. Which of the following can be described as a single unit comprised of insulation sandwiched between two layers of metal skin?
   a. Solar air heating panel b. Insulated metal panel
   c. Solar-ready roof system d. Above sheathing ventilation

6. According to the course, _____ is the optimal space needed to achieve continuous air space from the eave to the ridge when using above sheathing ventilation (ASV) spacer shims.
   a. 3/8″ b. 1 1/8″
   c. 3/4″ d. 2″

7. In which of the following categories can metal components contribute to LEED points?
   a. Integrated Process, Heat Island Reduction, and Rainwater Management
   b. Outdoor Water Use Reduction and Indoor Water Use Reduction
   c. Optimize Energy Performance and Renewable Energy Production
   d. All of the above

8. Which of the following is the result of an equation where the value of a number, ranging from 0 to 100, indicates the coolness of a roof (the higher the value, the cooler the roof)?
   a. SRI b. SR
   c. TE d. IMP

9. In April 2020, Metal Construction Association (MCA) released an Environmental Product Declaration (EPD) for roll-formed aluminum and steel cladding products, which are an environmentally responsible design choice that feature high recycled content, low maintenance, and long service life; the metal used in panels is also _____ recyclable at the end of its useful life.
   a. 75% b. 88%
   c. 97% d. 100%

10. The Rubenstein Forum, located on the University of Chicago's campus, is currently pursing LEED _____ certification.
    a. Certified b. Silver
    c. Gold d. Platinum

Modern Architectural Benefits and Design Considerations of Molded Brick

Presented By:

BELDEN
THE BELDEN BRICK COMPANY

Brick is one of the oldest known building materials and is still in demand today for its sustainability, appearance, and durability properties.

LEARNING OBJECTIVES

1. Explore brick-building history, benefits, and trends, and understand the differences between molded and extruded brick.
2. Review brick's manufacturing process, and identify its sustainability properties.
3. Illustrate brick's physical properties through ASTM standards and classifications.
4. Describe different types of brick and common functions, and envision the creative application of various special shapes and sizes.
5. Specify planning and design details for brick walls, including key installation considerations.

CONTINUING EDUCATION

This course is approved for AIA Learning Unit Credit.

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A BRIEF HISTORY OF BRICK BUILDING

Bricks are one of the oldest known building materials in the world, with brick buildings discovered in ancient Jericho and Egypt. The use of bricks in various applications dates to ancient Rome, when Roman builders constructed roads, buildings, walls, forts, aqueducts, arches, and vaults. In fact, the Romans were responsible for bringing the art of brick building to Europe. Brick architecture would come and go throughout the next few thousand years, and each region had its own style and manufacturing process depending on climate and available materials.

In the U.S., bricks first appeared in the early 17th century thanks to Dutch and British immigrants. For hundreds of years, bricks were made at the jobsite and molded by hand, up until about 1885 and the Industrial Revolution. Advancements in brick machinery helped to make urban expansion possible, with most buildings in cities like Boston and New York City largely constructed from brick. The Empire State Building, for example, was made from about 10 million bricks.

As time went on, bricks were used in more than just commercial structures in the U.S. In the 19th century and onward, U.S. homes started to incorporate brick exteriors. Bricks are naturally non-combustible and fire-resistant, and their weather-resistant durability has helped keep brick building a mainstay in the U.S. and worldwide. They add a unique character and look to any project while outlasting many other types of materials. And with modern manufacturing, molded bricks can be made into almost any shape, color, and texture, giving architects and builders almost unlimited flexibility and creativity in building design.

WHY BUILD WITH BRICK?

The soft edges, warm colors, and varying textures common to molded brick lend it to interesting architectural statements. Using projections, recesses, varying unit orientations, and shapes, molded brick offers limitless character to any design. Its long lifespan ensures that unique designs are built to last.

Brick is low-maintenance, durable, doesn't need to be painted, and it won't rot or color-fade. Brick is non-combustible and can even help contain a fire, plus it offers an excellent barrier against the elements. Some homeowner insurance companies will even offer discounts on homeowner insurance for homes with brick exteriors, for these reasons. It's estimated that 34 percent of homeowners ranked brick as their top choice for a home exterior … and were willing to pay more for it. Brick homes tend to have higher resale values, too.

When used as both a home's exterior and its structure, brick construction lends itself to a more energy-efficient, sound-resistant, and structurally sound home compared with using brick with a traditional load-bearing wall. Given fluctuating lumber costs, using bricks provides another cost advantage to building projects.

Brick is also environmentally friendly. It's made from some of the most abundant natural materials on Earth—clay and shale—and most brick manufacturers strive for a sustainable manufacturing process. Plus, it's recyclable. Bricks that are torn down from buildings or homes can be recycled and reused in a few ways, such as:

- Repurposed into retaining walls or walking paths,
- Ground up for use in sub-base materials, or
- Chipped into small pieces for use in permanent landscaping mulch.

MOLDED AND EXTRUDED BRICK: TWO DIFFERENT LOOKS

Modern bricks are manufactured as either molded or extruded. Both are suitable in a wide range of applications.

Molded brick is the traditional method of forming brick. It's the modern equivalent of ancient brick building. Molded bricks are known for their distinct character and textural effects.

Extruded brick is made using an automated manufacturing process. Long strands of brick are cut into uniform units using a die machine press and wire cuts. Extruded brick has crisp edges, unlike molded brick's softer edges.

The textural effects of molded brick can be enhanced by varying position in the wall and bond patterns, the inclusion of architectural design features such as quoin corners, and structural elements such as arches.

The Brick Industry Association (BIA) defines molded brick, or soft-mud brick, as brick that is produced by molding relatively wet clay (20–30 percent moisture) by a hand or machine process. When the insides of the molds are sanded to prevent the sticking of the clay, the product is called sand-struck brick. When the molds are wetted to prevent sticking, the product is referred to as water-struck brick.

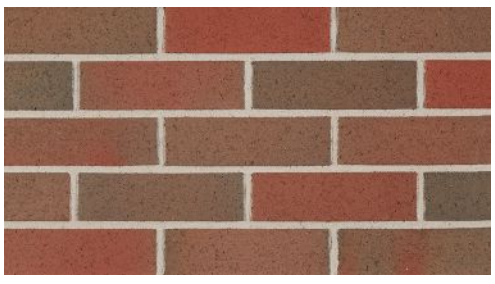
In a dry-press process, suitable for clays of low plasticity, clay is mixed with a minimal amount of water (up to 10 percent) then pressed into steel molds under pressures from 500 to 1500 psi (3.4–10.3 MPa) by hydraulic or compressed-air rams.

There are three types of molded brick:

- Straight-edged or machine-molded,
- Antique texture brick, which is made on a machine but not pressed as hard, and
- Handmade brick, which has more voids and folds, and arguably the most character.

The BIA defines extruded brick, or stiff-mud brick, as brick that is produced by extruding a stiff but plastic clay (12–15 percent moisture) through a die. Most extruded bricks have perforations, core holes, a smooth surface, and clean edges.

There is no right or wrong answer when deciding between molded or extruded brick in a project. The decision comes down to design preferences and desired aesthetic. Molded brick produces a softer, warmer, and more authentic look than extruded brick, while extruded brick results in a uniform, almost institutional appearance.



On the left, the uniform lines of extruded brick, versus the softer edges of molded brick on the right.

TRENDS IN BRICK DESIGN AND BUILDING

BIA reports that monochromatic colors, primarily whites, blacks, light and mid- to dark grays, are trending for both residential and commercial brick projects. The West Coast is favoring limewashed and whitewashed brick. Brick, with its vast design flexibility, is also being used to help propel the trend of outdoor living spaces.

GLOSSARY

Back Arch: A concealed arch carrying the backing of a wall where a lintel carries the exterior facing.

Jack Arch: Also known as a flat or straight arch, a jack arch features horizontal or nearly horizontal upper and lower surfaces.

Brick Type: Designation for facing brick; controls tolerances for chippage, size and distortion. Noted as FBS, FBX, and FBA for facing brick; and HBS, HBX, HBA, and HBB for hollow brick.

Corbel: A shelf or ledge formed by projecting consecutive rows of masonry units out from the face of the wall.

Frog: Depressions in brick, usually located on one bed surface. Frogs are found in the molded brick manufacturing process and assist in the filling of the corners of the mold.

Hacking: The procedure of stacking brick in a kiln or on a kiln car.

Rowlock: A brick laid on its face edge so that the normal bedding area is visible in the wall face.

Soldier: A stretcher set on end with face showing on the wall surface.

Stretcher: A masonry unit laid with its greatest dimension horizontal and its face parallel to the wall face.

Molded Brick: Also known as soft-mud brick, molded brick is produced by molding relatively wet clay (20–30 percent moisture) by a hand or machine process.

Extruded Brick: Also known as stiff-mud brick, extruded brick is produced by extruding a stiff but plastic clay (12–15 percent moisture) through a die. Most extruded bricks have perforations, core holes, a smooth surface, and clean edges.

Vitrification: Part of the firing process in brick manufacturing; allows clay to become a hard, solid mass with low water absorption.

Mixed materials are becoming popular with commercial brick applications, where brick is paired with metal, glass, steel, or wood. Bright pops of color are popular with new glazes and allow customers to experiment with the standard color palette. New coated brick products, like grays that complement whites, and a shift to linear styles and elongated sizes are also trending with commercial buildings.

Patterning and creative layering techniques elevate a simple brick façade into a more sophisticated, eye-catching design. Adding bricks that are laid at different depths is a way to add dimension and impact to feature walls and bespoke looks that combine contrasting colors and textures.

Thin brick is one way that residential and commercial applications are blending vintage with contemporary design schemes. It's being used as exposed brick interior walls, backsplashes, and floor applications, as well as in renovation and refurbishment projects.

MOLDED BRICK MANUFACTURING PROCESS

Molded brick will look slightly different depending on which region it's manufactured in. Natural differences in soil types and composition result in bricks with notable appearance differences; for example, brownish-gray molded bricks are more common in the Southeast U.S. and red molded bricks are more common in the Northeast U.S.

Regardless of where the raw materials come from, there are six general phases to manufacturing molded bricks. They are:

1. Mining and storing raw materials
2. Preparing raw materials
3. Forming the brick
4. Drying
5. Firing and cooling
6. De-hacking and storing finished products

Mining and storing raw materials

Clays occur in three principal forms, all of which have similar chemical compositions but different physical characteristics.

- Surface clays, found near the Earth's surface, may be the upthrusts of older deposits or more recent sedimentary formations.
- Shales are clays that have been subjected to high pressures until nearly hardened into slate.
- Fire clays are usually mined at deeper levels and have refractory qualities.

All three types of clay are composed of silica and alumina with varying amounts of metallic oxides. Metallic oxides act as fluxes, promoting fusion of the particles at lower temperatures. Metallic oxides influence the color of the fired brick. The manufacturer minimizes variations in chemical composition and physical properties by mixing clays from different sources and different locations in the pit. Chemical composition varies within the pit, and the differences are compensated for by varying manufacturing processes.

As a result, brick from the same manufacturer will have slightly different properties in subsequent production runs. Further, brick from different manufacturers that has the same appearance may differ in other properties.

Surface clays, shales, and some fire clays are mined in open pits with power equipment. Then the clay or shale mixtures are transported to plant storage areas. Normally, several storage areas (one for each source) are used to facilitate clay blending.

Preparing raw materials

To break up large lumps and stones, the material is processed through size-reduction machines before mixing the raw material. Usually, the material is processed through inclined vibrating screens to control particle size. Blending produces more uniform raw materials, helps control color, and allows raw material control for manufacturing a certain brick body.

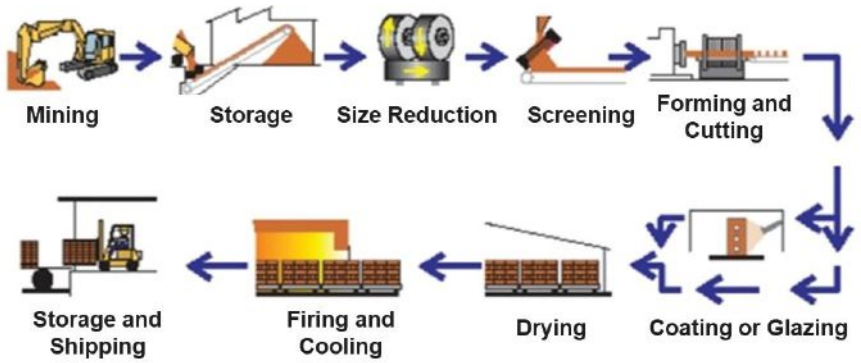
Forming the brick

Tempering, the first step in the forming process, produces a homogeneous, plastic clay mass. Usually, this is achieved by adding water to the clay for a mixture that is 20–30 percent water. After mixing, the plastic clay mass is ready for forming, by either hand or machine.

In the soft-mud or molded process, mold lubricants (either sand or water) are used for ease of release and to impart color and texture. When machines are used in the soft-mud process, a soft column of the mixed clay is extruded and cut into slugs. The soft clay slugs used in molded brick production allow for the character common to hand-molded brick. The molded clay slugs are introduced into a hopper. Lined molds beneath the hopper are filled with the clay slugs.

Drying

The molds are inverted to release the brick, and the unfired "green" brick is moved to a dryer before firing. Most of the water content is evaporated in dryer chambers at temperatures ranging from about 100° F to 400° F (38° C to 204° C). The extent of drying time, which varies with different clays, is usually between 24 and 48 hours. Heat and humidity must be carefully regulated to avoid cracking in the brick.



Diagrammatic Representation of Manufacturing Process

A diagram courtesy of the Brick Industry Association (BIA) showing the brick manufacturing process.

A worker inspects and sets the brick before it is placed into a kiln for firing.

Firing and cooling

After drying, the green brick is inspected and moved to kiln cars for firing.

Hacking is the process of loading a kiln car or kiln with brick. The setting pattern influences appearance—brick placed face to face will have a more uniform color than brick that is cross-set or placed face to back.

Brick is fired between 10 and 40 hours, depending upon kiln type and other variables. There are several types of kilns used by manufacturers; the most common type is a tunnel kiln, followed by periodic kilns.

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The Belden Brick Company pioneers innovation in the art of brick making for architects, builders, and homeowners. Offering a unique blend of manufacturing capabilities and bringing modern technology together with our heritage of quality craftsmanship, Belden Brick products represent the brick industry-standard of comparison.

QUIZ

1. Extruded brick is also called stiff-mud brick because the moisture content in the plastic clay is roughly _____ moisture.
   A. 8–10 percent
   B. 10 percent
   C. 10–12 percent
   D. 12–15 percent

2. Of the three types of clays used in brick manufacturing, _____ is mined at the deepest level.
   A. Fire clays
   B. Shales
   C. Surface clays
   D. None of the above

3. Face brick contributes to LEED 2009 or LEED V4 credits through:
   A. Materials and Resources: Local/regional materials
   B. Indoor Environmental Quality (thermal comfort)
   C. Indoor Environmental Quality (inherently non-emitting VOC)
   D. All of the above

4. Brick qualifies for a particular classification based on its properties _____ manufacturing.
   A. Before
   B. During
   C. After
   D. N/A—the manufacturing stage is irrelevant

5. ASTM brick classification for C902 – Pedestrian and Light Traffic Paving Brick for durability is:
   A. Class and Type
   B. Class
   C. Type
   D. Grade

6. _____ is the process of unloading a kiln or kiln car after the brick is cooled, a job often performed by robots.
   A. Kiln burn
   B. Corbelling
   C. De-hacking
   D. None of the above

7. In the table ASTM Standard Specifications for appearance, X indicates:
   A. Standard Production
   B. Architectural or Aesthetic Criteria
   C. Extreme or Extra Control
   D. Exterior Application

8. When specifying the size of brick units, dimensions should be listed as follows:
   A. There is no uniform standard; check with the manufacturer
   B. Height by length by thickness (width)
   C. Length by height by thickness (width)
   D. Thickness (width) by height by length

9. Example(s) of a brick arch include:
   A. Flat
   B. Jack
   C. Bullseye
   D. All of the above

10. Does brickwork grow and change over time, and, if so, how much over its service life (based on 100 feet of brickwork as an example)?
    A. Yes—1 inch
    B. Yes—6 inches
    C. Yes—1 foot
    D. No—brick's natural water absorption does not fundamentally change the brickwork's size over its service life

Exploring a Revolutionary, Systems-Based Approach to Downdraft Ventilation

Presented By:

GAGGENAU

LEARNING OBJECTIVES

1. Discuss the critical connection between indoor air quality and kitchen ventilation appliances.
2. Examine challenges with traditional downdraft ventilation and how integrated downdraft ventilation can overcome many of these challenges.
3. Explore the components and technologies of this downdraft system that optimizes performance and aesthetics.
4. Describe specification and installation considerations for downdraft ventilation, including the benefits of downdraft ventilation over traditional hoods.

CONTINUING EDUCATION

This course is approved for AIA & IDCEC Learning Unit Credits. AIA Continuing Education Provider IDCEC APPROVED

Use the learning objectives to focus your study as you read this article. For details on the learning units or credit information, and to earn credit and obtain a certificate of completion, visit http://go.hw.net/AR6215 to view the entire CEU and complete the quiz. If you are new to Hanley Wood University, CEU courses are free of charge once you create a new learner account; returning users log in as usual.

HOW COOKING AFFECTS INDOOR AIR QUALITY

Outdoor air pollution has been widely researched for decades, while far less attention has been paid to indoor air quality. Given that the average American spends about 90% of their time indoors, this issue hasn't received anywhere near the level of scrutiny it seems to warrant. There are many potential factors that can affect indoor air quality, but cooking is high on the list. Cooking can introduce a number of contaminants to indoor air; this is because it often involves using combustion appliances and heating ingredients at high temperatures.

When consumers think of the purpose of cooktop ventilation, they may think first and foremost about comfort—about eliminating irritating smoke or food smells in indoor spaces. Smoke and odors can also be trapped in woods and fabrics, and grease may accumulate on walls, ceilings, counters, and other kitchen surfaces if allowed to linger in the air. But these sources of discomfort also pose short- and long-term health hazards: "Many classes of odorants and volatile organic compounds that are deleterious to our wellbeing can be emitted from diverse cooking activities. Once emitted, they can persist in our living space for varying durations."[1]

In the developing world, cooking has been studied extensively as a source of indoor air pollution. Research in Guatemala, for instance, has shown a higher prevalence of asthma among those living in homes where cooking was done over open fires as opposed to on improved, ventilated stoves. In the developed world, the effects that particulate matter from cooking can have on asthma symptoms are underexplored by comparison, but there has been some research. In one such study in the San Francisco Bay Area, which examined the impact of cooking behaviors in homes of children with asthma, results suggested that not using the stove hood fan during cooking contributed to higher particulate matter levels, which correlated with increased asthma severity for the children in the study.[2]

Corroborating this finding, John Balmes, a pulmonologist at the Human Exposure

Laboratory at the University of California, San Francisco, has data suggesting that running a ventilation system while cooking correlates with a steep reduction both in household particulate levels and in childhood asthma attacks.[3] And according to a 2014 study published by *Environmental Health*, "The adjusted odds of asthma, wheeze, and bronchitis were lower among children whose parents reported using ventilation compared to children whose parents reported not using ventilation when operating gas stoves."[4]

While research may lag in the United States compared with that of other countries, what data we do have from studies such as the ones mentioned above indicate that, compared with the complex problem of reducing outdoor air pollution, there is a relatively straightforward solution to this source of indoor air pollution: cooktop ventilation. Of course, not all ventilation systems are created equal; much depends on where and how well the trapped air is filtered and/or vented to the outside. The methods and technologies available throughout recent history have come a long way, even if innovation came in fits and starts.

HISTORY OF COOKTOP VENTILATION

Human beings have long recognized the need to rid the home of as much cooking-related air pollution as possible. This is why fireplaces, hearths, and stoves were traditionally placed on an outside wall where the chimney was located. Even though we no longer cook on a hearth and have the option of cooktops, ovens, and ranges that can be located on an island in the middle of the room, the tradition of placing cooking appliances against a wall has endured. Perhaps this is due in part to the sometimes obtrusive traditional solution to ventilation: range hoods.

The idea for ventilation hoods that could extract smoke and odor while capturing grease arose in the early 20th century. The first hood was manufactured in 1937 in Dallas, Texas.[5] Throughout the years, the concept and design of range hoods essentially remained the same, and hoods were virtually the only option for cooktop ventilation for nearly 25 years.

Downdraft ventilation was introduced in the U.S. in the 1960s and to Europe in the 1970s. This invention revolutionized the possible layouts of kitchens by allowing cooktops and ranges to be placed in an island, rather than against a wall, without the need for a large hood that obstructed sight lines.

Despite this new possibility, most U.S. kitchens still have a range placed against a back wall with a large hood over it. (A 2003 study of California homes, for example, found that over 90% had hood ranges and only 4% reported having downdraft ventilation.)[6] This may be due in large part simply to historic precedent; as previously noted, it's the traditional placement of stoves in the kitchen. However, another factor is that downdraft ventilation has not yet been widely adopted. In the next section, we'll examine the reasons why designers, architects, and consumers have resisted traditional downdraft ventilation—and look at a recent innovation that can overcome many of these challenges.

INTRODUCTION TO DOWNDRAFT VENTILATION IN THE KITCHEN

A typical household produces a great deal of cooking particulates each year, which eventually land on surfaces and stick, becoming difficult to clean while attracting additional dirt. Ventilation systems draw these particulates, as well as vapor, smoke, and odors, out of the room and into filters; the air is then either vented outside or recirculated. So for ventilation to be effective, it should

GLOSSARY

Blower: A device consisting of a ventilator, filter, and a motor for ventilating air from a cooking stove.
Btu: British thermal unit—a way to measure heat or energy, defined as the amount of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit.
Downdraft ventilation: A method of ventilation integrated into the cooking surface, eliminating the need for a range hood.
Particulate matter: Microscopic particles of solid or liquid matter in the air.
Regenerable filters: Filters that are designed to be cleaned and reused repeatedly.
Retractable or telescoping downdraft: A type of downdraft system that remains flush with the cooktop surface when not in use, rising up only when turned on.
Teppan Yaki grill: A flat cooking surface designed for grilling or broiling food directly on it.
Toe kick: Recessed space at the bottom of most cabinetry.
Ventilation deflector: A device that redirects the air flow caused by ventilation; for downdraft, it protects gas burner flames from being disrupted by suction during cooking.
Volatile organic compounds: Gases emitted from certain solids or liquids; VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects, and are consistently higher indoors than outdoors.

never be an afterthought or considered a freestanding appliance; even a range hood must be thought of as part of a system. This is even more true for downdraft ventilation, which is incorporated into the cook space itself, rather than being mounted above it.

This means that, unlike hoods, downdraft systems can offer unobstructed views. Retractable downdraft ventilation is raised during cooking, whereas other systems that are integrated into the cooking space remain out of sight even when in use. These integrated downdrafts work by pulling air across the cooktop and down into vents, through a filter, and into a duct to either be released outside or cycled back into the kitchen air once it's filtered.

At its best, downdraft ventilation can offer a host of benefits to homeowners beyond taking pollutants out of the air. For example, it allows for less cleaning of tile, walls, ceilings, and other surfaces that can become heavily coated in grease, because it captures particulates before they can rise and then land on surfaces.

From a design perspective, one of the most significant benefits of downdraft ventilation is aesthetic: It allows for uninterrupted views and sight lines from the island to living spaces and beyond. Downdrafts also provide homeowners with far more lighting choices over the cooktop than a traditional hood, which often provides limited options and weak lighting. And because occupants can stand at the island cook space and face the living area, rather than having their backs to the room as they would with a typical stove and hood against the wall, conversation is easier with family and guests while preparing food.

CONSUMER OBJECTIONS TO TRADITIONAL DOWNDRAFT VENTILATION

In the years since its introduction, homeowners as well as designers and architects have developed resistance to trying downdraft ventilation due to perceived challenges with traditional systems.[7] Consumers considering their ventilation choices have expressed the following wants and needs, which weren't always addressed with traditional downdraft options.

"As part of my entertainment space, I want the appliances to be as quiet as possible."
Because they're working against hot air's tendency to rise, downdraft systems need to be very powerful to capture the vapor before it rises then force it down into the vent. This becomes even more difficult if the pot or pan isn't right next to the fan; now it has to pull the vapor over, capture it, then force it down. From there, the air needs to be routed through ductwork to the outside or through filters before being rereleased. In the past, all this forced movement meant loud blower fans, which resulted in more noise than with hood ventilation.

"I don't want to think about the ventilation, about the power level."
As annoying as the noise may be for consumers, not having that additional power in traditional downdraft systems leads to poor drafting. Downdraft has to work harder than hood ventilation to pull rising steam, smoke, and grease toward the appliance. In addition, many telescoping downdrafts are effective at trapping steam and light amounts of grease when using shallow pots and pans that are close to the fan, but they don't work as well with taller pots and pans, or when a lot of grease is produced.

Part of the challenge with homeowners is that they *don't* think about ventilation—or it's an afterthought. Waiting until the air is becoming smoky to turn it on makes it much less effective. (This is a problem for those using range hoods as well as downdraft systems.)

Traditional downdraft tended to be intrusive in another way, too: The filtration and ducting took up all of the space under the counter, as opposed to hood ventilation, which runs through or along the ceiling.

"Even if I know a ventilation system is greasy after use, it is important to be able to clean it easily and fast."
All filters collect grease—and probably need to be cleaned more often than homeowners realize—but downdraft ventilation filters in traditional systems tended to become saturated with grease more easily and were inconvenient to clean or replace.

"I wish there was a quiet system that didn't obstruct my view."
Hoods always obstruct views—unless they are placed too high, which improves aesthetics but prevents the hood from functioning optimally. This is one of the reasons downdraft was such a revolutionary innovation. However, for homeowners who installed downdraft specifically to be able to have an island stove with an unobstructed view, it can be frustrating when traditional retractable downdrafts obscure views while in use.

Another issue that can lead to negative consumer sentiment is if they've used a downdraft for the wrong type of cooking application—for instance, with a range. Downdraft typically isn't designed for this type of cooking surface because downdrafts lack the capture area to vent a range effectively. Some homeowners and even designers aren't aware they need to make sure they have the right system for their appliance. Many factors must be weighed to determine the correct technology to use for optimal ventilation.

RECENT ADVANCES IN DOWNDRAFT VENTILATION

Despite its sometimes less-than-perfect reputation, which can make architects and designers hesitant to recommend it, downdraft ventilation has advanced since its inception, with recent innovations that

drastically improve its performance and the consumer experience. There are now downdraft products that not only provide a new way to configure a variety of cooktops with downdraft ventilation but eliminate many of the drawbacks of traditional downdraft systems and solve the consumer needs mentioned above. In addition, these new downdraft solutions take up less cabinet space underneath the cooktop and are quieter, more powerful, easier to clean, and integrated into the cooking surface for an aesthetically pleasing appearance and unobstructed view.

THE FUTURE OF DOWNDRAFT VENTILATION

In this new integrated systems-based approach, cooktops, special appliances, and downdrafts are modular and able to be mixed and matched to create the ideal culinary scenario based on the homeowner's needs. All cooktops and special appliances in this system have the same stainless steel frame and flush installation for a uniform appearance.

This article continues on http://go.hw.net/AR6215.
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SPONSOR INFORMATION

GAGGENAU

Gaggenau is a manufacturer of high-quality home appliances and acknowledged as an innovation leader in design and technology "Made in Germany." The company, with a history dating back to 1683, has revolutionized the domestic kitchen with its internationally acclaimed products. Gaggenau's success is founded on technological innovation and a clear design language combined with high functionality. Gaggenau has been a subsidiary of BSH Hausgeräte GmbH in Munich since 1995 and is currently represented in more than 50 countries with 24 flagship showrooms in major cities around the world.

QUIZ

1. According to the course materials, how much of their time does the average American spend indoors?
   a. 25%
   b. 40%
   c. 79%
   d. 90%

2. According to a study conducted in San Francisco, higher severity of childhood asthma was associated with higher levels of _____.
   a. Particulate matter
   b. Heat
   c. Cooking odors
   d. Carbon monoxide

3. According to the course materials, a holistic downdraft system overcomes previous downdraft ventilation objections because of which of the following?
   a. Less noise
   b. Provide more cabinet spacing
   c. Easier to clean
   d. All of the above

4. Aesthetic advantages of downdraft include uninterrupted views and sight lines, as well as _____.
   a. A range of color options
   b. More lighting options
   c. Different grate patterns to choose from
   d. All of the above

5. Which of these are cooking surface options on a modular cooktop?
   a. Induction burner for wok cooking without gas
   b. Grill with lava rocks underneath
   c. Teppan Yaki grill or flat contact griddle
   d. Gas burners
   e. All of the above

6. According to the course materials, in high-end kitchens, fully flush downdraft integration is more common in what area?
   a. North America
   b. Europe
   c. Equally common in both of the above
   d. Very uncommon in both of the above

7. Many downdraft systems on the market are known to generate more noise due to which of the following?
   a. Systems not designed to optimize airflow
   b. Architects may not specify ductwork leading to contractors buying third-party options
   c. Systems with high efficiency capabilities
   d. Both a & b

8. Downdraft functions properly only with individual cooktops smaller than ___ inches in width, though with modular cooktops combined with integrated downdrafts, there are infinite possibilities.
   a. 18
   b. 24
   c. 30
   d. 36

9. According to the course materials, how many times per hour should kitchen air be cycled?
   a. 3
   b. 5
   c. 10
   d. None of the above

10. When planning blower size for ventilation, what's the suggested ratio for amount of cubic feet per minute (CFM) needed per Btu?
    a. 1 CFM per 100 Btu
    b. 1 CFM per 1,500 Btu
    c. 100 CFM per 150 Btu
    d. 100 CFM per 15,000 Btu

The Benefits of Using Steel Roofing and Siding on Multi-Family and Senior Living Projects

Presented By:

EDCO

LEARNING OBJECTIVES

1. Examine the history of modern metal siding and roofing materials.
2. Compare steel to other roofing and siding materials, including appearance, durability, fire resistance, sustainability, and ease of installation.
3. Demonstrate the performance benefits of steel roofing and siding products, review specification considerations, and explore case studies where they were used.
4. Describe installation considerations for steel siding and roofing.

CONTINUING EDUCATION

This course is approved for AIA Learning Unit Credit.

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Use the learning objectives to focus your study as you read this article. For details on the learning units or credit information, and to earn credit and obtain a certificate of completion, visit http://go.hw.net/AR6214 to view the entire CEU and complete the quiz. If you are new to Hanley Wood University, CEU courses are free of charge once you create a new learner account; returning users log in as usual.

HISTORY OF MODERN METAL MATERIALS

Metal building materials are ubiquitous today, and we may even take them for granted. Skyscrapers rise above our cities, primarily constructed of steel and concrete. Metal agricultural and industrial buildings dot the landscape. Metal is used in residential and commercial construction to achieve the clean lines, bold accents, and raw materials prevalent in modern design. But, it's only been in the past century that the use of metal has expanded beyond smaller building components such as hardware, decorative ceilings, and railings into entire buildings framed with, roofed, and clad in steel.

Iron has arguably been the most important metal for the past 3,000 years, as workable iron ore occurs in almost every region of the world, and it can be formed into many different materials with a wide range of properties. "Historically, there have been three basic forms of iron: wrought iron, cast iron, and steel. Craftsmen relying entirely on experience and observation discovered each of these forms and used them for centuries. It was not until the 19th century that the constituent differences among them were understood."[1]

For the past 150 years, steel has been the most important and widely used form of iron. Steel's properties depend on both the amount of carbon contained in the iron ore and other alloy materials so that it can be used for a great range of products. "Before the middle of the 19th century, achieving this balance of properties required craftsmanship of a high order, but the discovery of new tools and techniques, such as open-hearth smelting and the Bessemer process (the first inexpensive industrial process for mass-producing steel from iron), made steel cheap and plentiful, displacing its rivals for almost all uses."[2]

Fast forward 150 years, and today metal as a cladding and roofing product is definitely on the rise and metal is being used in increasingly creative ways to define a building. The color palette is expanding, building planes are being juxtaposed, and textures provide character and added dimension by capturing and reflecting light.[3]

Steel roofing is available with a slate or shake look that mimics these centuries-old products but with increased durability and performance.

HISTORY OF METAL ROOFING

The earliest metal roofing in America was made of lead and copper, such as the copper roof of Christ Church in Philadelphia, built between 1727 and 1744.[4] Domes and cupolas were frequently clad in copper, which gains a characteristic green patina over time and can still be seen today. Other metals such as sheet iron didn't become popular until the late 18th century when a rolling mill in Trenton, New Jersey, began manufacturing the product. This mill was able to roll out flat sheets of metal in increasingly large sizes and with increasing efficiency. Sheet iron was used on Revolutionary War financier Robert Morris' Philadelphia mansion and Princeton's Nassau Hall roof.[5]

Corrugating

The method for corrugating iron was patented in 1829.[6] Corrugating stiffened the sheets, provided greater strength than flat sheets, allowed longer spans over a lighter framework, and reduced installation time and labor.

Galvanizing

Galvanizing with zinc protects the base metal from rust and was patented by Stanislas Sorel of France in 1836. This is a process whereby iron is coated with a thin layer of zinc to protect it from the elements, which up until this point had been a significant drawback in the use of sheet iron as a building material.[7]By the 1850s, galvanized metal was used on factories, train sheds, post offices, and customhouses. "In 1857, one of the first metal roofs in the South was installed on the U.S. Mint in New Orleans."[8]

Rolling mills

Once rolling mills were established in the U.S., tin-plate iron became the most common roofing material due to its light weight, low cost, and low maintenance. Thomas Jefferson installed a standing-seam tin roof on Monticello (ca. 1770–1802), and by the end of the 19th century, embossed tin roofs were popular throughout the U.S.[9] Tin roofs were typically painted red or, to imitate the patina of copper, green.

HISTORY OF METAL SIDING

Metal building components such as hardware and railings have been manufactured for centuries, but "in the early 20th century, steel companies began to shift from selling only components to selling entire buildings. The Truscon Steel Co. was a leader in this effort, particularly in the market for industrial buildings and warehouses."[10] Steel clapboard and sheet iron siding were patented in 1903, but it wasn't until the 1930's that Sears, Roebuck & Company began offering embossed steel siding in stone and brick patterns. "During this time, rural North America saw a shift in agricultural practices from animal-driven to equipment-dependent, necessitating a quick and economical method of constructing farm outbuildings to house machinery and supplies." Pole barns became ubiquitous across the landscape, with many still standing today. The outer walls and roofs of pole barns are typically constructed of galvanized, corrugated steel sheet siding supported by debarked and de-limbed tree trunks.[11]

Siding panels provide a natural look with the unmatched performance of steel, and the product offers a wide range of colors from dark, rich earth-tones to variegated colors.

GLOSSARY

AAMA 2605—The high-performance exterior specification for coatings; AAMA 2605 finishes exhibit excellent resistance to humidity, color change, chalk, gloss loss and chemicals

ASTM Specification A653—This specification includes steel chemistry requirements, typical mechanical properties for the general grades (CS, FS, DDS, and EDDS designations), strength and formability requirements for SS and HSLAS steels, and coating weight requirements for the different coating designations

Coating Thickness—Measured as coating weight in ounces per square foot, coating thickness is an essential factor in the effective application of galvanized sheet metal

Corrugating—A process that stiffens iron sheets, which provides greater strength than flat sheets, allows longer spans over a lighter framework, and reduces installation time and labor

CS Type B—This commercial steel designation is for the basic product, which is useful for many general-purpose applications requiring steel's strength and workability

Engineered Wood Siding—A newer material composed of wood fibers held together by a resin binder that can be manufactured in many styles to look like real wood

Fluoropolymer (PVDF) Finish—Sustainable, resin-based coating that meets AAMA 2605 specifications

Galvanizing—A process whereby iron is coated with a thin layer of zinc to protect it from the elements

Stone-Coated Metal Roof—Roofing material constructed of 24- or 26-gauge steel coated with a layer of stone chips permanently adhered to the surface with an acrylic film; it can resemble asphalt shingles, tiles, or shakes

Thermal-Fused Shake—Roofing manufactured with a thermal fusing process that permanently affixes PVDF coated granules into the PVDF coated roofing panel, providing a permanent thermal-fused texture that will not chip, peel, or crack

Steel siding was initially used on a limited basis due to its vulnerabilities to water penetration and rust. In 1939, however, Frank Hoess patented his solution to this problem, interlocking flanges at the top and bottom of siding panels.[12] The use of steel siding declined during WWII, but the housing shortage that followed created an uptick in the industry. Steel siding saw another resurgence in the 1970s with the development of seamless steel siding.

STEEL ROOFING STYLES

As we discussed at the beginning of this course, slate roofing and wood shingle roofing have been popular for centuries and have been used to highlight various architectural styles throughout history. Now, steel roofing is available with a slate or shake look that mimics these centuries-old products but with increased durability and performance. Roofing panels provide the natural look of wood shake or slate with the unmatched performance

Slate roofing, wood shingle roofing, and wood siding have been popular for centuries and have been used to highlight various architectural styles throughout history. Now, steel roofing and siding is available that mimics these centuries-old products but with increased durability and performance.

of steel. Both products offer a wide range of colors, from a multi-toned stone blend to red, green, gray, brown, bronze, and copper. Thermal-fused shake roofing has a natural grain and multi-tone shading that provides a building with additional contour, depth, and texture. The thermal fusing process permanently affixes PVDF coated granules into the PVDF coated panel, providing a permanent thermal-fused texture that will not chip, peel, or crack.

STEEL SIDING STYLES

Now, steel siding is also now available in five different profiles that mimic historic wood siding products but with increased durability and performance. Steel siding is available in 6 inch, 8 inch, double 4 inch, double 5-inch Dutchlap, and 12-inch vertical board and batten steel siding. Siding panels provide a natural look with the unmatched performance of steel, and the product offers a wide range of colors from dark, rich earth-tones to variegated colors.

Using multiple panels for a distinct look

Although steel siding only comes in long horizontal or vertical panels, steel roofing is available in panels that look like either slate or shake and can be used on the sidewall. For

APPLEWOOD POINTE COOPERATIVE COMMUNITIES

Minnetonka, MN

The re-emergence and growth of cooperative housing communities in many cities across the United States is a new and attractive option for those wanting maintenance-free living.

For Applewood Pointe Cooperative Communities, the notion of maintenance-free living started in the JSSH Architects office in Minnetonka, Minnesota. JSSH, with over 40 years of experience designing similar projects, was a natural fit to design these communities for United Properties. Roger Johnson, lead specifier at JSSH, is no stranger to steel exterior building products. “I have had nothing but success with steel,” said Johnson. He suggested using steel siding to reduce future maintenance costs and maintain a consistent appearance for years to come. “We wanted to incorporate a siding product that would stand up to the test of time,” said Johnson. “When I suggested steel siding to the developer, they were not convinced it was the best option.” After Johnson reviewed several projects with them where competing products were installed and had failed, the developer agreed that steel siding was superior.

Shawn Niznik, Vice President of Crossroads Construction, Inc. and responsible for the proper installation of the steel products on this project, agrees that the maintenance-free aspect of steel siding sells itself. “Being able to achieve a consistent look for many years gives a project timeless curb appeal.” He noted that it is also important when it comes to the resale value within the community.

He noted that the proprietary 70 percent PVDF paint finish used on the project’s siding products is a very durable finish that will not chip, crack or peel, and can also reduce energy costs for a building or home. With this type of paint

performance, building owners will never have to repaint siding, which leads to significant cost savings in the future. “The installation is a little different than other siding products. However, steel is by far the better product. At the end of the day, we would rather install steel siding on a project because it looks so good and will last for a very long time.”

As new communities are built, additional steel products will be incorporated into the design to reduce future maintenance costs. “I have had nothing but success with steel. It is such a high-quality product, which is important to any project we design,” Johnson said.

example, shakes can be installed in gables with siding below. Vertical siding can be used as an accent panel in gable ends or to complete the whole exterior for a board and batten look.

Although steel siding only comes in long horizontal or vertical panels, steel roofing is available in panels that look like either slate or shake and can be used on the sidewall; vertical siding can be used as an accent panel in gable ends or to complete the whole exterior for a board and batten look.

COMPARING ROOFING MATERIALS

Before we discuss specification and installation considerations for steel roofing and siding, it's crucial to understand how they compare to their competitors based on appearance, durability, and ease of installation, among other performance measures. Roofing and siding are critical components of the building envelope, acting as the first line of defense in protecting homes and businesses from rain, snow, wind, hail, and fire. The material specified should be highly resistant to the elements to stand the test of time. Many roofing and siding products are available on the market, from steel and asphalt shingles to fiber cement, vinyl, and engineered wood. With all the factors one must consider, comparing roofing and siding materials to make an informed choice is the most important first step.[13]

This article continues on http://go.hw.net/AR6214.
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QUIZ

1. Galvanizing with zinc protects the base metal from rust and was patented by Stanislas Sorel of France in _____.
   a. 1836 b. 1872
   c. 1936 d. 1972

2. Steel clapboard and sheet iron siding were patented in _____, but it wasn't until the 1930's that Sears, Roebuck & Company began offering embossed steel siding in stone and brick patterns.
   a. 1836 b. 1895
   c. 1903 d. 1922

3. With asphalt roofing, business owners can expect to replace their roof every _____ years on average.
   a. 5 to 10 b. 10 to 15
   c. 15 to 20 d. 20 to 25

4. Steel roofing panels are tested to withstand wind speeds up to _____ mph, while asphalt shingles are susceptible to high wind damage and prone to blow-offs.
   a. 100 b. 120
   c. 140 d. 160

5. Steel roofs can achieve a UL Class _____ Impact Rating, the highest impact rating available.
   a. 1 b. 2
   c. 3 d. 4

6. Which type of roof loses granules that can accumulate in gutters over time?
   a. Asphalt b. Stone coated metal
   c. Wood shakes d. Concrete clay
   e. Both A and B

7. Which of the following is a benefit of steel siding over fiber cement?
   a. Allows for expansion and contraction b. Lighter
   c. Realistic wood grain d. Does not absorb swell, decompose, or develop mold
   e. Non-combustible f. All of the above

8. _____ is a combustible material but will not ignite unless exposed to flames from an existing fire, although it will melt if exposed to a significant heat source.
   a. Fiber cement b. Engineered wood
   c. Vinyl d. Steel

9. Specify steel roofing with a ____ percent fluoropolymer resin-based (PVDF) finish that meets AAMA 2605 specifications for a coating that can withstand ten years of harsh South Florida exposure.
   a. 50 b. 60
   c. 70 d. 80

10. The minimum slope for either type of steel roofing is _____ pitch.
    a. 2/12 b. 3/12
    c. 4/12 d. 5/12

SPONSOR INFORMATION

EDCO

EDCO's steel exterior building products have become the standard for architects and specifiers to incorporate into their projects because the exceptional product quality stands the test of time. Since 1946, EDCO has designed and manufactured pre-finished, virtually maintenance free steel roofing and siding products with timeless style.

Concrete Pathways to Net Zero: Part 1, Embodied Carbon

Presented By:

BUILD WITH STRENGTH

Figure 1: The Broad, a contemporary art museum in Los Angeles, is an excellent example of a concrete building that incorporated LEED strategies to address both operational and embodied emissions. The project is certified LEED Gold. Photo: B.O'Kane / Alamy Stock Photo.

LEARNING OBJECTIVES

1. Evaluate commitments to net zero, such as Race to Zero, SE 2050, and Architecture 2030, and understand key terms related to carbon emissions.
2. Assess concrete's pathways to net zero, including its ability to sequester carbon, as well as material innovation such as blended cements, supplementary cementitious materials, and carbon sequestration.
3. Analyze the impact of prescriptive and performance specifications on concrete, and gain ideas on how to specify sustainable concrete.
4. Use whole-building life cycle assessment to measure and reduce the carbon footprint of buildings.

CONTINUING EDUCATION

This course is approved for AIA Learning Unit Credit.

AIA Continuing Education Provider

Use the learning objectives to focus your study as you read this article. For details on the learning units or credit information, and to earn credit and obtain a certificate of completion, visit http://go.hw.net/AR6212 to view the entire CEU and complete the quiz. If you are new to Hanley Wood University, CEU courses are free of charge once you create a new learner account; returning users log in as usual.

INTRODUCTION

"Net zero," as the United Nations (U.N.) notes, has become "a global rallying cry." "Zero" refers to greenhouse gas emissions (GHG), and "net" translates as positive emissions (burdens) and negative emissions (benefits or offsets). More and more countries, regions, organizations, and individuals are recognizing the need to reduce or eliminate carbon emissions, and many have joined global commitments to achieve carbon neutrality by 2050. To achieve that goal, committed countries and other organizations have outlined their pathways to success.

The U.N. states, "Efforts to reach net zero must be complemented with adaptation and resilience measures, and the mobilization of climate financing for developing countries. … The good news is that the technology exists to reach net zero."[1] Concrete plays a role in these efforts toward carbon neutrality and is continuously evolving to include technologies that reduce both the embodied and operational carbon associated with it.

Operational Emissions vs. Embodied Emissions

Operational energy can be defined as "The energy required for maintaining comfort conditions and day-to-day maintenance of … buildings. It is the energy for HVAC (heating, ventilation and air conditioning), domestic hot water, lighting, and for running appliances. Operational energy largely varies on the level of comfort required, climatic conditions and operating schedules."[2] In short, operational carbon emissions are produced from energy as it is used to fuel the running of buildings.

Embodied carbon, on the other hand, is "the sum of all the greenhouse gas emissions (mostly carbon dioxide) resulting from the mining, harvesting, processing, manufacturing, transportation and installation of building materials. The global warming emissions associated with these materials, along with emissions associated with construction itself, are the 'embodied carbon footprint' of design and construction."[3] As the AIA further notes,

Figure 2. The Smithsonian National Museum of African American History and Culture, Washington, DC achieved LEED Gold certification by combining a wide range of operational and embodied impact reduction strategies including passive design strategies. Photo: Efrain Padro / Alamy Stock Photo.

the embodied carbon emissions for new buildings "typically equal about 20 years of operating emissions."[4]

This course will focus on embodied carbon as it relates to the concrete industry and the ways in which material innovation allows designers to specify sustainable, financially economical concrete that contributes to better buildings with lower embodied carbon emissions. For more detailed information on operational carbon emissions, please refer to the course *Concrete Pathways to Net Zero: Part 2, Operational Carbon*.

COMMITMENTS TO NET ZERO: AN OVERVIEW

The U.N.'s Race to Zero campaign, Architecture 2030, the Structural Engineering Institute's SE 2050, and various concrete industry groups and manufacturers have made commitments to net zero.

Race to Zero

Race to Zero enlists commitments from "businesses, cities, regions, [and] investors for a healthy, resilient, zero carbon recovery that prevents future threats, creates decent jobs, and unlocks inclusive, sustainable growth." To date, 23 regions, 454 cities, 569 universities, 1,397 businesses, and 74 large investors have joined Race to Zero, pledging to achieve net zero carbon emissions by 2050.[5]

Race to Zero centers its goals around the Paris Agreement, another U.N. climate change initiative in which 196 countries formally adopted a legally binding international treaty. The specific goal of the Paris Agreement and, in turn, Race to Zero is to limit global warming, ideally to below 1.5 degrees Celsius.[6] The Intergovernmental Panel on Climate Change's (IPCC's) *Special Report on Global Warming* maintains that if the earth warms by 1.5 degrees Celsius, approximately 14% of the people on Earth will experience extreme heatwaves "at least once every five years"; if the earth warms by 2 degrees Celsius, the percentage of the population exposed to heatwaves increases to 37%. By 2050, this level of warming would have drastic effects on cities, causing them to become heat stressed. Ensuring the earth's warming does not exceed beyond 1.5 degrees Celsius equates to sparing 420 million people from exposure to extreme heatwaves.[7]

To prevent further increase of the earth's temperatures and achieve net zero by 2050, Race to Zero advocates replacing coal, gas, and oil with clean energy; switching to electric transport powered by clean energy; consuming less meat and more plant-based foods; and finding ways to remove carbon from the atmosphere.

TABLE 1. BURDENS, BENEFITS, AND GENERAL PATHWAYS TO NET ZERO[20]

Burden	Strategy	Benefits
Production of building products and structures	Make production more efficient, and/or use low-carbon constituents	Avoided carbon emissions,
Electricity and heat generation	Make building envelope and systems more energy-efficient, and/or use on-site renewable energy	Lower energy demand, reduced energy bills, reduced carbon emissions
Based on the table above, pathways to achieve net zero buildings must involve materials, specifications, design, construction, building envelope, energy systems, and renewables.		

Figure 3. One World Trade Center, New York achieved LEED Gold Core and Shell certification using several advanced energy and water-saving technologies. In addition, the building used high strength "green concrete" produced using high volumes of fly ash. Photo: Spinel_S / iStock by Getty Images

Architecture 2030

It is estimated that approximately 6.6 billion people—two-thirds of the world's anticipated population—will live in cities by 2060. Architecture 2030, a nonprofit organization established in 2002 and dedicated to sustainable, carbon-neutral planning and design in the built environment, maintains it is necessary to address the inevitable new building stock that will stem from population growths and shifts.

Its major initiatives include Achieving ZERO, ZERO Cities, ZERO Code, and ZERO Tool. Achieving ZERO is "a framework of integrated policies for national and sub-national governments (state, provincial and municipal) to phase out CO_2 emissions in the built environment by 2050." It focuses largely on new construction and existing buildings. The ZERO Cities project supports cities in the U.S. that are actively trying to achieve a zero-carbon building sector. Its major focuses are on electricity grid decarbonization and building decarbonization, and it outlines policies for both new construction and existing buildings so that cities are able to achieve those outcomes.[8]

The ZERO Code "is a national and international building energy standard for new building construction that integrates cost-effective energy efficiency standards with on-site and/or off-site renewable energy resulting in zero-net-carbon buildings." It focuses on new commercial, institutional, and mid- to high-rise residential buildings, and is both a national and international standard; it provides prescriptive and performance paths for energy efficiency based on current, widely used standards. Finally, the ZERO Tool "is used to compare a building's design or an existing building's EUI [energy use intensity], understand how a building achieves its EUI, and set EUI targets." This tool enables building professionals to "establish energy reduction baselines and targets, compare a building's energy performance with similar buildings and to codes, and understand how a building achieved its current energy performance."[9]

In addition to its standards and initiatives, Architecture 2030 issued The 2030 Challenge in 2005. In brief, The 2030 Challenge asked the global architecture, engineering, and construction community to begin to reduce its carbon footprint to make all new buildings carbon neutral by 2040. Since issuing the challenge, U.S. building sector emissions are projected to be 29% below 2005 levels.[10] This drive toward carbon neutrality recognizes that "embodied carbon will be responsible for almost half of total new construction emissions between now and 2050."[11]

Furthermore, Architecture 2030 issued the 2030 Challenge for Products in 2011, which urges the design and product manufacturing community to reduce embodied carbon emissions of building products by 65% by 2030 and 100% by 2040.[12] The concrete industry has embraced this challenge by helping manufacturers participate in an industry-wide Environmental Product Declaration (EPD) initiative.

SE 2050

According to Architecture 2030, "embodied carbon will be responsible for almost half of total new construction emissions between now and 2050."[13] To help reduce structural systems contribution to embodied carbon, the Sustainability Committee of the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE) recently launched SE 2050. This commitment program "has been designed to ensure substantive embodied carbon reductions in the design and construction of structural systems by the collective structural engineering profession" by 2050.[14]

The program has four basic goals: educate, engage, report, and advocate. The more the structural engineering profession is educated on sustainable design and construction practices, the greater the opportunity to achieve net zero embodied carbon by 2050. "Engage" encourages structural engineers to become part of an embodied carbon tracking program that would enable "the

GLOSSARY[21]

Admixtures: A material other than water, aggregates, cementitious materials, and fiber reinforcement, used as an ingredient of a cementitious mixture to modify its freshly mixed, setting, or hardened properties and that is added to the batch before or during its mixing. Nearly every type of concrete made today uses some sort of admixture.

Blended cements: A hydraulic cement consisting of portland cement uniformly mixed with slag cement, pozzolan, or limestone.

Carbonation: (1) Reaction between carbon dioxide and a hydroxide or oxide to form a carbonate, especially in cement paste, mortar, or concrete; (2) the reaction with calcium compounds to produce calcium carbonate.

Embodied carbon: "The sum of all the greenhouse gas emissions (mostly carbon dioxide) resulting from the mining, harvesting, processing, manufacturing, transportation and installation of building materials. The global warming emissions associated with these materials, along with emissions associated with construction itself, are the 'embodied carbon footprint' of design and construction."

Environmental Product Declaration (EPD): An independently verified and registered document that communicates information about the life cycle environmental impact of products.

Life cycle assessment (LCA): "Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle."

Net zero: "Zero" refers to greenhouse gas emissions (GHG); "net" translates as positive emissions (burdens) and negative emissions (benefits or offsets).

Operational energy: "The energy required for maintaining comfort conditions and day-to-day maintenance of … buildings. It is the energy for HVAC (heating, ventilation and air conditioning), domestic hot water, lighting, and for running appliances. Operational energy largely varies on the level of comfort required, climatic conditions and operating schedules."

Supplementary cementitious materials (SCMs): Inorganic material such as fly ash, silica fume, metakaolin, or slag cement that reacts pozzolanically or hydraulically. All enhance the performance of concrete when combined with portland cement, including increased strength, increased durability, and enhanced workability.

establishment of appropriate embodied carbon reduction targets until net zero is realized." "Report" refers to the need to gather, synthesize, and assess information "on the current embodied carbon impacts and trends of various structural systems for different regions throughout the country." Finally, by advocating for and communicating sustainability and carbon goals and initiatives with clients, others in the design community, and the wider public, structural engineers will be better able "to build an understanding about embodied carbon and impacts of the built environment."[15]

Overall, SE 2050 strives to "track the embodied carbon impacts of [...] structural systems, assess the trends for various systems, and then establish achievable reduction targets over time."[16] These goals align with those of Architecture 2030 and can be adopted in conjunction with it. The concrete industry supports SE 2050 and is participating on committees to help engineers work with concrete suppliers to meet their goals.

CONCRETE'S COMMITMENT TO NET ZERO THROUGH MATERIAL INNOVATION

Currently, buildings are responsible for approximately 39% of annual GHG emissions. Building operations alone results in 28% of the annual global CO_2 emissions; the other 11% of the annual global CO_2 emissions results from building materials and construction, or embodied carbon.[17] Three building materials are responsible for more than half of these emissions: steel, aluminum, and concrete.[18] Concrete, the most widely used building material on the planet, accounts for 7% of global CO_2 emissions, primarily due to the manufacture of cement. The concrete industry, however, is taking the lead in driving initiatives toward a sustainable future through transparency, innovative concrete solutions, and education on performance-based specification with positive results.

This article continues on http://go.hw.net/AR6212. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

QUIZ

1. To date, 23 regions, 454 cities, 569 universities, 1,397 businesses, and 74 large investors have joined _____, pledging to achieve net zero carbon emissions by 2050.
   a. SE 2050 b. Race to Zero
   c. Architecture 2030 d. Net Zero Caron Buildings commitment
2. What major initiatives include Achieving ZERO, ZERO Cities ,SERO Cities, ZERO Code, and ZERO Tool?
   a. SE 2050 b. Race to Zero
   c. Architecture 2030 d. Net Zero Caron Buildings commitment
3. Building operations alone results in 28% of the annual global CO_2 emissions; the other ___ of the annual global CO_2 emissions results from building materials and construction, or embodied carbon.
   a. 8% b. 9%
   c. 10% d. 11%
4. Because of its thermal mass, _____has long been the material of choice for energy efficiency, and because of its strength and durability, it has been the material of choice for disaster resilience.
   a. Steel b. Wood
   c. Concrete d. Vinyl
5. The most common supplementary cementitious materials (SCMs) are which of the following?
   a. Metakaolin and volcanic ash b. Fly ash, slag cement, and silica fume
   c. Rice husk ash and ground glass d. All of the above
6. To give an idea of how effective the use of SCMs is in reducing carbon footprint, going from a 100% portland cement mix to a 50% fly ash/slag cement mix can reduce carbon footprint by roughly_____.
   a. 15% b. 20%
   c. 33% d. 40%
7. Research conducted by Possan et al. indicates that during its lifetime, concrete can uptake anywhere from 40 to _____ of CO_2 emitted in its manufacturing process. In some cases, considering a structure's demolition (leaving crushed concrete exposed to air), its uptake can approach 100%.
   a. 90% b. 88%
   c. 75% d. 50%
8. The best example of a performance criterion is _____.
   a. Resilience b. Strength
   c. Aesthetics d. Minimum cement content
9. The best example of a prescriptive criterion is _____.
   a. Resilience b. Strength
   c. Aesthetics d. Minimum cement content
10. It is important to keep in mind that concrete requiring high early-age strength should be limited to around _____ replacement of fly ash or slag. Concrete that does not require early-age strength, such as footings, basement walls, and even some vertical elements like columns and shear walls, could have as much as 70% fly ash and/or slag.
    a. 10% b. 20%
    c. 30% d. 40%

SPONSOR INFORMATION

BUILD WITH STRENGTH

Build with Strength, a coalition of the National Ready Mixed Concrete Association NRMCA, educates the building and design communities and policymakers on the benefits of ready mixed concrete, and encourages its use as the building material of choice. No other material can replicate concrete's advantages in terms of strength, durability, safety and ease of use.

Looking for environmentally sustainable building materials?

CONCRETE IS THE ANSWER.

RECYCLED

The concrete industry utilizes **over 26 million metric tons of industrial byproducts** that would otherwise end up in landfills.

BUILD WITH STRENGTH

SUSTAINABILITY THAT LASTS

Few building materials can last as long as concrete. A long life cycle means fewer maintenance costs, higher energy efficiency and lower greenhouse emissions over the long term.

FUTURE-FORWARD FORMULAS

Unique concrete formulations have created endless possibilities for advancement. Concrete innovations such as self-cleaning, bendable, high- performance, graphene and carbon capture concrete are already lowering environmental impact.

TURNING CHALLENGES INTO SOLUTIONS

Our goal is to reduce concrete carbon emissions by 50% in 2030. It's an ambitious goal, but we are already well on our way—since 2014, the National Ready Mixed Concrete Association has reduced its carbon emissions by 13%.

Learn more about the sustainability of concrete.

buildwithstrength.com/sustainability

Sustainable and Renewable Coastal Softwood Timbers

THE ENVIRONMENTAL CHOICE

Presented By:

Western Forest Products
DEFINING A HIGHER STANDARD®

Nita Lake Lodge Derek KK Law | Photo credit: naturally:wood

LEARNING OBJECTIVES

1. Explore four species of sustainable and renewable coastal softwood timber.
2. Explain how the American Softwood Lumber Standard establishes grades for sustainable softwood appearance lumber.
3. Identify residential and commercial applications for softwood timber and how these sustainable products can be used in green buildings.
4. Examine how sustainably managed forests can impact the climate, carbon emissions, and communities worldwide.

CONTINUING EDUCATION

This course is approved for AIA & GCBI Learning Unit Credits.

AIA Continuing Education Provider

GBCI

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WOOD'S AESTHETIC, ECONOMIC, AND ENVIRONMENTAL BENEFITS

Wood is a beautiful natural building material that offers durability and versatility, making it well suited for a wide range of applications and project types. From residential to commercial to industrial buildings, wood can be used in both exterior and interior features. Wood provides a renewable and low-impact alternative to energy-intensive building materials such as concrete, aluminum, and steel and is the only construction material that stores carbon. Wood also offers cost advantages over other building materials.

SPECIES OF COASTAL SOFTWOOD TIMBER

Western red cedar, a highly sustainable and renewable coastal softwood timber, has become a widely popular species throughout North America for residential and commercial buildings. It is used extensively for outdoor structures, siding, ceilings, and other interior features. But, there are other important sustainable and renewable coastal softwood species you should know about that can be used in many of the same applications as western red cedar. They include yellow cedar, western hemlock (hem-fir), and Douglas fir. These species are grown by the same western red cedar suppliers and have varying performance characteristics that give each species their own specific use for structural or appearance uses. Specifying these alternatives will result in durable and brilliant designs.

North American softwood species come from conifer trees and have needle-shaped foliage instead of the leaves found on hardwood trees. Softwood lumber is highly versatile and beautiful, making it ideal for structural applications and exterior and interior projects where aesthetics take precedent. In fact, we will primarily discuss appearance-grade timbers in this course, not structural-grade lumber.[6] We will introduce you to yellow cedar, western hemlock, and Douglas fir in a bit, but let's start with the most widely used and most desirable coastal softwood: western red cedar.

Western Red Cedar is the most desirable appearance grade wood species in North America and has been used for generations due to its natural characteristics and timeless beauty.

WESTERN RED CEDAR[7]

Appearance Characteristics

Western Red Cedar is the most desirable appearance grade wood species in North America and has been used for generations due to its natural characteristics and timeless beauty. Western red cedar has a natural satin luster with a uniform, fine-grained texture complemented by warm colors ranging from amber to cinnamon to dark chocolate brown. When exposed to light, the color becomes more uniform, and when exposed to weather, it achieves a silver-gray color over time. "Western red cedar is pitch- and resin-free, which means it's ideal for accepting and holding a wide range of beautiful finishes including dark stains, shabby chic bleaches, traditional solid colors, and naturally beautiful semi-transparent stains."[8]

Common Applications

Western Red Cedar complements a wide range of architectural styles from traditional to contemporary and can be used in many applications, including siding, decking, and outdoor structures such as gazebos and pergolas. Architects can also enhance interior projects' beauty and elegance with cedar molding, windows, doors, posts, beams, ceiling and wall paneling, saunas, and decorative feature walls.

Performance Attributes

The natural compounds that give western red cedar its pleasing scent, called thujaplicins, also make it resistant to rot, decay, and insects, so no chemical treatment is required and it's low maintenance. This natural fungicide enables even a dead tree to be a valuable part of the forest. Even after 100 years, the wood of fallen western red cedar trees remains sound and can be salvaged for roof shakes. When properly finished, western red cedar products can last for decades, even in harsh environments. Other performance attributes beyond durability are light weight, dimensional stability, good machining qualities, and the wood's ability to accept a wide range of finishes.[9]

Sustainability

Western red cedar is harvested from some of the most sustainably managed forests in the world, in addition to being highly renewable, recyclable, and biodegradable. According to Think Wood, "Cedar species readily propagate, though in recent years there has been a strong emphasis on planting. An average of 8.0 million seedlings are planted each year on the coast, where cedar thrives."[10] Western red cedar is often used for reforestation due to its insect resistance and tolerance to shade, flooding, and a wide variety of soils, from nutrient-poor to very wet.[11]

GLOSSARY

Appearance Lumber—Lumber that is non-stress graded by visual inspection of appearance and suitability for end-use rather than strength; intended for applications where strength is not the primary consideration

Clear[1]—Free or practically free of all blemishes, characteristics, or defects

Finish Grade

The highest grade of appearance lumber, often used for interior trim or cabinetwork, and typically only available in Douglas fir and western hemlock

Grain[2]—The fibers in wood and their direction, size, arrangement, appearance, or quality

Heartwood—The dead, inner wood, which often comprises the majority of a stem's cross-section

Knot[3]—A portion of a branch or limb that has become incorporated into a piece of lumber; in lumber, knots are classified as to form, size, quality, and occurrence

Pitch—An accumulation of resinous material

Select Grade—The appearance grade below Finish Grade; available in all softwood species

Softwood[4]—One of the group of trees which have needle-like or scale-like leaves; the term has no specific reference to the softness of the wood

Structural Lumber[5]—Lumber used in construction that is visually and/or mechanically (MSR) graded for its strength and physical working properties (appearance is secondary, unless specified)

Commercial Availability

Western red cedar lumber is often sold green due to its unique properties and longer drying times. The lumber is then kiln-dried according to customer specifications and end-use, which improves its strength and stiffness, increases its insect- and decay-resistance, and enhances its appearance.[12]

YELLOW CEDAR[13]

Appearance Characteristics

Yellow cedar is not as large as western red cedar, growing to just 24 meters tall and 90 centimeters in diameter, but it often lives to be 1,000 years old, and some 2,000-year-old specimens have even been identified. Yellow cedar is one of the slowest growing conifers, with closely packed growth rings and little distinction between earlywood and latewood rings. This results in a fine texture, dense, uniform yellow color, and lack of visible grain.

Performance Attributes

Yellow cedar has exceptional longevity and is one of the world's most durable woods. Because it is considerably harder when dry than most commercial softwoods, yellow cedar is extremely strong. Like western red cedar, the wood of yellow cedar has natural extractives that make it decay-resistant and aromatic when cut, and it is pitch- and resin-free. Unlike most softwoods, yellow cedar has very uniform density across single growth rings, making it a suitable species for carving and woodworking, as it can be easily machined and finished.

Common Applications

Because yellow cedar wood is incredibly easy to work, it is prized for applications such as joinery and carpentry, decorative paneling, furniture, moldings, and cabinet work. It is also an excellent choice for exterior architectural applications such as shingles, posts, poles, and doors. Because of the wood's strength, hardness, and wearing properties, structural grades are often used for exterior applications such as landscaping, decking, stairs, and bridges. It also resists corrosion and the elements, so it is ideal for industrial uses like floors or outdoor seating in sports facilities. Yellow cedar is even used in specialty construction projects such as temples and shrines.

Commercial availability

In North America, yellow cedar is produced in appearance grades according to NLGA rules, most commonly as clears, shop lumber, and molding stock, but is also offered in export grades for Japan and other overseas markets. Yellow cedar lumber is often sold green then dried according to end-use and customer specifications. Like western red cedar, kiln drying inhibits natural staining, improves strength and stiffness, enhances its appearance, and increases its decay- and insect-resistance.

WESTERN HEMLOCK (ALSO CALLED HEM-FIR)[14]

Appearance Characteristics

Hem-fir is a combination of western hemlock and the true firs such as noble, California red, grand, Pacific silver, and white fir. It is the most abundant tree species on the coast of British Columbia. Hem-fir is a large tree that typically grows 30 to 50 meters and usually lives about 500 years. These trees are shade-tolerant and prune themselves as they grow to produce a tall, branch-free trunk, which means that they may have a clear stem for three-quarters of their height in dense stands. This natural growth characteristic produces large amounts of clear and factory lumber from the log.

Hem-fir is one of the most desirable western softwoods for those seeking wood with a very light color. Hem-fir products range from white to a pale straw color, often with a slight lavender cast. The heartwood is not distinct, but sometimes small, delicate dark gray or black streaks appear in the wood. Hem-fir is fine-grained and even-textured, with a refined appearance.

Industrial and structural applications for western hemlock have expanded greatly in the last several years since the Canadian Standards Association improved strength testing for hemlock timbers by utilizing better technology and more accurate test methods.

Performance Attributes

Western hemlock has a vast range of uses because of its good strength-to-weight ratio and even density, which gives it excellent working qualities. The wood turns, planes, and shapes well and can be sanded to a smooth finish. Also, it is non-resinous and takes stains and finishes exceptionally well, glues easily, sands smoothly, and has high nail/screw holding ability.

Industrial and structural applications for western hemlock have expanded greatly in the last several years since the Canadian Standards Association (CSA) improved strength testing for hemlock timbers by utilizing better technology and more accurate test methods. More accurate ratings allow western hemlock to be used for strength applications previously reserved for Douglas fir and non-lumber products such as timber frame homes and industrial uses such as bridges. This is a significant development, as western hemlock comprises the largest volume of trees within coastal forests (approximately 80%). Now there is a species with a larger volume, lower price, and strength testing on par with Douglas fir, that can be used for the same applications because of its proven strength. See the chart below for strength and modulus of elasticity comparisons between Douglas-fir larch and hem-fir.

SPECIFIED STRENGTHS AND MODULI OR ELASTICITY FOR BEAMS AND STRINGS, MPA

		Compression					Modulus of Elasticity	
Species Combination	**Grade**	**Bending, f_b***	**Longitudinal shear, f_v**	**Parallel to grain, f_c**	**Perpendicular to grain, f_{cp}**	**Tension parallel to grain, f_t**	**E***	**E_{05}***
Douglas Fir-Larch	SS	19.5	1.5	13.2	7.0	10.0	12000	8000
	No. 1	15.8		11.0		7.0	12000	8000
	No. 2	9.0		7.2		3.3	9500	6000
Hem-Fir	SS	16.8	1.2	13.0	4.6	7.4	11500	8000
	No. 1	14.4		12.4		6.3	11000	7500
	No. 2	14.4		12.4		6.3	11000	7500

Common Applications[15]

Western hemlock is an extremely versatile species due to its strength, which rates just below Douglas fir. The species is used for general-purpose framing applications, roof decking, laminating stock, and glue-laminated and solid beams. Its strength and stiffness make it ideal for horizontal components and longer spans, especially compared with other species. Western hemlock's excellent working properties also make it the first choice for high-quality case goods, doors, windows, veneered interior paneling, floors, moldings, and millwork.

Commercial Availability

"Western hemlock and amabilis fir are nearly identical in appearance and physical properties so [as noted] they are commonly sold and shipped together under the name hem-fir."[16] Hem-fir is primarily available as structural lumber for North America and export markets, but products are also available in appearance and remanufacturing grades. Like other species, western hemlock lumber is typically kiln-dried according to end-use and customer specifications. The wood is easily pressure-treated with preservatives, making it useful for decks and other outdoor amenities.

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SPONSOR INFORMATION

Western Forest Products
DEFINING A HIGHER STANDARD®

Western Forest Products is a leading forest products company that manufactures high-quality wood products and sustainably manages forests. Headquartered in Vancouver, British Columbia with operations in the coastal region of B.C. and Washington State, Western meets the needs of customers worldwide with a specialty wood products, focus and diverse product offering. Western Forest Products proudly distributes their exclusive product brands WFP TRUESTYLE™ and WFP COAST TIMBERS. Westerns large investment in manufacturing and progressive approach to safe and sustainable forestry practices ensures the health and prosperity of the business, forests and communities for generations to come.

QUIZ

1. Which coastal softwood discussed in this course is resistant to rot, decay, and insects thanks to the natural compounds called thujaplicins that give the wood its pleasing scent?
   A. Western red cedar
   B. Yellow cedar
   C. Douglas fir
   D. Western hemlock
   E. Both A and B

2. Which coastal softwood is one of the slowest growing conifers, with closely packed growth rings and little distinction between earlywood and latewood rings that give it a fine texture, dense, uniform color, and lack of visible grain?
   A. Western red cedar
   B. Yellow cedar
   C. Douglas fir
   D. Western hemlock

3. The Canadian Standards Association improved strength testing for _____ timbers by utilizing better technology and more accurate test methods, which allows the wood to now be used for strength applications previously reserved for Douglas fir.
   A. Western red cedar
   B. Yellow cedar
   C. Western hemlock
   D. None of the above

4. _____ has the highest modulus of elasticity (stiffness) of all North American softwoods and the highest ratings of any western softwood for strength, including fiber stress in bending, horizontal shear, tension parallel to grain, compression parallel to grain, and compression perpendicular to grain.
   A. Western red cedar
   B. Yellow cedar
   C. Douglas fir
   D. Western hemlock

5. _____ lumber is used in construction and is graded for its strength, so the structural integrity of the wood is the primary requirement in the grading process.
   A. Structural
   B. Appearance
   C. Factory
   D. Shop

6. _____ lumber is used in visible applications and is graded according to the number of characteristics that might detract from the appearance of the piece.
   A. Structural
   B. Appearance
   C. Factory
   D. Shop

7. Which of the following is typically considered appearance lumber?
   A. Decking
   B. Trim
   C. Siding
   D. Shingles
   E. Flooring
   F. All of the above

8. _____ is the highest grade of appearance lumber and is usually available only in Douglas fir and western hemlock
   A. Select
   B. Finish
   C. Knotty
   D. Clear

9. Forests help mitigate climate change and global warming by absorbing nearly _____ of the carbon emissions caused by human activity.
   A. One fifth
   B. A quarter
   C. Half
   D. Three quarters

10. Which of the following in an important tenet of sustainable forest management?
    A. Sustain biodiversity while preserving ecosystems and wildlife habitats
    B. Considers the social and economic effects on the surrounding community
    C. Never exceed the allowable amount that can be harvested
    D. Reforest every hectare harvested
    E. Voluntarily certify forests with organizations such as the FSC or the SFI
    F. All of the above

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AIA Architect

CREDIT: LYNSEY WEATHERSPOON

Leaving a Footprint

Young architects should be responsible stewards as well as innovators.

Desmond Johnson became the youngest architect in Georgia when he was 25 years old. Five years later, he is known as a fierce advocate for equity in the profession, recently receiving a 2021 AIA Young Architects Award for his exceptional leadership. Johnson is currently a project manager at NELSON Worldwide and serves as chair of Atlanta's Urban Design Commission. Two of his most notable projects include the design of Morehouse School of Medicine's first-ever on-campus housing (while employed at Rule Joy Trammell + Rubio) and the renovation of the historic Roosevelt Hall while working at Moody Nolan.

As told to Christina Sturdivant Sani

The Atlanta University Center is a consortium of historic Black colleges and universities near Atlanta's West End. According to a lot of people, the area is one of the meccas for Black culture in the city. I spent a lot of time in the area, so I was drawn to the prospect of designing a project—Morehouse Medical School's housing—for the AUC Consortium. It truly is a living and learning community for the school of medicine.

Roosevelt Hall is an 18,000-square-foot building from the 1930s. It was the centerpiece for the University Homes neighborhood, which was the first public housing development in the country for African Americans. Roosevelt Hall is a relic—the one remaining building that's still standing from the development. We were tasked with renovating, reusing, and redesigning it as a commercial centerpiece for a new mixed-use development. It includes a community space, computer labs, and office space. We also incorporated historic timelines and artwork that tell the story of University Homes and celebrate the building's iconic past.

When I became the youngest architect in Georgia, that was a very proud moment for me. But what was more significant to me was the responsibility, achievement, and accomplishment of being one of the 2% of all licensed architects who are Black. I think that number is an embarrassment, frankly. I want to use my skills, talents, and platform to give back so that other people of color, particularly Black people, can see themselves succeeding in this profession.

My role as a commissioner of Atlanta's Urban Design Commission is to help make sure that each proposed project to be constructed or renovated is a responsible steward to the context and design of its neighborhood. Our goal is to protect and preserve the historic fabric and nature of the city.

I'm also proud that, in 2019, NOMA Atlanta established the first design award specifically tailored to people of color and women. It was the first time any design award in Atlanta specifically targeted or celebrated the contributions of minority designers. And I was the chairperson who planned, executed, and realized the vision of those awards.

What drew me to architecture was leaving a footprint on the physical environment. But if my impact can touch people and help to repair communities that have been torn apart, then that exceeds all my expectations professionally and I can die happy. AIA

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Healthier Conditions Ahead

Growth in backlogs signals increased demand.

By Michele Russo

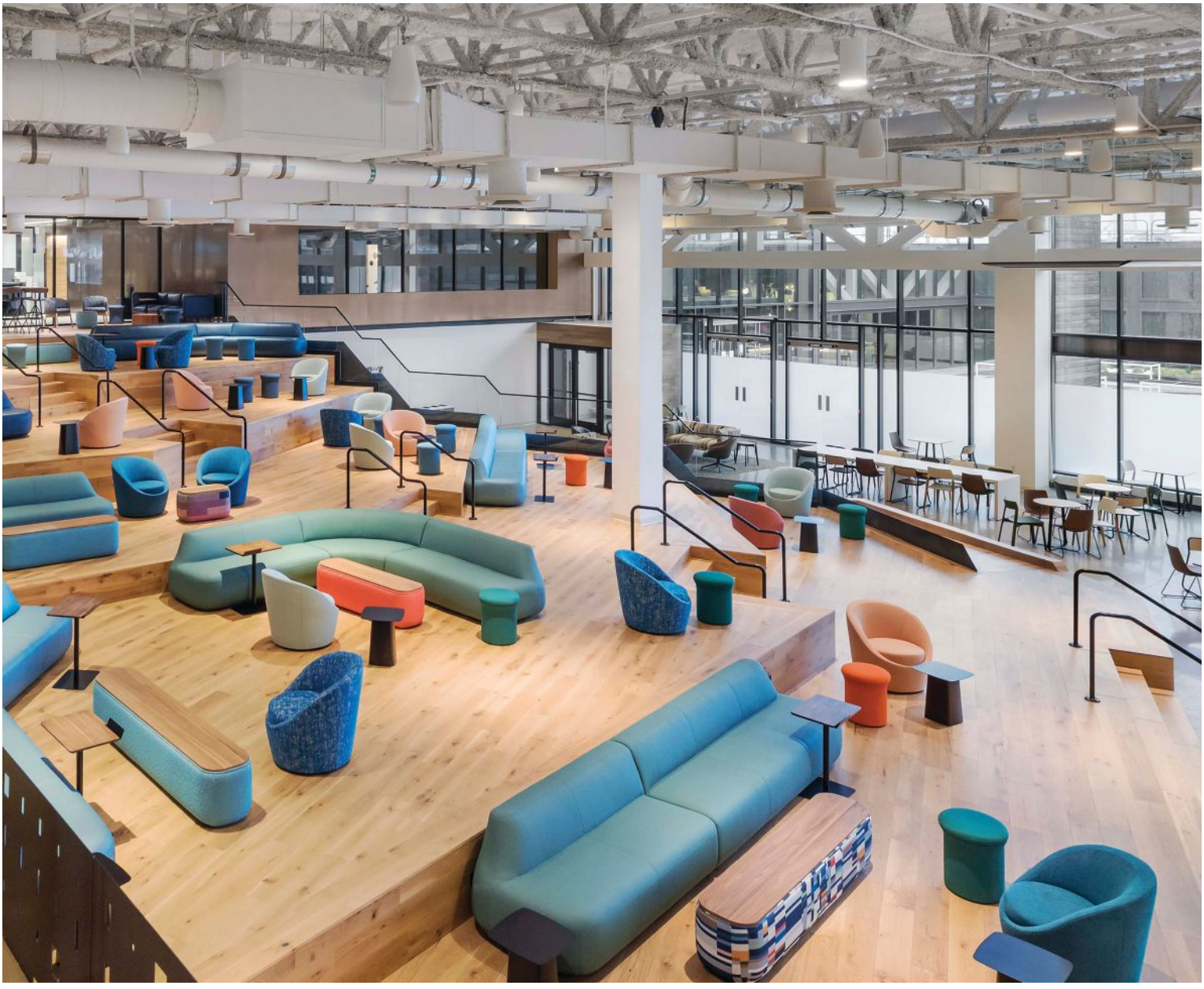
Architecture firms report an average backlog of 6.1 months for the first quarter of 2021—up from the 5.3 months reported in the fourth quarter of 2020. Throughout 2020, backlogs decreased dramatically to an average of 5.3 months, with a low of 5.0 in the first quarter of 2020. The decrease was influenced by the shutdowns in the spring and summer, when firms either saw cancellations of projects or worked down existing backlogs. The new growth is an indicator that firms are seeing healthier conditions for their architectural services in 2021. AIA

Source: AIA Work-on-the-Boards/ABI survey. For more information, visit aia.org/abi.

Changing the Game for Office and Retail

The converging crises of 2020 have altered the office and retail landscapes, likely forever. That means room for architects to design something better.

By Steve Cimino



ALL IMAGES CREDIT: BERGMEYER

Above: Boston- and LA-based firm Bergmeyer designed a new headquarters for robotics firm Boston Dynamic utilizing open space.

It's no secret that America's offices and retail spaces are facing a time of great uncertainty.

For more than a year, the pandemic has forced everyone with flexible careers or health concerns to their homes, and most people aren't in a rush to return to the office. Online shopping went from on the rise to becoming the norm, as did telecommuting.

So what happens to the country's massive downtowns filled with multistory office buildings? Or to all the surviving brick-and-mortar stores packed with products we can easily buy online?

Tracy Hadden Loh made it her professional mission to find out. She's a fellow with the Anne T. and Robert M. Bass Center for Transformative Placemaking at the Brookings Metropolitan Policy Program. She's also a co-author of "The Great Real Estate Reset," a report from the Brookings Institution that attempts to dissect where the real estate market goes from here.

The report's broad recommendation for the real estate industry? Stop focusing on middle-class white families. It's time for American real estate to pivot—hard—or risk "becoming a central contributor to the deterioration of American political and social cohesion."

"Many of the guardrails we have in place are no longer suitable to guide us," Loh says. "The reason we've had this status quo for so long is because it was working for some people. How much change there's going to be is tied to how much discomfort stakeholders who were happy with the status quo are feeling, but also how much disturbance, reshuffling, and expanding there is of who's at the table making the decisions about what needs to happen."

Loh and her co-authors diagnosed five major trends coming together to disrupt real estate: segregation by race and income, the country's demographic transformation, weakened regional housing markets, the future of work, and interruptions in the retail ecosystem. All five are in some way tied to the built environment, but the latter two may be the most impacted by COVID-19, our related shifts in lifestyle, and decades of ignoring whom our buildings serve.

It's a clear opportunity for architects to step up and make their voices heard. Not just as designers who can update structures for a post-COVID world, but as advocates for change who have long lamented being left out of larger conversations regarding the built environment. Now more than ever, people's ears are open.

"If we're in a situation where a huge percentage of the existing built environment inventory in the United States is obsolete—it's either the wrong product or in the wrong location or both—then there's a major adaptive reuse challenge," Loh says. "And the design profession is uniquely equipped to understand the details of that challenge and to help the public, the private sector, and elected officials understand what it's going to take to adaptively reuse these obsolete spaces and structures in a way that is feasible, efficient, and equitable."

Are Owners Ready for a Full-Scale Shift?

If that sounds daunting, it's because it is.

"No one individual is responsible or able to get this done," Loh adds. "This is not going to be a personality-driven transition. We're talking changing the rules to the extent that we'll be playing a different game. That requires a movement; that requires the profession as a whole, working in collaboration across silos."

Is the profession ready for such a movement? Perhaps more importantly, are the owners who make the decisions regarding these spaces ready to commit to such a reshaping?

Andrew Teng, AIA, is an architect and real estate consultant who specializes in multifamily residential and commercial developments. Like many designers during the pandemic, he's been providing owners and developers with guidance on adapting to COVID-centric challenges. Also like many designers, he's waiting to see how the people with the checkbooks ultimately respond to a post-pandemic world.

"Those of us who work with developers, we're reacting to where they're deciding to place their bets," Teng says. "A lot of times, it comes down to developer dollars and them figuring out what the product they have is—and it is a product—and then we go ahead and try to implement that as best we can." When it comes to post-COVID real estate, he says the goal posts are still moving.

That's not to say that architects don't speak up early and often on a project, especially when the challenges are as large as the ones surrounding COVID-19. He's just learned throughout his career that a good architect hears their owner out and ultimately responds with the best design possible.

The economic response to COVID-19 has been a unique one. Unlike in a traditional recession, some sectors have thrived during COVID-19. Mom-and-pop restaurants were decimated, but tech and online retail exploded. The goal of most owners and developers, Teng says, will be to sense where spending is headed next and get in as soon as possible.

Designing for Experiences

When stores and restaurants began reopening in mid-2020, the focus was on adjusting to a world where a deadly virus raged. Plexiglass was added in front of cashiers; customers were urged to stay 6 feet apart. But it soon became clear that

Below: Superette Spadina, designed by Bergmeyer, offers an elevated retail experience.

Above: Bergmeyer's design for the Boston Bruins Pro Shop draws shoppers into the retail experience.

this was a Band-Aid solution, one that clients and designers would have to tackle together.

"We started being asked all these new and interesting reopening questions. 'How do we reopen safely? How do we shift our business? People might not be coming back to our spaces or using them in the same way; what do we do with them?'" says Zachary Smith, AIA, an associate and senior architect at Bergmeyer and member of AIA's Retail and Entertainment Knowledge Community Leadership Group.

Of course, no one expected the pandemic to continue for over a year and lead to thousands of retail locations going dark nationwide. But that doesn't mean in-person shopping is gone forever. As doors close for some businesses, windows open for others, including formerly online-only retailers.

"The last five years have seen the clicks-to-bricks movement—Warby Parker, Everlane, Casper—slowly open physical locations," Smith says. "It's ironic because their business plan was originally based on not having physical space. But now there are open spaces and cheap rent. There are reasons to start moving faster."

And that's not just limited to name brands. Nobody wants a street full of empty storefronts, which means rent is also reasonable enough for another group of entrepreneurs: craft makers who got their start on Etsy and other online marketplaces during lockdown. Storefront owners have become far more amenable to hosting temporary pop-ups; anything to increase foot traffic.

"There's an interesting opportunity for these true small businesses, these maker-type places, that would be well served by premium retail spaces getting a chance to go in and maybe make businesses out of it," he says. "Maybe half of them are saying, 'Sure, why not?', but the other 50% could be the next clicks-to-bricks success story."

What about getting people back to big-box stores, which are notoriously massive and unable to pivot on a dime? Smith points to unique levels of interactivity that companies like Nike adopted pre-pandemic with their in-store basketball courts, along with using some online tech to shape the shopping experience.

"We're starting to talk about experiential design," he says. "What is bringing people back to retail spaces now that they can buy anything in the world online? Maybe you walk into the Nike store and instead of walking up to a wall of 150 pairs of shoes, you're seeing a virtual wall of six pairs, the ones Nike.com knows you want to see. How can we use all of these things that have been successful online and fully bleed them into the physical environment in a way that's new, that's an experience?"

Time to Disrupt Design Thinking

For many designers, pondering the future goes beyond just asking what architects can do to get work going forward. The pandemic has exposed untenable inequality—in regard to health, economic status, gender, and race, among others—that was already known to many and is now laid bare for all. That goes for the design world as well, where even the most well-intentioned spaces were created for a specific subset of people. There's no better time than now to start making up for those flaws.

"Design thinking has to be disrupted," says Angie Lee, AIA, partner and design director of interiors at FXCollaborative. "Most things in our society have to be disrupted, and the only silver lining that I can point to after this horrible year-plus is that it's already happening."

"We've been constantly chasing this Eurocentric, modernist curriculum that we were taught, most of us, in design school," she adds. "Leaving that behind and shedding this kind of worship of Midcentury Modern and Bauhaus, things that are serving a straight white male typology, is hard to do. I've been doing this for almost 30 years now, and this whole time, without realizing it, I've been creating spaces for people who are not me."

She's thinking about design decisions big and small. About how, for decades, crash-test dummies were designed using the dimensions of the "average" male. About offices created for the comfort of that same man, with the thermostat set to a male-preferred temperature, something that's prompted her female colleagues to wear ski jackets in the middle of summer. About redesigning FXCollaborative's own office and absentmindedly asking her co-workers not to bring in "stinky," often ethnic foods for lunch without considering how they could design a solution.

"There is such a thing called design that can handle those kinds of issues," she says.

Lee has already seen progress among her clients. It's often more about conversation than notable design decisions, but they're still conversations that were not happening pre-2020.

"I don't have to bring up health and wellness or biophilia; they're bringing those issues to us," she says. "When it comes to gender equity, they're very receptive to listening to presentations that strive for a better balance in terms of not being too masculine, not being afraid of stereotypically feminine design gestures. It's happening in very subtle but meaningful ways."

In theory, that could be owners pleasantly placating more-progressive designers. But Lee doesn't think so. She's previously voiced concerns around how women or people of color may respond to a space; the response was often, "I don't think that's going to be an issue." These days, they listen.

"I think our clients are understanding that there's an importance to what they're doing, whether it's commercial, residential, or retail," she says. "They're helping to create an infrastructure, a community. And now we're talking about who we're designing for instead of just the usual suspects, the people you see in every rendering. There are small habits being formed, which are sometimes the most important kinds. They're the entrees into bigger movements." AIA

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Above: Chris T. Cornelius's Domicile is a speculative drawing based on the Oneida moon calendar.

How Can We Decolonize Architecture?

Architecture and colonization have gone hand in hand in the United States for centuries—but does it always have to be this way?

By Katherine Flynn

What does it mean to decolonize architecture, and who should ultimately benefit? We talked to Chris T. Cornelius, an architecture professor and citizen of the Oneida Nation of Wisconsin, about how to frame the conversation around settler colonialism and how architects can start to consider the implications of designing structures on unceded land.

Cornelius founded his design and consulting practice, studio:indigenous, with the goal of serving Indigenous clients. Together with Antoine Predock, FAIA, Cornelius worked as a cultural consultant and design collaborator on the Indian Community School of Milwaukee, which won an AIA Design Excellence Award from the Committee on Architecture for Education in 2009. He received an Artist in Residence Fellowship from the National Museum of the American Indian, Smithsonian Institution, and represented Canada in the 2018 Venice Architecture Biennale. Cornelius is currently the Louis I. Kahn Visiting Assistant Professor at Yale University.

What does the act of decolonizing architecture look like to you?

There's an article by Eve Tuck [and K. Wayne Yang] called "Decolonization is not a metaphor" that, I think, is the standard by which it should be understood—that it directly relates to dispossession of land from Indigenous Americans and Canadians.

ALL IMAGES CREDIT: CHRIS CORNELIUS

It shouldn't be folded into the diversity, equity, and inclusion realm.

So for me, as an Indigenous person working in the discipline, how can I begin to think about what that means for me? Specifically, how do I think about whom architecture is serving? And how am I educating young architects?

I think we should be rethinking the curriculum because if we're intervening in this landscape, we should know the history of it, and I don't think we do. It's not really taught.

What do you think can be done in the academy to help students better understand this country's history of colonization?

I propose that every architecture student should take Indigenous history, especially in the U.S. and Canada.

Right now, I'm teaching an advanced graduate studio, so I have 10 very bright graduate students. We're studying Indigenous housing in Canada, and I began to realize that I was spending a lot of time teaching them history and policy—how did this situation come about, and what can we do about it? And then, what things can we do as designers about political policy and understanding? I realized that it wasn't their fault, not at all. Through their K–12 and their undergraduate educations, they never got that history.

As designers, if we're intervening in the landscape, we should know the history of it. It's not just a rural, prairie, or reservation sort of issue—it's an urban issue, too, because most U.S. cities are founded on Indigenous settlements that pre-existed the cities themselves. A site analysis should include that history that didn't just start with colonization.

Even in my own education, I hadn't realized that I never saw any Indigenous architecture examples—that the history was never talked about. I had to go out and seek the information, because I wasn't getting it in my architecture department.

What initially drew you to architecture as a profession?

I grew up in HUD housing on a reservation here in Wisconsin. It didn't take long to realize that the built environment, meaning the homes that were built for Indigenous people, did not suit all of the ways people lived. As I began to think about it, there were no trees, no sidewalks—basic amenities. It seemed like there was a complete lack of care of how these homes were put in the landscape. They didn't line up or follow any kind of a setback—things you would find in suburbia. I never had a garage until I was in my 30s. I realized, "There has to be a better way of understanding the built environment." So I became interested in it at a young age.

My father was a brick mason and his brothers were in the construction industry, so I was always around building. By middle school, I knew I wanted to be an architect; it was just a matter of figuring out how I was going to accomplish that.

What were your guiding principles in founding studio:indigenous?

I was asked to be a part of the design team for the Indian Community School in Milwaukee, and they selected Antoine Predock as the design architect. As an Indigenous entity, the school wanted an Indigenous designer on the team.

I wasn't interested in making buildings that were metaphors for other things—meaning I wasn't making a building that looked like a turtle or a bear or something like that. The elementary school on our reservation was built in the 1990s, and it's shaped like a turtle. I felt that there had to be a better way to do architecture of Indigenous people, and that's when I founded the practice. It was important to me to then say, "Okay, if I'm going to do this, I want to serve Indigenous people and communities, but I want to do it in a contemporary way. How can I translate this timeless culture into contemporary forms and materials?" It was very important to me to be able to do that and to start to develop new ways of thinking about Indigenous architecture.

How did you apply more traditional principles of Indigenous design to a modern project?

I was lucky to work with Antoine and the client, because the client wanted something different—something that didn't

Below: Wiikaami, created for Exhibit Columbus 2016-17 and positioned outside Saarinen and Saarinen's First Christian Church.

exist yet. Antoine was very good about understanding this Indigenous point of view and being able to translate it because it was similar to the way he thinks about architecture and nature and how to see the world. It was like a whole other graduate education working with him.

Neither of us wanted to make a building that looked like an animal. However, we talked about the building like it was an animal. I felt like we were all speaking a similar language between me, him, and the client.

I feel like the project itself is a sort of gift, in a way, because it has helped me understand that it is possible to make a contemporary space that is, in its very essence, Indigenous. Indigenous people see themselves in it, in things that resonate with them that are beyond the symbols and artifacts. I think that those things still, obviously, have a place, but to understand that the architecture can help support [them]—that was the thing that we tried to accomplish with this project.

What comes next when it comes to decolonizing architecture? What happens after the conversation?

I think it has to be followed up by action; I don't think it can just be rhetoric. It can't just be conceptual or theoretical. The most radical and extreme is that Indigenous lands are given back to Indigenous people, and that dispossession is basically acknowledged and taken care of. How are the ways that could be done? Could it be done through policy and legislation? For instance, are there opportunities in urban areas where we have vacant sites that nobody wants? What if you started to give back those lands to those people to put into a federal land trust, or larger swaths of land, or parts of federal parks or the land that land grant colleges possess, which are big parts and pieces of land where billions of dollars have been extracted in resources to benefit universities?

It's [about] beginning to understand that these treaties weren't honored; how do we make steps toward [honoring them]? That's one part. The other part, for me, is that we have to have an honest discussion about the history of this country and its relationship to Indigenous people, along with other groups of people. That history must be honestly accepted and taught. We can't just pretend these things didn't happen—we can't pretend that genocide didn't happen, we can't pretend that [Indigenous people] magically disappeared. We have to take honest steps forward together and start to ask, What does sovereignty look like for Indigenous people, and how can the design disciplines help foster that? There are certainly opportunities to do that.

We should be thinking about how we're educating young architects, and there's a time now to change it. I think the idea of decolonizing how Indigenous people fit into the picture is just one area. We should be thinking about social justice and how the discipline can expand itself, and how we can prepare young architects to be good citizens. AIA

AIA PERSPECTIVE

Our Resilience and Our Values

By Peter Exley, FAIA, 2021 AIA President

I was privileged recently to present the 2021 AIA/ACSA Topaz Medallion to Kathryn Anthony, who has worked tirelessly to bring diversity, inclusion, and social justice to the front and center of architectural education. In 2017, she published a book called *Defined by Design* about the hidden signals found in places and products that reinforce deleterious attitudes toward age, bodies, and gender. In 2001, her book *Designing for Diversity* marshaled data to illustrate why official design culture in architecture is perpetuated and how it challenges those who wish to make the profession more diverse in its culture, outlook, and composition.

When Anthony testified before Congress in 2010, in support of the Bipartisan Restroom Gender Parity in Federal Buildings Act, she said, "Much of our built environment was constructed in a different era—one in which women were not as prevalent in the public realm and in the workforce as we are today." Whether it's adequate restrooms or the hierarchies of the architecture studio or the coded messages in the products we buy, she had one simple message: Resolutions for inclusion and equity are hollow so long as the spaces we inhabit and the culture we defend are unfair and disenfranchising.

Her scholarship and her teaching prepare us to confront the systemic inequities, both visible and invisible, represented in the built environment. The people who learn, live, and make their living in the spaces we create need tools to help them communicate to architects and critique our work. Anthony's work enables that, not to mention being data-rich, a thoughtful wake-up call for architects, and a true public service for everyone else. This evidence-based accessibility, for me, is the basis for awarding the Topaz to Anthony.

What must her work galvanize for us? To be equitable as a profession is to accept all designers and architects who wish to make a healthier, more resilient world, and to reject the myopia and inequity of a world designed by the select few. Our resilience as a profession is our ability to protect everyone who chooses this community, and continuously re-create this community to reflect those who choose it.

If we value our communities, and our communities thrive because of us, then our resilience as a profession must be defined by this reciprocation.

To be inclusive as a profession is to accept our failures and celebrate the contributions of tens of thousands of architects of Asian descent. We have celebrated Asian American and Pacific Islander heritage during the month of May since 1979. In May 1843, 14-year-old Manjiro Nakahama was rescued off the coast of Japan and adopted by an American naval captain, becoming the first Japanese immigrant to the United States. May is also the month when, in 1869, the Golden Spike was affixed to the tracks in Utah Territory to celebrate the Transcontinental Railroad, largely built by Chinese immigrant labor. I urge you to celebrate along with my wife and me, but I also encourage you to honor and stand with Asian American and Pacific Islanders—and the architects among them—this and every month. AIA

CREDIT: RUTH YARO

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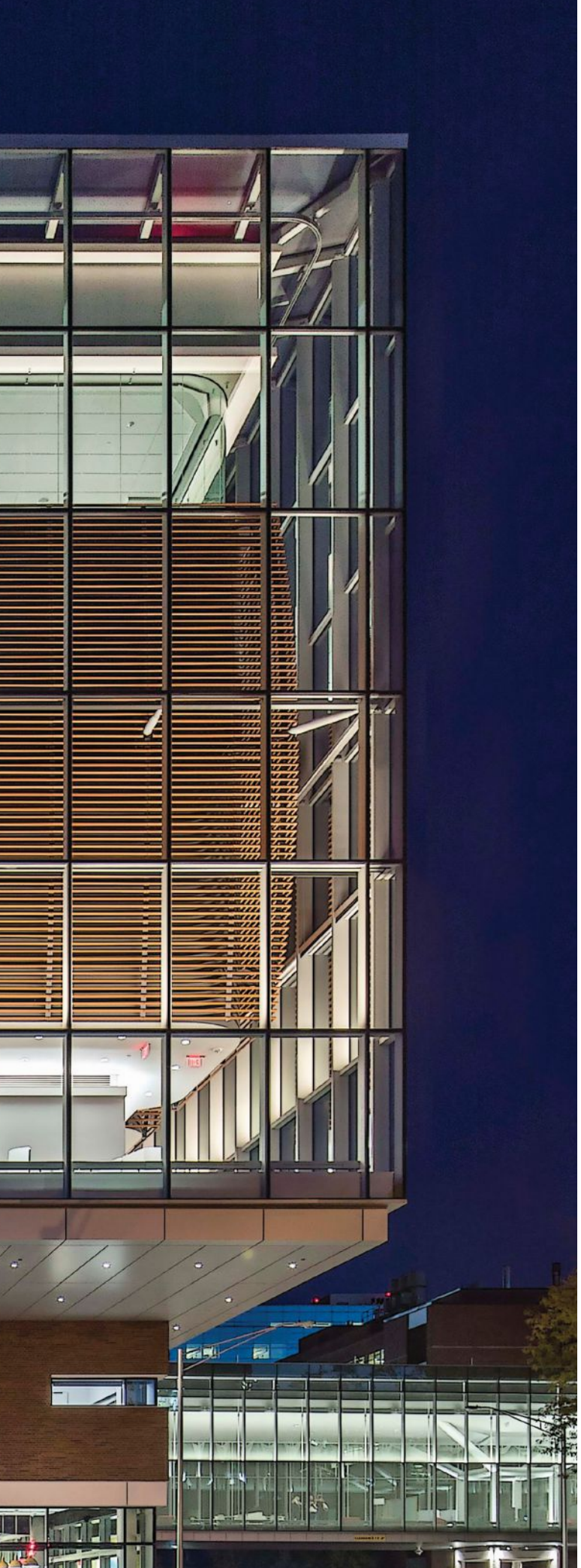

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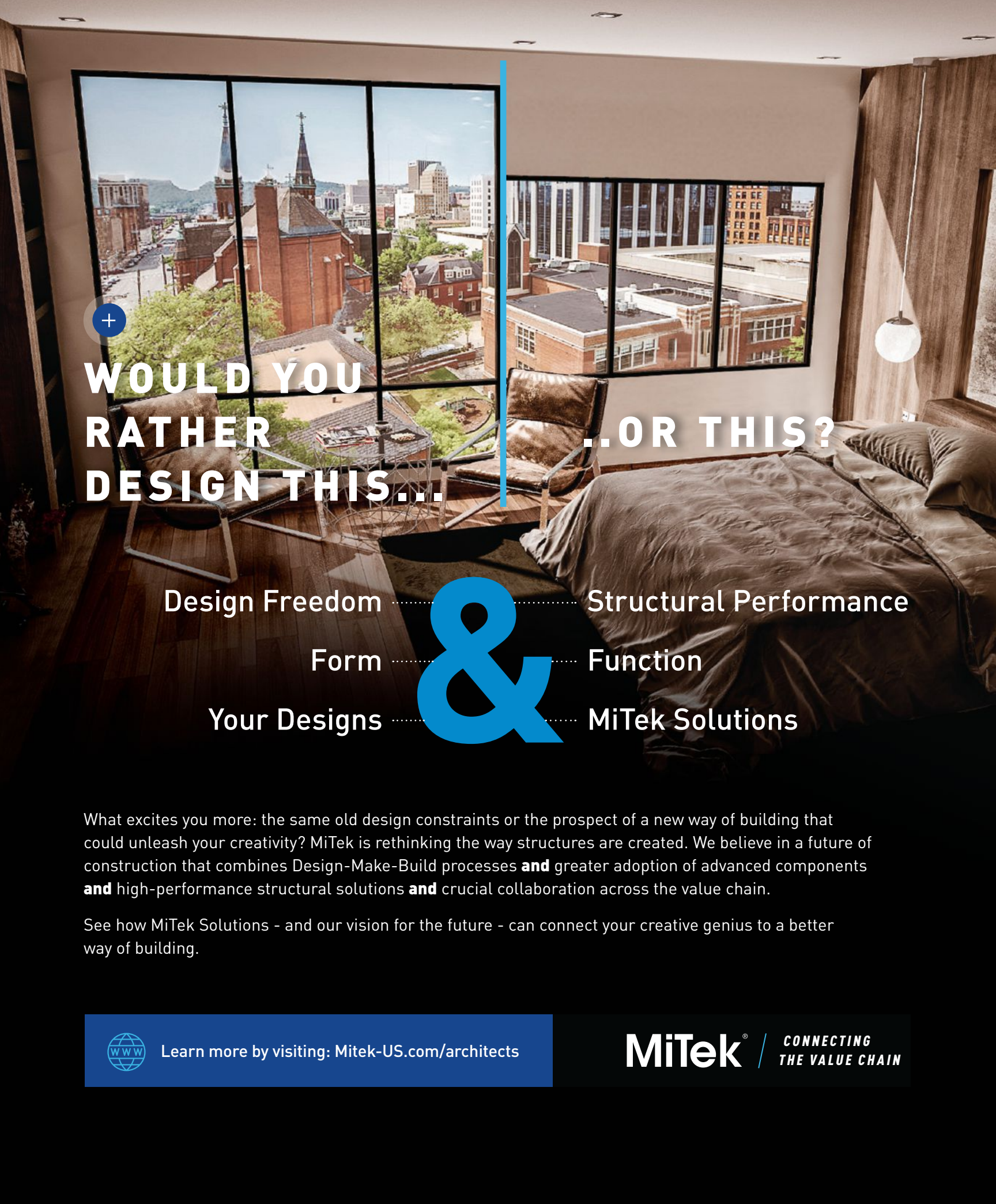

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2021 AIA AWARDS

EDITED BY ERIC WILLS

The winners of this year's AIA Awards offer a glimpse of architecture in its most expansive and visionary state. For starters, the Gold Medal didn't go to an architect with a world-renowned portfolio of buildings but rather a pioneer who helped rally the profession to recognize the built environment's alarming contribution to the climate crisis. Similar activists and boundary pushers, ambitious thinkers, and designers appear on the following pages. Together they have aspired to make the profession—and the world—a more sustainable, equitable, and just place.

> *For more about this year's winners, visit bit.ly/2021AIAAwardsonline.*

ROBERTO E. ROSALES

GOLD MEDAL

Edward Mazria, FAIA

In 1962, as a student at Pratt Institute in New York, Edward Mazria was drafted by the New York Knicks. He entered the Peace Corps instead, an experience that helped shape a singular career that has now earned him the highest honor bestowed by AIA. Mazria pioneered the effort to calculate the built environment's outsize role in exacerbating climate change and, with his New Mexico–based nonprofit Architecture 2030, has led a decades-long effort to make the profession take action. Mazria responded to his Gold Medal in predictable fashion—with a challenge to his fellow architects:

"These are extraordinary times. The awarding of the AIA Gold Medal this year signals a break with the past and looks to the immediate future where architecture, planning, and design confront and prioritize practices that address the most significant crisis of our time: climate change. It portends an architecture not just on the Earth, but of the Earth, manifesting in unprecedented design opportunities and possibilities that dramatically expand architecture's scope and unique role in the world.

"This particular award reexamines architecture and brings with it a serious discussion and new way of thinking, looking at the global picture and major challenges we face, while mobilizing and motivating the profession to take actions that ensure we continue to coexist with the natural and biological world. The time scales to act are short, meaning how quickly we transform as a profession may very well determine the sustainability of the planet.

"The 2021 Gold Medal challenges each of us to achieve that which will be our most important legacy."

ARCHITECTURE FIRM AWARD

Moody Nolan

SHON CURTIS

Founded in 1982 by Curt Moody, FAIA (right), who soon joined forces with the late engineer Howard E. Nolan, Moody Nolan has grown to become the largest African American–owned and operated firm in the country, with Curt's son, Jonathan Moody, AIA (left), now serving as CEO. That pioneering journey, reflected in the firm's commitment to designing "responsive architecture" that empowers communities, has been recognized with the highest honor AIA bestows on a firm.

What is the firm's greatest achievement?
This award. It is a privilege to receive this honor, but to become the first African American firm to earn this recognition is a dream come true.

What led to the founding of the firm?
A lack of minority representation in the profession, especially at a leadership level.

What does it mean to be the largest African American–owned and operated firm in the country?
We have an opportunity to be role models for underrepresented professionals to see that they can pursue their passion and be successful at any level.

What is the greatest challenge the firm has faced over the years?
Proving ourselves as a minority-owned firm and building our practice during a recession. In the early '80s, it was believed that minority firms lacked the capacity and capabilities to design major projects. We are thankful to the firms that collaborated with us early on and helped us build our portfolio so we were able to win larger contracts on our own. This is something we try to do for other minority firms today. Building our practice during a recession helped us get through the Great Recession of 2007 and has prepared us to withstand the current pandemic.

What is the firm's approach to architecture?
We practice responsive architecture—which means we will listen intently and analyze effectively, and then design an innovative, functional, and aesthetically pleasing space, without losing sight of the project's program and budget. We work collaboratively with our clients to arrive at a design solution that achieves a common vision with uncommon results.

What project best illustrates that approach?
The Student Library and Learning Center was the first new building on Texas Southern University's campus in the last 20 years. It was important that the design serve as a central gathering space for the campus and the surrounding community. Our approach led to a contemporary, angular design that helps draw you inward toward the main lobby and up through a five-level atrium that serves as the heart of the building—and the campus.

What projects is the firm most drawn to?
Projects that bring people together. Projects where anyone who experiences them is immediately aware that they can create a place where people can come together and leverage collective resources to make change.

What word best describes the personality of the practice?
Integrity. Several pillars of our guiding principles fall under the idea of being ethical and treating others with respect.

What is the firm most proud of?
Legacy House. We are fortunate to have reached a level of success that allows us to give back in a direct and tangible way. Our firm began the Legacy Project in 2017. This initiative gifts a mortgage-free home to a family in need in each of the 11 cities where we have offices.

What is the greatest challenge facing architects today?
Climate and Justice together.

What should architects do to respond to that challenge?
We have to acknowledge that the challenges around our climate and social infrastructure get worse every day. We have a responsibility as architects to create communities and spaces that empower all people with respect and dignity. We must strive to reach underserved youth and create inclusive and environmentally just communities. As professionals, we must re-evaluate our corporate structure to create cultures that support this work.

When Phoenix needed a new central library, the city turned to Will Bruder Architects, which produced a mesa-like design that was as environmentally sensitive as it was aesthetically striking. Completed in 1995, the library has become a treasured icon, its annual summer solstice celebration renowned for a dazzling light show that the architects engineered with their careful placement of the skylights. Here's Will Bruder, FAIA, on the project's legacy:

What was the greatest achievement in the design of the library?
That the library's built reality has been functionally adaptable for 25 years of programmatic changes, including radical collection movements on all levels, without compromising the building's iconic image or its architectural integrity.

What buildings or architects served as inspiration during the project?
My practice was always focused on creating desert-appropriate and energy-passive architecture, starting with our first modest residences and commercial and civic buildings in the early 1970s. My deep knowledge of the work of Frank Lloyd Wright and Paolo Soleri inspired my passion for materials.

Why was there so much focus on creating a sustainable and efficient design?
Even though the LEED system of rating and valuing sustainable architecture did not exist yet, our ethos and aesthetic as design professionals meant the library had to become the poster child for the future of best practices. Sustainable features included optimizing the thermal mass "swings" of the structure, minimizing east- and west-facing glazing, optimizing the solar shielding of the major glazing surfaces—on the south with horizontal louvers, and on the north with vertical sculptural "shade sails"—and selectively manipulating the sunlight coming through the skylights on the fifth floor. If it was to be successful, this library needed to take us from the past, when librarians were known as the caretakers of knowledge, to an age when librarians would become the navigators of knowledge. We knew it had to be a sustainable building to best achieve that goal.

What happens during the solstice celebration?
Every year at solar noon on the day of the summer solstice, hundreds of people gather in the Great Reading Room. There, on the fifth floor, the sun washes down the west wall through the 300-foot-long narrow skylight where the wall meets the roof, forming a curtain of light. As the sunlight kisses the floor on the western edge, it rises up the western face of the eastern wall through a similar parallel narrow skylight. At the moment when light and shadow patterns on both east and west walls are symmetrically balanced, the final act unfolds. Through 7-inch-wide "clear circles" located in the blue-tinted skylights, the sun's rays align to focus on the tips of the building's tapered concrete columns—each one looking like a candle topped by a flame. That moment marks the start of summer in the Arizona desert, as the library becomes a celebration of Phoenix's place, not merely in the Southwest, but in the universe.

What is the best description of the finished building?
It seems successful as a Wunderkammer, as every library should aspire to be. The building is filled with invitations to be curious, to learn, to look, to dive deep into something, and to delight all the citizens it serves.

What made the project so innovative?
It never lost sight of the user or the budget. It made ordinary materials appear extraordinary. It looked at unconventional and innovative ways to solve every problem. It celebrated its place and time.


BILL TIMMERMAN

TWENTY-FIVE YEAR AWARD

Burton Barr Phoenix Central Library
Phoenix
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WHITNEY M. YOUNG JR. AWARD

Pascale Sablan, FAIA

An associate at Adjaye Associates, Sablan has dedicated her distinguished career to architectural activism, founding Beyond the Built Environment, an organization that aims to eliminate the inequities perpetuated by the profession. Newly elevated to the AIA College of Fellows, she is the youngest African American so honored.

What is your approach to architecture?
I am an architect-activist who champions women and diverse design professionals by documenting, curating, and elevating their work. The objective is to create a just profession, bring social awareness to the built environment, and empower communities through design.

What project have you worked on that best illustrates this approach?
The first project that crafted my approach was the African Burial Ground National Monument in New York. It was an example of Architecture serving as an Advocate. The monument honors the existence of the estimated 15,000 African remains buried under City Hall and the neighboring federal buildings.

What does architectural misery mean?
"For every injustice in this world, there is an architecture that has been designed to facilitate and perpetuate it." This quote by Bryan Lee Jr. made me reflect and take responsibility for how I have contributed to the creation of architecture that hurts and oppresses. It also inspired me to take a stance against participating in the design and construction of certain typologies. I encourage our profession to step away from designing spaces such as prisons, jails, detention centers, and police stations, and instead shift our efforts toward supporting the creation of new systems and typologies based on prison reform, alternatives to imprisonment, and restorative justice.

What's your greatest ambition that you have yet to achieve?
Dismantling and eradicating racism and oppression from the built environment and the profession.

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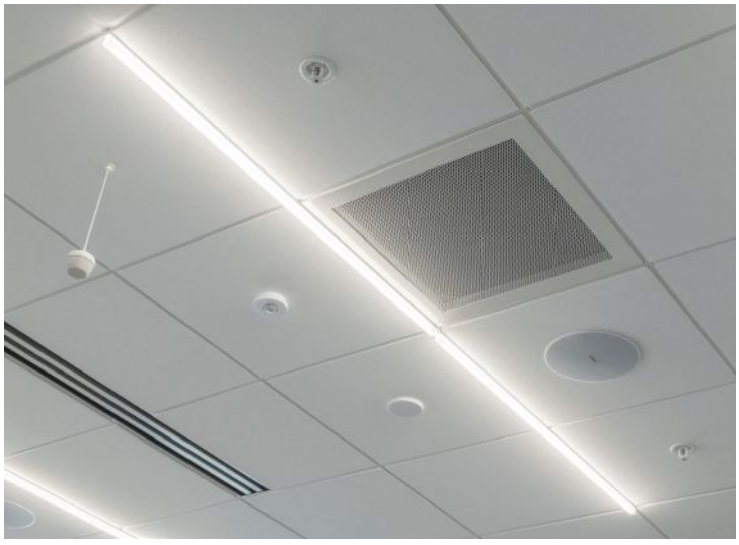

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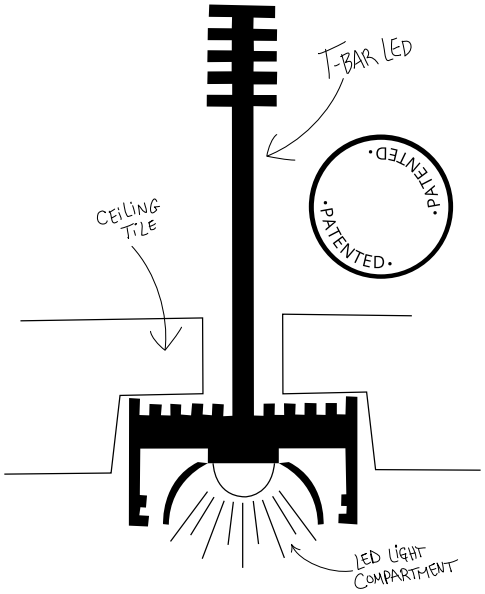

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TOPAZ MEDALLION

Kathryn Anthony

Anthony's illustrious teaching career—she's the ACSA Distinguished Professor at the University of Illinois at Urbana-Champaign—was informed by her groundbreaking research on gender and race in architecture. Her work called out toxic studio cultures and advocated for a more diverse and inclusive profession—issues she also explored in the classroom as a mentor to countless students.

What is your greatest achievement?
Seeing my books published; testifying before the U.S. Congress about the need for gender equity in design; serving as media spokesperson about the importance of designing for diversity; teaching and learning from generations of students; and now the Topaz Medallion—the icing on the cake!

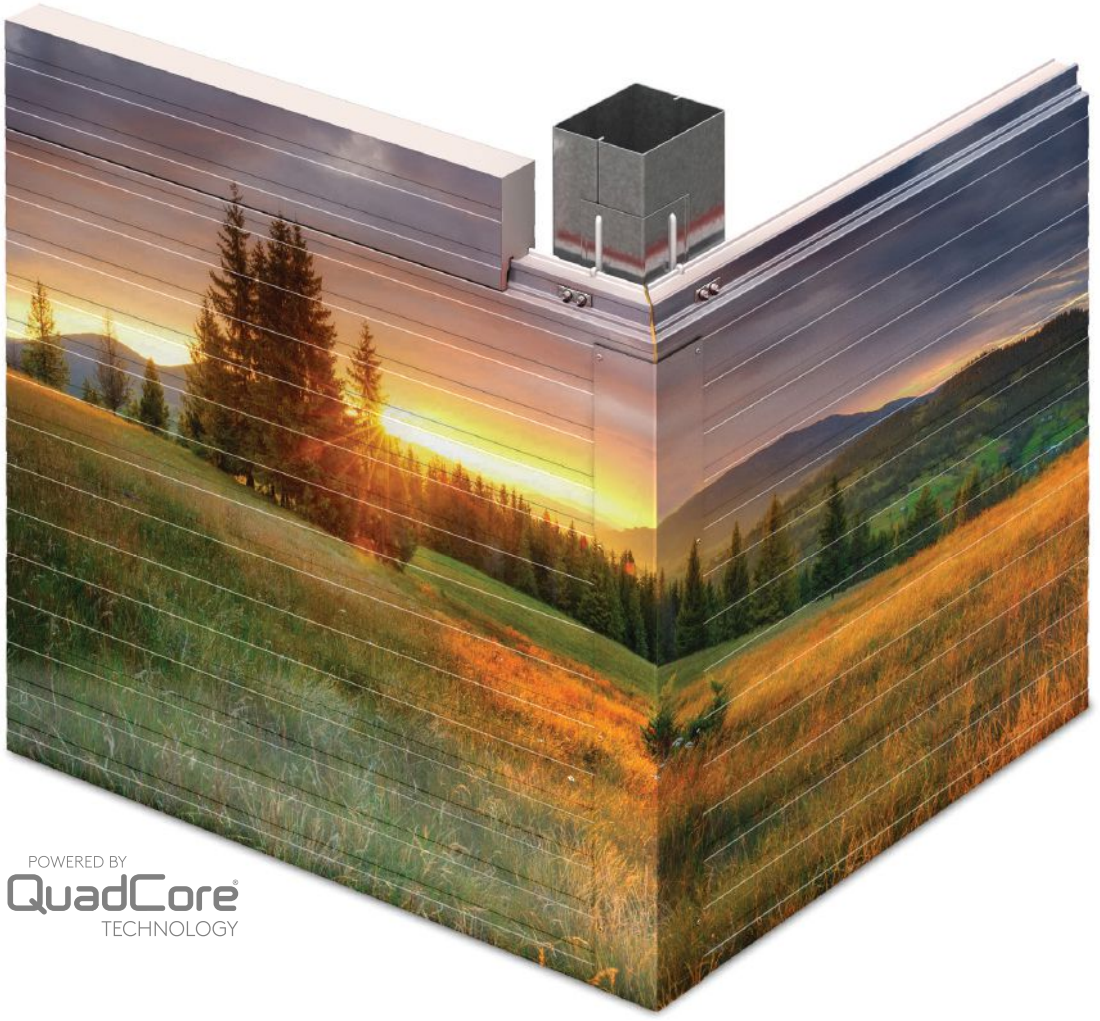
What is your teaching style?
My style is to bombard students with an extensive list of readings and media, along with lots of carefully constructed, hands-on assignments that empower them to apply what they've learned. I always encourage students to present their projects in graphic, written, and oral forms, all of which speak to different audiences. In years past when I've team-taught design studios, we've always worked with a real client who helped us develop the program and evaluate the projects, a win-win situation.

What role does your research and scholarship play in your teaching?
They have always been closely connected. I've made it my life's work to stand up for those who have been invisible for too long, advocating on behalf of people who have been left out and left behind: architecture students facing devastating design juries that drove some right out of the field; women architects and architects of color who are treated unfairly on the job, far outnumbered, and often leap-frogged by white male colleagues; everyday people who inhabit, work in, or visit spaces where they are disadvantaged by design.

What has been your greatest challenge?
My first book, *Design Juries on Trial,* which shed light upon students' private, devastating reactions to overly harsh public criticism, took years to find a publisher. I could decorate a wall with rejection letters. But after I spoke at an ACSA conference, a Van Nostrand Reinhold editor magically appeared from the audience and introduced himself. To me, he had a halo around his head. The rest is history.

TARA PIXLEY

A New Horizon



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COLLABORATIVE ACHIEVEMENT AWARD

MASS Design Group

With offices in Boston (above), Kigali, Rwanda (below), Bozeman, Mont. (below middle), and Sante Fe, N.M. (below right), MASS Design Group has pursued its mission of socially conscious design by leveraging the power of its collaborations with nonprofits, activists, and communities around the globe.

What has the firm learned over the years about the art of collaboration?
That the practice of architecture is inherently built to achieve results born out of collaborative processes, though the practice itself is structured in a way that does not foster this collaboration. At least not in a way that is initiated, curated, and driven by architects. Our biggest challenge is to claim that responsibility back from the supply chain systems. —CHRISTIAN BENIMANA, SENIOR PRINCIPAL AND MANAGING DIRECTOR

What projects is the firm most drawn to?
We are most drawn to what we call "lighthouse projects": partners who are seeking to make transformative change in how they serve their communities. They have reached the inflection point where a project of some kind is essential to make that happen. —PATRICIA GRUITS, SENIOR PRINCIPAL AND MANAGING DIRECTOR

What is the greatest challenge facing architects today?
Forty percent of all carbon emissions are the result of infrastructure and buildings. We can't face the most existential threat to our planet without changing the way we build. But the building trades must also consider how environmental restoration is interrelated with social and economic justice, without which that restoration will be impossible to achieve. —SIERRA BAINBRIDGE, SENIOR PRINCIPAL AND MANAGING DIRECTOR

BOSTON: TONY LUONG; KIGALI: CHRIS SCHWAGGA; BOZEMAN AND SANTA FE: ANNIE TRITT


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AWARD FOR EXCELLENCE IN PUBLIC ARCHITECTURE

Katie Swenson

A senior principal at MASS Design Group, Swenson launched her ground-breaking career in community-based design as the director of Enterprise Community Partners' Rose Fellowship program, an experience she documented in the book *Design with Love*.

What is the most memorable moment of your career?
In my final year of architecture school, I saw an announcement from Enterprise Community Partners looking for "community architects." I had never heard those two words together, but something in me immediately lit up: Whatever a community architect was, that's what I wanted to be.

What inspired that interest in public design?
In high school, I volunteered at Rosie's Place, a shelter for women in Boston. I witnessed the devastating effects of homelessness, which was reaching epidemic proportions in the mid-1980s. It was shocking. Without a home, it seemed, everything else fell apart. Inequality in this country is complex. But everyone is vulnerable without a home, and so housing becomes the ultimate solution to so many social ills. What will it take for us to create a national housing policy that commits to the fundamental right of every person to have a good quality home? Until that happens, I'll keep working.

What do you hope your legacy will be?
I hope that I'll be remembered as someone who centered the concept of love in design. For me, the concept of home—on both a personal and a political level—is inextricable from the concept of love. Safe, well-designed spaces create an environment where we thrive emotionally, physically, and culturally.

TONY LUONG


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AWARD FOR EXCELLENCE IN PUBLIC ARCHITECTURE

Jennifer Sage, FAIA

The co-founder of the New York firm Sage and Coombe Architects, Sage has left an indelible mark on her native city, aiding post-Sandy rebuilding efforts and designing prominent civic and cultural institutions.

What's the greatest challenge facing architects today?
Convincing skeptics who do not understand that great design is important to the diversity, equality, and health of American cities. And that it can be completed on budget and on schedule, and it can be tough enough to endure the wear and tear of nonstop civic life.

What inspired your interest in public design?
The best and the worst of my New York City childhood: the decrepit subway stations of my high school years, the glories of Central Park's Bethesda Fountain, my favorite local library on lower Seventh Avenue. Perhaps my interest was always lurking below the surface, but I couldn't articulate it until I started building.

What has New York's Design Excellence Initiative meant to your practice?
It has proven that public policy can play a pivotal role in making meaningful civic contributions. It requires enlightened public leaders and administrators who enjoy the process and believe in the power of design.

What role should public design play in a post-pandemic world?
The support of public design initiatives is increasingly important in their ability to address economic inequality: funding and treating each neighborhood as equal to the next, allowing public work to be a palpable expression of care, support, and equity.

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EDWARD C. KEMPER AWARD

Anthony Schirripa, FAIA

Schirripa, who held leadership positions at Gensler and Mancini Duffy, established a legacy of extraordinary service to AIA, transforming AIA New York with his financial management and contributing his powerful advocacy to the Institute's national board.

What's your greatest achievement?
I take a high level of satisfaction in knowing that I turned over the leadership reins of Mancini Duffy to the next generation at the right time. I'm proud to say the firm was in a much improved financial condition and, with the right people in place, it will continue to grow for generations to come.

What prompted your AIA involvement?
My mentor and dear friend Walter Hunt asked that I get involved at the local level. I agreed to serve on the finance committee of the New York chapter as it launched a capital campaign to raise funds to build a new headquarters and Center for Architecture. Walter wanted me to be involved in that process and to apply my knowledge of complex interior renovation projects to insure things came in on budget. That ultimately led to nearly 20 years of service at the local level as chapter president, as state-level director, and as regional and at-large director on the national board.

What have you hoped to accomplish through your AIA advocacy?
I always hoped—and I think I contributed to this—to strengthen an organization that is responsive to the needs of its members, that is financially strong to weather economic cycles, and that is recognized by the public we serve as the leading voice for architects in service to society.

What is the greatest challenge facing architects today?
Keeping abreast of the ever increasing complexity of buildings and their systems in order to achieve resilient and sustainable designs that reduce energy consumption and our carbon footprint. We also must ensure that the future of our profession is diverse and inclusive and represents the public we serve.

How should architects respond to those challenges?
By sharing knowledge with our peers through AIA and other organizations. We must collaborate with others as we can't solve these challenges on our own. We should also get involved in K–12 education to expose young people to careers in architecture and mentor them to achieve success.

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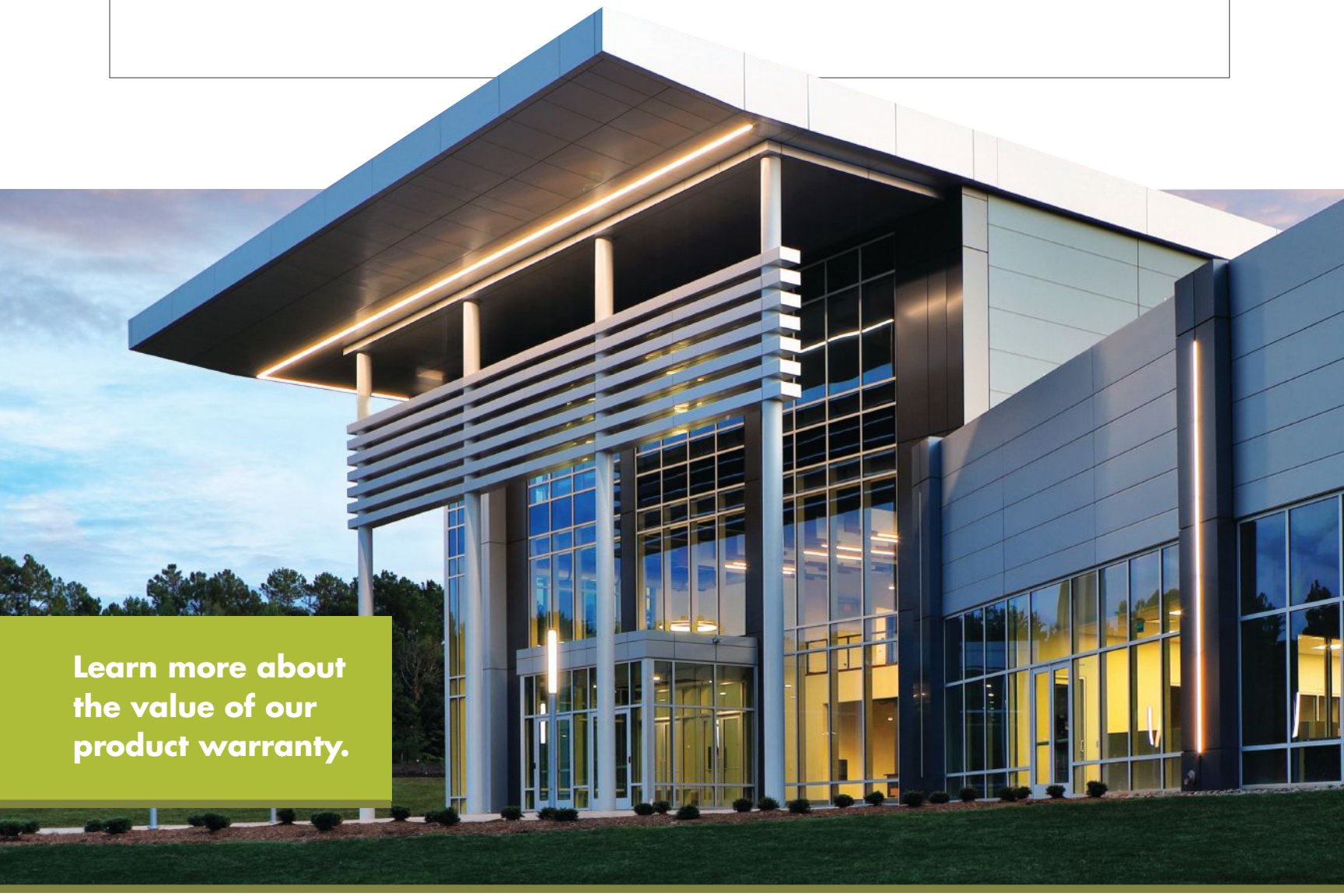

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ASSOCIATES AWARDS

Tiara Hughes, ASSOC. AIA
Senior Urban Designer
Skidmore, Owings & Merrill
Chicago

"As the founder and executive director of FIRST 500, I travel the country to raise awareness of the importance of Black women architects throughout history and their contributions to the built environment. These women serve as inspiration and motivation for the Black women looking to become licensed, and for those studying in our universities to graduate and enter the field."

Oscar Lopez, ASSOC. AIA
Design Principal
Space Bureau
Tucson, Ariz.

"Architects (and architecture) are at a moment in time when we need to decide which side of history we want our profession to be on. We need to move beyond aesthetics and accept that we need to play a greater role in supporting the communities that we serve. Our dedication and our commitment to the underserved and underrepresented is one of the most important issues facing our profession."

Ricardo de Jesús Maga Rojas, ASSOC. AIA
Senior Project Coordinator
GFF
Austin, Texas

"I think that the disconnect in the pipeline that leads into architecture practice needs to be revisited. We cannot afford to bring in the next generation of architects and designers with antiquated practices that hinder people of color. Let's revisit examination and the student performance criteria to create a more just, equitable, diverse, and inclusive profession."


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Cody Henderson, AIA
FSA
St. Louis
Director of Science and Education

"Many in the field appear to be leaving for more financially enticing opportunities and are not joining the next generation of architects. Without efforts to create a more diverse, just, and equitable practice with financial incentives, we will continue to see the loss of existing and potential talent."

Danielle Tillman, AIA
bKL Architecture
Chicago
Managing Principal

"The next generation of architects must be a representation of the communities in which we live and work. This requires me to be visible, engaged, and tenacious in changing the perception of who an architect is."

Jeff Guggenheim, AIA
Guggenheim Architecture and Design Studio
Portland, Ore.
Principal

"We need to promote the idea of the architect as being a creative force and not just a rubber stamp. The relevance of architects will depend on our ability to be creative leaders and not just service providers preparing permit sets under the direction of our clientele."

Jack Becker, AIA
bld.us
Washington, D.C.
Principal, Co-founder

"The accomplishment I'm most proud of is building the Grass House, the first code-compliant bamboo structure on the East Coast. My ambition is to spread a farm-to-shelter approach across the Mid-Atlantic."

Danielle McDonough, AIA
CambridgeSeven
Cambridge, Mass.
Senior Associate

"In order to develop equitable projects and communities, the ability to communicate with multiple parties is essential. This skill is foundational and architectural education should expand on it, along with providing students hands-on experience."

Daniel Yudchitz, AIA
Leo A Daly
Minneapolis
Director of Design

"We need to develop ways to have a greater impact while utilizing fewer resources. All projects must consider the fourth dimension—time—and design with an understanding of life cycles in mind."

Amanda Loper, AIA
David Baker Architects
Birmingham, Ala.
Principal

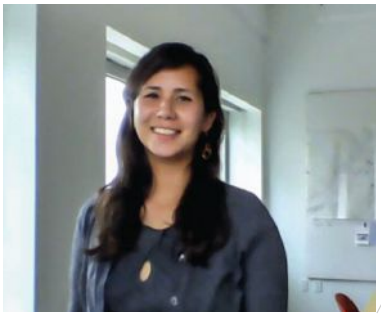
"I've come to believe we need stronger policies at the state and local levels to encourage sustainable and equitable development that benefits all residents. The building code also plays a role. I've seen firsthand the difference that green building requirements can have."

YOUNG ARCHITECTS AWARDS

Jennifer Park, AIA
Brininstool + Lynch
Chicago
Principal
"COVID has made clear the tie between human and environmental health. As architects, we deal directly with both. Buildings can leave large carbon footprints and also influence how we interact with each other and nature."

Mark Bacon, AIA
BVH Architecture
Lincoln, Neb.
Design Principal
"We must educate clients on the value of resilient design. A lot of my work is in rural areas and we push hard to demonstrate that every design decision has a purpose and can contribute to a community's long-term sustainability."

Matthew Thornton, AIA
Dake Wells Architecture
Springfield, Mo.
Architect
"The growth and quality of design culture here and in the entire Central States area has increased by leaps. I'm proud to have played a small part while serving on the local AIA board."



Patricia Culley, AIA
Bohlin Cywinski Jackson
Pittsburgh
Associate Principal
"One of our greatest assets is our problem-solving skills. Yet most practitioners focus on project-specific work. I would encourage architects to balance that work with policy and advocacy efforts to become stronger catalysts for societal transformation."

Adam Harding, AIA
Roth Sheppard Architects
Denver
Partner and Design Principal
"I believe that every firm should be a signatory and participant of the AIA 2030 Challenge and develop an action plan that suits their firm's philosophy, culture, and commitment to sustainability."

Jonathan Moody, AIA
Moody Nolan
Columbus, Ohio
CEO
"My hope is that we are successful in growing the current pipeline of diverse practitioners into a better culture of support. NOMA and AIA's Large Firm Roundtable have issued a 2030 diversity challenge to double the number of Black architects by 2030."

REMOTE PORTRAITS: SHAYLA BLATCHFORD

Dagmara Larsen, AIA
MSR Design
Minneapolis
Principal
"Architecture needs to be more participatory, both in the ideas phase—broadly involving the community in the process—as well in the design and construction phases, through technology integration in practice."

Matt Toddy, AIA
Design Collective
Columbus, Ohio
Architect
"We can learn a lot from looking back at our history, but our profession is notorious for being risk-averse and adapting slowly. We need to ask the hard questions about how and why we practice the way we do."

Myer Harrell, AIA
Weber Thompson
Seattle
Principal, Director of Sustainability
"I like big ideas that are ripe for scaling and mass adoption. In 2008, a small team of us stumbled upon the idea of vertical farming in a design competition. Not only did we win first prize, but we continued to develop the concept after the competition."

Michael A. Davis, AIA
Sanders Pace Architecture
Knoxville, Tenn.
Project Architect
"Sensitivity to place is central to my design process. The projects I work on are primarily in East Tennessee, and I am committed to making architecture that draws from the region's history and traditions and engages the various contexts and terrains found here."

Desmond Johnson, AIA
Middle Street Partners
Atlanta
Design Manager
"I would love to see architects become accessible stewards to the multitude, not just the wealthy. It is estimated that less than 2% of the world's population can afford the services of an architect."

Katelyn Chapin, AIA
Svigals + Partners
New Haven, Conn.
Associate
"We need to diversity the voices at the table. Imagine the impact we could have if we invite more people of diverse backgrounds into the design process."

Adrienne Cali Magners, AIA
Bruner/Cott Architects
Boston
Associate
"Firms need to reevaluate how they are structured and how they hire, prioritizing specific talents to better design outcomes. Historic preservationists, building-envelope specialists, code consultants, etc.—all can help round out a firm."

REMOTE PORTRAITS BY SHAYLA BLATCHFORD

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Marlon Blackwell Architects

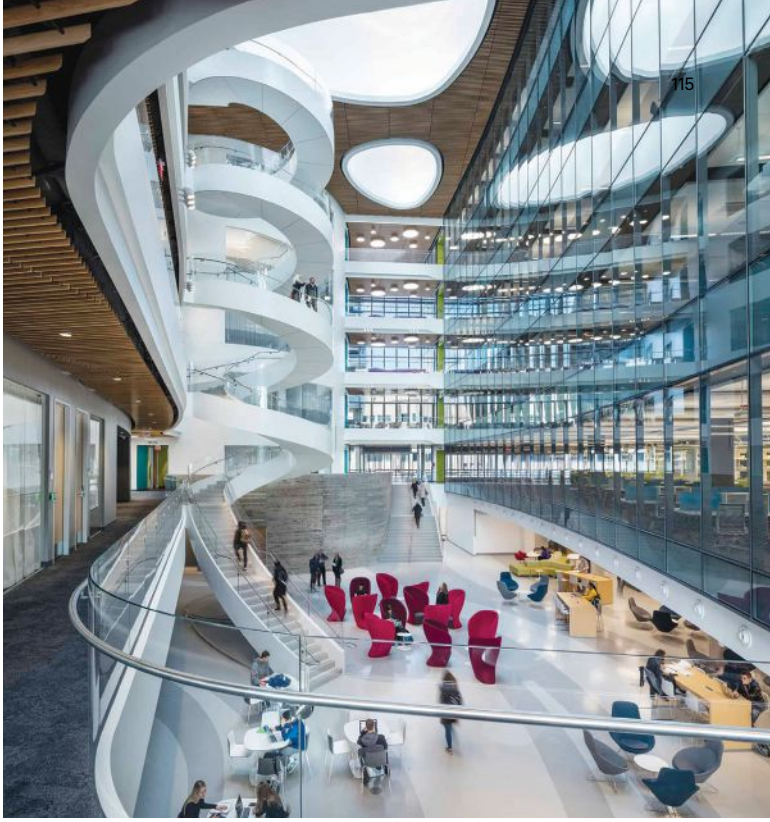
ARCHITECTURE

Martin's Lane Winery
Kelowna, British Columbia
Olson Kundig

Loghaven Artist Residency
Knoxville, Tenn.
Sanders Pace Architecture

CLOCKWISE: TIMOTHY HURSLEY, BRUCE COLE, NIC LEHOUX

The Polygon Gallery
North Vancouver, British Columbia
Patkau Architects



Northeastern University Interdisciplinary Science and Engineering Complex
Boston
Payette

JURY
Kim Yao, AIA, Architecture Research Office (chair)
Phillip Bernstein, FAIA, Yale School of Architecture
Melissa Daniel, ASSOC. AIA, Amentum
Magdalena Glen-Schieneman, AIA, MGS Architecture
Keith Lashley, AIA, HKS
Jim McDonald, FAIA, A&E Architects
Marianne McKenna, AIA, KPMB Architects
Connor Merritt, Washington University in St. Louis
JoAnn Wilcox, AIA, Mithun

Sound Transit University of Washington Station
Seattle
LMN Architects

Fass School and Teachers' Residences
Fass, Senegal
Toshiko Mori Architect

CLOCKWISE: JAMES DOW/PATKAU ARCHITECTS; WARREN JAGGER; KEVIN SCOTT; IWAN BAAN

Walker Art Center Expansion
Minneapolis
HGA

TWA Hotel
New York
Beyer Blinder Belle in collaboration with
Lubrano Ciavarra Architects

To create the **Salt River Pima-Maricopa Indian Community Justice Center**, the Phoenix office of Gould Evans fashioned a building that could fulfill the legal and administrative needs of the Native American community local to Scottsdale, Ariz.; provide the technologies of a 21st-century courthouse; and be respectful of the modern-day tribes' long history in the region. The center incorporates subtle references to Indigenous traditions and culture and carefully frames views of the landscape to create a connection with its place and people. ⁄ Designed by Marlon Blackwell Architects, the **Lamplighter School Innovation Lab** is situated on a Dallas campus that reflects the institution's commitment to community, light, and landscape. The firm conceived the Innovation Lab's design as a kind of meditation on the idea of openness. Interior learning spaces are linked to one another with little in the way between them. At each end of the T-shaped plan stand deep-set entryways, leading students back to the great outdoors. ⁄ With its raked profile, **The Polygon Gallery** in Vancouver, British Columbia, by hometown firm Patkau Architects nods to the city's past as a center for shipping and manufacturing. Its lofted, glazed *rez de chausse* doubles as a public space, an indoor extension of the surrounding waterfront park. And with its glossy steel cladding, the structure appears as a compelling architectural object, a suitably enigmatic setting for the photography on display within. ⁄ **Northeastern University's Interdisciplinary Science and Engineering Complex** in Boston by local firm Payette creates a hub for the sciences as well as a social center for students. Sitting among several of the city's diverse communities and framed by a primary rail corridor, the complex's arresting curved profile and light-filled interior are capable of stopping visitors in their tracks. ⁄ Designed by local firm LMN Architects, **Sound Transit University at Washington Station** in Seattle is a destination in its own right: Moving over and past a slender pedestrian bridge, visitors descend 100 feet below ground, passing a dazzling light and metal installation en route to a train platform graced with colorful wayfinding and elegant circulatory systems. With aboveground amenities, the building is a multimodal hub with a truly public character. ⁄ The Josef and Anni Albers Foundation with Senegalese nonprofit Le Korsa commissioned New York–based Toshiko Mori Architect to create the **Fass School and Teachers' Residences** in a village on Senegal's Atlantic seafront. Everything from the school's site plan to the curriculum was developed with local residents. Constructed of mud-brick walls topped by pitched thatched roofs, the project's circular buildings possess an undeniable—and undeniably contemporary—visual appeal. ⁄ Log cabins get a remarkable update in the **Loghaven Artist Residency**, a project in Knoxville, Tenn., from local office Sanders Pace Architecture. To create a live–work colony on the vast woodland site, the designers sensitively and smartly refurbished six Depression-era cabins into comfortable contemporary homes. They also added three structures that adopt the same gabled silhouette and rustic materiality as their decades-old counterparts, but with a freshness and simplicity all their own. ⁄ Charged with all the romance, post-industrial glamor, and rustic charm for which Seattle-based Olson Kundig is known, **Martin's Lane Winery** in British Columbia leverages its site into the winemaking process—proceeding gravitationally from the uplands down into the building itself, where the wine is casked and kept naturally cool in cellars tucked into the slope. Tasting rooms overlook sun-dappled fields. ⁄ The high-profile task of resuscitating Eero Saarinen's 1962 airline terminal at New York's John F. Kennedy airport into **TWA Hotel** fell to Beyer Blinder Belle in collaboration with Lubrano Ciavarra Architects. Beginning nearly 20 years ago with structural improvements, the designers have created a hospitality destination, with upgrades both minute in detail—replacing tiny tiles in the aging floor—and daring in vision—adding two structures that flank the original building. ⁄ When expanding the **Walker Art Center** in Minneapolis, HGA began by recladding the original 1971 building by Edward Larrabee Barnes. Then, in a vacant site next door, the firm inserted a pavilion to serve as the museum's primary entrance, restoring a natural procession that had been lost in previous alterations. Accented by an eye-catching yellow vestibule, the structure is topped by a green roof that allows the entry pavilion to blend seamlessly into the surrounding gardens.

LEFT: PAUL CROSBY; RIGHT: DAVID MITCHELL; COURTESY TWA HOTEL

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Linde Center for Music and Learning at Tanglewood
Lenox, Mass.
William Rawn Associates, Architects

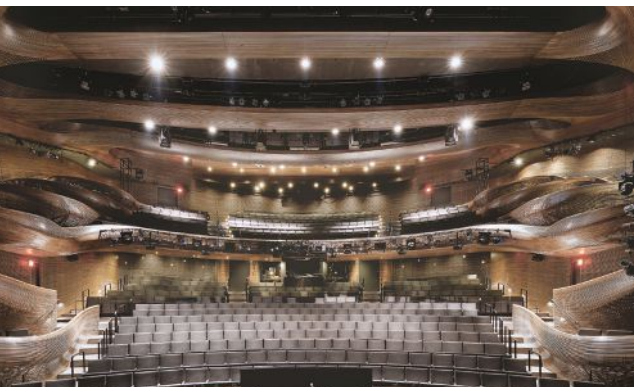
High Desert Retreat
Mountain Center, Calif.
Aidlin Darling Design

INTERIOR ARCHITECTURE

JURY
Carol Bentel, FAIA, Bentel & Bentel (chair)
Venesa Alicea-Chuqui, AIA, Nyvarch Architecture
John Harrison, FAIA, GreenSlate
Heather Rose-Dunning, Yellow Dog Studio
Michelle Watanabe, AIA, Leo A Daly

Vilcek Foundation
New York
Architecture Research Office

Coca-Cola Stage at Alliance Theatre
Atlanta
Trahan Architects



CLOCKWISE: ROBERT BENSON PHOTOGRAPHY; JOE FLETCHER; ELIZABETH FELICELLA/ESTO; LEONID FURMANSKY

Seattle Academy of Arts and Sciences Middle School
Seattle
LMN Architects

Historic Shipyard Reincarnation
San Francisco
Marcy Wong Donn Logan Architects

Co-Op Ramen
Bentonville, Ark.
Marlon Blackwell Architects

TOP TO BOTTOM: LARA SWIMMER; BILLY HUSTACE; TIMOTHY HURSLEY

Designed by Boston-based William Rawn Associates, the **Linde Center for Music and Learning** furnishes Tanglewood Music Center in Lenox, Mass., with 24,000 square feet of new spaces for performance, rehearsal, and public programming—all part of an educational initiative by the Boston Symphony Orchestra. Pulling together the whole ensemble is a series of repeated interior thematics—light wood surfaces, broad windows, black or burnished metal fixtures, recessed theatrical lighting, and elegant wall sconces. ⁄ The sleek, low-slung profile of San Francisco–based Aidlin Darling Design's **High Desert Retreat** creates an anomalous presence in the wild landscape of the San Jacinto Mountains, in Mountain Center, Calif. With an interior palette of blonde timber, acetylene-burnt wood, dark steel, and polished concrete, the architects have achieved a domestic ambience of rustic sublimity. The interior is sited unusually close to the ground plane, such that the floor-to-ceiling windows gracing most rooms appear to bring the outdoors right inside. ⁄ For the **Seattle Academy of Arts and Sciences Middle School**, LMN Architects developed an interior solution that turns the infrastructure of education into a visual journey. From the project's complex plan, connection between new and existing buildings, balcony passageways that overlook learning spaces, and a chromatic scheme enlivened by splashes of red and green, the architects fashioned a spatial ensemble that reveals something new at every turn. ⁄ Marcy Wong Donn Logan Architects' **Historic Shipyard Reincarnation** on the San Francisco waterfront sneaks in a host of surprises. The Berkeley, Calif.–based firm carved a tech-friendly corporate campus out of six industrial buildings. Central to the design approach is lighting—of both the electric and natural variety, the latter of which pours in through expansive windows. Existing as well as new fixtures are ingeniously placed to show off original steel trusses. ⁄ In Bentonville, Ark., **Co-Op Ramen** provides helpings of high-caliber, pulled noodles in an environment at once dazzling and comforting, urbane yet homey. In 2,000 square feet, Marlon Blackwell Architects' interior melds a crisp, luminous ensemble of concrete-block panels, wooden tables and seating, a ceiling of geometric plywood coffers, and a green wall teeming with plant life. While clearly referencing the minimalist traditions of Japan, the design manifests an ambition and complexity that reflects Bentonville's increasing global profile. ⁄ To house the **Vilcek Foundation** in New York, local firm Architectural Research Office turned a historic five-story row house into a high-end, high-performance interior for events, exhibitions, and administrative offices for the foundation's assorted works. ARO's solution slips almost seamlessly into the building shell, comprising enhanced circulation and a rear glazed façade that overlooks the garden. Wood office paneling, a bronze staircase and grilles, and white stone floors mediate between 1910s Neoclassical reserve and 1960s Modernist chic. ⁄ For the **Coca-Cola Stage at Atlanta's Alliance Theater**, New Orleans–based Trahan Architects crafted a concert hall aimed not just at technical superiority, but also at creating a social environment that brings together audience members and performers alike. Oak, cut into slender ribbons and hand-curved to form softly contoured seating tiers and railings and acoustical panels, creates the sense of a soft, secure container—an aesthetic inspired by the work of a local ceramicist, rooting the project in the traditions of Atlanta's diverse community.

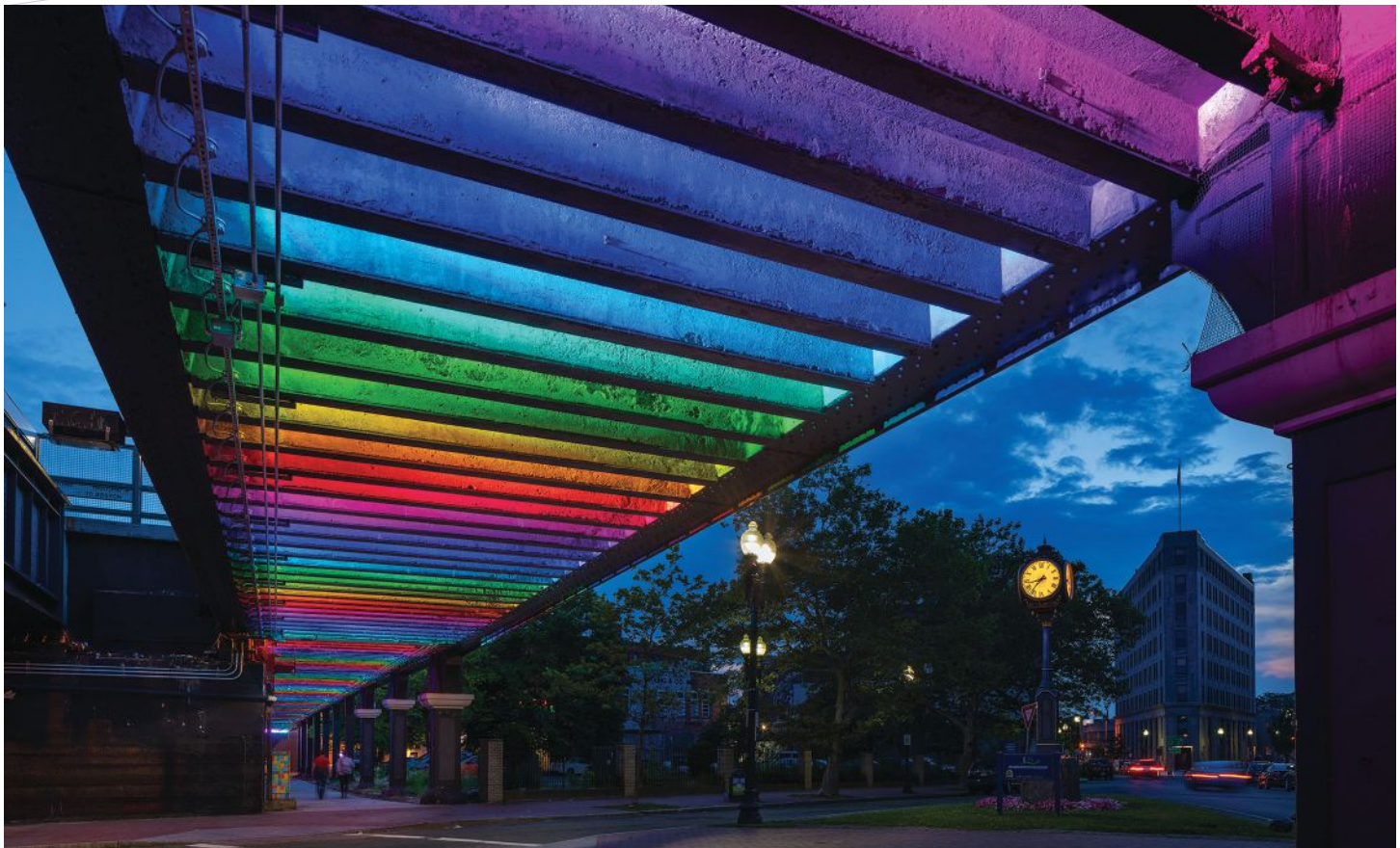
Haxtun—Saving Main Street
Haxtun, Colo.
HDR

Rebuilding a Local Food Economy: Oahu, Hawai'i
Island of Oahu, Hawaii
University of Arkansas Community Design Center

REGIONAL AND URBAN DESIGN

JURY
Mark Gardner, AIA, Jaklitsch/Gardner Architects (chair)
Lesley Bain, FAIA, Framework
Katie Horak, Architectural Resources Group
John Smoley, City of Minneapolis
Dan Yudchitz, AIA, Leo A Daly

Beyond Walls: Building on the Vibrancy of Lynn
Lynn, Mass.
Payette



CLOCKWISE: COURTESY HDR; COURTESY UNIVERSITY OF ARKANSAS COMMUNITY DESIGN CENTER; QUALLSBENSON; COURTESY PAYETTE; WARREN JAGGER

Essex Crossing
New York
SHoP Architects

Northeastern University Interdisciplinary Science and Engineering Complex
Boston
Payette

Like many communities across the country that struggle with the presence of disruptive, underutilized infrastructure, the heart of Lynn, Mass., was sliced through by an elevated transit viaduct, creating darkened passages. To repair the urban fabric and provide a new civic amenity, Boston-based Payette and a team of collaborators created ***Beyond Walls: Building on the Vibrancy of Lynn***, a light installation placed in the underpasses at three proximate sites. Complemented by street murals and an outdoor exhibition of vintage neon signage, the low-maintenance LED installations dazzle pedestrians with a rainbow-inspired spectral array, turning nighttime streets into a dreamy landscape for years to come. ⁄ To create a successor space to Essex Market, one of New York's most storied, but long-struggling, public markets, SHoP Architects went big. Located inside a 2 million-square-foot residential development, the 37,000-square-foot **Essex Crossing** is fairly sprawling in scale, yet the vendor stall layout fosters surprisingly cozy and quiet moments, with new discoveries waiting just beyond the next booth. Food also takes center stage in the design: Shoppers can wander through aisles of fruit, cheese, and smoked fish or nosh from the upper-level seating galleries while watching the ballet of commerce unfold below. ⁄ A hospital became the starting point of Omaha, Neb.–headquartered HDR's speculative scheme ***Haxtun—Saving Main Street***, which seeks to reinvigorate the economy and culture of the relatively remote rural community in Colorado. The proposed set of structures would combine residential, commercial, and institutional functions into a single, densely-packed compound with the hospital at its heart. Topped by gabled roofs, with familiar shotgun-style typologies thrown into the mix, HDR's design intends to bring a feeling of place and communal life back to Haxtun and serves as a prototype for transforming small towns everywhere. ⁄ In one of its two wins in this year's AIA Awards, the **Northeastern University Interdisciplinary Science and Engineering Complex**, designed by Boston firm Payette, aims to provide a hub for intellectual and social activity, which can be hard to create at an urban college with a significant commuter population. In addition to high-tech laboratories and computer learning spaces, supported by a highly efficient mechanical system, the building serves as a social and civic conductor, weaving the institution into the fabric of the neighborhood through careful siting—right by a major transit line—and a winding circulatory system running through and around it. ⁄ The University of Arkansas Community Design Center's proposal ***Rebuilding a Local Food Economy: Oahu, Hawai'i*** represents socially responsible design at its best. Developing a novel food distribution center in Hawaii is an attempt to rectify the state's dependence on outside produce to feed its growing population. On the more rural northern side of the state's most populous landmass, new structures—including wholesale facilities, a marketplace, and a domelike grow house that doubles as an eye-catching recreational destination—would create accessible opportunities to foster local agriculture. The center also suggests a comprehensive approach to logistics and pattern for land ownership and management, which could help Hawaiian farmers establish more ecologically and financially sustainable business models.

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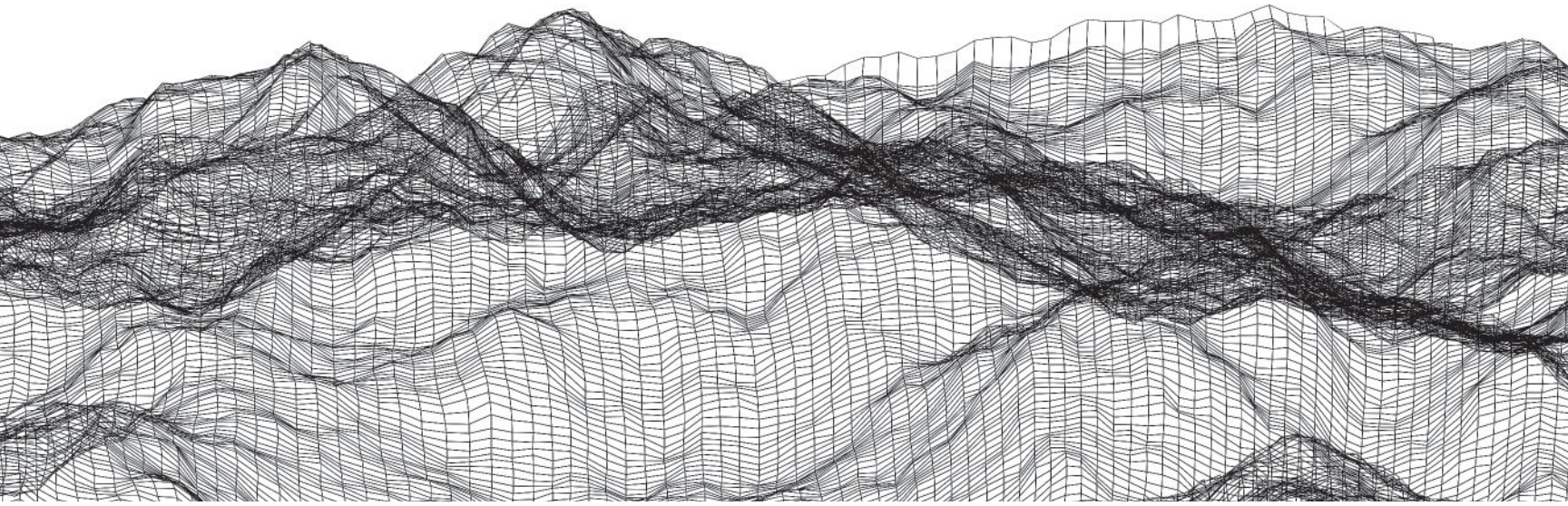

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Editorial: Architecture as Collective Action

TEXT BY THE EDITORS

Looking back to the start of 2020, few could have envisioned what was in store. The COVID-19 pandemic upended life as we knew it, laying painfully bare long-standing racial and economic inequities, affordable housing shortages that dwarf even those during the Great Recession, and the increasing urgency of the climate crisis. The pandemic also exposed the need to devote more resources to public spaces like parks and plazas, even turning streets over to pedestrians. And as the healthcare industry was overwhelmed and the demand grew for more testing sites and quarantine centers, the need to design and build faster and smarter saw the increase in flexible, less wasteful ways of building. In short, the breadth and scale of these challenges required everyone to help define, pave, and improve the path for a more equitable and just world.

Each year's AIA Awards reflect the most forward-thinking individuals and built environments, as determined by juries with an array of backgrounds and expertise. What's refreshing from many of this year's winners is the degree of their commitment to activism and change through architecture. Gold Medal honoree Edward Mazria, FAIA, for example, remains both steadfast and optimistic as a pioneer of carbon-positive architecture. As one of the first to call the profession to task on the built environment's alarming contribution to the climate crisis, he founded Architecture 2030 to provide educational resources and leadership on the design of sustainable and resilient communities. Mazria views his receipt of the Gold Medal as confirmation that the architecture community understands its place at the front line of climate action.

Whitney M. Young Jr. Award–winner Pascale Sablan, FAIA, is another inspiration for us all. The founder and executive director of Beyond the Built Environment and the president-elect of the National Organization of Minority Architects, Sablan is on a mission to elevate diverse architects and designers. She has dedicated her career to architectural advocacy and activism, addressing the inequities and disparities in the industry. Take a look at—or contribute to—her Great Diverse Designers Library, which aims to highlight 500 women and BIPOC designers and their work to inspire future generations of architects. And that's only one of Sablan's many initiatives.

Finally, seeing Moody Nolan named as the recipient of this year's Architecture Firm Award is nothing short of momentous—and a testament to the Columbus, Ohio-based firm's leadership and work—particularly when you consider the profession's continued lack of diversity and history of exclusion. It is the first African American–owned-and-operated firm to earn this recognition. With offices in 11 cities, Moody Nolan can likely connect its success and outstanding caliber of work to its diverse talent and dedication to reflecting the communities it serves. Of the firm's 220-plus employees, 42% are women and over 30% identify as minorities. Moreover, its co-founder Curt Moody, FAIA, and his son, Jonathan Moody, AIA—the firm's CEO and also a recipient of this year's AIA Young Architects Award—are both champions of the 2030 Diversity Challenge launched by NOMA and the AIA Large Firm Roundtables to double the number of Black architects by 2030.

These are but a few of the change makers featured throughout this issue who are challenging the design community to create better environments that are purposeful, accessible, equitable, and stewards of the Earth and its inhabitants.

A group picture of this year's AIA Architecture Firm Award winner, Moody Nolan, in the firm's Columbus, Ohio, office in August 2020.

SAM BROWN/MOODY NOLAN

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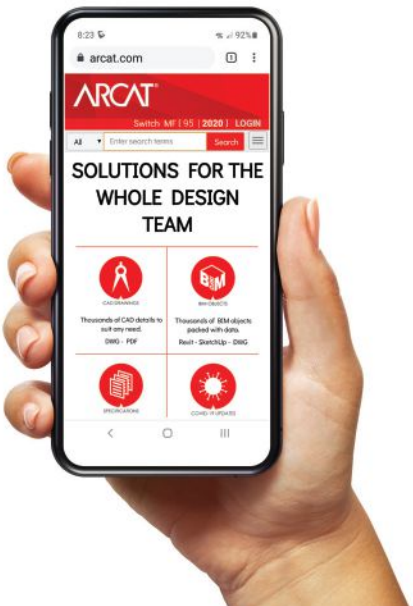

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