ARCHITECT

Architecture 2030 on COP26
AIA Year-End Wrap-Up
Office of Things
DNA Architecture + Design

architectmagazine.com
The Journal of The American Institute of Architects

2021 Residential Architect Design Awards

Connecting to a smarter life

M22344-W – Simple, flexible, reliable video indoor station

ABB Welcome® M22344-W basic 4.3" video hands-free indoor station is our cost-effective solution for residential applications that only require basic but functional door communication features. M22344-W is used to initiate and accept communication with outdoor panels, guard panels, and indoor panels. It is easy to install requiring only a single pair of non-polarized wires and can be flush, surface, and desktop mounted. Commissioning is also effortless through an intuitive 4.3” color display that guides the way with a touch of few buttons.
Scan the QR code to discover more.

TAKTL® Architectural Ultra High Performance Concrete

Since introducing Architectural Ultra High Performance Concrete (A|UHPC®) in 2011, TAKTL has led the design and manufacture of A|UHPC façade elements for rainscreen assemblies and prefabricated building envelopes with a broad range of custom and standard textures. TAKTL panels' thin profiles and large formats are perfectly suited to unitized wall systems. TAKTL has the highest impact resistance in its class, integral freeze-thaw performance, and superior flexural strength. All supported by a dedicated team of architects, designers and engineers with a passion for collaboration. Made in the USA.

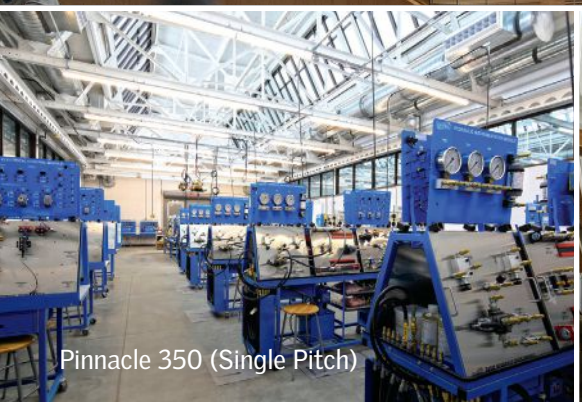
SHOWN: Custom Ribbed TAKTL panels with KORSA aggregate finish

PROJECT: Cypress College, SEM Building
LOCATION: Greater Los Angeles, California
OWNER: Cypress College
ARCHITECT: LPA, Inc.
CONTRACTOR: Sundt Construction
INSTALLER: Caston, Inc.

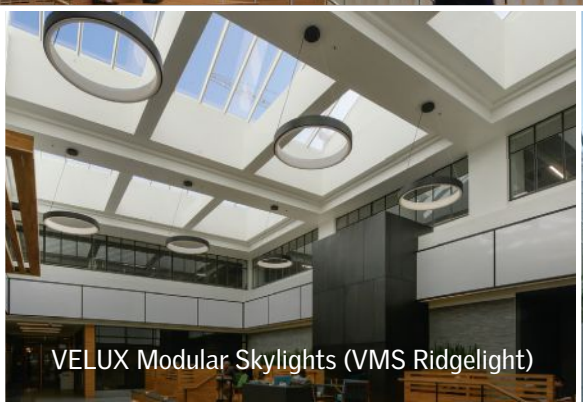
10 STANDARD TEXTURES + 9 STANDARD COLORS
ASTM C1186: Grade IV Certification
Registered EPD: Environmental Product Declaration

Pittsburgh, PA | 412.486.1600 | info@taktl-llc.com WWW.TAKTL-LLC.COM

Pinnacle Series (Single Pitch)



Pinnacle 350 (Single Pitch)



VELUX Modular Skylights (VMS Ridgelight)

Horizon C-Series Canopy

Bring big ideas to light.

If you have big ideas, VELUX® Commercial has big solutions, whether you're looking for custom large-span skylights or an easy-to-install, innovative daylighting system. Our wide product portfolio of custom skylight solutions offers a perfect fit for every design scenario. And with natural daylight and fresh air, your architectural plans can become unlimited design realities. VELUX Commercial: Bringing big ideas to light.

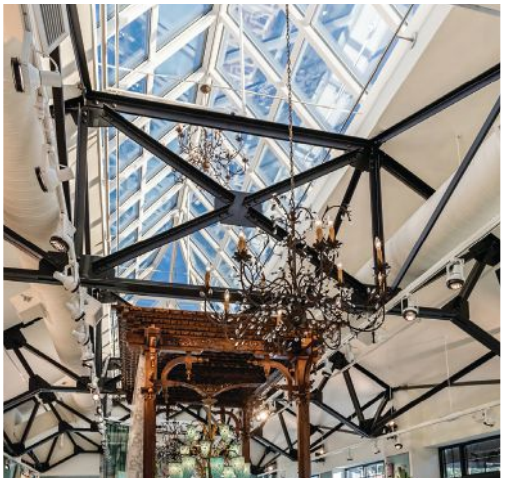
VELUX® Commercial

COMMERCIAL.VELUXUSA.COM

CASE STUDY

Arhaus Furniture – Manhasset

The Pinnacle Skylight System helps transform a car dealership and service station into an English observatory-style, luxury, outdoor furniture gallery.



The custom, hybrid structural ridge and pyramid skylight system was engineered and fabricated specifically for this project.

CHALLENGE

Convert a 1930s aircraft hangar-turned-car dealership and nearby automotive service station into a luxury retail furniture showroom for Arhaus Furniture's Roslyn, New York, sales campus.

Transform and connect the disparate structures by creating a truly unique skylight that matched the architect's requirements for the historic building without the advantage of previously engineered templates.

SOLUTION

RDL Architects worked closely with VELUX Commercial sales representatives, project management team and engineering team. Together, they were able to design, engineer, build and install a custom 64' x 10' roofing system that includes a special extended pyramid skylight straddling a structural ridge skylight.

Location
Roslyn, NY

Project type
Refurbishment

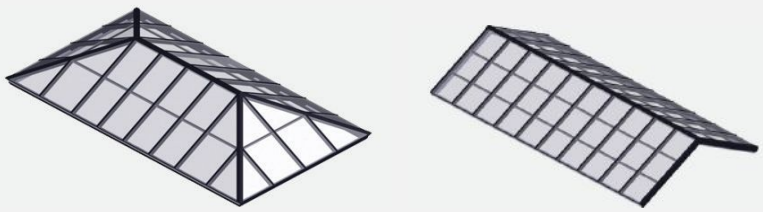
Year of construction
2016

VELUX® Commercial

COMMERCIAL.VELUXUSA.COM

Products used in project

The Pinnacle Series offers maximum design flexibility and convenient on-site assembly. By utilizing ball-and-socket and pre-drilled construction, Pinnacle Series glass is always driven by your build's unique glazing and energy needs and available in a wide array of finish options.



Pinnacle Hybrid Extended Pyramid and Structural Ridges

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

hanley wood UNIVERSITY

Presented by GAGGENAU

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.

CONTINUING EDUCATION COURSE CREDIT: AIA 1 LU | HSW, IDCEC 0.1 CEU | HSW, Canada Potential 1 Learning Credit

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 08. November/December 2021.
On the cover: Light Path in Waverly, Pa., by Bohlin Cywinski Jackson; photo by Nicholas Snyder.
Below: The Goat Heads in Marfa, Texas, by Candid Rogers Studio; photo by Mark Menjivar.

Volume 110, number 08. Nov/Dec 2021. ARCHITECT® (ISSN 1935-7001; USPS 009-880) is published monthly except combined issues in Jan/Feb, May/June, July/Aug and Nov/Dec by Zonda Media, 1152 15th Street NW, Suite 850, Washington, DC 20005. Printed in the USA. Periodicals postage paid at Washington, DC, and at additional mailing offices. POSTMASTER: Send address changes to ARCHITECT, P.O. Box 3494, Northbrook, IL 60065. Canada Post Registration #40612608/G.S.T. number R-120931738. Canadian return address: IMEX, P.O. Box 25542, London, ON N6C 6B2. For subscription inquiries, address changes, and single-copy sales ($10 in the U.S., $15 in Canada, $20 for other countries, payable in advance in U.S. dollars) write to ARCHITECT, P.O. Box 3494, Northbrook, IL 60065 or call 847.291.5221 or toll-free 888.269.8410. REPRINTS: Call or email Wright's Media: 877.652.5295 or zonda@wrightsmedia.com. DISCLOSURE: ARCHITECT® will occasionally write about companies in which its parent organization, Zonda Media, has an investment interest. When it does, the magazine will fully disclose that relationship. PRIVACY OF MAILING LIST: Sometimes we share our subscriber mailing list with reputable companies we think you'll find interesting. However, if you do not wish to be included, please call us at 888.269.8410.

For special pricing, access to trade-only promotions, exclusive event invites and more, sign up to be a Star® Partner at **THERMADOR.COM/STARPARTNER**

RESIDENTIAL | COMMERCIAL | CONSULTATION

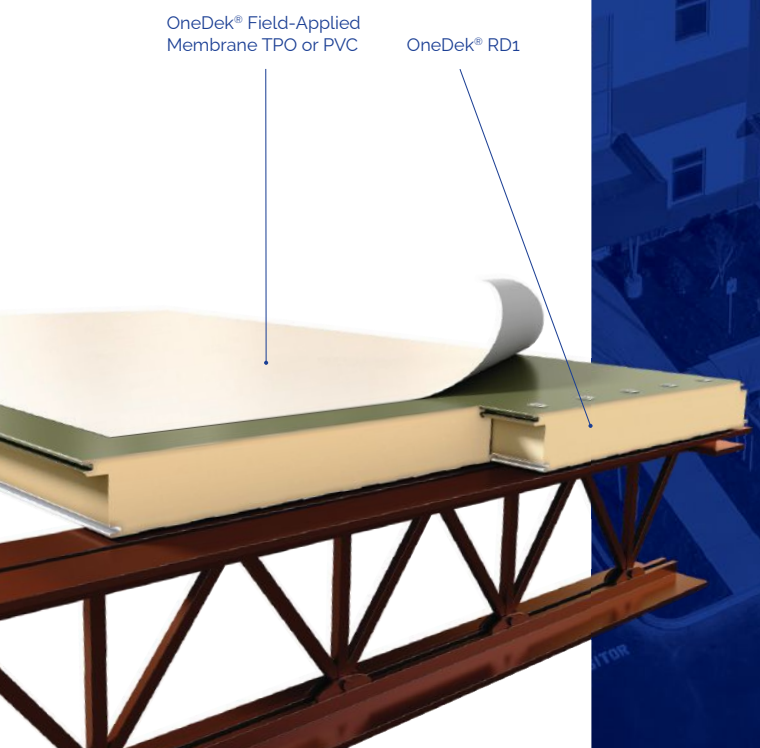
HEAVY TIMBER | MASS TIMBER

midatlantictimberframes.com

The POWER of ONE

Add simplicity, performance and sustainability to your low-slope roofing projects with OneDek® from All Weather Insulated Panels. Fewer layers equals a simplified design plus a faster, more convenient installation. For quality, performance and value, leverage the Power of OneDek®.

Learn more at PowerOfOneDek.com or call 1-888-970-2947



THE POWER OF ONEDEK®
INSULATED ROOF DECK

AWIP All Weather Insulated Panels

DRAW YOUR NEXT BLUEPRINT WITH SOLUTIONS THAT SPEC. WE CAN SUPPLY THAT.

GLOBAL™ INDUSTRIAL
We can supply that.®

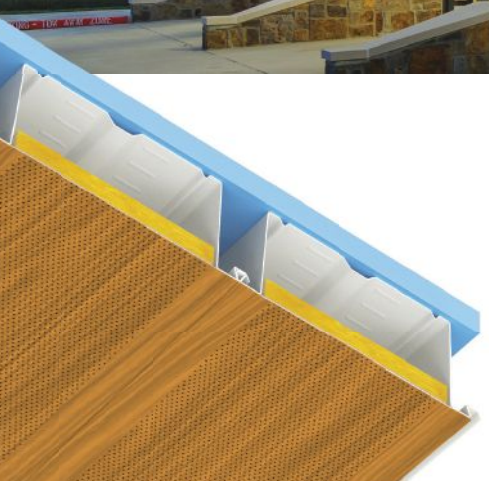
Global Industrial offers high-value solutions that fit the bill and your plans. From lighting to bottle refilling stations, we can help complete your blueprints and please your clients. So don't go back to the drawing board. Scan the code below, explore our products, and get your project moving forward.

globalindustrial.com

Envista®

Roof and Floor Deck Ceiling Systems

Envista F and FA Timberlok® provides the structural support and fire resistance of steel roof deck panels while providing the warm appearance of natural wood. Four woodgrain finishes, superior acoustic properties, and long 36´ spans are offered in this architectural panel.



Products:
Envista F7.5A,
Colony Maple

EPIC METALS® 877-696-3742 epicmetals.com

Spring Fire Department, Station 75 - Spring, Texas Architect: Brown Reynolds Watford Architects - College Station, Texas

ARCHITECT

The Journal of The American Institute of Architects

Editorial
Editor-in-Chief
Paul Makovsky
pmakovsky@zondahome.com
@paulmakovsky

Executive Editor
Wanda Lau
wlau@zondahome.com
@wandawlau

Senior Editor
Alex V. Cipolle
acipolle@zondahome.com

Managing Editor
Laurie Elden
lelden@zondahome.com

Assistant Editor
Madeleine D'Angelo
mdangelo@zondahome.com

Design
Design Director
Tina Tabibi

Freelance Designer
Alice Ashe

Contributing Editors
Aaron Betsky
Blaine Brownell, FAIA
Elizabeth Evitts Dickinson
Thomas Fisher, ASSOC. AIA
Eva Hagberg
Karrie Jacobs
Edward Keegan, AIA
Cathy Lang Ho
Ian Volner
Mimi Zeiger

Advertising
Executive Vice President
Paul Tourbaf

Vice President
John Tatusko
jtatusko@zondahome.com

Strategic Account Directors
Mike Gilbert
mgilbert@zondahome.com

Lori Lenis
llenis@zondahome.com

Tracy Szafarz
tszafarz@zondahome.com

Strategic Account Manager
Jaeda Mohr-Palmer
jmohrpalmer@zondahome.com

Account Coordinator
Katina Billado
kbillado@zondahome.com

Marketing
Group Director, Audience Marketing & Circulation
Chris Lustan

Production
Senior Director, Print Production
Cathy Underwood

Senior Director, Print Production
Margaret Coulter

Production Manager
Stephanie Fischer

Published by Zonda Media
Chief Executive Officer
Jeff Meyers

Chief Financial Officer
Melissa Billiter

Chief Operating Officer
Andrew Reid

Executive Vice President, Chief Content Officer
Jennifer Pearce

Vice President, Digital Strategy and Operations
Bridget Forbes

Vice President, Audience Development and Analytics
Jennifer Malkasian

Group Vice President, Talent Strategy
Kurt Nelson

Executive Vice President, National Sales
Amy Dudley

Senior Managing Principal, Advisory Group
Tim Sullivan

List Rentals
The Information Refinery
Brian Clotworthy
brian@inforefinery.com
800.529.9020

PEFC Certified
This product is from sustainably managed forests and controlled sources
PEFC
PEFC/29-31-337
www.pefc.org
PEFC certification applies to text only

Zonda Media

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.

Senior Director External Affairs
Clinton S. Manning

Senior Manager External Relations
Katherine Flynn

BEHR

COLOR TRENDS

2022

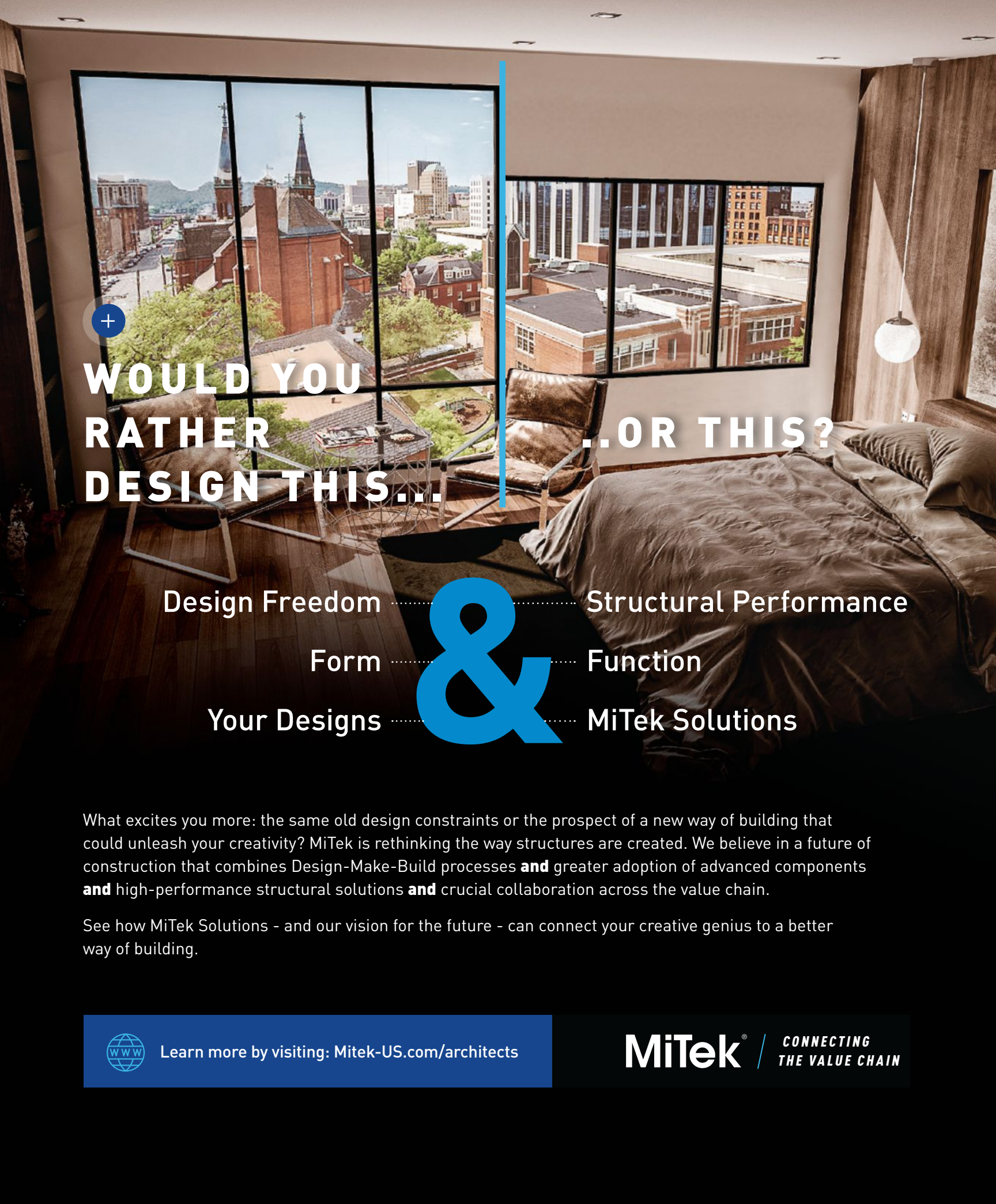
WHISPER WHITE HDC-MD-08[U]	STUDIO CLAY MQ2-27[U]	SUNWASHED BRICK S180-2[U]	PERFECT PENNY S180-6[D]	BASSWOOD MQ2-46[M]
CORN STALK M290-3[U]				ETCHED GLASS MQ3-27[U]
NIGHTINGALE GRAY N200-3[M]				LUNAR SURFACE N460-3I-[M, E-U]
WILD MUSTANG N240-6[D]	SUSTAINABLE S350-4[M]	WAVE TOP M450-3[U]	AFTER RAIN M520-2[U]	EXPLORER BLUE M470-5[M]
LINGONBERRY PUNCH M150-6[D]	LAUREL TREE S390-5[D]	OCEAN ABYSS MQ6-01[D]	DARK COBALT BLUE PPU15-03[D]	CRACKED PEPPER PPU18-01[D]

THE WORLD IS YOUR PALETTE

The Color Trends 2022 Palette consists of 20 hues to inspire the upcoming projects of professional designers, painting contractors and facility managers.

Explore the palette at behrpro.com/2022trends

Exclusively at THE HOME DEPOT



WOULD YOU RATHER DESIGN THIS...

...OR THIS?

Design Freedom ..... & ..... Structural Performance

Form ..... & ..... Function

Your Designs ..... & ..... MiTek Solutions

What excites you more: the same old design constraints or the prospect of a new way of building that could unleash your creativity? MiTek is rethinking the way structures are created. We believe in a future of construction that combines Design-Make-Build processes **and** greater adoption of advanced components **and** high-performance structural solutions **and** crucial collaboration across the value chain.

See how MiTek Solutions - and our vision for the future - can connect your creative genius to a better way of building.

Learn more by visiting: Mitek-US.com/architects

MiTek® | CONNECTING THE VALUE CHAIN

THERE'S ONLY ONE METAL PARTITION WHERE PRIVACY IS TRULY INTEGRATED.

INTRODUCING ASI'S PROPRIETARY, INTEGRATED PRIVACY™ SYSTEM FOR METAL PARTITIONS.

We have elevated the standard for privacy in metal partitions. ASI's partitions are engineered with built-in privacy and manufactured as one color matched unit. The result? A patent-pending design with superior aesthetics and complete privacy without the need for any retrofitted components. Exactly what building occupants want and deserve.

At ASI privacy isn't an afterthought—it's our standard.
Visit asi-globalpartitions.com/privacy

ASI® Group
Integrated Building Products

B&D BUILDERS LLC

Built Right or Not at All

Home is the setting of your story. We ensure every birthday, every dinner party, every lazy Sunday afternoon is a chapter to remember.

717.687.0292 | BandDBuilders.com

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

How Do You Draw Even More Attention To Your Design Ideas?


Let Your Imagination
Go Outside And Play.


Thinking outside the box is easier when you have extraordinary elements to work with. Our Architectural Wall Systems are a good example. These grand expanses of glass become an additional structural building material that can change the way you look at design, and change the way your clients respond to your plans.
SIERRA PACIFIC WINDOWS
SierraPacificWindows.com | 800-824-7744 A Division of SIERRA PACIFIC INDUSTRIES
Watch our brand video
Find your local representative by using the locator on our website.
Find ideas and inspiration by joining our Instagram community.
Architect: LEVER Architecture
Builder: Schommer & Sons
Photo: Jeremy Bittermann, Joel B Sanders Agency

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

We spend our days working on new ideas, new technologies and new ways for you to add a signature element to your vision. Once the last line is drawn and the last specifications are checked, we want any project you complete with Sierra Pacific windows and doors to be an attention-getter you'll be proud of for years.

Architect: LEVER Architecture
Builder: Reworks
Photo: Jeremy Bittermann, Joel B Sanders Agency

SIERRA PACIFIC™
WINDOWS THAT NEVER COMPROMISE

ARCHITECT
The Journal of The American Institute of Architects

69th ANNUAL CALL FOR ENTRIES

Progressive Architecture Awards

p/a

2021 P/A AWARD WINNER URBAN AWNING IN LOS ANGELES, BY GENSLER

ELIGIBILTY

Projects must have a client and a completion date after February 1, 2022. Judging will take place in January 2022. Winners will be notified in February 2022, published in the March 2022 issue of ARCHITECT. For more information and rules and regulations, visit *paawards.com*.

RECOGNITION

Winners will be featured in the March 2022 print issue of ARCHITECT with expanded coverage online at *architectmagazine.com*.

HOW TO ENTER

SUBMIT YOUR WORK AT

> *paawards.com*

EARLY BIRD ENTRIES

DEADLINE	December 15, 2021
FEE	$195
ADDITIONAL ENTRIES	$145

REGULAR ENTRIES

DEADLINE	January 7, 2022
FEE	$245
ADDITIONAL ENTRIES	$195

**for entries submitted after December 15*

ARCHITECT
The Journal of The American Institute of Architects

Emerging professionals are fueling today's design conversation with high-energy ideation that challenges stated norms.

Zonda Media congratulates and thanks ASI Group for its ongoing commitment to design innovation driven by architecture's next generation.

ASI Group
Integrated Building Products

Zonda Media

Next Progressives: Office of Things

EDITED BY PAUL MAKOVSKY

Locations:
New York, Chicago, and Charlottesville, Va.

Year founded:
2016

Firm leadership:
Lane Rick and Can Vu Bui (New York); JT Bachman, AIA, and Katie Stranix, AIA (Charlottesville); and Vincent Calabro (Chicago)

How we met:
At the Yale School of Architecture, where we all had an intersecting interest in design and technology.

Experience:
Adjaye Associates, Studio Gang Architects, Rockwell Group, among others

Firm size:
Eight

Firm mission:
The heart of the practice of architecture lies in a multitude of voices, ideas, and realities that shape the environment. Our work aims to navigate this complexity to unearth specific clarity within the noise. These days, this takes the form of a growing fascination with the generic and the specific. Somewhere in that friction is the practicality of getting things built and the frivolity of the imaginations that occupy it.

Defining project:
"Overworld," our 2016 installation for the Toronto Design Offsite Festival, remains a project that we return to often. It wove together many questions that we are still exploring: the integration of technology and architecture, the body in immersive environments, smallness and the feeling of immensity, and what it means to escape momentarily into a world set apart.

Another important project:
While we are deeply interested in the spaces of immersive design, we also believe in our duty as architects. We are currently working on an affordable housing project in central Oregon, where we're training our focus on how single-family workforce housing can be reevaluated to focus on design and community.

Biggest challenge facing architects today:
Sometimes, architecture feels incredibly precarious. It is at once inextricable from the social structures and infrastructures that shape contemporary society, while, in many ways, lacking the agency to effect change. Architects need to find a way to navigate that tension.

Design tool of choice:
Our library. This takes the form of our books, photographs, drawings, memories, recordings, and discussions of everything we have seen and continue to see in the world, for better or worse. We draw from these observations in everything we do.

The most important piece of criticism you have received:
Simplify. Amplify.

Design aggravation:
Describing visual concepts without using visuals.

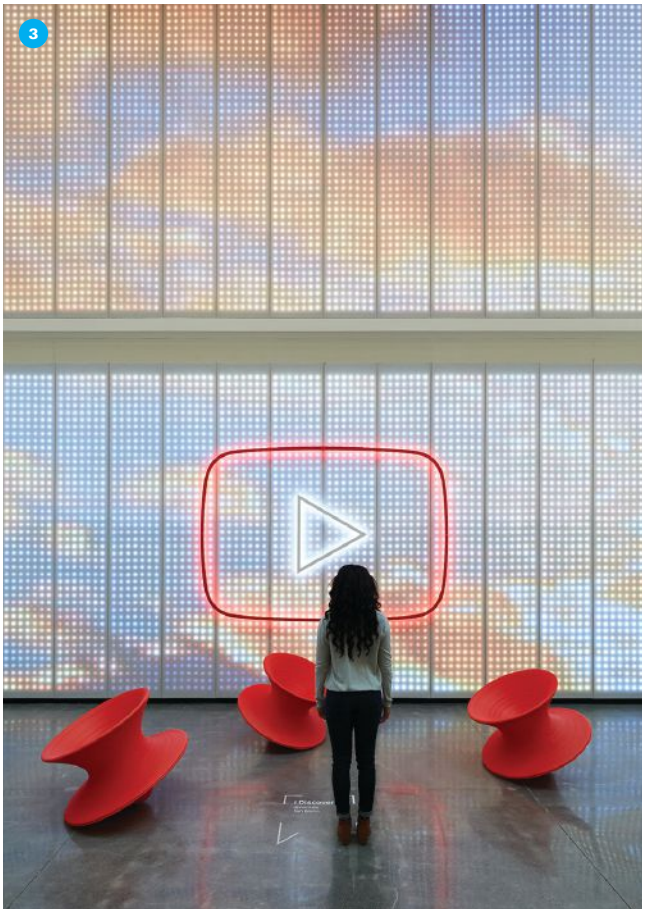
Biggest challenge in running a successful practice:
Embracing the sense that you have no clue what will happen next.

On the bookshelf:
Independently, all of us are reading or have read Liu Cixin's *Three Body Problem* (Tor Books, 2016) trilogy; proof that world-building isn't just for architects and that there is always another level of craziness you can reach.

COURTESY OFFICE OF THINGS

> *To learn more about Office of Things and see more projects, visit bit.ly/ARnpOT.*

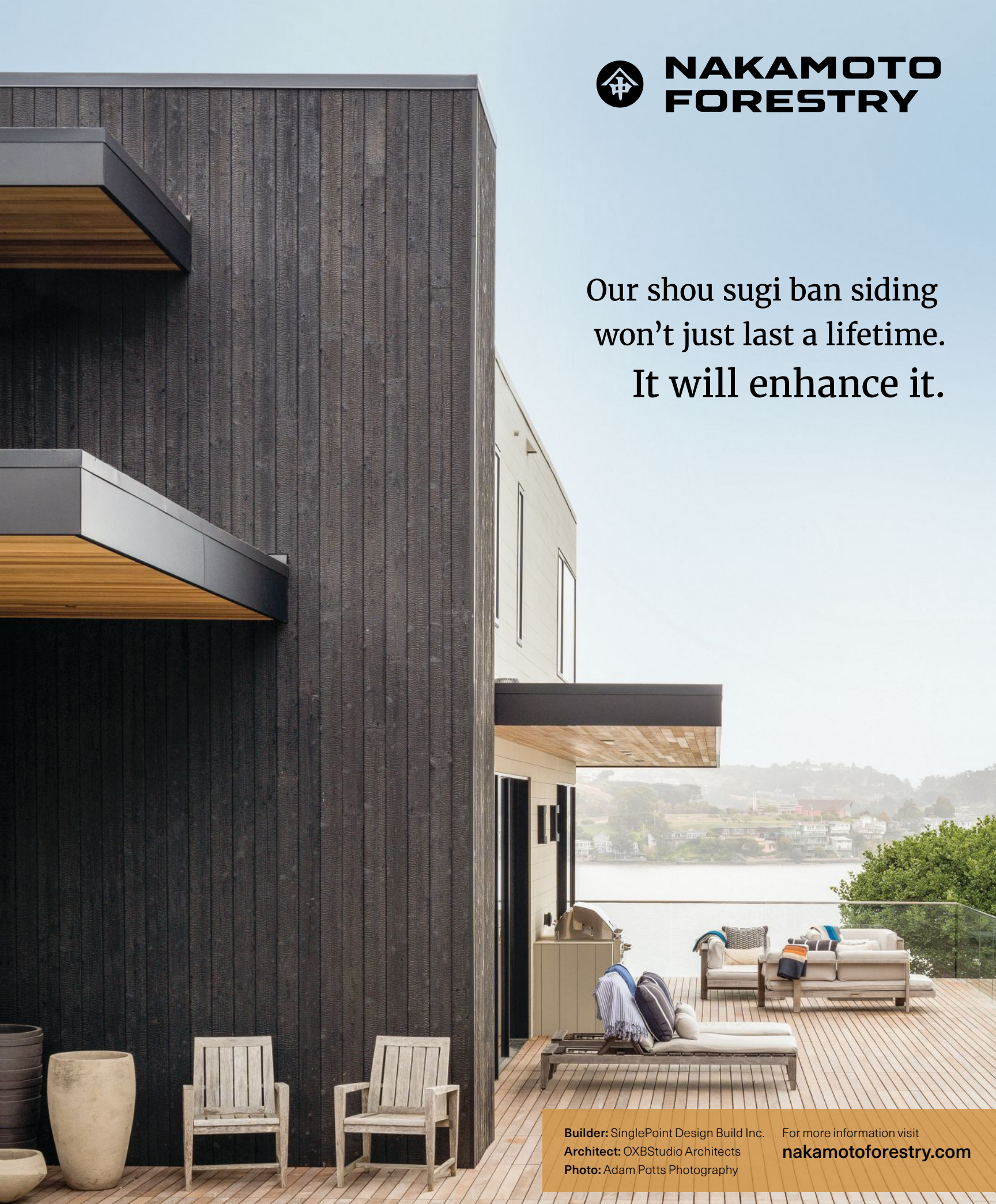
Next Progressives:
Office of Things



1, 2: OFFICE OF THINGS; 3: MARIKO REED

1. "Roll Play" is a 2021 finalist for the Ragdale Ring temporary theater. Through an ensemble of rolling "Wobblers," the Ragdale Ring is transformed into a space of play and imagination. Users can sit and rock back and forth on a Wobbler, crawl under one and peer out from its rounded leaves, or roll a few Wobblers together to create an impromptu landscape. **2.** A 5-acre project in Central Oregon, Helmholtz—Inside Out reimagines workforce housing and suburban residential planning by establishing social spaces and prioritizing interior access to light and views. Shared courtyards that balance privacy and community within each group of houses create a sense of place. **3.** Designed for the main lobby of YouTube's California headquarters, Soft Screen is a responsive architectural partition with more than 30,000 LEDs hidden behind a fuzzy acoustical membrane. By standing on medallions distributed throughout the lobby, visitors trigger interactive features within the wall, creating a personalized experience. **4.** A 600-square-foot renovation of a 1920s townhouse in Queens, N.Y., Glendale Townhome is an artful transformation of claustrophobic and dark rooms into a sculptural and airy house arrayed in a palette of golds, greens, and reds. **5.** Immersive Space Series: Coves was designed for a Silicon Valley tech company to provide a workplace escape—both mental and physical—through the interplay of color, light, and sound. Each room is a built illustration that invites quiet contemplation through subtle shifts of the environment.

4: NICHOLAS VENEZIA; 5: JOHNNA ARNOLD


NAKAMOTO
FORESTRY
Our shou sugi ban siding
won't just last a lifetime.
It will enhance it.
Builder: SinglePoint Design Build Inc.
Architect: OXBStudio Architects
Photo: Adam Potts Photography
For more information visit
nakamotoforestry.com

PAUL & LINDA DEBRUCE HALL
KANSAS CITY, MO

Brick Color: Manganese Ironspot **Architect:** Hufft

Photo by Hufft

CarbonPositive: Building on the Best of COP26

TEXT BY CARL ELEFANTE, FAIA

As negotiations concluded in Glasgow, views on the success of the 26th United Nations Climate Change Conference (COP26) varied enormously, its beauty in the eyes of the beholders. Some breakthroughs occurred, including agreements on methane, deforestation, and global carbon trading, as well as the formal recognition of the role of fossil fuels in the climate crisis. However, most observers agree that COP26 fell well short of the actions necessary to limit global warming to 1.5°C. More is needed and quickly.

That said, COP26 magnified global awareness and attracted multitudes of climate stakeholders from every walk of life. The Glasgow summit made climate change the top story in the media for two solid weeks in November. Its participants included thousands of public- and private-sector organizations, dozens of which represented cities and the building, design, and planning community. This diverse cross section of people and groups left Glasgow with new and strengthened coalitions.

By and large, nations most vulnerable to the ravages of climate change are the least responsible for its causes.

For the building sector, COP26 revealed a fundamentally changed landscape. Architects and engineers have the know-how to zero out operational emissions. In developed nations, like the U.S., the latest code standards mandate a level of performance that puts zero carbon well within reach. The building products and construction industry is redirecting billions to innovations in order to zero-out embodied emissions, focusing first on the largest emitters—concrete and steel—and the materials that sequester carbon. Both represent new value propositions for our sector.

The financial sector was also well represented at COP26. From central banks to private-sector investors, it delivered a strong message with a united voice. Globally, dollars are moving to win-win opportunities with both climate and financial benefits. Carbon accounting must be given equal footing with finances in business decisions. Design teams are uniquely positioned to facilitate this transition with reliable estimates of whole life carbon assessment.

Importantly, local governments had a strong presence. Mayors from Austin, Texas, to Izmir, Turkey, delivered compelling and consistent messages. Cities cannot approach climate change as a partisan issue. For cities around the globe, 2021 realities have tipped the scale. Delay will cost cities far more than action will. Designers can serve as trusted experts and as activists with the skills and temperament to embrace diverse interests and forge beneficial solutions.

Glasgow categorically validated Architecture 2030's 1.5°C COP26 Communiqué and the AIA Strategic Plan. To stay within the 1.5°C warming cap, architects are ethically bound to accelerate the reduction of greenhouse gas emissions in the building sector consistent with the Communiqué targets. Protecting public health, safety, and welfare means nothing without climate action. The inseparability and urgency of the Strategic Plan's twin priorities—climate action and social equity—were evident everywhere at COP26. By and large, nations most vulnerable to the ravages of climate change are the least responsible for its causes. Climate action requires climate justice.

Glasgow changed the global trajectory of climate action. It was a sobering but necessary check-in on the momentous Paris Summit of six years ago. Climate action must be scaled far more rapidly. Continual evaluation of our collective progress and commitments is vital. I believe Architecture 2030, AIA, and every major built-environment association around the world left COP26 more prepared and dedicated to support every designer on every project. Now the real work begins.

Carl Elefante, FAIA, is a senior fellow at Architecture 2030 and an AIA past president. He served as part of Architecture 2030's delegation to COP26.

> *To read more articles by Architecture 2030, visit bit.ly/ARcp2030.*

WHIRLPOOL CORPORATION PRODUCTS CAN BE FOUND IN MORE THAN 70% OF U.S. HOMES*

We've spent **over 100 years** building the appliances homeowners **love.** But it's never been about just being **popular.** Our brands are **trusted** in homes across America because they offer features and designs that make a **real difference.** That means you can give your clients **choices** that fit their space — **and their lives.**

COUNT ON US.

Whirlpool CORPORATION

**Based on 2020 Whirlpool Corporation consumer survey among households having income of $30k or more.*

WHIRLPOOLPRO.COM/70PERCENT

Whirlpool® KitchenAid® MAYTAG® AMANA® JENNAIR®

YOUR ONLY LIMITATION IS YOUR IMAGINATION

With a distinctive design like no other, you can use The Belden Brick Company's Molded Brick in a wide range of commercial and residential projects. From impressive contemporary and modern structures, to the traditional colonial architectural style, only you can imagine. Discover our many colors, sizes, textures, and shapes at beldenbrick.com.

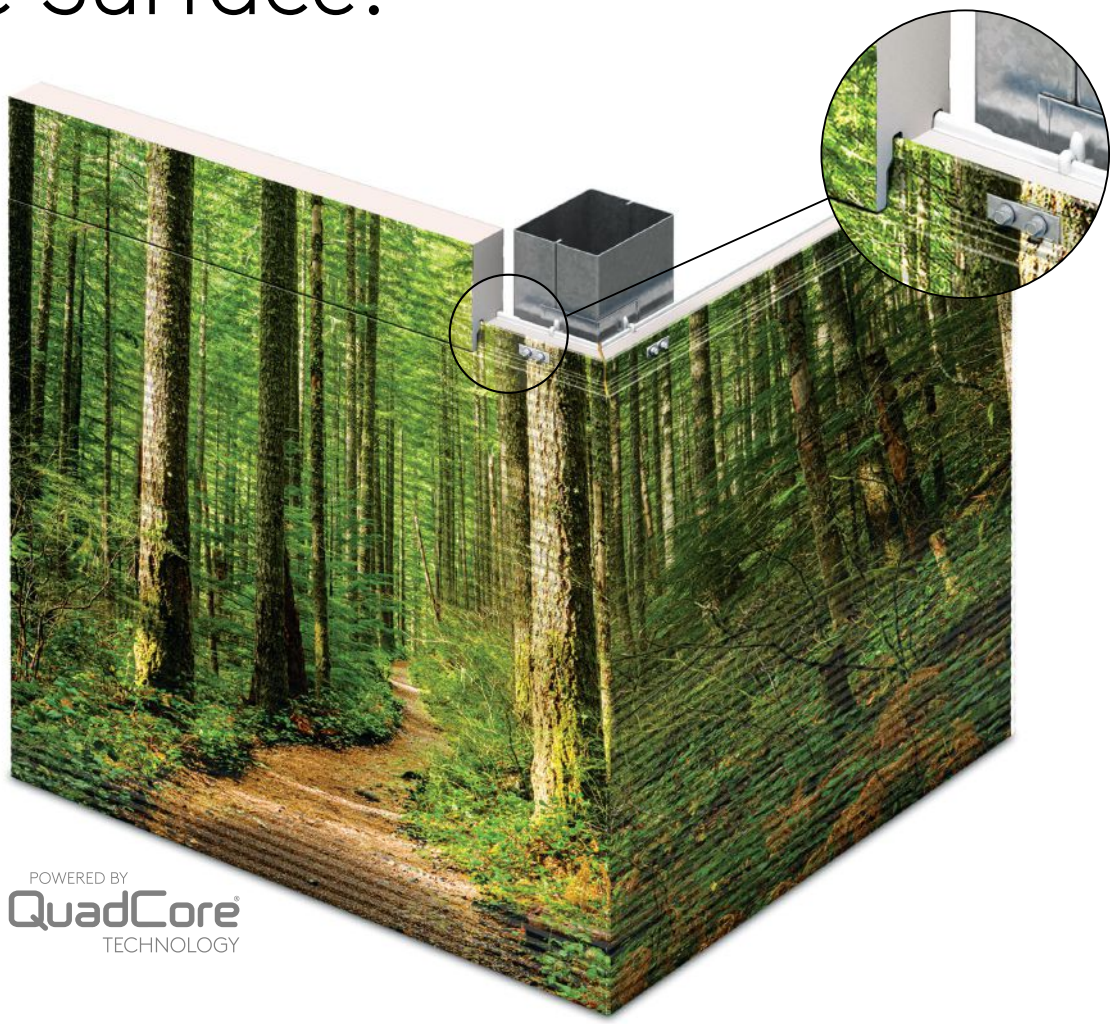
PRODUCT: Sand Mold - Belcrest 650
ARCHITECT: Wheeler Kearns Architects
PHOTO: Steve Hall, Hall + Merrick Photographers

BELDEN
THE BELDEN BRICK COMPANY

COMMERCIAL | RESIDENTIAL | PAVING

beldenbrick.com | 330-456-0031 | *The Standard of Comparison Since 1885*

Sustainable Beyond the Surface.



QuadCore® Technology by Kingspan is the next generation of self-blended hybrid insulation core for insulated metal panels. When compared in a recent study to other wall assemblies, QuadCore® panels reduce embodied carbon by up to 28 percent, saving on your project's total carbon footprint.

QuadCore® also offers unrivaled thermal performance, superior fire protection and unmatched health and wellness certification, making it the premier choice for both the built environment and the human environment.

Learn more at QuadCore.kingspanpanels.us/surface

Kingspan®

On the Boards:

Trebek Center Bridge Housing
Los Angeles
DNA Architecture + Design

TEXT BY MADELEINE D'ANGELO

COURTESY DNA ARCHITECTURE + DESIGN

For 63 years, Northridge Skateland was an icon in its namesake northern Los Angeles neighborhood, welcoming generations of visitors to its maple-floored roller-skating rink. But, after months of closure due to the COVID-19 pandemic, the 23,000-square-foot facility permanently shuttered its doors in March. With local government support and funding from individual donors, the California nonprofit Hope of the Valley purchased the property with the intent of transforming the rink into Trebek Center Bridge Housing, a supportive, 107-bed interim shelter, as part of the city's 2018 A Bridge Home initiative. Designed by the local firm DNA Architecture + Design, the adaptive reuse project aims to ease the city's ongoing housing crisis, merging design dignity with a sustainable response to community needs.

Having worked with Hope of the Valley on Raymer Street Homeless Shelter, completed in 2020, DNA had an idea of the project's program requirements. However, fitting everything into the existing, rectilinear structure presented a puzzle. The primary design challenge, says DNA founding principal Valéry Augustin, AIA, was starting with "a facility that was not designed for anybody to be living there."

Exposed ceiling trusses will be painted a rainbow of colors, adding visual joy while creating a sense of zoning inside the project.

The former rink's open interior proved adaptable, allowing the design team to fill the space with individual bedrooms, administrative offices, and community spaces. When it came to daylighting, DNA addressed the building's long span by going upward, removing the existing acoustical ceiling to expose structural wood trusses and carve out skylights.

> *To see project credits and more images of Trebek Center Bridge Housing, visit bit.ly/DNATrebek.*

DWELL ON THE POSSIBLE

A Shingle that Reduces Air Pollution Like Trees

At Malarkey, we're a family business, started in Oregon over 65 years ago.
Our guiding principle is simple – build the shingles we want on our own homes –
made better to **last longer,** and **more sustainable.**

WHEN IT MATTERS™

Malarkey Roofing Products®

On The Boards:
Trebek Center Bridge Housing

COURTESY DNA ARCHITECTURE + DESIGN

The now nearly 30-foot ceilings also foster an airy volume that can "positively affect" residents, Augustin says. "They're going to be spending some considered amount of time in this facility. Let's create a space that can hopefully help them along that journey."

The design team crafted a careful scale between private spaces for residents and larger communal areas that connect to landscaped outdoor areas. Inside, the project offers "pockets of space for one-on-one interactions," Augustin says. "You create more informal opportunities for interacting."

DNA experimented with color throughout the design, selecting different hues to delineate different building zones and create calming spaces for residents. The paint colors inject "playfulness and whimsy" into the space without incurring extra cost, economically creating "a place that people actually want to be in," Augustin says. "Somebody who has been living on the street can recognize when they're just being warehoused in a space."

With construction scheduled for completion in 2022, Augustin hopes that Trebek Center Bridge Housing will embody a form of "social sustainability" that connects the residence with its surrounding community, he says. "The building gets to live on and the story of the building also gets to live on. That keeps it part of the community."

Plans from Office of the Designed Landscape will provide residents with comfortable green space, fostering an indoor and outdoor connection.

International Architecture Design Competition

Carbon Positive Affordable Housing

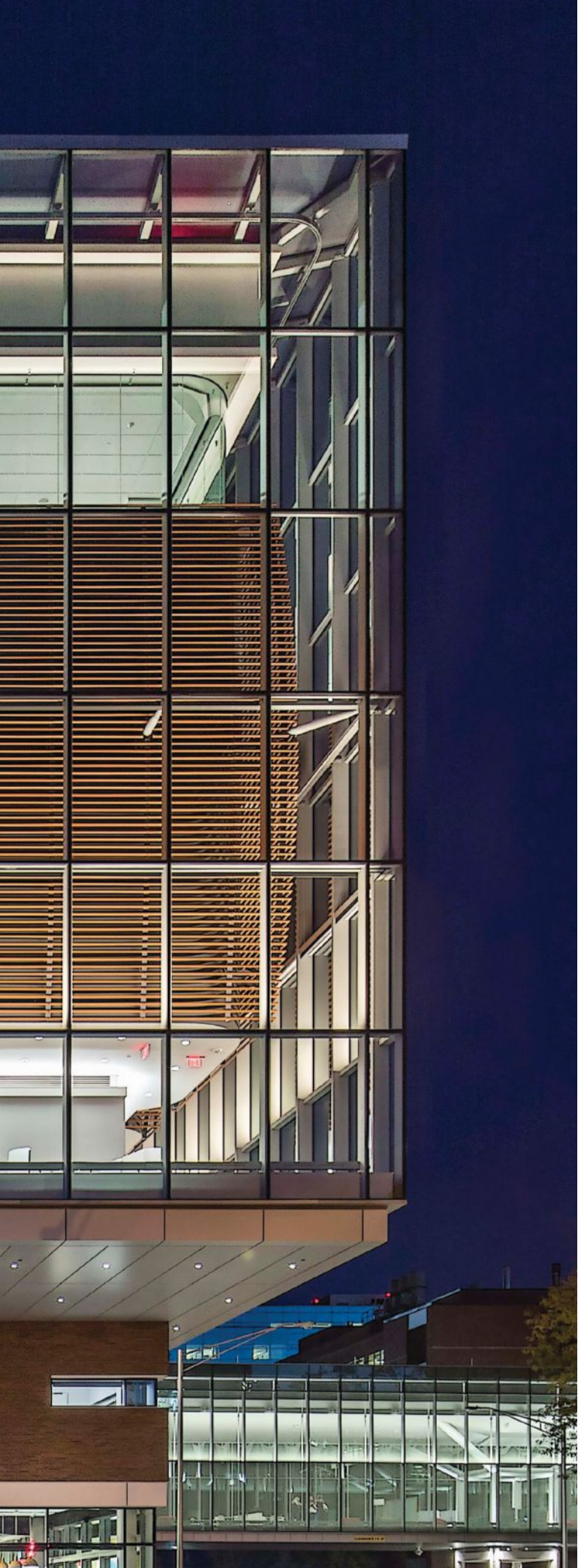
$50,000 Prize

REGISTRATION DEADLINE

14 January 2022

Powered by cove.tool drawing.tool

thearchitecturecompetition.com



Less green.
For less green.

Find affordable clarity in the *Solarban*® *Acuity*™ low-e glass series.

Introducing *Acuity*™ low-iron glass—which is 60 percent less green than ordinary clear glass. The new *Solarban*® *Acuity*™ series by Vitro Architectural Glass provides the truly clear look you want with the outstanding performance of the full range of *Solarban*® solar control low-e coatings.

Upgrading a low-e coated clear insulating glass unit to *Solarban*® *Acuity*™ glass will typically increase the total installed curtainwall cost by only $1–2 per square foot.

Give a little, get it all.
Request your samples at vitroglazings.com/acuity

SOLARBAN® *Acuity*™ Series
Low-E Low-Iron Glass

University of Kansas Medical Center
Health Education Building | Kansas City, Kansas
Helix Architecture + Design and CO Architects

Shown: *Solarban*® 72 *Starphire*® glass*

*Like *Solarban*® *Starphire*® glass, *Solarban*® *Acuity*™ glass delivers a distinctive, highly transparent low-iron aesthetic.

Vitro®
Architectural Glass

JURY MODERATED BY **ALEX V. CIPOLLE** AND **PAUL MAKOVSKY**

RESIDENTIAL ARCHITECT DESIGN AWARDS

Honor Award winner Highland Park Residence, in Highland Park, Texas, designed by Alterstudio Architecture

TEXT BY **ALEX V. CIPOLLE, EDWARD KEEGAN, AIA,** AND **IAN VOLNER**

EDITED BY **WANDA LAU**

For 22 years, the Residential Architect Design Awards program has recognized the best in advancing housing design. This year's jury evaluated 266 entries to select outstanding examples of where the field is going. The 21 winners—12 Honor Award recipients, representing the highest level of achievement, and nine Merit Award recipients, representing distinguished achievement—showcased in the following pages reflect the jury's diverse selections, from heartfelt responses to the nation's affordable housing crisis to meaningful explorations of typologies addressing aging in place and co-living. As we rethink what housing can be, the 2021 RADA winners exemplify promising models for the future and aim to spark conversation on how to improve housing for all.

JURY

Matthew Bremer, AIA
Architecture in Formation

Carlos Madrid III
Skidmore, Owings & Merrill

Kimberly Sheppard, FAIA
Gabellini Sheppard Associates

Ingrid Spencer
AIA Austin and Austin Foundation for Architecture

CASEY DUNN

HONOR Custom House Less Than 3,000 Square Feet

Manifold House

ARLINGTON, VA.
DAVID JAMESON ARCHITECT

"This house doesn't look like a house—and that is a good thing. The interiors are humble as opposed to opulent. The simplicity is refreshing." **—Carlos Madrid III**

Echoing some of the most celebrated experiments in American architecture, Manifold House is an audacious bid by David Jameson Architect to match formal ambition with livability and a spirit of play. Located close to the architect's office in Bethesda, Md., the 2,998-square-foot house's extraordinary appearance is in part a response to its site. Flanked by a commercial corridor on one side and a residential neighborhood on the other, the project navigates two seemingly irreconcilable contexts.

David Jameson, FAIA, and his team decided to respond to both and neither, creating a building that escapes any easy typological identification and becomes its own thing altogether. Structurally, it comprises three layers, featuring a dark steel–framed, glazed curtain wall surrounded by a full jacket of steel louvers, each fixed in place at a distinct angle to the next and weathered for a textural finish. The effect, as seen from the street, is of a beguilingly abstract pattern, as though the whole design was simply an iterative study in opacity and transparency. In fact, the three-story building makes for a highly functional domestic environment, with a double-height living room and top-floor bedroom suite affording just the right combination of light and privacy thanks to its striking exterior shutters. —I.V.

PAUL WARCHOL

Valley Rock Guesthouse

SONOMA, CALIF.
SCHWARTZ AND ARCHITECTURE

"This is a poetry piece—the essence of *house*, a pure expression of walls and roof that transcends into sculpture."
—Kimberly Sheppard, FAIA

Designed by San Francisco–based firm Schwartz and Architecture, the Valley Rock Guesthouse is an exercise in impeccable taste and structural economy that provides accommodations for visitors to an estate in the Sonoma Valley. The project brief called for no more than a bedroom, bathroom, galley kitchen, and covered outdoor dining area on a site with sweeping views across the landscape.

The designers responded with an engineering concept that maximizes the views, minimalizes the 816-square-foot building's material presence, and conveys a strong sense of shelter. Anchored to a rear service core, with only slender pilotis at its corners, a semicantilevered roof (braced by an invisible truss system) launches over the mostly glazed-in space, making the house a sophisticated lean-to. Schwartz's design also gives the house a particular thematic connection to its natural, rugged locale with the jagged lozenge-like roofline finished in, as with most of the exterior, an ash gray–black that recalls the lumps of hardened volcanic stone that can be found in the region. Light-wood interior finishes and minimal furnishings, not to mention a stunning concrete-lined swimming pool, complete the picture of serene refinement. —I.V.

DOUGLAS STERLING

> *To see full project credits and more images, including photographs and floor plans, visit bit.ly/AR21RADA.*

MERIT Custom House More Than 3,000 Square Feet

Dogtrot

JACKSON, WYO.
CLB ARCHITECTS

"A barn-vernacular architectural mountain home with a surprising interior that is light-filled, artful, and whimsical."
—Carlos Madrid III

An invigorated interpretation of mountain living, Dogtrot takes its namesake inspiration—the historical "dogtrot" cabin and barn known for their long central breezeways—and unfurls itself before the Teton Range. Sited on an 18-acre meadow, the house's main volume is oriented along an east–west axis, filling the glazed living spaces with southern light. The second volume—the garage—links to the main area by way of a heroic porch, which signals entry, provides outdoor shelter, and creates a graphic play of light through an aperture in the roof.

Local firm CLB Architects chose minimalist, impactful materials. The oxidized steel and Siberian larch cladding nod to the rust colors of the nearby foothills, a palette that the interior continues and pairs with glass, steel, and concrete. The public spaces are topped by soaring ceilings and cocooned in wood paneling, creating a warm, rustic, and surprisingly bright atmosphere. —A.V.C.

MERIT Multifamily Housing

Canyon Drive

LOS ANGELES
LORCAN O'HERLIHY ARCHITECTS

"Though unconventional, the unique design reinvents the typology of the dense, small-lot house."
—Ingrid Spencer

Canyon Drive, a multifamily housing development by Lorcan O'Herlihy Architects, rises like five swelling white caps amid the palms south of Los Angeles' Hollywood Hills. Designed with the city's tight housing market and the 2005 Small Lot Subdivision Ordinance in mind, the project creatively explores the outer limits of a small-footprint typology. Beginning with the maximum allowable envelope, the design tilts exterior walls at different angles away from the lot lines, creating five unique, light-filled residences that assume the form of expanded A-frames. The project deploys a simple and curved panelized system for its exterior wood frame, deftly providing privacy from neighbors, and mirrors itself internally with elegant, white-ribbed rooms illuminated by glazed curtain walls. A cedar-clad first-floor exterior housing a two-car garage warms the structure. To maintain density, the design swaps traditional yards for rooftop decks with views of LA. The results are single-family homes that are cohesive but maintain their individuality. —A.V.C.

ABOVE: MATTHEW MILLMAN; BELOW: HERE AND NOW AGENCY

HONOR Custom House More Than 3,000 Square Feet

Highland Park Residence

HIGHLAND PARK, TEXAS
ALTERSTUDIO ARCHITECTURE

"If you're going to design a super big house, make it gorgeously grand, fantastically executed, and in perfect, reciprocal balance with the landscape."
—Matthew Bremer, AIA

Into a typical sprawl-style lot, Austin, Texas–based Alterstudio has inserted a sleek two-story form that takes architectural issue with its more traditional Tudor mansion and French château neighbors. The boomerang-shaped floor plan of the 12,398-square-foot residence boldly defines a modern place of quiet repose. Its two stacked volumes are abstracted as a solid stone bar hovering above a glazed void, while the landscape extends the ground floor seamlessly across the site. Adding drama is a 35-foot cantilever above the entrance to both the house and a structure that displays the clients' art collection.

The minimalism of the overall forms is mitigated by contrasting textures and finishes: mill-finished steel against Indiana limestone panels, handmade Mexican tile and glazed volcanic stone juxtaposed with walnut casework and stainless-steel fixtures. The stone cladding the second story is set as stacked 3-, 6-, and 9-inch-wide vertical strips, offset in a staccato pattern to create shadows and textures. This pattern is repeated in the living room's two-story fireplace, one of several moments where the architects carve into the upper volume to enhance the spatial experience of the main level. —E.K.

CASEY DUNN

PERNILLE LOOF & THOMAS LOOF

The Smile

NEW YORK

BIG–BJARKE INGELS GROUP

"This brilliant project smashes the New York City zoning code in the most amazing way. And it brings light down on the street and enlivens it."
—**Matthew Bremer, AIA**

A creative riff on the setbacks first required by New York's 1916 zoning code yields this gently curving, 233-unit Harlem apartment tower designed by BIG. Dubbed The Smile, the 275,568-square-foot structure assumes a Y in plan, thanks to a concave 11-story face that boldly alters the typical street wall on East 126th Street. A solo wing—the leg of the Y—extends above existing commercial structures to the south. The building elevations create a checkerboard of blackened stainless steel and glass. The curved main façade allows each element to reflect sky and sunlight differently, resulting in varying shades of black.

Inspired by the neighborhood's histories of Puerto Rican and Caribbean immigrant populations, the building lobby and halls feature herringbone patterns in bright reds, blues, greens, and yellows that contrast the building's otherwise monochromatic palette. Wood and exposed concrete structure and steel trusses create the material language. Rooftop amenities include a swimming pool and whirlpool baths that look out to the city's skyline to the south. Nursing school students and staff animate the first floor throughout the day. One-third of the building's rental apartments are affordable housing units.

Harlem's history is one of perpetual change and evolution. The Smile builds on these legacies while providing a striking and new architectural interpretation of the New York apartment block. —E.K.

Courtyard House

VANCOUVER, BRITISH COLUMBIA
LECKIE STUDIO ARCHITECTURE + DESIGN

"The palette, the details, and the composition of this house are impeccably sublime."
—Carlos Madrid III

The Courtyard House is an urban infill solution that places nature at its literal and metaphoric center, creating a home that looks inward and outward without compromising privacy or architectural interest. Challenging the typical real estate proposition that opts for an abundance of built area, the minimalist two-story, 2,500-square-foot design by local firm Leckie Studio Architecture + Design is a spatial experience that posits the mantra "less but better."

A full-height operable window wall opens the entire first floor to a central courtyard, weaving an enclosed vision of nature into the house's public spaces. On the street façade, vertical wood battens provide privacy for the living room's floor-to-ceiling glazing. Punched bedroom windows on the second floor frame views of the North Shore Mountains. Sculpted ceilings add spatial interest while helping to bathe the spaces in natural light. The rear two bedrooms cantilever over the first floor, providing shade for the south-facing glass wall of the kitchen and dining areas.

Colors and materials are kept simple. Light white-oak panels and millwork contrast with an otherwise monochromatic gray palette. The first level features a polished concrete floor slab; the second level, white-oak flooring. A stone island dominates the kitchen and dining areas, concealing the requisite appliances within. —E.K.

EMA PETER

MERIT Architectural Design Detail

Wuehrer House

EAST HAMPTON, N.Y.
ENGELKING ARCHITECTS

"Every aspect of this home has been carefully considered and detailed to come together with grace and balance. There are no ego moments—it plays like a symphony."
—Kimberly Sheppard, FAIA

A private gravel path through a forest preserve in East Hampton, N.Y., leads to the Wuehrer House, a meditative structure that acts as a looking glass for the changing seasons and its neighbors: white oaks and eastern red cedars. Brooklyn, N.Y.–based Engelking Architects designed a space of serene reflection by balancing modular fabrication and traditional construction methods, while embracing a passive environmental strategy. Through simple geometry and materials, the rhythm of the 2,800-square-foot house unfolds in the staccato of wood beams and blinds and the legato of unadorned, uninterrupted glass and concrete. Southern yellow pine, laminated and milled into beams and columns with precise profiles, brings texture to the minimalist interior. A Canadian manufacturer helped combine the façade mullions with the columns to create one slender glulam element. —A.V.C.

MERIT Affordable Housing

Aya

WASHINGTON, D.C.
STUDIO TWENTY SEVEN ARCHITECTURE, LEO A DALY

"The architecture has a sense of character and optimism, and it capitalizes on light and views. Bravo!"
—Carlos Madrid III

As a welcoming, dignified, and beautiful hub for vulnerable families, the Aya is the kind of project every city needs. Located on one of Washington's original arterial streets, the affordable housing project by Studio Twenty Seven Architecture and Leo A Daly provides short-term emergency shelter for up to 50 families. Its seven-floor ziggurat form—designed to preserve the tree canopy and maximize daylight—shimmers with a glazed north façade that looks toward the Capitol, while the south façade's checkered window pattern reveals a warm color palette within.

Commissioned by the district, the Aya provides seven to 10 units per level, as well as laundry facilities, a dining area, a computer room, monitoring stations, private and family bathrooms, and a sublevel neighborhood health center. The east elevation features outdoor play areas on each floor, while the faceted west elevation creates small green roofs that become a "front lawn" for the unit above. The project received unanimous support from the local advisory council. —A.V.C.

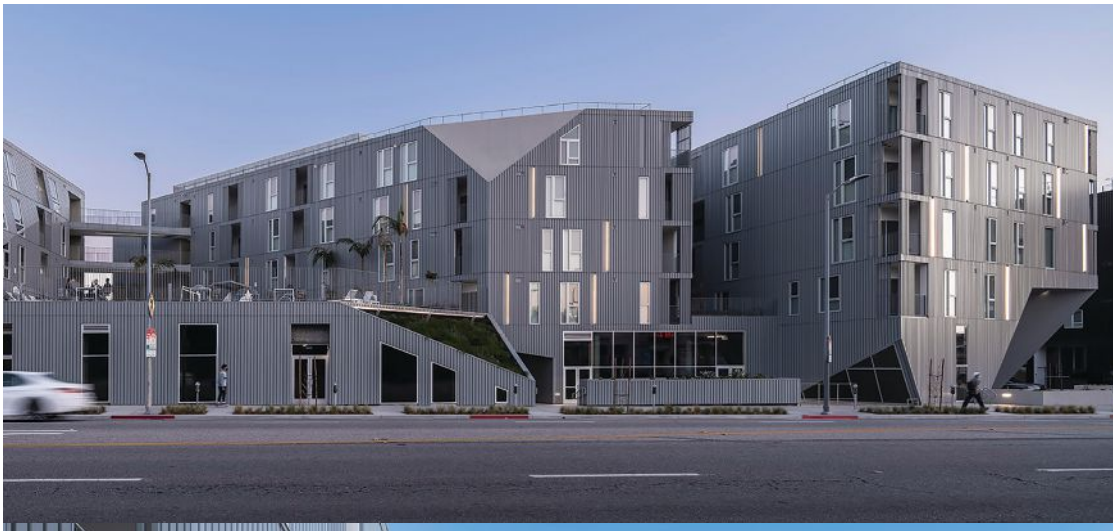
ABOVE: ©NIC LEHOUX;
BELOW: ALLEN RUSS/STUDIOHDP

Granville 1500

LOS ANGELES

LORCAN O'HERLIHY ARCHITECTS

"There is a lot of attention to quality construction for such a big project. The bones are strong and can easily accept different furniture and decor to evolve as personalized temporary homes."
—**Kimberly Sheppard, FAIA**



Designed by locally based Lorcan O'Herlihy Architects, Granville 1500 comprises three faceted and distinctive blocks that open to Los Angeles' Santa Monica Boulevard. The 153-unit, 320,000-square-foot student housing project replaces a car dealership, exemplifying how mixed-use infill can help move a city from car-centric sprawl toward a denser, pedestrian-friendly experience. Ground-level retail engages the street while a raised podium conceals parking and creates a protected open space with a swimming pool for residents one story above the sidewalk.

Corrugated metal panels clad the five-story structures, while asymmetric triangular cuts in the volumes intensify different parts of each building by widening the sidewalk, visually connecting the second-floor podium to the street, and allowing more daylight to reach the pool. The composition creates an urban village of eccentric public spaces, transforming what could have been three simple blocks of housing into a compelling place of spatial interest.

Located within a 10-minute drive of the University of California, Los Angeles, the complex offers below market–rate housing to the school's medical students and staff, embedding academic life within the neighborhood. —E.K.

HONOR Affordable Housing

The Goat Heads

MARFA, TEXAS
CANDID ROGERS STUDIO

MARK MENJIVAR

"Look at what 350 square feet as a standalone module gets you! It is resolved beautifully: The interior is joyful, and the little screen porches with concrete blocks are quite great." —**Matthew Bremer, AIA**

The seemingly offbeat name The Goat Heads suits the affordable housing development perfectly: Nothing about the solution from San Antonio, Texas–based Candid Rogers Studio is quite in line with expectations. At first glance, the development, named after the hearty seedlings of a common local weed, seems like another small tract in the arid, low-density Trans-Pecos area: an ensemble of two single-story, low-profile structures clad in wood and siding and set in a brushy, dusty landscape.

But on closer inspection, elements of the local vernacular, tweaked into compelling visual and practical effect, begin to appear. The siding is painted in mellow shades of turquoise and maroon; the roofs extend slightly beyond the volumes to provide a shaded porch over the translucent living-room façades; and that most humble of materials, concrete cinder block, forms walls that fold around the porches and screen side windows, giving residents both enhanced privacy and a little protection against the harsh West Texas sun.

Using off-the-shelf components and low-cost construction methods, The Goat Heads breaks the mold, offering a prospective model for affordable housing throughout the region and beyond. —I.V.

HONOR Restoration / Preservation

Moore House

LOS ANGELES
WOODS + DANGARAN

"The architects respect the original house, maintaining its uniqueness and design essence, while breathing new life and functionality into it."
—**Kimberly Sheppard, FAIA**

Updating a classic 1965 Craig Ellwood house in Los Angeles for 21st-century needs provided a tidy canvas for contemporary interventions by local studio Woods + Dangaran. A decades-prior renovation of the 1,700-square-foot residence had stained the redwood siding an unfortunate purple hue. The studio replaced the cladding with natural redwood to match the exposed structural framing—and the original design intent. Inside, the restoration largely retained the house's open layout, save for tweaks to the kitchen and bathroom. Teak paneling with black accents replaced white gypsum board, strengthening the indoor–outdoor connection. Earth-tone ceramic tile, brass-plated hardware, and dark marble with golden veining all reference the natural materials of the original. Insulated glass replaced single-pane glazing while preserving the optical quality and operating systems. Similarly, the designers chose custom contemporary and authentic midcentury fixtures and furnishings to complete the design with sympathetic warmth. In Moore House, Ellwood's vision has been restored and extended. —E.K.

JOE FLETCHER PHOTOGRAPHY

CASEY DUNN

Wine Cave

TEXAS HILL COUNTRY
CLAYTON KORTE

"This project is like a grown-up's playhouse or secret hideout—with wine! It is a refined intervention inserted into a carved-out cave."
—**Ingrid Spencer**

Some of Central Texas' most breathtaking scenery can be found in its Hill Country. Its proximity to Austin has helped the area become a popular destination for prosperous homeowners with a taste for finer things—such as the private wine cave designed by local firm Clayton Korte. An oenophile's dream, the 4,000 bottle–capacity project combines a cozy, yet chic interior with high-performance amenities. It is also, courtesy of design ingenuity, a model for future residential outbuildings in the region.

Literally embedded in one of the area's namesake hills, the 1,405-square-foot project boasts a wild setting for what appears on the inside to be all but identical to a high-end wine bar in the city. The designers were largely content to leave alone the cave itself, which long predated the project; the only portion of the new structure that engages the rock face is the entrance, composed of board-formed concrete shaped to fit the irregular contours of the cave mouth. Walls of exposed rock, sprayed with concrete for stability but natural in appearance, surround a comfortable bar-lounge and a temperature-controlled storage and tasting room. The space is warmed by wooden cabinetry and ceilings and toughened by black metal fixtures and seating. The design's quietude speaks volumes, making the case for preserving the Hill Country's landscape with an architecture of understated organicism. —I.V.

MERIT Renovation / Adaptive Reuse

West Pullman School Senior Housing

CHICAGO
URBANWORKS

"This transformed landmark building contains beautiful airy spaces and so many nods to its previous life."
—**Ingrid Spencer**

Occupying nearly an entire block in a Chicago South Side neighborhood, the West Pullman School Senior Housing complex continues its more than centurylong legacy as a community resource. Local firm UrbanWorks preserved, renovated, and adapted a former elementary school—built and expanded in 1894, 1900, and 1923—into 60 units of affordable senior housing. The playful renovation straddles both typologies—chalkboards find a second life as headboards, classroom built-ins become personal storage, and the auditorium, gym, and wide corridors once again become social hubs. By preserving the building history and architectural details—including both Romanesque Revival and Classical Revival elements—the project is poetic in its use of history and past connections to reinforce cognitive skills for residents. This ethos carries through to the exterior restoration, which complies with the standards to sustain the buildings' Chicago Landmark status. —A.V.C.

MERIT On the Boards

ABOVE: LEE BEY; BELOW: COURTESY S^A | SCHWARTZ AND ARCHITECTURE

The Meander

MARIN, CALIF.
SCHWARTZ AND ARCHITECTURE

"The invitation for natural landscape and views to flow inside from every subtle angle will make for connective and inspirational inside–outside living."
—**Kimberly Sheppard, FAIA**

Named after the rivers that carved the coastal valleys of Marin County, Calif., The Meander looks to the future. Designed to be off-grid, it considers surrounding systems, from wind and water to thermal flow and locally sourced materials, such as the milled Monterey cypress cladding salvaged from fallen trees.

Set for completion in 2023, the 6,724-square-foot structure on 40-plus acres of ridgeline references its setting at different scales. At the site level, three staggered volumes extend the rhythm of the valley's zigzagging river spurs, with each roof reinterpreting a nearby landscape element—reservoir, grassland, and rock outcropping. At the building scale, the lower garage and bedroom wings frame the entry, mimicking a valley. And, at the interior, human scale, a wood-lined stairwell connects the wings physically, spatially, and materially. The lines and site of the Schwartz and Architecture project elegantly reimagine fire lookout towers of yore. —A.V.C.

Passage Home

RALEIGH, N.C.
LS3P

"This well-researched project addresses issues of displacement and offers design solutions that fit the neighborhood."
—Ingrid Spencer

South Park, a historic and predominantly Black neighborhood in Raleigh, N.C., has suffered the hallmarks of systemic racism: redlining, predatory buying tactics, and gentrification. This affordable housing project was designed in a pro bono effort by Wilmington, N.C.–based LS3P to provide "equitable city design for all people, including affordable housing." The $25 million, 226,000-square-foot scheme proposes 216 residential units across three sites with different zoning: 13 detached houses, two accessory dwelling units, 26 townhomes, and 175 units for renters earning between 30% and 70% of the area's median income. Lots on predominantly residential streets feature one- and two-story gabled structures, while the former industrial site becomes a development of three-story walk-up apartments. All residents will have access to shared green spaces. The architects engaged visioning sessions with nonprofit leadership, staff, community, the Raleigh Planning and Development Department, and a pro bono team of civil, landscape, and modular-building consultants. The team's strategy is to construct and sell the detached homes and townhomes at market rate first, with proceeds financing the rent-restricted units, which will be delivered for $100 and $130 per square foot. Though a market-driven solution would typically push out long-term residents, Passage Home seeks to match the demographics of the current population. —E.K.

West Campus Residence

AUSTIN, TEXAS
ALTERSTUDIO ARCHITECTURE
MELL LAWRENCE ARCHITECTS

COURTESY LS3P

"This house is small, but its interior flow, light, privacy, storage, and public and private spaces are all accomplished with a deft hand."
—**Ingrid Spencer**

Constrained by mature oaks and property setbacks, the net-zero West Campus Residence squeezes into one of the densest neighborhoods of Austin, Texas. Designed by Alterstudio and Mell Lawrence Architects for one of Alterstudio's architects and their five-member family, the two-story, 1,922-square-foot residence delivers an efficient and cost-effective space that is in harmony with its surroundings. The interior invites in the outdoors through extensive first-floor glazing, skylights, and a second-floor porch that engages with the street.

The first level flows in a series of linked common spaces demarcated by thoughtful, pragmatic elements such as floor-to-ceiling operable oak screens and panels that hide storage and utilities. The integration of IKEA cabinetry with custom light fixtures throughout, including in the four bedrooms, stretches the budget without compromising the spirit of the aesthetic. And, by collaborating with mechanical engineers and solar designers, the studio achieved a smaller environmental footprint through details such as solar panels covering two-thirds of the roof.

Particularly lovely moments occur where a slatted oak screen reveals a staircase—as if it were an anticipated guest—and where a warm wood panel faces off against a lacquered steel one. —A.V.C.

CASEY DUNN

HONOR New Approaches to Housing: Caregiving

Light Path

WAVERLY, PA.
BOHLIN CYWINSKI JACKSON

"This house takes the notion of healthy living and accessibility and turns it into something beautiful in unexpected ways."
—**Matthew Bremer, AIA**

In a profession—and culture—increasingly cognizant of the needs of the elderly and of individuals with disabilities, Bohlin Cywinski Jackson fosters with Light Path a familial atmosphere that prioritizes accessibility and occupant well-being. The single-story residence on a forested site not far from BCJ's Wilkes-Barre office provides a retired couple a rural retreat that anticipates their changing needs, including a recent diagnosis of Alzheimer's.

Balancing aesthetic daring and technical sophistication with a keen sense of place, the scheme is straightforward: A single volume, rectangular in plan, is topped by a gable with a light well running the length of the structure. This glazed spine covers a central hallway, off of which branch the primary rooms, including a large living and dining space (also glazed in) and a den that can be combined, via sliding glass doors, with an adjacent terrace to create an indoor–outdoor patio. A profusion of operable windows, flexible room arrangements, and a connection to the surrounding wilderness make the house a welcoming, alluring destination for the owners' city-dwelling kin. —I.V.

NICHOLAS SNYDER—BOHLIN CYWINSKI JACKSON

13th Street Sanctuary

WASHINGTON, D.C.
STUDIOMB

"The amount of zoning and building code gymnastics itself makes co-living an exciting design typology, and this ambitious project moves the dial for something that is transformational."
—Matthew Bremer, AIA

Two crises gave rise to Washington-based StudioMB's adaptive reuse co-living project for the 13th Street Sanctuary. The decommissioned church sits squarely in a region riven by rising housing costs and chronic housing shortages—problems that conventional market-based development has failed to alleviate. Second, the church structure had been critically undermined by a disaster far less common in the area: a minor earthquake in 2011.

In the vacant building, StudioMB found an opportunity to attempt a novel form of low-cost housing. Its design preserves the 1917 building's details and character while inserting three new floor plates, using the existing steeple as a circulatory core. The only exterior evidence of the change is black-framed fenestration that pierces the restrained Gothic façade. Inside, eight units make the most of 9,000 square feet by pooling amenities and social spaces, which allows multiple residents to share a single apartment, saving on costs and maximizing density. Dynamic and economical, the project is as resourceful as it is sensitive, demonstrating how existing building stock can be creatively used to solve housing woes. —I.V.

MERIT New Approaches to Housing: Prefabrication

Great Lakes Cabin

GEORGIAN BAY, ONTARIO
LECKIE STUDIO ARCHITECTURE + DESIGN

"Provocatively utilitarian, this microhouse is prefab, flat-packed, and modular, with a zero-waste philosophy. It is the future."
—Carlos Madrid III

The Great Lakes Cabin, the prototype for the Backcountry Hut Co., may signal the next tiny-house wave. Now occupying a remote island in Lake Huron, the cottage was designed by Leckie Studio Architecture + Design, fabricated on Vancouver Island, and then disassembled and shipped to the 2019 Interior Design Show in Toronto, where it was reassembled in 72 hours for presentation, catching the eye of an attendee who purchased it. The cabin's final journey—by truck and barge—was possible because of its innovative scheme: a flat, pre-packed "kit of parts" and nail-in window system that required no heavy machinery to assemble. Adding to its appeal is its ability to be scaled—the basic structural module comes in 10-foot increments—and customized, from interior fit-out to exterior finishes. The modern design maintains traditional cozy cabin elements, such as a wood-burning stove and lofted sleeping areas. —A.V.C.

MERIT Bath

Sitt'n and Shower'n

MIDLAND, TEXAS
RHOTENBERRY WELLEN ARCHITECTS

"This project blurs the line between public and private, celebrates industrial materiality, and proliferates the act of showering alfresco."
—Carlos Madrid III

Sitt'n and Shower'n, an indoor–outdoor bathroom design, taps into the cultural and environmental character of its location: Midland, Texas, a city with a dry, desert climate that boasts 266 days of sunshine a year. Local firm Rhotenberry Wellen Architects responded to the homeowner's request to update the bathing facilities to include an elevated pavilion entrance and a partially enclosed outdoor shower with flexible privacy provided by ipe-covered panels. The view out from the bath expands past the shower to an existing pool and cabana and to the new pavilion deck, constructed above an existing drainage area that serves the backyard, naturally irrigating the desert flora.

The design is mindful of inside–outside transitions, seen where the wood and brick materials of the update match the exterior of the original house, and in the galvanized bar-grate decking, which is set at the elevation of the existing house floor. RWA's scheme is an integral, seamless addition. —A.V.C.

ABOVE: KYLE CHAPPELL; BELOW: ©HESTER + HARDAWAY

> *To see full project credits and more images, including photographs and floor plans, visit bit.ly/AR21RADA.*

Amp up your reputation with energy-efficient innovations.

Whether you're performing major renovations or taking on a smaller job, we can help you identify and implement energy-efficiency improvements that will elevate building health, safety and comfort. All while keeping costs in check.

Find more opportunities in more places at ngrid.com/business

nationalgrid

These programs are funded by the energy-efficiency charge on all customers' gas and electric bills, in New York and Massachusetts per state regulatory guidance and in accordance with Rhode Island law.

THE LOOK OF PUBLIC SCHOOL EQUITY

How a pair of net zero K-8 schools help transform Baltimore public education.

"They will have an immediate impact on anyone walking in the buildings. They're breathtaking, new, and vibrant." That's a Baltimore City public school official describing the opening of Charm City's first two net-zero energy schools. One of the school principals is more succinct: "This is what equity looks like."

Welcome to Graceland Park/O'Donnell Heights Elementary/Middle School and Holabird Academy, both Title 1 K–8 schools. For a community and public school system grappling with challenges, the opening of two LEED Platinum–certified net-zero schools is a welcome vote of confidence in the area's underserved.

A QUESTION OF HOW

"The school system is … ecstatic," says Paul Bradshaw, principal of Grimm and Parker Architecture, the firm responsible for designing both 94,000-square-foot schools. "This is a fulfillment of a structural and educational vision. This points the way forward."

That path had its share of challenges. For Bradshaw and his design team, it wasn't a question of convincing city officials to invest in net-zero sustainability. That was a given. The looming question was how to design the firm's first net-zero project.

Bradshaw says their team undertook a comprehensive investigation of net-zero design. That discovery process led them to Arlington, Va., and the aptly named Discovery Elementary School, one of the region's first net-zero schools.

SURPRISE STRATEGY

Many of the Virginia school's conservation strategies were familiar to Grimm and Parker, such as geothermal wells supporting a battery of heat pumps. However, one sustainability strategy caught them by surprise.

"It was new to us. It was new to our structural engineer. I believe it's also new to Maryland school construction," Bradshaw reports.

The Virginia school is built with insulating concrete forms. ICF is a wall system formed by stacking foam-framed, Legolike blocks to create a cast-in-place concrete wall. The Virginia school's energy use is impressive, with documented energy use averaging 15.8 kBTU per square foot per year versus a projected usage of 21.1 kBTU per square foot per year.

"Yes, you can get to net zero with a traditional building method," Bradshaw says. "Both our team and the owner agreed: Let's go with ICF."

BEYOND NET ZERO

Bradshaw says that decision proved to be a boon to the Baltimore projects for a variety of reasons, including:

- Project Cost. "ICF is cost neutral. Cost estimates were comparable to traditional steel and CMU construction. It was on par with the state's budgeting guidelines," Bradshaw explains.
- Construction Speed. "The GC worked with a [subcontractor] on both schools that specialized in ICF installation. The GC was surprised by how fast they enclosed the building during a very wet winter," Bradshaw reports. "We had another school project being built using traditional methods at roughly the same time. ICF speed was obvious."
- Design Flexibility. "Every construction system has things you can and can't do. We didn't feel limited by ICF at all. Once it as a go, we embraced it. We weren't hampered in any," Bradshaw says.

Today both schools are actively transforming the lives of about 450 young scholars and their families. "We're helping create a new generation of sustainability natives," Bradshaw says. "The students will carry these ideas forward as long as they live."

Learn more about how ICF can help your firm achieve net zero project success at buildwithstrength.com.

Produced by Zonda Media, a Delaware corporation.
marketing.zondahome.com

FLEXIBLE SOLUTIONS
FLEXIBLE MESH

BANKER

Engineered by CODINA

Learn more about Flexible Mesh and request your custom sample box at

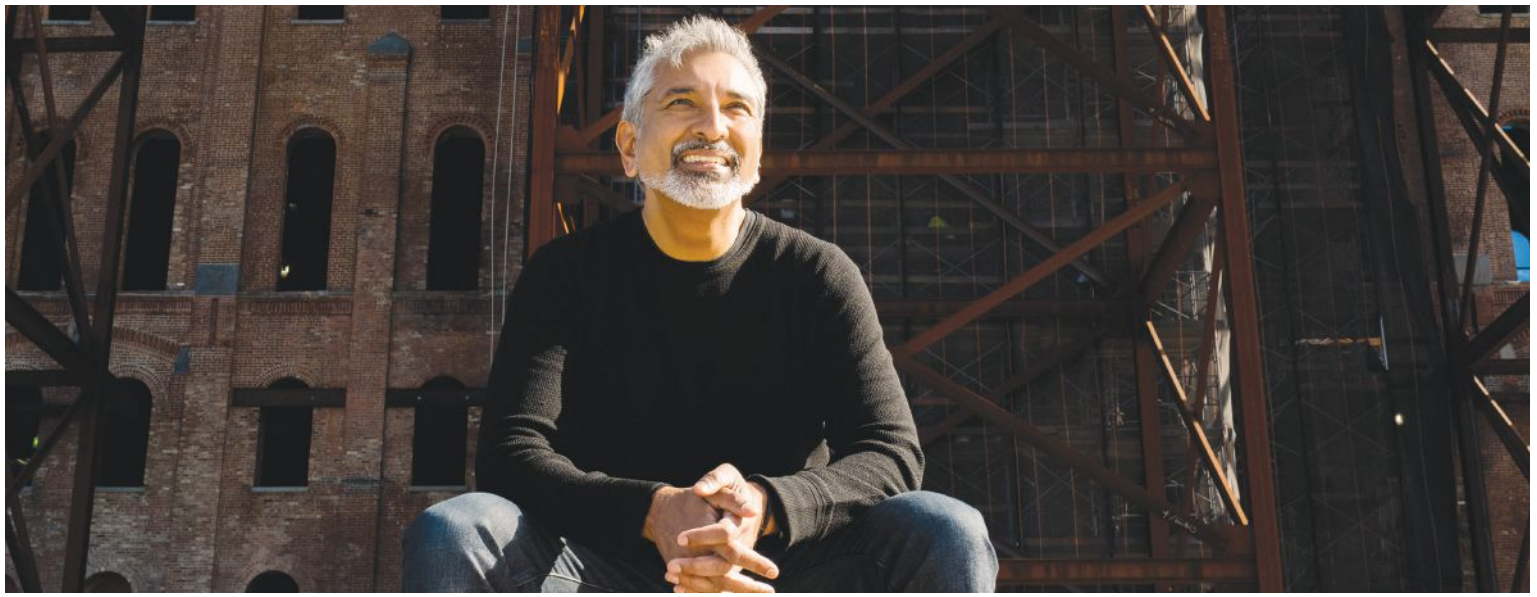
WWW.BANKERWIRE.COM

Because if your roof membrane isn't protected, your building isn't either. Learn why Hydrotech Protected Membrane Roofs last up to three times longer than conventional membrane roofs. Visit hydrotechusa.com/PYB

HYDROTECH®

hydrotechusa.com

AIA Architect



CREDIT: EVA WOOLRIDGE

A Narrative of Generosity

Equity, not austerity, will usher in a better society and built environment.

Vishaan Chakrabarti, FAIA, is the founder of Practice for Architecture and Urbanism, as well as the author of the book A Country of Cities: A Manifesto for an Urban America (Metropolis Books, 2013). *After 9/11, he was appointed to be the planning director for the city of Manhattan. He's a former faculty member at Columbia University and the University of Virginia, and most recently, the William W. Wurster Dean at the University of California, Berkeley. We talked to him about the post-pandemic city and the opportunities of this moment.*

As told to Katherine Flynn

Coming out of this pandemic, we have learned many lessons that we should build upon. There remains a huge digital divide for low-income communities, and we can think about how to bridge that divide, providing Wi-Fi, cell service, and broadband to every home.

Part of social mobility is actual mobility and how we transport people around. We are going through an enormous reshuffling in terms of how people work, and I don't think the dust has settled around that in terms of how much people will be working from home versus commuting. A common conclusion we've heard during this period is that the pandemic has been an "accelerant" for certain trends that were already in the making. One of these trends is the transformation of where work happens—so, the city becoming truly multi-modal instead of just containing a couple of business districts. The pandemic is adding fuel to that transition because people are working from home, they're working in cafes, they're working in co-working spaces. What is the transportation system you need to support that? It's not the hub-and-spoke system that we have in a city like New York. The entire system was built to bring people in and out of the central business districts in Manhattan. To me, the obvious answer is to rethink how we use our streets; to have far less private car usage in our cities; have far more bus routes; far more bike lanes; and far better accessibility for systems that allow people with disabilities to move around in cities. We need to stop allowing private cars to dominate and dictate so much of city space.

In my book, I talk about an "infrastructure of opportunity." Equity is really about equal opportunity; it's about cities providing a level playing field for everyone in terms of schooling, housing, infrastructure, health care, and public space. We need a new narrative of generosity, not of austerity. The point that Heather McGhee makes in her book *The Sum of Us* is that without this, we all lose, because we're losing the extraordinary human capital that comes from giving everyone a fair shot.

This idea that we need a narrative of generosity isn't just some airy notion of throwing money away, which I think is the way conservatives frequently paint this. It's about equal investment in humanity, and it's going to produce great results. With a spirit of generosity, we can build a better society. AIA


Invest in architecture's future.
Donate today.
architectsfoundation.org
Architects Foundation

CREDIT: RACHEL KAPISAK JONES

How Does Your Firm's Tech Stack Up?

By Michele Russo

In a recent report, 47% of architectural professionals stated that IT at their firms is managed by IT professionals. However, that experience is different at firms of different sizes. While 95% of large firms with more than 100 employees have dedicated IT professionals, the percentage decreases as firm size decreases. Half of firms with 20 to 99 employees have a dedicated IT professional, and only 31% of firms with five to 19 employees and 11% of firms with fewer than five employees report the same. AIA

For more information on technology in architecture firms, view AIA's new report, "Technology, Culture & the Future of the Architecture Firm."

CREDIT: LOVEIS.WISE

Pressure Points for the Profession

A new report from AIA and UC Hastings College of the Law quantifies the challenging impacts of bias on the profession—and proposes solutions.

By Katherine Flynn

Despite growing scrutiny in the last several years of historical inequities in the profession of architecture, research shows that white men continue to have an intrinsically different—and in many ways, better—experience in the architectural workplace than women and people of color.

A joint study conducted by AIA and the University of California, Hastings College of the Law and completed by 1,346 architectural professionals measured bias based on gender and race/ethnicity in the practice of architecture. The study builds on recommendations from AIA's Equity in Architecture commission and an industry-wide study published by AIA in 2016, "Diversity in the Profession of Architecture", as another resource to move the needle on diversity, equity and inclusion in the architecture profession.

While the study is not a comprehensive overview of the profession, the study's authors tried to be inclusive and thorough in their research methods. The report, titled "The Elephant in the (Well-Designed) Room" and released in December 2021, pinpoints necessary areas of improvement within firm and practice culture to continue building a profession that's diverse and equitable. In this article, we offer some highlights that we believe will be useful to firms, architects, and industry professionals who are working to put an end to bias in the workplace.

"Even though many of the experiences we discuss in the report are small or isolated, they add up to patterns that can be career-defining for women and people of color," says Rachel Korn, a research director at the UC Hastings Center for WorkLife Law and one of the authors of the study. "Current firm leadership needs to be proactive about addressing bias now if they want to see more women and people of color at the top in the future."

Learn more about the report and the survey data at AIA.org.

Bias From the Boardroom to the Break Room

Biases play out in two ways: in everyday workplace interactions and in formal business systems and policies. The study asked respondents about fairness in their organizations' workplace processes and policies, including hiring, compensation, performance evaluations, sponsorship, and promotions.

While architects often delineate a lack of racial and gender diversity in the profession as a pipeline issue, as this study illuminates, it is also a culture issue. Open racism and sexism play a role, too.

The "Workplace Experiences Survey," designed to identify experiences of bias, found that the largest divergences were between white men and women of color.

Throughout the study, Black architects and designers reported racial bias at what the authors call "stunningly high" levels. 52.4% of Black women and 50% of Black men reported dealing with negative racial stereotypes at work. As the study points out, one cost of racism is the time and effort people need to invest in managing it deftly; that is, stopping it without triggering resentment or retaliation.

As a group, Black women reported the most negative experiences in the architecture profession. Over 50% of those surveyed reported that they had to deal with negative racial stereotypes at work. The same percentage reported being left out of the information-sharing networks of their workplaces.

Sexism plays a large role in the rate of attrition for women from the profession. One white woman shared, "I've been told I should be a housewife." In the survey, 70.9% of white women and 61.2% of women of color reported experiencing sexism in their workplaces, as compared with less than a quarter of white men and men of color.

The study shows that bias can be seen when people feel excluded at work and feel promotions are not fair, and as a result, feel less satisfied with their career overall and consider leaving the profession.

While all of the bias patterns studied were impactful, tightrope bias was one of the strongest. It can be difficult for women and people of color to balance authoritativeness with "approachability" while finding what leadership considers to be an appropriate way to demand career-enhancing work.

"Prove-it-again" bias was nearly as powerful. Women, Black people, Latinx people, and people from lower income backgrounds are stereotyped as less competent—so they are forced to prove themselves more than others in a professional workplace to get the same respect and recognition as white men from elite backgrounds, according to the study.

Women reported having to prove themselves repeatedly at much higher levels than white men—50% compared

to 24.5%. Native American, Alaska Native, Indigenous, and others underrepresented in the architectural professions—as well as Black women—reported the strongest "prove-it-again" bias. Black men reported more "prove-it-again" bias than other men of color.

Architectural professionals of Asian descent reported more "tug-of-war" bias (when bias against a group fuels conflict within it) compared to all other groups. They also reported being seen as team players rather than leaders (62% of women and 58.7% of men of Asian descent), being seen for their technical skills rather than managerial skills (55% of women and 51.5% of men of Asian descent), and being treated as "forever foreigners" (35% of women and 24.7% of men of Asian descent).

Among types of bias, motherhood, according to the study's authors, triggers the strongest form of gender bias. The report states that being a mother, getting pregnant, or just being a woman of a certain age can trigger strong negative competence and commitment assumptions at work. Among women in the profession, 64% say that women's opportunities diminish after they have children, and 59% report that women's pay is worse as well.

The study found that mothers who leave the architecture profession do so not only in search of work-life balance but also because they feel their careers have stalled out due to discrimination against mothers in the form of pay inequality, lack of opportunities, and assumptions about their priorities. The authors of the study found a large discrepancy between the experiences of men and women in the architecture profession after they had children.

While the data suggest that family-friendly policies and working hours are present in many architectural firms, the 2018 "Equity in Architecture" study found the flexibility stigma was widespread: Of respondents, 70% believed that using the available work-life benefits in their organization would jeopardize their chances of promotion. Even if the official office policies support flexible arrangements, people do not necessarily feel free to use them.

As one woman told researchers, "Part-time and flexible arrangements exist and are promoted by HR and you won't get fired, but women who use them find themselves sidelined or, in at least one case, harassed by another more senior woman about her perceived lack of commitment following having a child."

Perceptions around parenthood disproportionately impact women, as do incidents of sexual harassment. Sexual harassment was something that most female architectural professionals reported encountering in their workplaces. Nearly a quarter of white women and women of color reported unwanted romantic or sexual attention in their workplaces, along with 6.4% of white men and 10.5% of men of color.

Other research has found that sexual harassment often hurts women's careers and can lead to lost opportunities—46% of women who had experienced sexual harassment on the job reported that the harassment caused them to leave their job. For everyone to be on a level playing field in the workplace, every employee's autonomy and boundaries must be respected.

Interrupting Bias in Your Firm

There are a number of strategies firms can put in place if they want to prioritize minimizing the impacts of bias on their workplaces.

Each solution presented in the study—in the areas of hiring, assignments, performance evaluations, meetings, family leave, and workplace flexibility—takes a three-step approach:

- Use metrics.
- Implement bias interrupters.
- Repeat as needed.

Bias interrupters, developed by the Center for WorkLife Law, are tweaks to basic business systems that are evidence-based and designed to produce measurable change.

Businesses use metrics to assess progress toward any strategic goal, and clear metrics can help firms pinpoint where bias exists—and the effectiveness of measures to mitigate bias. For each metric, consider whether patterned differences exist between majority men, majority women, men of color, and women of color (as well as any other underrepresented group that your firm may track, such as military veterans, LGBTQ+ people, people with disabilities, etc.)

As the proposed solutions outline, firms must employ an evidence-based, metrics-driven approach to hiring. A few strategies include limiting referral hiring, tapping diverse networks, considering candidates from multi-tier schools, and insisting on a diverse pool of candidates.

When it comes to assignments, make sure that high-profile "glamour work" (as well as office housework) is distributed equally. Some suggestions: Don't ask for volunteers for office housework or "glamour work" (women will feel pressure to take on less glamorous, but still important, tasks); hold everyone equally accountable; choose employees to serve as administrators and establish a rotation.

An informal study of performance evaluations in tech conducted by researcher Kieran Snyder found that 66% of women's performance reviews contained negative personality criticism (for example, "You come off as abrasive") whereas only 1% of men's reviews did. Use metrics to analyze such questions as, "Do your performance evaluations show consistent disparities by demographic group?" and "Do the same performance ratings result in different promotion or compensation rates for different groups?"

In meetings, men tend to interrupt more than women. Women of all racial/ethnic groups were dramatically more likely to be interrupted than white men, with men of color falling in the middle. Another pattern, as the study points out, is that men will sometimes get the credit for an idea originally posed by a woman. In the survey, this stolen-idea phenomenon was reported by women—and women of color, especially—at a much higher rate than men. Actions to address this include making employees at all levels active participants in keeping metrics to track who speaks in meetings, who interrupts, and whose ideas get implemented, with the goal of using the data to have conversations and make adjustments in workplace culture as needed.

When it comes to family leave, companies need to create comprehensive leave and work-life balance policies to retain the best workers. If your firm offers disability leave, it needs to also offer it for childbirth. Offer equal parental leave (eliminating a "primary caregiver" model), as well as leave for all types of caregiving responsibilities. Perhaps most importantly, eliminate the flexibility stigma: Tell employees that taking leave won't undercut their progress in the organization, and back up the policy by action. For example, track and share metrics showing promotion rates for team members who use all of their paid time off versus some of it versus none.

Lastly, workplace flexibility is something that 96% of architects say they need. When workplaces rely on an outdated model of a breadwinner who is always available for work, they exclude most people working today while hurting the company's bottom line. This can be remedied by allowing for flex time, offering a wider range of work arrangements, and paying attention to what an employee's efforts lead to, not how many hours it takes to get there.

Ultimately, the study is a powerful source of information on the equity problems facing architecture—and how we can work together to fix them. AIA


A'22
CHICAGO
JUNE 2022
The architecture &
design event of the year!
conferenceonarchitecture.com

The Big Impact of Small Spaces

2021 AIA Film Challenge winners showcase the communal power of design.

By Jocelyn Rogers

A vacant lot in Chicago. An outdated library in rural Kentucky. The AIA Film Challenge 2021 winning entries demonstrate the power of design to transform neglected spaces like these into thriving community hubs.

Grand Prize winner *POP Courts!*—by filmmaker Brodie Kerst and the Lamar Johnson Collaborative (LJC), the name of both the project and the film—chronicles a project to bring outdoor amenities, economic opportunity, and community gathering space to Chicago's "Soul City Corridor." Key to the city's Invest SouthWest initiative, POP Courts! is part of a larger vision to help develop Chicago's underinvested communities.

Community Engagement Was Central to Designers' Approach

"We didn't want to come in as 'know-it-all' architects who knew what was best for this community," says architect Alan Barker, AIA. "We knew the community should have a say and be able to influence this space that they will take ownership of."

Working under a tight budget and time constraints, POP Courts! architects and designers relied on close collaboration with community leader Vanessa Stokes.

"What we had was relationships and open communication, and we had to lean on them that much more," Barker says. "That was the strength that brought us through."

The space is divided into three zones, or "courts," where activities can "pop" up organically. One zone is a basketball court that converts seamlessly into an event space with the addition of a stage or DJ booth. The next zone, a gravel drive, hosts food trucks and farmers markets—spurring commerce. A soft space marks the third zone with shaded lawn seating and playground-style spin chairs that appeal to all ages.

"Young people have a place where they can be, and be safe and play," Stokes said. "In a lot of communities, those things are taken for granted."

Project leaders engaged residents through events like a ribbon-cutting and a community paint day. But no invitation was needed. Neighbors immediately gravitated to the space, including daycare students down the block.

CREDIT: BRODIE KERST AND LJC

Above: A basketball court at POP Courts! in Chicago provides a colorful space for youth activities.

Above: Shaded lawn seating and spin chairs at POP Courts! provide places for community members to gather.

"Daycare kids came around the corner, and their faces changed automatically," Barker recalls. "They ran onto the turf and knew exactly how to engage the spin chairs. This was a space the kids instinctively knew how to use, and it's an amenity they didn't have previously. A space that people could come occupy naturally is what we were trying to set up."

The community's immediate enthusiasm made Kerst's job as a filmmaker that much easier. "We didn't have to stage anything," he says. "A testament to the success of the community involvement is when we went out there to shoot, kids ran over to the basketball court and started playing almost immediately."

The lesson? "Even though it's small, it had a huge impact," Kerst says. "Impactful projects don't have to be huge and grandiose and take years and years to design and execute. It can be done in six months, in a small park, and have a big impact."

The same principle is on display in People's Choice Award winner *A Jewel in Appalachia*. Directed by Alex Michl, this film documents OPN Architects' renovation of Lawrence County Public Library in Louisa, Ky.

According to library director Carlie Pelfrey, Louisa is a small town (just more than 5,000 residents) where "everybody knows everybody" but "jobs and cultural opportunities are scarce." Hit hard by the decline of coal jobs, the Appalachian town relies on its library as "a place of lifelong learning and the focal point of our community"—hosting everything from classes to a summer meal program for school children.

But the existing 1960s structure, dark and disjointed, was ill-equipped to meet the community's needs. OPN project architect Toby Olsen, AIA, embraced the opportunity to transform the library into an inviting, multifunctional space.

"The building has to operate essentially like a Swiss Army knife that provides multipronged tools that allow us to create a space that is able to adjust with needs," he explains. "They wanted the freedom to grow, to flex their programming muscles, and the freedom to be who they are. And we knew that this building has to be for all community members. Every person needs to be welcomed and safe in this space."

Olsen and his team focused on introducing light and transparency—opening up the space and creating a children's area as a focal point, "a jewel box

CREDIT: ALEX MICHL

Above: Louisa, Kentucky, the site of People's Choice Award Winner *A Jewel in Appalachia*, was impacted by the loss of coal jobs.

that shows off the wonderful things that are happening in the library."

Michl's aerial footage emphasizes how the library stands out as a beacon while still blending into the surrounding community. "This neighborhood is socioeconomically challenged, but you're sitting in this space that's beautiful, that's a good learning environment, and a good place to be," he notes. "You could see it was something elevated above the rest of the area but also very ingrained into the site and a part of the community already."

As a library specialist, Olsen understands the unique potential of these public spaces to support equity and opportunity. Libraries, he says, are "the most democratizing of all spaces and places where you can get access to information, share ideas, talk and learn, be entertained, and find joy." His experiences growing up in a small town also informed his approach in Louisa. "I understand what it's like to live in a small, rural community," he says. "For many growing up in that environment, you hear things like 'Oh, we don't deserve that; that can't happen here.' It's important that we rectify that when we go into rural communities. Just because it's a small town doesn't mean you don't deserve the best we can possibly deliver for your budget or bring you services that you couldn't imagine, or think could only happen in a large city."

For Michl, the Louisa project also resonated. He says that while most media coverage of architecture emphasizes "high profile, high end projects ... what the Film Challenge does is give a platform to emphasize how architecture impacts a community, people, families."

Kerst agrees. "Architects are great at communicating to other architects," he explains. "But if you're able to make a video that I can show my mom, and she'll say 'I get that—that's why design is important,' it's that much more powerful."

Rural or urban, indoor or outdoor, blank slate or renovation—these two projects are proof that, with collaboration and creativity, architects can create a zero-carbon, resilient, healthy, just, and equitable built environment, community by community. AIA

AIA PERSPECTIVE

Aligning Ourselves With a Greater Cause

By Peter Exley, FAIA, 2021 AIA President

How do you plan to use your talent? Whether you're a licensed firm owner of 25 years or a new graduate applying for internships, this is an important question to consider for at least a moment between deadlines. The trouble people run into when they try to answer it is they are only looking back on what they've done as evidence of why it matters. Yet, the project of our lives, the purpose with which we undertake it, and the root cause of our undertaking—all of these elements—can be found in the future. All of them can be identified by looking forward.

To all those within architecture's realm, we're on a long journey, indeed. There is so much we've figured out about designing with nature, but there is obviously so much more we must do to mitigate carbon emissions. Despite our hope, there are still bitter opponents of sustainability, and in our time, there is still complicity at the grandest possible scale. Architecture's adoption of sustainability and resilience is a journey that can no longer tolerate errors of omission or errors of commission. We must not simply continue journeying to conferences and rallies. We must take action in the legislature and in code books, and we must take action in the classroom and in the studio. To anyone reading this piece, I urge you to get serious about the 2030 Commitment as a design ethic that can guide your practice.

If past is prologue, though, the "Guides for Equitable Practice" have started to become an industry conversation. I began the year telling everyone I could about their value and utility, and by the end of the year, I found that this information was already out there when I'd speak to an architect or a firm. Another major step had to do with the cohort of 10 architecture students from HBCUs who, thanks to NOMA Foundation Fellowships, worked at 10 different architecture firms nationwide this year. This was the first initiative of the AIA Large Firm Round Table's 2030 Diversity Challenge, and it won't be the last. There are a dozen other pivotal moments that came to pass in 2021, and all of them were the first steps in an overdue journey. For all of us, the very first step is to care and to learn more, and hopefully to finally align ourselves with a greater cause—join NOMA or join an AIA Knowledge Community; write to our congressperson; find the project, purpose, or cause that leverages our talents, wherever they are, for the change we wish to see.

I see in my academic life, as well as my professional life, nothing but fervent conversations about fairness and inclusion. But there is obviously so much more we need to soften the edge conditions of architecture so that we admit all those who wish to make the world a better place and filter out only those unwilling to commit to that responsibility that I hope every architect feels. It's in their DNA, as it's in mine, to do no harm—and that ideal should extend to racial and social justice just as it extends readily to health, safety, and welfare standards. In looking back at her partnership with Robert Venturi, one of my heroes, Denise Scott Brown, once said, "I think our best projects were when we worked together." I share that sentiment with my wife and partner, Sharon Exley, and I also believe it's flexible enough to be true at the scale of architecture itself. That is to say: The larger project of architecture can only realize its fullest potential if we work together. AIA

CREDIT: RUTH YARO

QHB: LightingSimplified.

TCP quality has never been easier to install.

- Lightweight design allows for 50% faster installation than traditional high bays
- Quick Install construction
- Sleek, contemporary design
- Frosted lens for glare control
- 250 or 400W HID equivalent
- 120 degree beam spread
- TCP SmartStuff compatible

TCP's powerful new LED high bays aren't just thin and sleek—they're also a breeze to install thanks to a lightweight extruded aluminum body.

Call TCP at 1-800-324-1496 or visit TCPi.com/QTL to learn more.

TCP®

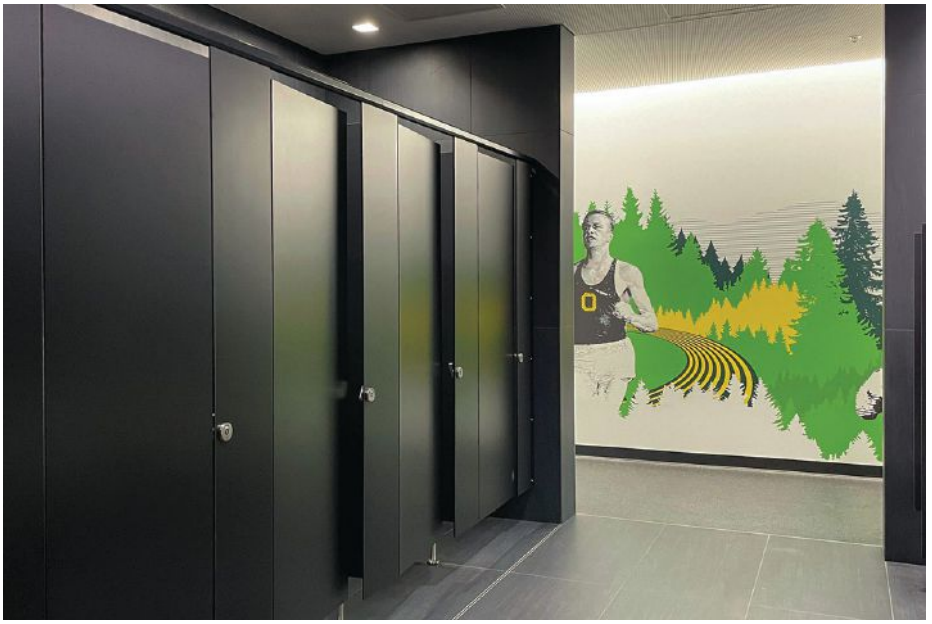
Innovation is LED by TCP

ARCHITECT INTEL

ASI Group
Integrated Building Products

TAKING THE STADIUM EXPERIENCE TO THE MAX

The revamp of a legendary venue at the University of Oregon focuses on comfort and aesthetics to provide athletes and spectators with the ultimate experience.



Hayward Field has always held a special place in the history and traditions of the University of Oregon, including the experiences of generations of athletes and fans from around the world. As the host site for the 2021 U.S. Olympic Team Trials and the upcoming 2022 World Athletics Championships, the stadium was primed for a 21st century reimagining on an epic scale.

The challenge was a lofty one: to transform this historic 100-year-old track and field landmark into a modern state-of-the-art venue with comfortable seating, unrivaled in-stadium amenities, and amazing sight lines. Additionally, the design team was tasked with creating a sense of intimacy between athletes and fans to provide the ultimate overall sporting experience.

SRG Partnership and Hoffman Construction Co. took on the challenge, and they understood that completing the tall order would require great partners. The project's aesthetics and quality would need to extend to all areas of the venue, including the restrooms. "Every detail in the stadium was based on providing an ultimate experience for both the athletes and spectators," says Marquesa Figueroa, Assoc. AIA, associate at SRG Partnership. "Our goal for the partitions was to offer complete privacy with self-closing doors to provide a clean, finished look."

So SRG Partnership chose the ASI Group to provide a solution that aligned with the arena's sophisticated design. They wanted to offer athletes and fans restroom facilities to maximize their experience, with an added focus on total privacy. And the ASI Group delivered, installing its Alpaco Partitions, a European style privacy collection that has zero-sightline doors and pilasters that meet in a flush finish and guarantee total privacy with routed, overlapping closures. The partitions are offered in a range of options and functionality, perfect for high-profile settings like Hayward Field. And the self-closing feature of the Alpaco doors delivers a sleek, uniform appearance.

"ASI Group worked with our team to understand our aesthetics and performance requirements on the product, and the final result is a true testament to the collaboration ASI Group provided," Figueroa says.

The project began in 2017, with an ambitious construction schedule set to meet the deadline for hosting the 2021 Olympic trials. The finished structure is impressive, with a 12-story landmark tower showcasing exhibits in its lobby, an observation deck, and a training staircase that runs directly to the top of the tower, a testament to meticulous design.

Visitors to the reimagined Hayward Field will benefit from the attention to detail found in every aspect of the architecture and design, where the focus is always on maximizing the experience for athletes and spectators alike.

Learn more about how next-level restroom partitions can elevate the stadium experience at **asi-accuratepartitions.com/privacy**.

Produced by Zonda Media, a Delaware corporation.
marketing.zondahome.com

Socialize

@architectmag

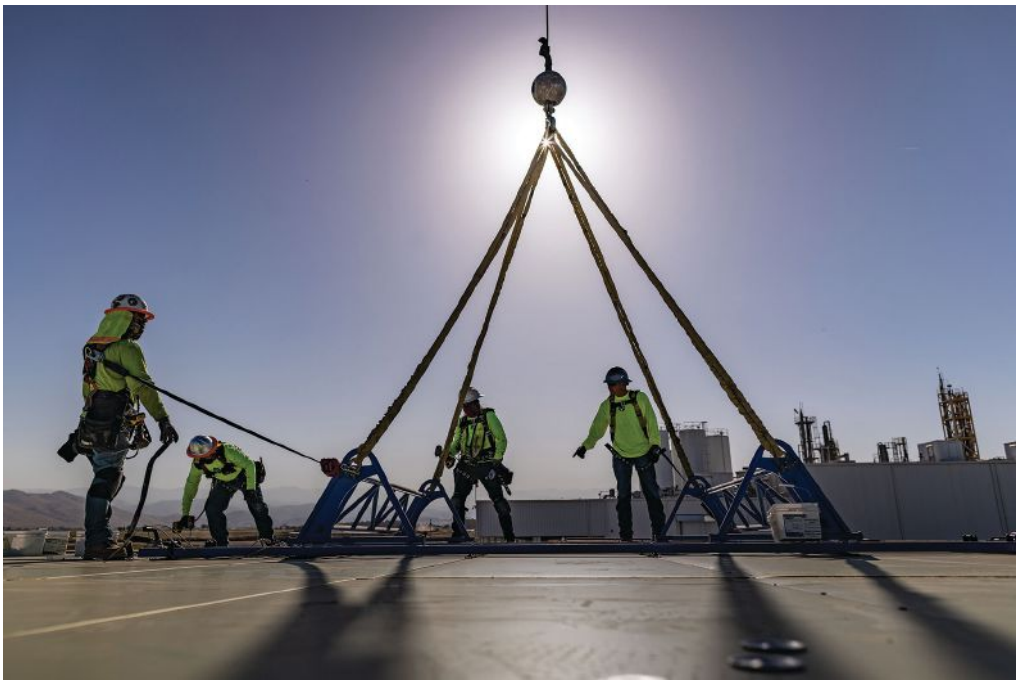
< Visit our new LinkedIn page

ArchitectMagazine

An Alternative to Traditional Low-Slope Roofs

INSULATED ROOF DECK SYSTEM OVERVIEW AND CASE STUDIES

Presented By:
AWIP All Weather Insulated Panels



LEARNING OBJECTIVES

1. Understand the characteristics and performance attributes of an insulated roof deck system.
2. Explore the role of diaphragm design and learn how an insulated roof deck system contributes to green building certification.
3. Consider design details of complex commercial/industrial buildings and analyze the impact of an insulated roof deck system on the construction of a new freezer storage facility.
4. Discover trends in cold storage facility construction and renovation and learn how an insulated roof deck system was used in the total roof replacement of a climate-controlled building.

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/AR12212 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 TO INSULATED ROOF DECK SYSTEMS

Insulated metal panels (IMPs) are a long-established commercial building solution in Europe. One estimate puts the use of IMPs in European commercial-industrial builds at 50%—and most of them are specified for roof applications. This building trend has been picking up in North America since 2018 and accelerated in part due to the COVID-19 pandemic and ensuing supply chain disruptions for traditional systems such as steel B-deck, and ISO insulation boards. Using IMPs for commercial and industrial roof applications is a long-term, sustainable alternative to traditional low-slope roofing applications—and it is more efficient.

Historically, insulated metal panels have been utilized as a non-load-bearing wall and roof cladding material. Their main benefit was acting as a high-performance building envelope. Modern IMP roof deck systems are manufactured to create a rigid assembly that still maintains excellent performance attributes 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 thermoplastic polyolefin (TPO) or polyvinyl chloride (PVC) membrane. Panels are made on a continuous line in standard widths of 40 inches and lengths from 8 to 50 feet—in some cases up to 70 feet, depending on site conditions. Foam is injected between the steel facings, creating a natural chemical bond to the steel. A factory sealant is then applied to the interior panel joint. Insulated roof deck systems are typically a two-component system that reduce the number of parts necessary to achieve air, water, and thermal barriers.

Materials in an Insulated Roof Deck System

Insulated Roof Deck Panel:

The insulated roof deck consists of two steel skins filled with polyisocyanurate foam. The exterior and interior steel skins typically range from 22 to 26 gauge and are available in coil coated finishes. The exterior steel skin is provided with a primer-coat suitable

Insulated roof deck systems save time and labor costs, are more energy efficient, and—when paired with a patented mechanical panelizer system—improve job site safety compared with traditional low-slope roofing products.

to fully adhere the membrane, or 22 gauge to mechanically attach the membrane. The interior is typically painted white to give a clean, neutral ceiling finish and reduce indoor lighting needs, but other colors are available. The insulating polyisocyanurate foam core is between 2 and 8 inches thick, and can achieve an R-value of R-8 per inch ranging from 16 to 62, respectively.

TPO or PVC Membrane:
TPO or PVC single-ply membrane (typically 60 mil) is adhered or mechanically fastened to the exterior skin.

This roof deck assembly (insulated roof deck and TPO or PVC membrane) creates a continuous air barrier by also utilizing factory caulking in the finger joinery.

Advantages

Insulated roof decks can provide various advantages compared with traditional low-slope roofing systems, which require several layers and types of components to achieve a weathertight roof system.

These advantages include:

Design Simplification
Insulated roof decks simplify the design of low-slope roofing systems by reducing the number of components required to achieve a weathertight roof system. Reducing the number of components inherently reduces complexity in detailing the roof system, especially since they can serve as the structural system. Insulated roof decks can be integrated into the roof system design to enhance structural integrity and increase R-values per inch of thickness, which 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. With the proper mechanical fastening and design, its shear load capacity is comparable to 1.5-inch-deep, 22-gauge structural metal decking.

The fact that insulation is built into the system is another important factor. Even multi-layer materials in traditional systems may still require an additional, separate layer of insulation to achieve satisfactory R-values for roofing.

Construction Process Simplification
This system does not have as many components, meaning fewer trades are required to install a weathertight roof system and less coordination between trades is necessary. A simpler roof system can result in reduced labor costs and increased speed of installation.

Improved Quality and Risk Reduction
Simplifying the design can also improve the overall quality of the system because it's less complex to install. Reducing system complexity, labor to install, potential installation errors, and coordination of trades on the jobsite also leads to a reduced risk of failure of the roof assembly.

Improved Performance
Insulated roof deck panels can achieve R-values ranging from 16 to 62, depending on the product thickness, which ranges from 2 to 8 inches.

An interior factory-painted white steel skin is a clean ceiling with a washable finish that reduces interior lighting needs. The smooth, flat exterior steel skin provides a sturdy workable surface and damage resistance. Finally, a field-applied membrane fastens mechanically or fully adheres to the top steel skin. It requires approximately half the fasteners, which do not penetrate through the entire system like a traditional low-slope roofing system (depending on diaphragm shear requirements), and the deck panels arrive at the job site ready for installation.

The exterior steel facing is impermeable to air and water and can support foot traffic without a separate hard cover board. Its high strength provides excellent transverse load resistance.

GLOSSARY

Built-up Roof: A type of traditional low-slope roof featuring steel deck, multiple layers of ISO board insulation, hard cover board, and a membrane.
Cricket: In roofing, a V-shaped structural element installed at roof transitions or on the high side of a chimney; designed to direct water and aid in water drainage.
Diaphragm Shear: The structural element that transfers resistance loads from the building to the foundation or soil.
Low-Slope Roofing: A nearly flat or slightly pitched roof with a pitch below 2:12.
R-Value: Measures an insulating material's resistance to conductive heat flow; the higher the number, the better the insulating material.
Thermal Barrier: As it relates to a roof system, a material that will limit the average temperature rise of the unexposed surface to not more than 250 degrees Fahrenheit after 15 minutes of fire exposure, according to the IBC (International Building Code).
TPO: Thermoplastic polyolefin, a type of traditional low-slope roofing material that is a single-ply membrane.
PVC: Polyvinyl chloride, a type of traditional low-slope roofing material that is a single-ply membrane.
Vapor Barrier: A system or membrane as part of the overall roof system that controls water vapor movement to 1.0 perm or less into the roof system.
Wash-Down: In food and beverage facilities, the process of cleaning an area or equipment with a high-pressure water spray and/or chemicals to disinfect and sanitize.
Wind Uplift: Net upward force when wind flows over a building and the pressure directly above the roof surface decreases while internal air pressure due to penetrations or infiltrations simultaneously increases.

Insulated roof deck panels can achieve R-values ranging from 16 to 62, depending on the product thickness, which ranges from 2 to 8 inches.

Sustainability

Insulated roof decks reduce the quantity of waste generated on site, which means less waste going to landfills. These systems also reduce heating loads due to the white TPO or PVC membranes that are attached to the exterior skin. These roof systems typically last at least 20 years and don't need to be completely replaced when the TPO or PVC membrane reaches end of life. A new TPO or PVC membrane can be easily installed over the existing roof, reducing reroof costs by upwards of 75%.

Comparison to Other Low-Slope Roofing Materials

Traditional low-slope roofing materials tend to involve a substantial amount of time and labor, and several distinct types of chemicals and long fasteners, which are visible from inside the building and detract from the overall aesthetic.

A traditional built-up deck system starts with the installation of a steel deck, which is typically installed by a steel-erecting contractor. After the deck is secured, a roofing or waterproofing contractor installs a vapor barrier. Next, a roofing or insulation contractor installs multiple layers of ridged ISO board by screwing them down through the vapor barrier and deck. When required, the following step is to screw down a cover board to protect the ISO board and make the roof walkable.

It is important to point out that a great deal of the fasteners used through this step are visible from the internal conditioned space. Finally, a membrane is either adhered or mechanically attached to the coverboard. The building is dried-in only when membrane installation is complete.

By comparison, an insulated roof deck system has just **two** primary components: an insulated roof deck panel and a field-applied membrane, which is typically installed by a single contractor. On a 100,000-square-foot roof using traditional roofing products, up to 20,000 fasteners and plates secure the insulation, which can take two five-person crews up to two weeks to finish. Alternatively, the same 100,000-square-foot roof using an insulated roof deck system would require 3,600 fewer (18% less) fasteners and can be installed in as little as five days with a crew of six. That comes out to 800 man-hours for a traditional system compared with 240 for an insulated roof deck system.

DIAPHRAGM SHEAR CAPACITY

Insulated roof deck systems are known for their durability, performance, and aesthetics. Two designs are available: diaphragm and non-diaphragm. With diaphragm designs, the insulated roof deck system becomes a structural component of the building that can withstand lateral loads, such as wind and seismic forces.

It also provides superior resistance to wind uplift and transverse bending loads. Insulation is chemically bonded to the steel facings of insulated roof deck panels, and the roof system is rigidized as one unit. When using an insulated roof deck diaphragm fastening pattern, the application can reduce the amount of structural steel required for the project.

As a composite product, insulated roof decks provide higher structural performance at longer spans than traditional low-slope roofing products. Steel-facing strength enables the roof to resist in-plane shear loads. Proper fastening and design are determined on a per-project basis, where panel fastening patterns and steel frame spacing are reviewed to meet diaphragm design requirements. The pattern depends on diaphragm shear requirements for the building.

Manufacturers can provide load span tables with applicable testing such as AISI S907 for diaphragm shear, ASTM E1592, or ASTM E72 for wind uplift, and code approvals such as International Association of Plumbing and Mechanical Officials (IAPMO) to validate the design data.

A non-diaphragm panel design is ideal when the diaphragm bracing is built into the steel framing. Non- diaphragm applications could eliminate upwards of 90% of total fasteners compared with traditional built-up low-slope roofs.

GREEN BUILDING CERTIFICATION

Thanks to the innovative material content and installation methods used with insulated roof deck systems, the systems have a long life cycle, which reduces the product's carbon footprint. Since fewer trucks are required to source and supply materials—resulting in fewer vehicle miles per roof—the environmental impact and cost of transportation are also reduced. There is also less material waste on-site.

A minimum of 30% recycled steel is used to manufacture the panels. They have a higher R-value per inch than traditional systems, saving energy costs and reducing the need for additional materials.

Insulated roof deck systems do not emit any volatile organic compounds (VOCs). Further, they have zero ozone-depleting potential (ODP) and meet the U.S. Environmental Protection Agency's blowing agent requirements as well as the requirements for reducing global warming potential (GWP).

Insulated roof decks contribute to compliance with LEED for New Construction and Renovation (LEED-NC) through:

- **Sustainable Sites: Heat Island Effect—Roof**, achieved using roofing materials with a solar reflectance index equal to or greater than 78% of the roof surface for low-slope roofs.
- **Energy and Atmosphere: Minimum Energy Performance/Optimize Energy Performance**, achieved through percentage improvement in whole-building energy performance or prescriptive compliance with ASHRAE Advanced Energy Design Guide.
- **Materials and Resources: Building Reuse, Material Reuse, Recycled Content**, achieved by maintaining at least 75% of the existing building structure envelope.

  - Material reuse points are achieved through using at least 5% salvaged, refurbished, or reused materials on the project, based on cost and the total value of project materials. Achieved using materials with minimum recycled content values.
- **Indoor Environmental Quality: Low Emitting Materials—Adhesives and Sealants, Daylight, and Quality Views**, adhesives and sealants points achieved through compliance with stated VOC limits.
  - Daylight points are achieved through energy and/or illuminance simulations. Achieved by providing building occupants with an unobstructed view of the outdoors for 75% of all regularly occupied floor areas.
- **Water Efficiency: Water Efficient Landscaping, Innovative Wastewater Technologies, Water Use Reduction**, achieved through reducing potable or other natural surface or subsurface water consumption.

Enhanced structural integrity, sustainability attributes, simplified design, and quicker installation are just some of the reasons why an insulated roof deck system should be considered over traditional built-up systems.

This article continues on http://go.hw.net/AR12212. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

SPONSOR INFORMATION

All Weather Insulated Panels

All Weather Insulated Panels manufactures high-performance insulated metal wall and roof systems engineered for simplified design and installation, along with the highest-performing, most energy-efficient building envelopes available. AWIP's state-of-the-art, continuous line manufacturing facilities in CA, AR, and PA offer the capacity needed to fulfill any size project, and the stability required to support the emerging needs of the North American building industry.

QUIZ

1. The core of insulated roof deck systems can achieve R-values ranging between _____.
   a) 10 and 50
   b) 12 and 54
   c) 16 to 62
   d) 18 to 64

2. Which of the following is a benefit of insulated roof deck systems?
   a) Fewer components
   b) Simpler installation
   c) Higher R-values
   d) Less waste generated on site
   e) All of the above

3. A new TPO or PVC membrane can be easily installed over the existing roof, reducing reroof costs by upwards of _____.
   a) 50
   b) 65
   c) 75
   d) 85

4. Insulated roof deck systems can have a shear load capacity comparable to _____ structural metal decking.
   a) 1-inch-deep, 22-gauge
   b) 1.5-inch-deep, 22-gauge
   c) 2-inch-deep, 26-gauge
   d) 2-inch-deep, 26-gauge

5. Based on a 100,000-square-foot roof using traditional roofing products and 20,000 fasteners and plates, an insulated roof deck system uses ____ less fasteners.
   a) 18%
   b) 20%
   c) 22%
   d) 24%

6. Insulated roof deck systems with a diaphragm design can withstand _____.
   a) Vertical loads, like impact load
   b) Lateral loads, like wind
   c) Longitudinal loads, like tractive force
   d) None of the above, it is not a structural element

7. Non-diaphragm insulated roof deck systems can eliminate up to ____ of total fasteners compared with traditional built-up roofs.
   a) 60%
   b) 70%
   c) 80%
   d) 90%

8. The mechanical panelizer system enables panel installation in less time and with less labor time than traditional processes—and it reduces exposure to leading-edge roofing falls by up to ____.
   a) 86%
   b) 68%
   c) 58%
   d) 38%

9. An insulated roof deck system can be ___ lighter than wood-frame structures.
   a) 20%
   b) 30%
   c) 40%
   d) 50%

10. The insulated roof deck system eliminates the need for wall support beams because they maintain an adequate ____ load on their own.
    a) Live
    b) Dead
    c) Radial
    d) Axial

Thin Brick Veneer Design and Installation

Presented By:

BELDEN
THE BELDEN BRICK COMPANY

LEARNING OBJECTIVES

1. Provide an overview of thin brick veneer and discuss the system's advantages and design considerations.
2. Discuss design considerations for thin brick veneer, such as application methods, and review relevant building code requirements and guidelines.
3. Study thin brick veneer material specifications, shapes and sizes, mortar, and adhesive used in installation.
4. Explain installation methods for thick and thin set, modular, and prefabricated thin brick veneer systems.
5. Evaluate practical applications for thin brick veneer and summarize case studies in commercial and residential projects.

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/AR12211 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

Brick is a timeless look. It can bring out the classic beauty of weathered architecture or let the elements of a modern building shine through. It appears brick is always in style and in demand. The market for brick is growing, too.[1]

Designers and builders don't have to *use* brick to get the look of brick. Thin brick veneer combines the aesthetic of brick without the weight or cost. It can be used in new builds, renovations, inside and out. Thin brick veneer comes in different varieties and styles, and its flexibility can be used in almost any project.

DEEP DIVE: THIN BRICK VENEER

Thin brick veneer made its way onto the market in the 1950s to reduce labor in new construction and to reface existing buildings. Since then, technology and design have advanced to expand the use of thin brick veneer across residential, commercial, multi-family, retail, and more.

It's classified according to one of four different installation methods: thick set, thin set, modular panel systems, and prefabricated panels, each of which will be explored in more detail. Thin brick veneer is applied to a substrate much like solid brick, though installation techniques are different.

For example, a solid brick home was typically built with two layers of brick or a concrete block layer plus a layer of solid brick on the exterior. In both cases, the solid brick wall is part of the building's structural support system. It needs to be installed in the early stages of a building process because it's integral to the structural support system. Solid brickwork is known for header bricks and reinforced arches around windows.

Thin brick veneer, on the other hand, is used as part of a build with a steel or wood frame with wood sheathing and insulation. It is installed on top of the substrate and can be added at any point after construction is finished. Unlike solid brick walls, thin brick veneer can be removed, and the structural integrity of the building would remain intact.

Thin brick veneer units are made from mostly clay and shale, with a small percentage of pigments and additives to achieve the desired color and texture. According to its environmental product declaration (EPD), hazardous substances are not used when producing thin brick veneer.[2] Because thin brick veneer isn't as thick as solid brick, it uses fewer raw materials, resulting in lower embodied energy. Fired thin brick is extremely durable and long-lasting, and manufacturers that source local materials further contribute to the product's overall sustainability.

There are three types of thin brick veneer:

- Type TBX, or select
  - Thin veneer brick for use in general masonry where a higher degree of precision and lower permissible variation in size than permitted for type TBS is required
- Type TBS, or standard
  - Thin veneer brick for general use in masonry
- Type TBA, or architectural
  - Thin veneer brick for general use in masonry, selected to produce characteristic architectural effects resulting from nonuniformity in size and texture of the individual units[3]

Thin brick veneer relies on weep holes to release moisture between the veneer and the substrate and allow the veneer to drain. Substandard installation can result in blocked weep holes, which then can give way to moisture retention and related damages.

Adhered vs. Anchored Veneer

Although these systems are usually referred to as brick, it is important to note the distinction between adhered and anchored veneer. Adhered veneer is what the building codes refer to when they say thin brick. This is not to be confused with anchored veneer, which is the term used for traditional veneer walls. Key differences between the two are as follows.

Adhered veneer:

- Thin brick adhered directly over suitable substrate (adhesion)
- Thin units
- Acts like a barrier wall

Anchored veneer:

- Brick wythe connecting to backing through wall ties (anchors)
- Full size units
- Acts as a drainage wall

This course discusses adhered brick veneer.

Adhered brick veneer, or thin brick veneer, can be installed almost anywhere that anchored brick veneer, which is heavier, cannot be. Thin brick veneer exerts less load onto a building and can be made to match existing anchored veneer or solid brick.[4]

A common misconception is that thin brick veneer is made of thin pieces of brick reminiscent of veneer floors and decorative interior elements. This is inaccurate; thin brick is made from the same material as solid brick. It's simply thinner, as the name implies.

THIN BRICK VENEER ADVANTAGES AND DESIGN CONSIDERATIONS

Thin brick veneer offers many stylistic and functional advantages over solid brick walls. As previously mentioned, it weighs less and can be installed more quickly and easily in about half the time of solid brick. Installation still requires mortar or another adhesive. Thin brick veneer tends to be more affordable and can offer better insulation than solid brick walls. It maintains some of solid brick walls' thermal, fire, and sound-resistant properties, though to a lesser degree because there is less material.

Like solid brick walls, thin brick veneer requires little to no maintenance once it is installed and can last for several years.

GLOSSARY

Adhered veneer: Thin brick adhered directly over a suitable substrate.

Anchored veneer: Brick wythe connecting to backing through wall ties.

Architectural precast concrete: Large concrete slabs designed to contribute to structural and decorative building elements.

Backing system: Either wood, steel studs, concrete, or concrete masonry units (CMUs).

Flashing: A material that collects water drained from thin brick veneer systems and directs it out of the wall through weeps.

Lath: A building material used as a base for applying thin brick veneer system, slate, tile, or plaster.

Movement joints: A system of joints installed in thin brick veneer systems to allow the systems to expand and shrink.

Scratch coat: A variable layer of mortar or modified mortar applied to the substrate to which thin brick veneer is applied.

Weeps: Holes in a thin brick veneer installation to allow the system to breathe and permit moisture to escape.

Wythe: One layer of brick.

Still, there are other design considerations to keep in mind when working with thin brick veneer. If structural support is needed, solid brick is the way to go. Thin brick veneer will maintain some of brick's characteristic properties--but not fully. It is not structural and relies on the integrity of its supporting substrate. Any misalignments may be easier to spot–another reason why working with a qualified installer is important.

APPLICATION METHODS FOR THIN BRICK VENEER

Thin brick veneer comes in several different varieties and is classified into one of four application methods. These are:

- Thick set
- Thin set
- Modular panel systems
- Prefabricated panels

The first two installation methods are done on-site. Both involve installing each brick veneer unit on a substrate. Either thick or thin modified mortar is used, depending on whether the installation is thick or thin set, respectively.

Modular panel systems are installed using an intermediary panel. The usual area to support the panel system, which is made of polystyrene, metal, or other materials, is 6 to 12 square feet. Modular panels are then either fastened to the substrate wall when thin brick is already adhered, or the thin brick units are adhered directly to the panels on-site.

Prefabricated panels, also called brick-faced concrete panels, are usually larger than 10 square feet and are each structurally independent. The panels are lifted into place. They consist of architectural precast concrete or steel or wood stud framing; these elements are made off-site. Concrete for tilt-up panels is normally poured in the field.[5]

There is specific guidance that designers and builders can use when deciding which application method will work best.

- Direct to substrate
  - Thick set: Thin brick adhered to coating similar to stucco; easier to make up tolerances from the substrate
  - Thin set: Thin brick adhered directly to the substrate
- Modular or prefabricated panel
  - Thin brick adhered/glued to a panel that is fastened to the substrate

- Brick-faced precast concrete panel
  - Thin brick set into a precast panel

Examples of Application Methods

The thin set method of installation—on masonry or concrete—is the most popular because there is only one coat necessary, and it reduces installation costs. It can be used on the interior or exterior.

Thick Set Method

As an example, thick set application on stud backing begins by ensuring an appropriate sheathing is applied to the studs. Over the sheathing, the system consists of two layers of building felt, wire lath, a scratch coat, bond coat, and the thin brick. This is very similar to plaster installations and similar methods are used. The area between the lath or mesh and the studs becomes a water-resistant barrier.

Modular and Prefabricated Thin Brick Panels

Modular panels are very popular because they guide the application. These include galvanized metal sheets with tabs, plastic panels with formed grooves, and metal rail systems. Prefabricated panels are also made with the thin brick already applied, but this is mostly for the DIY market. Many prefabricated panels now have insulation, providing another benefit.

Brick-Faced Precast Panels

There are two kinds of panels: precast concrete with brick facing or a panel system incorporating brick, precast and other backing systems. In this example, heavy gauge galvanized, or stainless-steel studs receive the interior finish. The studs are reinforced with hot-dipped galvanized steel. High-strength architectural precast concrete is 2 inches thick, and a half-inch of air space reduces thermal transfer. This is especially beneficial for buildings where the thermal coefficient is important because thin brick veneer is known to have fewer thermal benefits than solid brick.

Movement Joints

Movement joints must be used in thin brick as in other brick wall systems. For full brick veneer walls, the recommendation is usually about every 25 feet, but for thin brick veneer it is recommended that the movement joints be spaced closer together. Part of this is due to the differential movement between the thin brick and its mortar or concrete backing. The other reason is that this is a more flexible

system so placing the movement joints closer together limits the deflections and possible cracks from occurring.

The Brick Industry Association (BIA) recommends that expansion joints be placed approximately every 18 feet apart or at every floor when using a wood frame. When using a mortar bed and metal lath, the joint should run through the entire system. The wall area should not exceed 144 square feet.

Backing Systems

When it comes to picking which backing system to use for thin brick veneer, designers and builders can choose between wood or steel stud framing or masonry or concrete. Some options will be more durable than others depending on the project. In any project, avoid attaching thin brick veneer to drywall.

The only backing system that has restrictions on it is the thin set method when used over a stud backing. This is because of the increased flexibility of the backing and potential for cracking. All other installation methods are appropriate for a stud backing. The recommend maximum deflection is L/360.

Backing surfaces may need additional preparation before applying the veneer system. For surfaces that vary by more than a quarter of an inch in 10 feet, apply a leveling coat.

Other considerations for backing systems include:

1. Having one or two layers of a water-resistant barrier is recommended on studs or sheathing attached to studs for interior or exterior, respectively.
   a. This is acceptable only when cement backer board is used.
2. For the International Building Code (IBC), the system must comply with the alternative design requirements of TMS 402.

This article continues on http://go.hw.net/AR12211. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

QUIZ

1. _____ release moisture between the thin brick veneer and the substrate, allowing the veneer to drain.
   A. Weep holes
   B. Corner bricks
   C. Lintels
   D. Shelf angles

2. Unlike anchored veneer, adhered veneer acts like a _____ wall.
   A. Drainage
   B. Barrier
   C. Retention
   D. None of the above

3. Thin brick veneer is like solid brick, EXCEPT that it outperforms solid brick in this key area:
   A. It offers better fire resistance.
   B. It provides more moisture resistance.
   C. It has better structural support.
   D. It is independent of the building structure.

4. When adhering brick veneer direct to substrate, the _____ application method is adhered to a coating similar to stucco, whereas _____ is adhered directly to the substrate.
   A. Modular panel, thin set
   B. Thin set, thick set
   C. Thick set, thin set
   D. Prefabricated panel, thick set

5. According to general code requirements, shear stress should not exceed ____ to show that the brick veneer unit can stay in place.
   A. 40 psi
   B. 50 psi
   C. 60 psi
   D. 70 psi

6. When using the weathering index to decide which grade of brick veneer to use, _____ is most often required for many locations within the U.S.
   A. Grade exterior
   B. Grade interior
   C. SW grade
   D. MW grade

7. Codes are moving towards more emphasis on _____ rather than ASTM C270 mortars.
   A. Type S mortars
   B. Adhesives
   C. Latex modified mortars
   D. Modified mortars

8. In thick set installation, the first two steps are to install _____ and then _____.
   A. Wire lath, scratch coat
   B. Water-resistant barrier, wire lath
   C. Scratch coat, thin bond coat
   D. Mortar, water-resistant barrier

9. Thin set installation may not be suitable for buildings where _____ is expected.
   A. Substrate imperfections
   B. Differential movement
   C. Both A and B
   D. Neither; thin set installation can be suitable on any building

10. In terms of brick veneer color trends, _____ are in demand for commercial offices and restaurants.
    A. Sleek blacks and bold reds
    B. Neutral, earth tones
    C. Whites and grays
    D. Standard reds

SPONSOR INFORMATION

BELDEN
THE BELDEN BRICK COMPANY

Belden Brick is a manufacturer and distributor of building materials. It offers face, oversized, structural, paving, chemical resistant, special-shaped, thin and glazed bricks, pavers, construction products, and masonry-related materials.

Traditional vs. Innovative WRB/AB Approach

HOW DOES A SINGLE-SOURCE SYSTEM APPROACH ADD VALUE?

Presented By:

Georgia-Pacific DensElement Barrier System

Sealing the building envelope of a Brooklyn high-rise with Georgia-Pacific's DensElement® Barrier System products.

LEARNING OBJECTIVES

1. Assess the differences between air- and water-resistive barriers and determine strategies for mitigating unwanted air and water infiltration and exfiltration.
2. Explore traditional and innovative weather-resistant barriers, including mechanically attached sheet products, fluid-applied membranes, self-adhered sheet membranes, and integrated sheathing materials.
3. Examine challenges project teams may encounter with different types of weather-resistant barriers.
4. Identify important specification and installation considerations for weather-resistant barriers.

CONTINUING EDUCATION

This course is approved for AIA Learning Unit Credits.

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/AR12215** 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

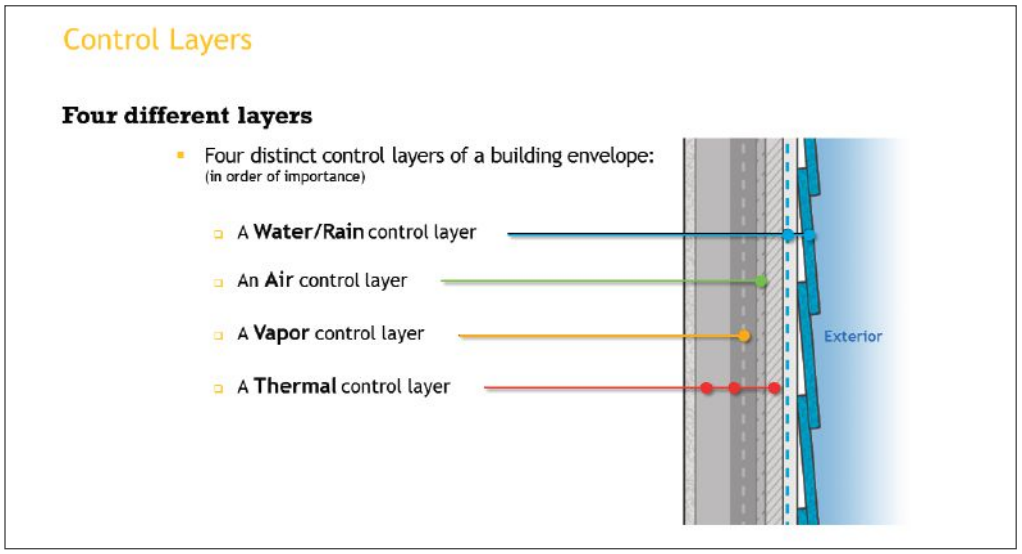
Numerous materials and technologies beyond traditional asphalt felt paper can be employed as weather-resistant barriers that prevent air and water infiltration. For instance, mechanically attached sheet products, fluid-applied membranes, self-adhered membranes, and integrated sheathing materials have all gained code approval through product/system evaluations. Each of these material types has a wide range of function. In general, if a weather-resistant barrier material holds a product evaluation report, it has been tested to specific weather-resistant barrier criteria verifying its ability to help keep water outside of the interior wall assembly. Many weather-resistant barriers may also meet compliance requirements as air barriers; these solutions have evolved over the past decades in response to demand for greater performance, durability, energy efficiency, and ease of installation.

IMPORTANCE OF AIR- AND WATER-RESISTIVE BARRIERS

In order to mitigate the negative effects of water and air leaks, pressure differentials, continuity, structural support, and durability are all key considerations for selection of air barriers and water-resistive barrier systems.

Air Barriers

The International Code Council (ICC) revised its definition of air barriers in 2018, stating that air barriers are "one or more materials joined together in a continuous manner to restrict or prevent the passage of air through the building thermal envelope and its assemblies." In order to be effective, the ICC notes "air barrier[s] must be continuous and breaks

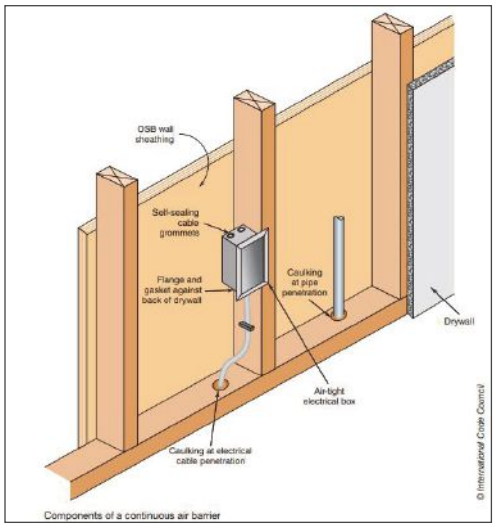


A visual representation of the crucial layers that help protect a building from various elements.

or joints in the air barrier must be sealed. Combinations of many different materials satisfy the air barrier requirements, including plywood, oriented strand board (OSB), gypsum board, and extruded polystyrene (impermeable insulation) sheathing."[1]

Many testing standards can help determine whole building airtightness, including the following:

- ISO 9972:2006 – Thermal performance of buildings — Determination of air permeability of buildings — Fan pressurization method
- ASTM E779 – Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
- ASTM E1827 – Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
- ABAA Standard Method for Building Enclosure Airtightness Compliance Testing[2]



Source: SBC Magazine.

While building testing is not compulsory for commercial buildings, it is often a performance-based option preferred by many designers. Ultimately, "by using whole building airtightness tests and by setting performance targets, architects and contractors can quantitatively verify the methods used were successful. They can also be employed diagnostically on new construction, remedial projects, and major energy-efficiency retrofits."[3]

The ICC does not approve air-permeable materials as part of an air barrier assembly and emphasizes that all air barriers must be continuous. Individual air barrier materials "are classified by meeting air permeance requirements of ASTM E2178, Standard Test Method for Air Permeance of Building Materials, while air barrier assemblies must meet requirements set forth in ASTM E2357, Standard Test Method for Determining Air Leakage of Air Barrier Assemblies."[4]

Air barriers "must [further] resist the positive or negative loads that are imposed on that component by wind, stack effect, and HVAC fan pressures without rupture, displacement, or undue deflection." Effective air barriers resist pressures and transfer loads

GLOSSARY

Air Barrier: "one or more materials joined together in a continuous manner to restrict or prevent the passage of air through the building thermal envelope and its assemblies."

Channel Flow: the "most common and serious" type of air leak; "the air entry point and exit point are distant from each other, giving the air enough time to cool below its dew point and deposit moisture in the building enclosure."

Diffuse Flow: occurs "when materials are used in the enclosure that are ineffective in controlling air infiltration and exfiltration due to many cracks or their high permeance to air, such as fiberboard or uncoated concrete block."

HVAC Fan Pressure: "can cause incremental enclosure problems to wind and stack pressures in heating climates."

Interstitial Condensation: happens within the fabric of the building, such as on the surfaces of assembly materials; it can cause mold and other moisture-related issues.

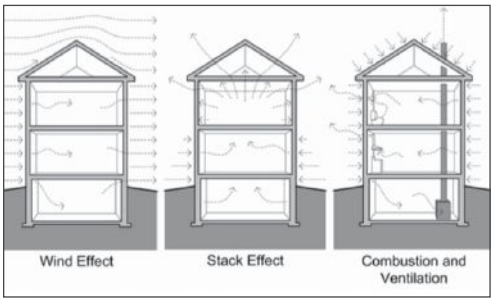
Orifice Flow: happens "when the air entry and exit are in a linear pathway, such as in the crack between a window rough opening and its frame."

Stack Pressure: also known as chimney effect or buoyancy, "is caused by a difference in atmospheric pressure at the top and bottom of a building due to the difference in temperature, and therefore, a difference in the weight of the columns of air indoors vs. outdoors in the winter."

Vapor Drive: occurs in an assembly when pressure differentials between the inside and the outside of the building cause moisture-laden vapor to move from an area of high pressure to an area of low pressure where cooler, drier air is present.

Water-Resistive Barriers: "materials on the exterior of a building that are intended to resist liquid water that has leaked, penetrated, or seeped past the exterior cladding and to keep that water from being absorbed into and damaging the exterior sheathing, framing, insulation, or interior finishes."

Wind Pressure: "tends to pressurize a building positively on the façade it is hitting, and as the wind goes around the corner of the building it cavitates and speeds up considerably, creating especially strong negative pressure at the corners and less strong negative pressure on the rest of the building walls and roof."



The different ways that air passes through a building's thermal envelope. Source: Building Science Corporation.

to the structure of the building. Materials, such as fasteners and adhesives, must be chosen so as to allow this transfer while other materials should be chosen for their air-impermeability. Fiberboard and uncoated concrete block, for example, are too permeable to be part of an effective air barrier system. Air barriers must also be durable for the life of a structure.[5]

The Air Barrier Association of America (ABAA) has determined a "maximum air leakage rate for wall air barrier assemblies as being 0.04 CFM/ft2 at a pressure difference of 1.57 lb./ft2 [0.20 L/(s·m2) at a pressure difference of 75 Pa] when tested in accordance with ASTM E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies."[6]

Water-Resistive Barriers

Water-resistive barriers "are materials on the exterior of a building that are intended to resist liquid water that has leaked, penetrated, or seeped past the exterior cladding and to keep that water from being absorbed into and damaging the exterior sheathing, framing, insulation, or interior finishes." These materials "can be mechanically fastened building wraps or building paper, fluid applied membranes, self-adhered membranes, cellular plastic, or any other material that has been designed to resist liquid water." When combined with other materials such as flashing, water-resistive barriers help to create a "shingled effect to direct liquid water away from the exterior sheathing."[10]

More specifically, the 2018 International Building Code (IBC) defines water-resistive barriers in Chapter 14, section 1403.2 as "not fewer than one layer of No. 15 asphalt felt, complying with ASTM D226 for Type 1 felt or other approved materials, shall be attached

WATER VAPOR PERMEABILITY VS. AIR TIGHTNESS

Air leakage normally occurs through holes, cracks, and other openings present in the wall assembly. Moisture movement as a result of uncontrolled air leakage can be substantial and more frequently contributes to deleterious effects caused by moisture intrusion.

When uncontrolled air enters and exits a building, the consequences can be severe, and preventing air leakage is often a higher priority in planning for moisture management than vapor diffusion. Bacteria and pollutants can enter a building from the outside, HVAC systems have the potential to be disrupted, and energy costs can increase due to fluctuating heating and cooling loads. Unwanted exfiltration of air can further cause condensation in northern climates, and unwanted infiltrated air can lead to decay, corrosion, and the growth of mold in southern climates.[7]

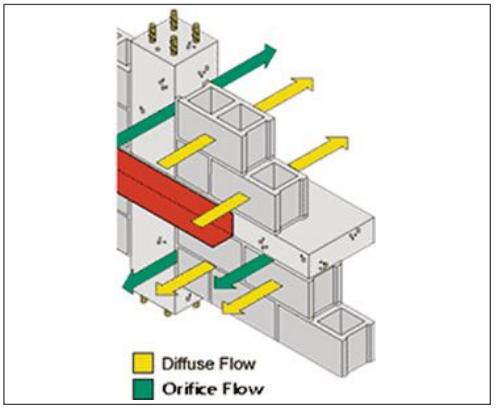
The Whole Building Design Guide (WBDG) lists three types of air leaks that can occur through the building enclosure:

1. Orifice Flow
2. Diffuse Flow
3. Channel Flow

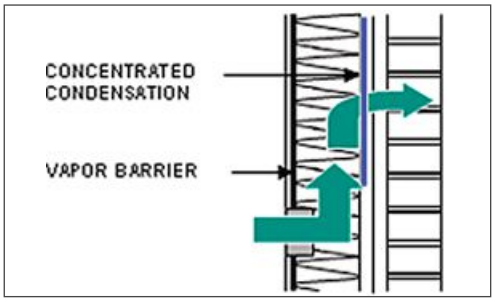
Orifice flow happens "when the air entry and exit are in a linear pathway, such as in the crack between a window rough opening and its frame." Diffuse flow occurs "when materials are used in the enclosure that are ineffective in controlling air infiltration and exfiltration due to many cracks or their high permeance to air, such as fiberboard or uncoated concrete block." The WBDG deems channel flow as the "most common and serious" type of air leak, stating, "The air entry point and exit point are distant from each other, giving the air enough time to cool below its dew point and deposit moisture in the building enclosure."[8]

The air leaks listed above can be caused by three types of air pressure:

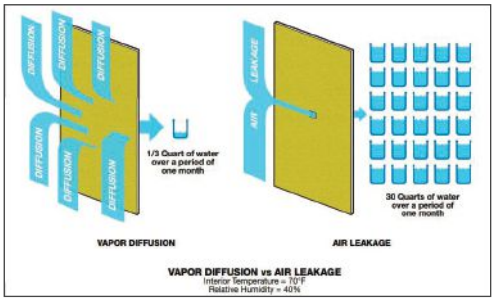
1. Wind Pressure
2. Stack Pressure / Chimney Effect / Buoyancy
3. HVAC Fan Pressure



Source: Whole Building Design Guide.



Source: Whole Building Design Guide.



Source: Building Science Corporation.

Wind pressure on buildings in the U.S., which the WBDG averages to be 10-15mph over the course of a year, "tends to pressurize a building positively on the façade it is hitting, and as the wind goes around the corner of the building it cavitates and speeds up considerably, creating especially strong negative pressure at the corners and less strong negative pressure on the rest of the building walls and roof." Stack pressure, which is also known as chimney effect or buoyancy, "is caused by a difference in atmospheric pressure at the top and bottom of a building due to the difference in temperature, and therefore, a difference in the weight of the columns of air indoors vs. outdoors in the winter." In cold climates, stack pressure can cause air to enter a building at ground level and exit near the roof. In warm climates, air conditioning can cause stack pressure where air enters the building at the roof and exits at ground level. Finally, HVAC fan pressure "can cause incremental enclosure problems to wind and stack pressures in heating climates." When the building envelope allows excessive infiltration and exfiltration, the additional heating and cooling costs range anywhere from 10% to 42%.[9]

to the studs or sheathing, with flashing as described in Section 1404.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer."[11] Other testing for water penetration is covered under ASTM E331 and AATCC 127.[12]

Properly installed water-resistive barriers, including "flashing around doors and windows, continuity at seams, and sealing around penetrations," can resist bulk water penetration and wind-driven rain that has breached the exterior cladding. Water-resistive barriers will ultimately help protect the wall assembly and improve a structure's overall performance by channeling water away from the building, reducing the likelihood of condensation build-up, rot, and degradation.[13]

Permeability and Performance

Water-resistive barriers may be vapor permeable, impermeable, or act as vapor retarders. A vapor permeable water-resistive barrier may be desirable because it allows for drying of any incidental moisture that penetrates the building envelope. Water-resistive barriers are manufactured in a range of permeance levels, which allow for a wide range of selection to accommodate various wall designs.

The design principles behind water-resistive barrier permeability in a building assembly are relatively straightforward — prevent moisture issues by ensuring the building envelope manages moisture and the movement of air throughout the building, and allow for moisture in the assembly to drain away or evaporate. However, generalizations and misconceptions about accomplishing these principles are perpetuated by outdated practices that often do not take into account advancements in understanding the movement of water vapor through a wall assembly.

This article continues on http://go.hw.net/AR12215. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

QUIZ

1. According to the WBDG, which of the following is the most common type of air leak?
   a. Diffuse flow
   b. Channel flow
   c. Stack pressure
   d. Orifice flow
2. In general, wind pressure on buildings in the U.S. averages to be _____ mph over the course of a year.
   a. 0-5
   b. 5-10
   c. 10-15
   d. 15-20
3. Which of the following terms can be described as causing "incremental enclosure problems to wind and stack pressures in heating climates"?
   a. HVAC fan pressure
   b. Chimney effect
   c. Orifice flow
   d. Buoyancy
4. Good water management can be achieved by following the basic principles of _____.
   a. Drainage
   b. Deflection
   c. Drying
   d. All of the above
5. Weather-resistant barriers include which of the following?
   a. Mechanically attached sheet products and fluid-applied membranes
   b. Self-adhered sheet membranes and fully integrated WRB-AB sheathing
   c. Single-component STP air-and water-resistive barriers
   d. All of the above
6. Mechanically attached sheets have been in use since the _____.
   a. 1940s
   b. 1950s
   c. 1960s
   d. 1970s
7. Fully integrated WRB-AB sheathing has a vapor permeability rate of _____ perms.
   a. 20
   b. 18
   c. 10
   d. 7
8. According to the course, durability and flexibility are two of the challenges associated with which type of weather-resistant barrier?
   a. Liquid-applied barrier
   b. Self-adhered membrane
   c. Integrated weather-resistant barrier wood sheathing panel
   d. Factory-installed weather-resistant barrier membrane
9. Which of the following are substrate considerations when installing weather-resistant barriers?
   a. Expansion joint detailing and bridging
   b. Chemical and adhesive compatibility
   c. Moisture and dirt
   d. All of the above
10. When installing integrated weather-resistant barrier gypsum sheathing, the product should not be less than _____ from the finish grade in weather protected siding systems.
    a. 5"
    b. 6"
    c. 7"
    d. 8"

SPONSOR INFORMATION

Greater Heights and Innovative Design

A NEW GENERATION OF ICF BUILDINGS

Presented By:

BUILD WITH STRENGTH

Pierce County Readiness Center. Photo: WJA Design Collaborative / Ric Peterson Photography

LEARNING OBJECTIVES

1. Understand the basic design criteria and construction elements of commercial, institutional, multifamily, and residential structures built with Insulating Concrete Forms (ICFs).
2. Assess codes and compliance/performance characteristics of ICF as it relates to fire, flood, wind, and earthquakes.
3. Evaluate the energy efficiency and sound mitigation properties of ICFs.
4. Examine case studies that demonstrate the innovative ways in which ICF can be specified.

CONTINUING EDUCATION

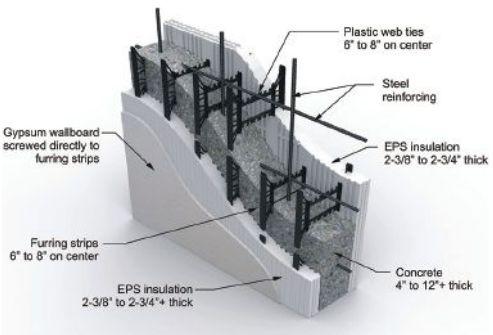
This course is approved for AIA Learning Unit Credit.

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/AR12213 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.

AN INTRODUCTION TO INSULATED CONCRETE FORMS (ICFS)

Insulated concrete forms (ICFs) combine two building products: reinforced concrete for strength and durability and rigid insulation for energy efficiency. Most ICF walls are made up of two layers of expanded polystyrene (EPS) insulation held together with plastic ties to form ICF units with a cavity in the center. There are some ICFs that use extruded polystyrene (XPS) for the forms and others that use steel ties. The ICF units are stacked in the shape of the wall, reinforcing steel is added into the form cavity, and then concrete is placed into the form. The result is a reinforced concrete wall with a layer of insulation on each side. What makes ICFs different than traditional concrete construction is that the forms remain in place after the concrete is cured to provide thermal insulation. The combination of reinforced concrete and insulation provides an ideal load-bearing wall, thermal envelope, fire barrier, and sound barrier.



Typical ICF Wall Detail. Image: Logix

History of ICFs

ICFs were first patented in Canada in 1966 and in the U.S. in 1968 by general contractor Werner Gregori. In an interview with *ICF Builder Magazine*, Gregori states the inspiration for ICF struck him during a beach vacation when he was using foam coolers to keep beverages cold. He notes, "I realized that if concrete blocks could be formed using that foam plastic, many construction costs and hours of labor could be eliminated."[1]

His first ICF prototype was a block he dubbed "Foam Form" that was 16-inches high, 9-inches wide, and 48-inches long, weighing 2 ½ pounds "with a tongue-and-

groove interlock, metal ties, and a waffle-grid core." For over 15 years, Gregori's design remained fundamentally unchanged. He notes the product received some initial industry pushback caused, in part, by a hesitancy to adopt new building practices. Gregori notes, "What finally won them over was the ease of installation." Eventually, enough research was conducted to further prove that "ICF walls could reduce heating costs by about one-third," and the product was ultimately accepted by insurance companies and fire codes, helping to mitigate building concerns. By 1969, the first house was constructed using ICFs as well as 12 two-story townhouses. By 1970, contractors were experimenting with the panelization of foam forms.[2]

Today, there are examples of ICF buildings all over the U.S., Canada, and other parts of the world including single-family residential, multifamily residential, hotels, dormitories, assisted living facilities, offices, healthcare facilities, manufacturing, and warehouse buildings. Schools built with ICF are popular due to low- or net-zero energy use. Theaters are also trending towards ICF construction for superior sound attenuation.

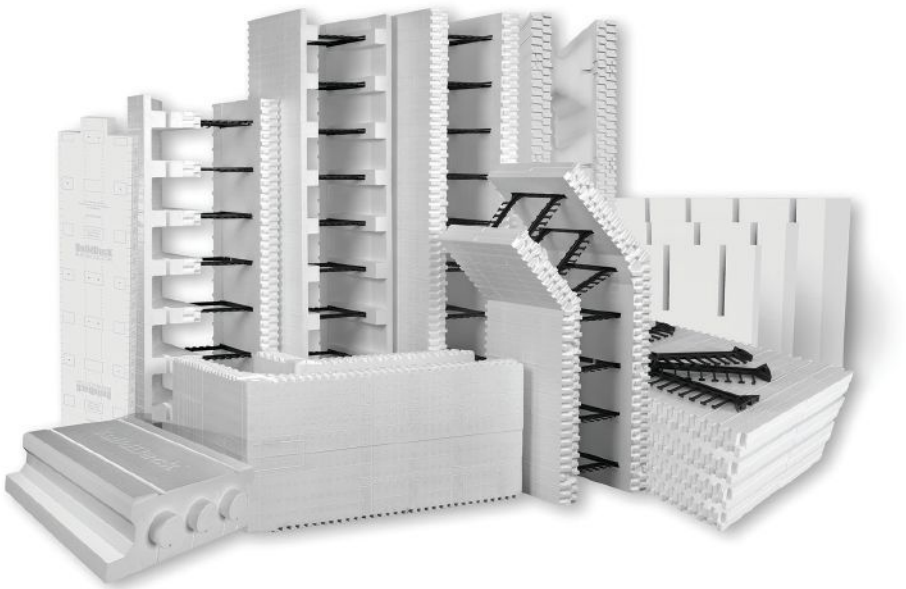
ICF Today

There are many different ICF manufacturers with similar ICF systems. The blocks range in size from 48 to 96 inches long and 12 to 24 inches high depending on the manufacturer. The most common configuration of an ICF unit is made up of two layers of 2-3/8-inch to 2-3/4-inch-thick EPS insulation spaced 4, 6, 8, 10, or 12 inches apart depending on design requirements. The most common spacing is 6 inches or 8 inches for most low to mid-rise buildings, but for taller buildings, taller walls, or exceptionally large loadings, thicker walls are necessary. For simplicity, ICFs are generally called out by the width of the cavity, hence an ICF with a 6-inch cavity is called a 6-inch ICF and an ICF with an 8-inch cavity is called an 8-inch ICF.

ICF manufacturers have a variety of ICF blocks to accommodate any design condition and offer thorough technical support including design manuals, design details, engineering support, and all the test reports needed for commercial construction including fire, energy, and noise. They have special components including straight blocks, corner blocks, brick ledge, angled blocks, curved blocks, and half-height units, minimizing the need for field modifications and further reducing construction time.

What makes ICFs attractive for multifamily construction is that they are cost-competitive with wood and steel frame. A building owner gets a building that is more disaster resilient and energy-efficient at or nearly the same cost. Fire safety is another key element of multifamily construction since occupants sleep in these buildings and are often challenged to evacuate during a fire. Concrete walls and floors provide the fire resistance needed to not only allow occupants to evacuate but to contain the fire within a single unit, imposing less risk on firefighters and property.

ICF wall systems have also been used for bearing wall structures ranging from single story to high-rise buildings over 20



Manufacturers Have a Variety of ICF forms. Photo: BuildBlock

GLOSSARY

Continuous Insulation (CI)—defined by ASHRAE 90.1 as "insulation that is continuous across all structural members without thermal bridges other than fasteners and service openings"

Expanded Polystyrene (EPS) Insulation—closed-cell insulation made from polystyrene polymers

Impact Insulation Class (IIC)—measures resistance to the transmission of structure-borne impact noise

Insulated Concrete Form (ICF)—made up of two layers of rigid insulation held together with plastic or steel ties, forming units with a cavity in the center; reinforcing steel is added to the cavity and then concrete is poured into it

Mass Wall—provides energy efficiency; stores energy during the day and releases it at night; includes ICF, concrete, and concrete block

Outdoor-Indoor Transmission Class (OITC)—indicates a wall system's ability to prevent outdoor noise from penetrating a building's interior; measured in the same way as an STC rating, but calculated in accordance with ASTM E1332; ranges from 80 Hz to 4,000 Hz; the higher the number, the better the performance

R-value—measures resistance to heat flow; the higher the R-value, the greater the resistance

Resilience—responding to fire, wind, earthquakes, flooding, or other deteriorating or destructive situations while maintaining livable conditions; avoiding damage or suffering it without complete failure

Sound Transmission Class (STC)—most common rating used in North America for determining airborne sound transmission loss; ranges from 125 Hz to 4,000 Hz and evaluates the ability of a specific construction assembly to reduce airborne sound such as voices, TVs, and machinery

Thermal Mass—a material's ability to absorb and store heat

stories tall and everything in between. In addition to ICF walls, there are also ICF floor and roof systems.

ICF Wall Systems

The efficient construction process is what sets ICF building systems apart from other building systems such as wood frame, steel frame, and masonry construction. ICF construction can help contain construction costs and reduce construction time because of the inherent efficiencies of the installed assembly, which serves nine functions:

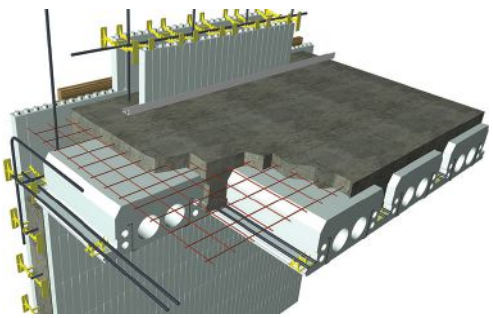
1. Concrete form (that stays in place)
2. Thermal barrier
3. Air barrier
4. Moisture barrier
5. Fire barrier
6. Sound barrier
7. Substrate for running utilities
8. Substrate for attaching finish materials
9. Reinforced concrete structure

In other forms of construction, these functions are installed by several different trades, usually at a significant added cost. General contractors can realize a number of on-site efficiencies including fewer trades, reduced crew-size, and accelerated construction schedules. Because construction schedules are usually much shorter with ICF construction, the general contractor can finish on time and within budget. The building owner can put the building into service sooner, cutting short his financing costs and initiating a quicker revenue flow.

ICF Floor and Roof Systems

ICF floor and roof systems are similar to ICF walls in that the ICF floor or roof is made with rigid insulation to function as a one-sided form at the bottom surface. The forms are installed to span between concrete walls, supported with shoring, reinforcing steel is added into the form cavity, and then concrete is poured over the forms. The result is a reinforced concrete floor or roof with rigid insulation on the bottom.

Each of the EPS panels, are supported and reinforced with integral cold formed steel beams or channels molded into the EPS along the length of each panel. The result is a joist and deck forming system that provides the maximum strength of a reinforced concrete deck with minimal materials and labor. The bottom side of each panel is typically flat, but the top side has channels along the length of the panel that provide a void for reinforcement and concrete to be placed into. The resultant concrete system is similar to a typical concrete joist system with joists spaced at about 24 inches on center and a slab in between the



ICF Floor System. Image: Quad-lock

CASE STUDY: PIERCE COUNTY READINESS CENTER

Owner: Washington Dept. of Enterprise Services
General Contractor + ICF Installer: Absher Construction Co.
Architect + Engineer: WJA Design Collaborative
Engineer: BCE Engineers (MEP)
ICF Use: 46,108 sq. ft.
Total Construction: 77 weeks
ICF Installation time: 115 days

Pierce County Readiness Center Under Construction. Photo: Nudura. *See page 1 of this article for completed project.*

Background

Camp Murray, near Tacoma, Washington, is home to the Washington Army National Guard, Air National Guard, and Washington State Guard. Built in 2017, the 80,700 sq. ft. Pierce County Readiness Center replaced the former Tacoma Armory and now boasts "recruiting and administrative offices, an assembly hall, break room, fitness room, equipment storage space, arms vault, training bay, and classrooms. It also includes a 16,000-sq.-ft. space for vehicle storage and maintenance and a central emergency operations facility."[3]

Challenges

The building is designed to accommodate a host of functions, making for a complex final design: wall heights ranged from 15 to 37 feet, and a variety of different roofing systems were integrated, "including standing seam metal roofing over bar joists, and composite concrete over a metal deck on steel beams." Some construction also needed to occur in the winter, and the design for the Pierce County Readiness Center additionally needed to take into account a Joint Force Headquarters to be built in the future to the west of the main entry. Finally, as Greg Nespor, Principal at WJA Design Collaborative notes, "The integrity of this structure during a natural disaster is paramount to allow for continued operation and emergency response following a natural disaster."[4]

Solutions

Absher Construction, the general contractor, chose to build with ICF and self-install it, ultimately "leading to enhanced schedule coordination and improved quality control." Approximately 46,000 sq. ft. of six- to eight-inch ICFs were used "with the thicker walls in areas of increased height or shear demand. [...] In a few areas, the wall core changed size at the corners, which required special attention." That winter, Tacoma saw a record rainfall; however, ICF permitted continued construction.

Jason Heidal, Absher's superintendent at the Pierce County Readiness Center site further notes, "Because of the blast rating and force protection needed on the project, there were many elements which required use of one-sided ICF forms." Nespor agrees and comments, "The energy and blast performance value make it [ICF] one of the most ideal products to design with in regard to U.S. military projects." He continues, "Additionally, the ICF walls provide excellent resistance to blast loading as required for federally-funded buildings."

Not only is the structure built to withstand extreme weather events and other disasters, it is also designed to be sustainable. Currently, it performs 32% better than ASHRAE standards, exceeding the requirements of the U.S. Green Building Council (USGBC) LEED-Silver certification.[5]

joists from 2 to 6 inches thick. The ICF floors and roofs can span up to about 30 feet, depending on the depth of each joist. The joist system is designed like any other concrete joist system with bending reinforcement placed in the bottom of the joists, shear reinforcement placed in the webs and top steel placed for shrinkage and crack control.

Although ICF floors are usually designed as simply supported one-way slab systems spanning between ICF walls, they could be designed as multi-span floors with intermediate supports by adding top bending steel. The EPS material, reinforcing steel, and concrete are the same as those used for ICF walls. The bottom surface of the ICF floor or roof is finished with gypsum board by screwing into the embedded metal channels. The top surface is a smooth concrete surface ready for any finish material such as carpet, wood, or tile. When used for a roof structure, any appropriate roofing system can be used, including membranes, inverted roof insulation, or even vegetated roof assemblies.

There are several manufacturers of ICF floor and roof systems that have similar configurations. Just like ICF wall systems, ICF decks combine EPS insulation with reinforced concrete to form a strong and energy efficient floor or roof system. Ideal for use in both commercial and residential construction, ICF floors combine the strength, security, and reliability of reinforced concrete with energy efficiency, fast construction and comfort. Many of the ICF wall system manufacturers carry a version of ICF floor and roof system that interfaces well with their wall system.

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.

QUIZ

1. Which two building products do ICFs combine?
   a. Concrete and loose fill
   b. Concrete and plywood
   c. Concrete and rigid insulation
   d. Concrete and mineral wool

2. The first ICF block was 16-inches high, 9-inches wide, 48-inches long, and weighed _____ pounds.
   a. 2 ½
   b. 3
   c. 3 ½
   d. 4

3. ICF wall systems have been used to build high-rises over _____ stories tall.
   a. 40
   b. 30
   c. 20
   d. None of the above

4. ICF bearing walls can be used with which types of floor systems?
   a. ICF slabs and traditionally formed reinforced concrete slabs
   b. Wood framing systems
   c. Precast hollow-core plank and concrete on metal deck combined with steel joists or cold formed joists
   d. All of the above

5. In 2019, fires resulted in _____ in property damage in the U.S.
   a. $148 million
   b. $500 million
   c. $2 billion
   d. $14.8 billion

6. 8-inch or thicker ICF walls achieve a _____hour fire rating.
   a. more-than 4
   b. 4
   c. 3
   d. 2

7. EPS insulation is approximately ____ times better than wood at stopping flame spread from materials burning in close proximity.
   a. 4
   b. 5
   c. 2
   d. 3

8. Increasing the energy efficiency of multifamily homes in the U.S. could save close to _____ annually.
   a. $3.4 billion
   b. $34 million
   c. $340 million
   d. $34 billion

9. Typical whole wall ICF assemblies have an R-value between _____ and _____depending on the exterior and interior finish materials compared to R-11 and R-19 for 2x4 and 2x6 wood frame.
   a. R-12 and R-15
   b. R-17 and R-20
   c. R-19 and R-22
   d. R-24 and R-26

10. Which of the following is the tallest ICF building in North America?
    a. Waterloo Dormitory
    b. Springhill Suites
    c. West High School
    d. Pierce County Readiness Center

This article continues on http://go.hw.net/AR12213. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

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

An Overview of North American Forestry and Implications for Wood Product Selection

Presented By:

LEARNING OBJECTIVES

1. Examine commonly held beliefs about forestry and how they are affecting communities in North America.
2. Review the economic and environmental importance of specifying sustainable and responsibly sourced wood products.
3. Explore the tenets of sustainable forestry management and industry standards that work to improve forestry practices.
4. Determine how durable softwood species can be a sustainable building material option.

CONTINUING EDUCATION

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

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/AR12214 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 TO NORTH AMERICAN FORESTS

Architects are asked to consider sustainability when making product selections, which includes understanding how products are sourced and created. Some argue for increasing the use of wood over other structural materials such as steel, concrete, and masonry, and taking into greater account the embodied carbon intensity of each of these materials. Research suggests that creating less steel and concrete would yield real carbon savings, but what are the consequences of increasing wood product consumption?[1] Can our forestry practices sustain such an increase? This course examines the ways North American foresters manage growth and harvest and why it is important to specify sustainable, renewable, and responsibly sourced softwood lumber from countries like the United States and Canada, where forestry practices are heavily regulated. While it is admittedly difficult to track wood products back to their source because of the complexity of the supply chain, the professional obligation still exists to understand this supply chain, how materials are sourced, and their impact on the environment.

The United States and Canada have approximately 15.5% of the world's total forest cover, with both countries maintaining observable standards for sustainable forestry, although the two countries differ in terms of forest ownership and laws.[2] The United States grows 823 million acres of forests and woodlands.[3] Forest management practices on these timberlands are regulated by federal law and industry standards, but forest ownership and management are complicated because they are so varied. Fifty-seven percent of the U.S. forested land base is privately owned by corporations, investment funds, and approximately 10 million family forest landowners, while the rest is owned by public entities such as national, state, and regional governments.[4] For example, in West Coast states such as Washington, Oregon, and California, coastal softwood forests may be owned and operated by the U.S. Forest Service and Bureau of Land Management (BLM); the state; or private companies such as Weyerhaeuser, International Paper, Hampton, and Sierra Pacific. However, they are bound

by extensive federal, state, and local legal requirements no matter the entity. Over the past 50 years, these strict regulations have allowed less than 2% of the U.S. standing tree inventory to be harvested every year, with a net tree growth of 3%.[5]

In Canada, "Ninety-three percent of the forests are publicly owned by the Provincial Government, and forest companies operate under some of the most stringent sustainability laws and regulations in the world. Less than one-half of one percent of the managed forest is harvested annually, and the law requires all areas to be promptly regenerated."[6] British Columbia (B.C.) is where Canada's softwood lumber industry is based. The province has one of the highest proportions of land covered with forests (57%) compared with China, Japan, the European Union, New Zealand, the Russian Federation, and the U.S. Within Canada, B.C. is the leading provincial forest producer by volume, producing 67.97 million cubic meters of roundwood in 2015. Roundwood is sections of tree stems, with or without bark, such as logs, bolts, posts, and pilings.[7] The total forest area in B.C. has remained stable at around 55 million hectares, with the lowest rate of deforestation (6,200 hectares per year) among all jurisdictions.[8] Importantly, "British Columbia ranks high among other jurisdictions on several key sustainable forest management parameters with legislation and forest management regimes aiming to meet the environmental, social, and economic needs of current and future generations."[9]

THE INTERSECTION OF INDUSTRY AND COMMUNITY INTERESTS

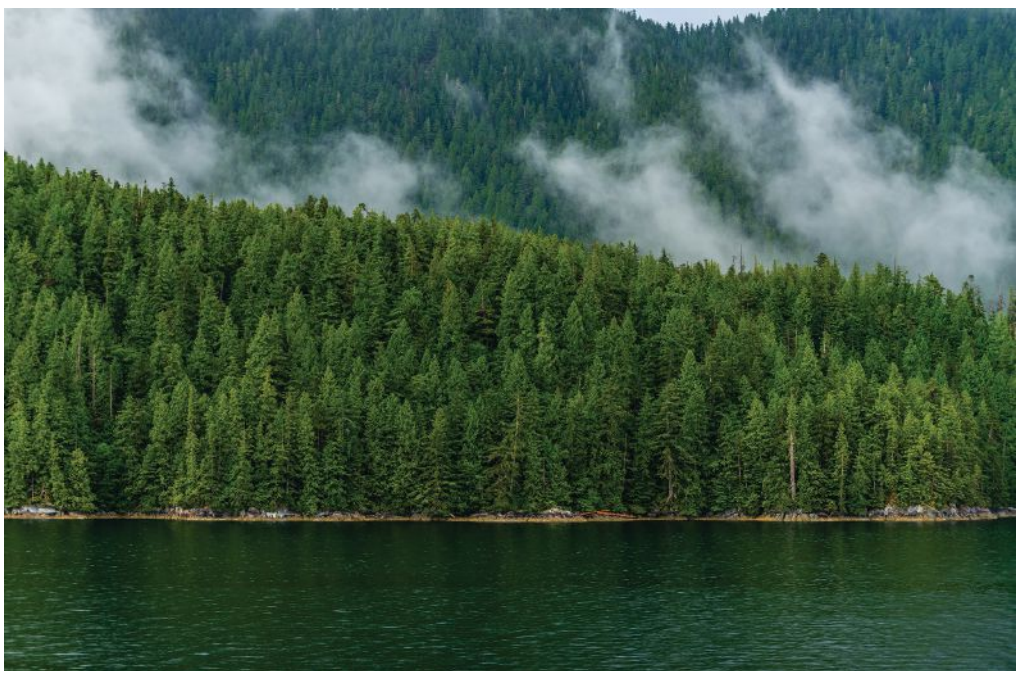
B.C. has some of the most abundant ecologically and climatically diverse forests globally, including their prized first-growth forests. First-growth forests are not just old or big trees; they are unique ecosystems composed of trees and plants of various species and ages, whose characteristics vary based on location. First-growth forests are an ancient ecosystem and an iconic piece of B.C.'s landscape and identity valued not only for their beauty but for their importance to the provincial economy.[10] In B.C., trees in the coastal region 250 years and older are defined as first growth or first cut. "In the Interior, where trees have a shorter life span, and wildfires are more common [than on the coast], first growth is defined as more than 120 years for forests dominated by lodgepole pine or broadleaf species, and more than 140 years for all other forests such as Englemann spruce, white spruce, and interior Douglas-fir."[11] According to *The State of British Columbia's Forests: A Global Comparison*, "22.6 million ha (41 percent of B.C.'s forests) have been classified as first-growth forests."

Timber from first-growth forests is a primary source of income in many communities; thousands of workers in hundreds of communities are dependent on the health and prosperity of the forestry sector, as are 120 First Nations that participate in the industry.

Timber from first-growth forests is a primary source of income in many communities. Thousands of workers in hundreds of communities are dependent on the health and prosperity of the forestry sector, as are 120 First Nations that participate in the industry.[12] First-growth trees are also valuable to the industry because they yield "tight-grain clear wood" without knots, favored for cladding, shingles, and decking products.[13] That being said, there is a move toward harvesting second-growth forests versus first-growth ones. For example, the industry is actively marketing knotty products harvested from second-growth forests (i.e., "second cuts") to ease the pressure on the more prized first-growth forests.

The authors of *A New Future for Old Forests: A Strategic Review of How British Columbia Manages for Old Forests Within its Ancient Ecosystems* note:

> In recent years, the government has been under pressure to protect older forests from degradation by industrial development. At the same time, there is pressure to maintain viable resource industries at a scale that can compete in global markets. This pressure has led to increasing tension and uncertainty about what will happen to the forest and the industry. In addition, the tremendous diversity of the province further complicates the challenge for



In Canada, ninety-three percent of the forests are publicly owned by the Provincial Government, and forest companies operate under some of the most stringent sustainability laws and regulations in the world.

the government. Not only are forest types different, but the history of development and economic dependence of communities on forestry varies vastly from one part of the province to another.

The 2020 *Strategic Review* of B.C.'s first-growth forest management indicates this pressure is growing: "Recently, there have been large-scale public demonstrations demanding an end to logging 'old growth' and others demanding the government protect jobs by protecting the 'working forest' in the face of diminishing timber supplies."[14] Environmental organizations have decried the loss of first-growth forests in B.C., claiming that only 1% of the province's forests are first growth when in reality, that number is 41%.[15] They have blockaded access roads to logging camps with boulders and timber they cut from the surrounding forest, leading to arrests. According to Reuters, "Protesters say they are trying to save the last intact watershed outside of a park or protected area on southern Vancouver Island, home to 1,000-year-old yellow cedars. The Pacheedaht First Nation, within whose territory this area lies, is divided on the issue, as the First Nation owns three sawmills and has signed a revenue-sharing agreement with the province for logging activities in its territory."[16]

FINDING A BALANCE

An ideal approach to material production invites environmentalists, communities, federal governments, and the lumber industry to find a balance that considers both the ecology of forests and the livelihood of people who work and live in them. Responsibly managed forests can play an outsized role in storing carbon, addressing climate change, and providing sustainable products, which is particularly important because the global need for wood is not diminishing. "Shutting down first-growth logging in B.C. will only move the supply to unregulated, [offshore] regimes, while homes and buildings constructed of an unknown alternative do not help the world's carbon footprint."[17] According to the British Columbia Council of Forest Industries, "In 2019, the forestry sector contributed C$13 billion, roughly 5 percent, to provincial GDP. Of that, only C$3.5 billion came from first-growth logging."[18]

There is a move toward harvesting second-growth forests versus first-growth ones and the industry is actively marketing knotty products harvested from second-growth forests (i.e., "second cuts") to ease the pressure on the more prized first-growth forests.

AN INCLUSIVE APPROACH TO FIRST-GROWTH FORESTS IN B.C.[19]

The B.C. government is taking a new approach to first-growth forests after engaging with thousands of British Columbians, including First Nation leaders, who are respected as decision-makers regarding resources in their territories. These First Nation leaders are helping to develop policies and strategies to protect their communities' forests. In addition, to combat misinformation and demonstrate good-faith efforts to protect Canada's first-growth forests, the provincial government recently instituted the Old Growth Technical Advisory Panel and conducted the 2020 Old Growth Strategic Review, which recommended protection of critical areas that are not currently adequately represented.

In September 2020, the provincial government designated nine areas that contain almost 196,000 hectares of first growth that will be deferred from harvest. They are also working to protect some of the province's largest trees through Special Tree Protection Regulation, which is expected to protect 1,500 of the largest trees in B.C. Naturally Wood notes, "These efforts will continue to enhance high conservation old-growth forests while enabling sustainable management of natural and diverse forests in B.C."

Balanced solutions to forest protection can be reached, in part, by ensuring that forests are responsibly and sustainably managed. We will discuss *how* forests should be managed later in the course, but let's first

GLOSSARY

American Tree Farm System (ATFS)—A PEFC-endorsed certification program for smaller family forests and tree farms; ATFS is the largest and oldest sustainable family woodland system in the U.S.

Canadian Standards Association (CSA) Group Sustainable Forest Management System (SFM) Standard—Canada's official national standard for sustainable forest management and the first in the world to be developed (1996)

Carbon Sink—A forest that sequesters carbon from the atmosphere through growth

Carbon Source—A forest that emits carbon back into the atmosphere through respiration, decay, death, or disturbance

Forest Stewardship Council (FSC)—A network of businesses, environmental organizations, and cultural organizations established in 1993 as a coalition effort between the World Wide Fund for Nature (WWF) and several environmental NGOs, timber producers, indigenous groups, and community forestry groups working to protect forests

Hectares (ha)—A metric unit of surface or land equal to 100 ares, or 10,000 square meters; equivalent to 2.471 acres

Lacey Act—A U.S. conservation law passed in 1900 that prohibits trade in wildlife, fish, and plants that have been illegally taken, possessed, transported, or sold; it protects both plants and wildlife by creating civil and criminal penalties for those who violate the rules and regulations

Roundwood—Sections of tree stems, with or without bark, such as logs, bolts, posts, and pilings

Softwood—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

Sustainable Forestry Initiative (SFI)—An organization that works to improve forestry practices on all forestlands in North America, whether boreal forests or plantation forests, and whether they are naturally regenerated or planted

Responsibly managed forests can play an outsized role in storing carbon, addressing climate change, and providing sustainable products, which is particularly important because the global need for wood is not diminishing.

B.C. FIRST-GROWTH FOREST FACTS[20]

- Sixty percent of B.C. is forested.
- An average of 200,000 hectares of forested lands are harvested every year in B.C. (based on 2014–2018 data); 0.1% of the total forest area harvested each year in the province is first-growth forest.
- Twenty-three percent (13.7 million hectares) of forest lands are considered first growth, of which over 70% (10 million hectares) is under protection or is not available for harvest.
- Not all old forests are the same, and old does not necessarily mean big trees.
- As much as 80% of old forests consist of smaller trees growing in bogs, sub-alpine elevations, and the outer coast.

This article continues on http://go.hw.net/AR12214.
Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

SPONSOR INFORMATION

The Western Red Cedar Lumber Association represents quality "Real Cedar" producers, distributors and retailers throughout North America. Founded in 1954 and known as "the voice of the cedar industry," WRCLA offers extensive resources to assist with selection, specification and quality standards. For more information, visit RealCedar.com.

QUIZ

1. In British Columbia, trees in the coastal region _____ years and older are defined as first growth or first cut.
   a) 120 b) 140
   c) 210 d) 250

2. 22.6 million ha, or ____ percent of British Columbia's forests, have been classified as first-growth forests.
   a) 21 b) 31
   c) 41 d) 51

3. By 2030, Canada's forest sector will remove _____ megatonnes of carbon dioxide from the atmosphere every year—representing more than 10 percent of Canada's climate change mitigation target.
   a) 10 b) 20
   c) 30 d) 40

4. The _____, is a U.S. conservation law that prohibits trade in wildlife, fish, and plants that have been illegally taken, possessed, transported, or sold.
   a) Lacey Act b) Special Tree Protection Regulation
   c) Old Growth Strategic Review d) Clean Air Act

5. Which of the following is a tenet of sustainable forestry management?
   a) Maintain sustainable yields b) Maintain biodiversity within the forest
   c) Protect wildlife habitats d) Meet or exceed water quality laws & regulations
   e) All of the above

6. Which of the following forestry standards was the first in the world to be developed?
   a) Canadian Standards Association (CSA) Group Sustainable Forest Management System (SFM) Standard
   b) Forest Stewardship Council (FSC) U.S. Forest Management Standard
   c) Sustainable Forestry Initiative (SFI) Forestry Management Standard
   d) American Tree Farm System (ATFS) Standards of Sustainability for Forest Certification

7. There are more than _____ million acres of third-party certified forests in the United States and Canada, representing over half of the world's certified forests.
   a) 258 b) 320
   c) 480 d) 530

8. Responsible forest management in North America has resulted in more than ____ consecutive years of net forest growth that exceeds annual forest removals despite increasing population and higher demand for wood products.
   a) 30 b) 40
   c) 50 d) 60

9. Which North American softwood species is often used for reforestation due to its insect resistance and tolerance to shade, flooding, and a wide variety of soils?
   a) Western red cedar b) Yellow cedar
   c) Hem-fir d) Douglas fir

10. Steel, concrete, and brick have many valuable properties and are widely used in most building projects today, but they are energy-intensive to create, accounting for around ____ percent of the entire planet's fossil fuel production.
    a) 6 b) 16
    c) 8 d) 18

Advertiser	Page	Website	Phone
ABB	cover 2	-	
All Weather Insulated Panels	70-73	go.hw.net/ar12212	
All Weather Insulated Panels	9	powerofonedek.com	888.970.2947
American Institute of Architects	58	architectsfoundation.org	
American Institute of Architects	63	conferenceonarchitecture.com	
ARCAT, Inc.	cover 3	arcat.com	
Architect Congratulates Wanda Lau	95	-	
ASI Group	15	asi-globalpartitions.com/privacy	
ASI Group	18	asigroup.us	
ASI Group	68	asi-accuratepartitions.com/privacy	
B&D Builders	16	banddbuilders.com	717.687.0292
Banker Wire	55	bankerwire.com	
Behr Paint Company	13	behrpro.com/ 2022trends	
Behr Paint Company	cover 4	behrpro.com/dynastyinterior	
Belden Brick	74-77	go.hw.net/ar12211	
Belden Brick	26	beldenbrick.com	330.456.0031
Cove.Tool	31	thearchitecturecompetition.com	
DeepStream Designs, Inc.	30	deepstreamdesign.com	305.857.0466
DoorBird	69	doorbird.com	
Doug Mockett & Co. Inc.	69	mockett.com	800.523.1269
Endicott Clay Products	23	endicott.com	
Epic Metals Corp.	11	epicmetals.com	877.696.3742
Gaggenau	4-5	go.hw.net/wellness	
Georgia-Pacific Corporation	78-81	go.hw.net/ar12215	
Global Industrial	10	globalindustrial.com	
Hanover Architectural Products	12	hanoverpavers.com	800.426.4242
Hydrotech Inc.	56	hydrotechusa.com/pyb	
Kingspan	27	quadcore.kingspanpanels.ur/surface	
Malarkey Roofing	29	malarkeyroofing.com	
Mid-Atlantic Timberframes	8	midatlantictimberframes.com	
MiTek	14	mitek-us.com/architects	
Nakamoto Forestry	22	nakamotoforestry.com	
National Grid	53	ngrid.com/business	
National Ready Mixed Concrete Assn NRMCA	82-85	go.Hw.Net/ar12213	
National Ready Mixed Concrete Assn NRMCA	54	buildwithstrength.com	
National Ready Mixed Concrete Assn NRMCA	86-87	buildwithstrength.com/sustainability	
Peterson Tegl A/S	outsert*	-	
Progressive Architecure Awards	17	paawards.com	
Sierra Pacific Windows	16a-d	sierrapacificwindows.com	800.824.7744
TAKTL	1	taktl-llc.com	412.486.1600
TCP Lighting	67	tcpi.com/qtl	800.324.1496
Thermador	7	thermador.com/starpartner	
Velux Commercial	2-3	commercial.veluxusa.com	
Vitro Architectural Glass	32-33	vitroglazings.com/acuity	
Western Red Cedar Lumber Assn.	88-91	go.hw.net/ar12214	
Whirlpool Corporation	25	whirlpoolpro.com/70percent	

** issue mailed in regional editions. Publisher not liable for errors or omissions.*

ARCHITECT
The Journal of The American Institute of Architects

The staff of Zonda and ARCHITECT

Congratulates

Wanda Lau, executive editor of ARCHITECT magazine, on being named a **Folio: 2021 Top Women in Media DEI Champion Honoree**

For more of Wanda's recent work:

- **VISIT** *architectmagazine.com* to read her 15-part "One Year Later" series, where members of the design community share how their conversations, view of, and place in the profession have changed between 2020 and 2021, a period that also saw an increase in attacks—many fatal—against people of color, as well as the loss of millions of lives to COVID-19.
- **LISTEN** to her podcast episode "What Does DEI Have to Do with Architecture?" on the ARCHITECT Podcast Network at *bit.ly/ARapn6o*.
- **LOOK OUT** for her continuing coverage in every issue of ARCHITECT magazine on pressing issues in sustainability and equity, as well as on the future of design, technology, and practice in architecture.

Congratulations and BRAVO, Wanda! We are all so proud of you!

Editorial: How Will We Design Together?

TEXT BY PAUL MAKOVSKY

At the 2021 Venice Architecture Biennale, participating countries attempted to answer the curatorial question: "How will we live together?" Speaking to a series of pressing issues—climate change, the refugee crisis, political polarization, and increasing social, economic, and racial inequities—their dozens of exhibitions filled the Arsenale and the nearby Giardini della Biennale, which also housed pavilions in which the countries presented their own architectural exhibitions.

"We need a new spatial contract," declared this year's curator, Hashim Sarkis, a Lebanese architect and the dean of architecture and planning at the Massachusetts Institute of Technology. "In the context of widening political divides and growing economic inequalities, we call on architects to imagine spaces in which we can generously live together."

My favorite responses to the curatorial theme came from the dozens of smaller exhibitions in the Arsenale. Researchers from the ETZ Zurich, for example, presented innovative building technologies using computational design and digital fabrication to create an experimental house. Berlin-based Raumlaborberlin—winner of the Golden Lion for the international exhibition—reconstructed part of a "floating university" for its installation "Instances of Urban Practice," a fun laboratory for collective and experimental learning, which invited different groups to gather and engage in fruitful conversation in an atmosphere recalling 1960s utopian communal living. "Commoning Domestic Space," curated by California College of the Arts associate professors Neeraj Bhatia and Antje Steinmuller, was a gem of an exhibition that explored the challenges and opportunities of collective living through case studies as well as speculative design proposals. It showcased how communes, co-living, and cooperatives are potential models in which we can live together.

As this issue of ARCHITECT goes to press, the 26th United Nations Climate Change Conference (COP26) has drawn to a close after weeks of negotiations. The Glasgow Climate Pact—signed by nearly 200 countries—was designed with the aim of building on the 2015 Paris Agreement by including new rules on transparency. However, huge concerns remain that the terms do not go far enough in countless areas. Lobbying from India, China, and other big emitters changed the wording of the final draft to "phase down"—completely undermining efforts to "phase out" fossil fuels with the urgency required. Mary Robinson, the former president of Ireland, perhaps said it best: "COP26 has made some progress, but nowhere near enough to avoid climate disaster. While millions around the world are already in crisis, not enough leaders came to Glasgow with a crisis mindset."

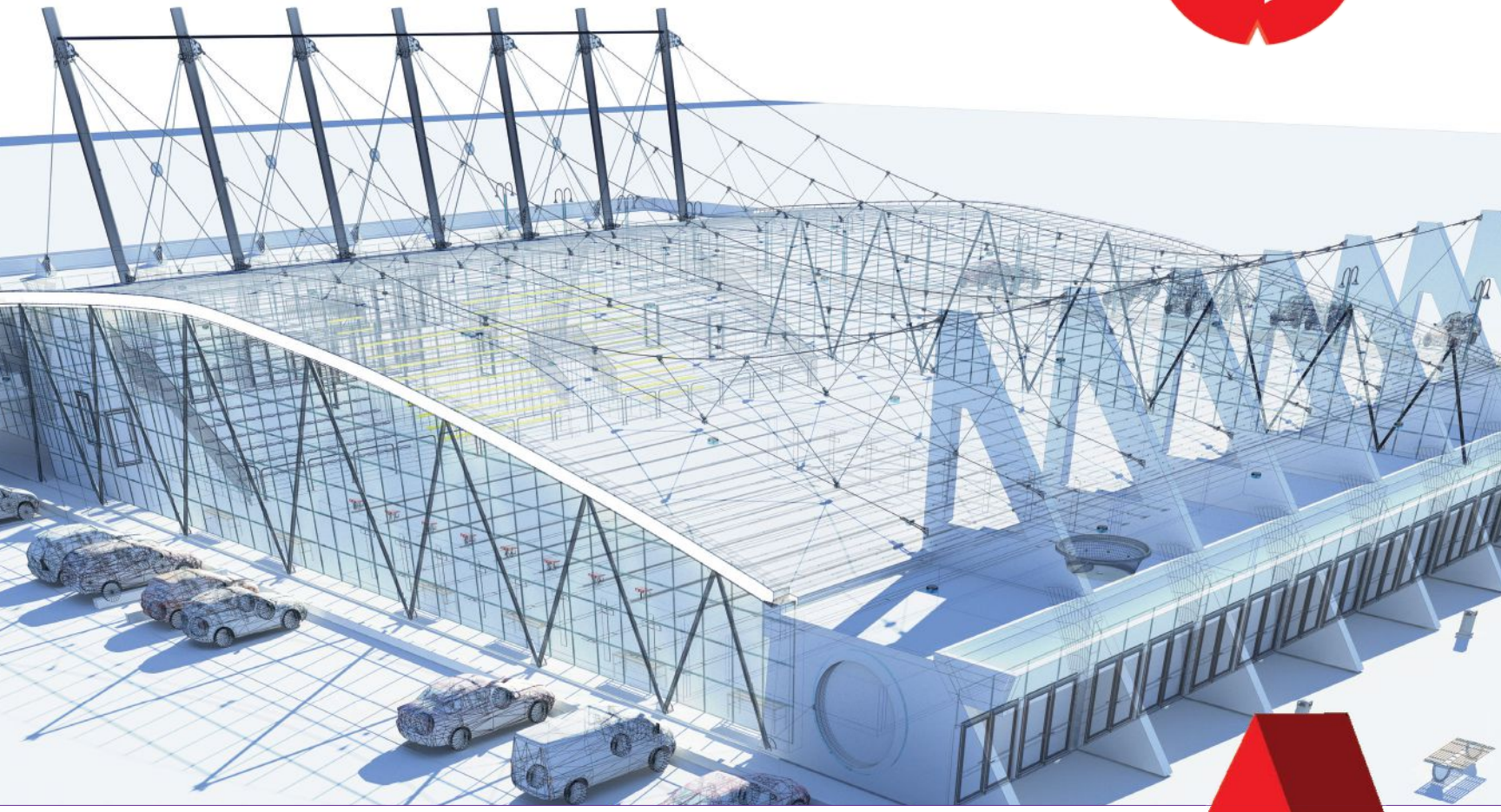
Climate change has already had a clear impact on housing and, as we look for new solutions to create new models, we face a long list of unknowns. One thing is certain: We need less talk and more action. The innovations coming out of architecture schools and firms are encouraging, but we have to act fast, before we are too late.

Model from "Commoning Domestic Space," curated by Neeraj Bhatia of The Open Workshop in collaboration with Antje Steinmuller of CCA Urban Works Agency.

COURTESY THE OPEN WORKSHOP

> *To read more ARCHITECT editorials, visit bit.ly/AREditorial.*

We have the BIM you want, and then some.



95% of ARCAT BIM clients offer even more content to help support your projects:

- Specifications
- CAD details
- SpecWizard® and much more!
- ***No dues!***
- ***No subscriptions!***
- ***No registration required!***

Visit us at ARCAT.com and see the difference for yourself!

ARCAT®
arcat.com

CLIENTS DESERVE YOUR BEST. YOU DESERVE OURS.

INTRODUCING BEHR DYNASTY™.

Our most durable, most stain-repellent, most scuff resistant, one-coat hide paint, ever. Now all in one can.

BEHR

LEARN MORE AT BEHRPRO.COM/DYNASTY-INTERIOR

Exclusively at THE HOME DEPOT